Three Essays on the Influence of National Culture on Corporate Finance

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Trois Essais sur l'Influence de la Culture Nationale sur la Finance d'Entreprise

Three Essays on the influence of National Culture on Corporate Finance

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Par

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Sous la direction de

M. le Professeur Benjamin WILLIAMS

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Galileo (1564-1642) is assigned the foundation of the concept that "*nature is written in mathematical language*".

From *North* (2005, p. ix): "*The immense variation in the performance characteristics of societies makes clear that the cultural component of the scaffolding that humans erect is … central to the performance of economies and polities over time.*" (Witt & Redding, 2009, p863)

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Abstract

The premises of this doctoral dissertation is investigating the role played by national culture on corporate financial choices and outcomes. The investigation is done through three empirical essays. The first essay analyzes the influence of national culture on firms' capital structure choices. The second essay is analyzing the role played by national culture on firms extending more or less trade credit from pre-to-post the mortgage financial crisis. The third essay analyzes the influence of national culture on firms' market value. Furthermore, a chapter of theoretical conceptualization is done to fit these empirical essays work into a mathematical topology framework.

This doctoral dissertation work finds itself at the junction of three broad sets of research bodies. These are the literature around the New Institutional Economics (NIE), the finance literature, and the social economics literature. We glue these literature sets together through the general mathematical topology framework to structure our culture and finance research. Chapter 2 introduces these literature sets and describes the foundations of our three essays.

Chapter 3 (essay one) presents the analysis of the links between national culture and firms financing choices leading to their capital structure. Chapter 4 (essay two) presents the analysis of culture's influence on firm's choice of extending higher or lower trade credit from pre-to-post the 2008 mortgage financial crisis. Chapter 5 (essay three) presents how firms' financial value maybe influenced national cultural values.

National culture is defined as the firm's country-of-origin cultural values. We represent it by four of Hofstede (1980, 2001) six cultural dimensions of *individualism*, *masculinity*, *uncertainty avoidance*, and *long-term orientation*. Hofstede national culture dimensions are largely applied in the growing culture and finance literature, thus providing strong empirically validity. Our choice of Hofstede dimensions are described in chapter 2.

We apply these cultural dimensions in our three essays. Our empirical analysis is build following the New Institutional Economics framework (Williamson, 2000). This framework is the key structure around which we are able to build the theoretical bodies of our three essays. NIE has popularized the understanding and acceptance of the non-financial constraints –in macro-and-micro economics– of the *social embeddedness level* of culture.

We empirically test the hypotheses in our three essays following Williamson NIE framework. The empirical tests are done on samples of listed firms from over 30 countries. These tests provide a broad applicability of our results to firms in the globalized economy. The results of our three essays meet our hypotheses expectations of culture's influence on firms' financial choices and outcomes.

The results provide all stakeholders a lens to view and analyze corporate financial choices and outcomes through firms' national culture values. Indeed, the financial numbers one may read may have different meaning depending on firm's country-of-origin cultural values. This understanding would have multiple implications for investors, creditors, managers, shareholders, and policy makers. It may help them in their investing, lending, financing, returns expectations, and policy design to optimize their profits.

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Résume détaillé en français de la thèse

Introduction générale

Cette thèse présente trois essais sur l'influence de la culture nationale sur la finance d'entreprise. Il se base sur le cadre théorique de la nouvelle économie institutionnel (NEI) de Williamson (2000) et sur le modèle de la culture nationale définit par Hofstede (1980, 2001). Si l'on considère littérature plus ancienne, cette thèse s'inscrit dans la lignée des travaux sur les fondements de la richesse des nations (Smith, 1776), qui seraient eux-mêmes fondés sur les traditions, les croyances et les pratiques des habitants d'une nation (Voltaire, 1773).

La culture nationale influence les choix financiers de l'entreprise au travers de son capital humain et de son capital financier. Le capital humain de la firme provient de celui de ses fondateurs et de ses employés (Pan *et al.*, 2017). Le capital financier est la ressource financière initiale que la firme a obtenu dans son pays d'origine (Kwok & Tadesse, 2006). La firme créée est aussi soumise au cadre légale de son pays (Porta *et al.*, 1998).

Les valeurs de culture nationale d'un pays se retrouvent dans la culture de la firme au travers de celles des fondateurs de la firme. Les institutions d'un pays se développent à l'image de la culture nationale de ce pays (Witt & Redding, 2009). Ces institutions contraignent à leur tour les choix de la firme (Williamson, 2000). En effet, Williamson décrit un ensemble de contraintes qui pèsent sur les firmes par un système qui s'étage sur quatre niveaux. Chaque niveau imposant des contraintes au niveau immédiatement inférieur.

Ce cadre théorique de Williamson décrit en premier lieu au niveau 1 les traditions, croyances et pratiques sociales qu'il appelle « *embeddedness level* ». Ce niveau contraint le développement des institutions (niveau 2) d'un pays à l'image de ses mœurs et de ses besoins. Ces institutions contraignent à leur tour le développement des mécanismes de gouvernance (niveau 3) dans le quels se trouve l'agence. Ces mécanismes de gouvernance contraignent enfin les choix des agents de la firme (niveau 4).

La culture nationale est la somme des traditions, des croyances et des pratiques sociales qui se transmettent de générations en générations de manière plus ou moins consciente (Hofstede, 1980). Au travers du cadre définit par Williamson (2000), les valeurs de la culture nationale « *embeddedness level* » se transmettent dans les choix que font les agents d'une entreprise. Ces choix pourraient donc ne pas être aussi « libre » qu'on pourrait le penser.

En effet, les fondateurs font des choix influencés par les valeurs de la culture nationale de leur pays d'origine (Pan *et al.*, 2017). Ces choix deviennent des principes de fonctionnement de la firme. De plus,

les agents de la firme sont contraints par les institutions financiers, légales, et de gouvernance du pays d'origine de la firme (Williamson, 2000). Ainsi, les valeurs de la culture nationale du pays d'origine de la firme se trouveraient en quelque sorte incluse dans la culture de la firme. Ces valeurs se transmettent dans les choix financiers de la firme et peuvent être observées dans les comptes des sociétés et dans leurs stratégies financières.

Sur la base de ce corpus théorique, cette thèse se trouve donc lier trois ensembles que sont la culture nationale, la finance d'entreprise et les secteurs industriels. Nous avons choisi de lier ces trois ensembles en utilisant les propriétés mathématiques de la topologie (Munkres, 2000; Krantz, 2009). Nous essayons d'appliquer la topologie générale à notre recherche doctorale en ayant à l'esprit, la phrase attribuée à Galilée (1564-1642) : « la nature est écrite en langage mathématique ». Notre approche topologique pourrait aussi s'aligner à la littérature de l'économie sociale de Weber (1904, 1905) et à celle du néo-positivisme (Kraft, 1953).

Ainsi, cette thèse explore au travers de trois essais, la transmission de la culture nationale du pays d'origine de la firme sur ses choix et sur ses résultats financiers. Chaque essai a pour objectif de valider les propriétés de l'espace topologique que nous proposons. Ces essais constituent autant d'études empiriques fondées sur un échantillon de firmes internationales issues de plus de 30 pays. Toutes les firmes sont cotées à minima à la bourse des valeurs de leur pays d'origine. Les sections suivantes résument chacun des trois essais.

Présentation du premier essai

Le premier essai analyse l'influence de la culture nationale (Hofstede, 2001) sur le choix de la structure du capital de la firme (Titman & Wessels, 1988). Cette étude est réalisée pour six secteurs industriels.

Introduction

La littérature existante explore cette question par des approches différentes. En effet, une première vaine de littérature analyse l'influence de la culture sur les choix de structure financière de façon globale, soit en recourant à une seule et unique mesure (Chui et *al.*, 2002; Fauver & McDonald, 2015) ou bien en recourant à une mesure dans un seul et unique secteur industriel (Haq *et al.*, 2018).

Notre étude porte sur l'analyse de la structure du capital à court-terme et à long-terme. Pour cela nous analysons quatre mesures de structure qui prennent en compte au numérateur soit la dette à court-terme, soit la dette à long-terme et, au dénominateur les fonds propres, en valeur comptable ou en valeur de marché (Titman & Wessels, 1988). Ainsi, nous analysons l'influence de la culture (Hofstede, 2001) sur

ces quatre mesures de structure, dans chacun des six secteurs industriels qui, au final, couvrent le champs complet de la classification industrielle SIC[1].

La structure du capital de la firme est dépendante de son industrie (Bradley *et al.*, 1984). La dynamique industrielle contraint en effet ses choix dans l'emploi du capital financier et du capital humain (MacKay, & Phillips, 2005). Les firmes dans des industries stables ont tendance à avoir leurs structures qui s'approchent de la moyenne à long-terme de la structure des firmes de cette même industrie (Bradley *et al.*, 1984). Cette moyenne et appelée « ratio cible » (*target ratio*). Nous supposons que la distance de la structure d'une firme par rapport à ce « ratio cible » est influencée par la culture nationale du pays d'origine de la firme.

Hypothèses

Dans cet essai, nous testons empiriquement l'influence de la culture nationale de la firme sur la distance de sa structure par rapport à ce « ratio cible ». Pour cette « structure optimale », nous calculons d'abord la moyenne simple de la structure financière des firmes d'un pays. Ensuite, nous calculons la moyenne simple de la moyenne de tous les pays de notre échantillon. En faisant ce choix de la distance de la structure de la firme à la « structure optimale » représentée par le ratio cible, nous adoptons une approche dans l'esprit des modèles linéaires hiérarchiques (Li *et al.*, 2013).

Ensuite, nous adaptons quatre variables de mesure de la culture nationale (Hofstede *et al.*, 2010). Ces variables sont *Individualisme / Collectivisme* (IDV), *Masculinité / Féminité* (MAS), *Contrôle de l'incertitude* (UAI), et *Orientation à Long-terme / Court-terme* (LTO). Hofstede a développé ces dimensions à partir de l'étude de près de 117000 employées d'IBM sur la période allant de 1967 à 1973, en les agrégeant ensuite au niveau national. Ces dimensions sont décrites de façon *Etic*[2], plutôt qu'*Emic*[3], et identifient les valeurs culturelles partagées par les habitants d'un pays. Chacune des dimensions est mesurée sur une échelle de 0-100. L'application de ces dimensions culturelles a été très largement validée par de nombreux études empiriques en management et en finance (Karolyi, 2016).

Hofstede définit les cultures individualistes (score élevé de IDV) où les gens s'occupent en priorité d'eux-mêmes et de leur famille proche. Dans les cultures dites collectivistes, les gens s'occupent de la famille élargie et prennent soin les uns des autres au sein de leur groupe social. Les cultures avec un score élevé de *Masculinité* sont plus orientées vers la performance et la réalisation des tâches. Les cultures plus féminines (faible score de MAS), sont moins compétitives et plus soucieuses du bien-être des autres. Le *contrôle de l'incertitude* correspond à un niveau, plus ou moins élevé, d'acceptation de l'ambivalence de l'environnement présent ou futur. L'*orientation à long-terme* (score élevé de LTO)

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[1] Standard Industry Classification
[2] En recherche interculturelle, le niveau *Etic* étudie la culture avec une vue externe sur elle.
[3] La recherche au niveau *Emic* analyse la culture à l'intérieur de la société.

indique une préférence pour le futur où les gens s'attendent que les événements les plus importantes auront lieu.

Nous faisons les hypothèses suivantes associant la culture nationale de la firme à sa structure du capital. Tout d'abord, notre hypothèse principale H1 décrit l'association des dimensions culturelles à la structure du capital. Ensuite, nos hypothèses secondaires associent chacune des dimensions culturelles à la structure du capital. Notre objectif est de comprendre les interactions fines entre culture nationale et choix de structure financière

Notre hypothèse principale est la suivante :

> **H1**. Il existe une relation entre la culture nationale de la firme et ses choix de structure financière à court-terme et à long-terme.

Par structure financière, on entend le niveau d'endettement de la firme par rapport à ses fonds propres.

Nos hypothèses secondaires sont les suivantes :

> **H2a**. Il existe une relation négative (resp. positive) entre l'*individualisme* et la structure financière à court-terme (resp. long-terme).

> **H2b.** Il existe une relation négative (resp. positive) entre la *masculinité* et la structure financière à court-terme (resp. long-terme).

> **H2c.** Il existe une relation positive (resp. négative) entre *le contrôle de l'incertitude* et la structure financière à court-terme (resp. long-terme).

> **H2d.** Il y a une relation positive (resp. négative) entre l'*orientation à long-terme* et la structure financière à court-terme (esp. long-terme).

Suite à la définition de ces hypothèses, nous décrivons notre méthode empirique et le choix des variables.

Méthodologie et variables

Nous adoptons la méthodologie de Titman et Wessels (1988). En effet, ils font le choix de sélectionner une période de 9 ans, qui en lissant les données, offre une meilleure analyse de la structure financière. Ensuite, ils divisent cette période en trois sous-périodes pour pouvoir introduire des décalages entre les différentes variables du modèle. Nous suivons leur méthode en choisissant les variables de contrôles au niveau de la firme à la période (t – 1). Les variables de structure, de culture, et de contrôles au niveau du pays sont choisies à la période (t). La variable d'utilisation des fonds levés est choisie comme le ratio de la période ($t+1$) à la période (t).

Ensuite, chaque variable choisie est calculée comme la moyenne des données sur chacune de ces trois sous-périodes (Titman & Wessels, 1988). Cette approche permet de lisser les données anormales d'une année. Nos trois périodes sont de 2009 à 2011 ($t-1$), de 2012 à 2014 (t), et de 2015 à 2017 ($t+1$). En partant de ces choix, nous pouvons décrire la mesure de la distance de la structure financière de la firme avec le « ratio cible ». Nous la notons $Y_{kj(t)}$, avec (j) le pays et (k) la firme. Ce qui nous permet d'écrire notre modèle empirique de la manière suivante:

$$(1) \qquad Y_{kj(t)} = \alpha_0 + \alpha_1 Culture_j + \alpha_2\, Firm_{level} Control\, Variables_{k(t-1)}$$
$$+ \alpha_3\, Firm_{level} Control\, Variables_{k(t+1)}$$
$$+ \alpha_4\, Country_{level} Control\, Variables_{j(t)} + \varepsilon$$

Ce modèle est appliqué à chacun des six secteurs industriels choisis. En complément de la culture nationale, nous adoptons des variables liées à la firme et au contexte institutionnel de son pays d'origine. Nous choisissons quatre variables de contrôle au niveau de la firme. La première est une mesure de la croissance de la firme (*dépenses en capital sur actif total*) (Myers, 1984; Frank & Goyal, 2009). Les variables suivantes sont la mesure de sa profitabilité (*résultat d'exploitation avant impôts sur actif total*) (Titman & Wessels, 1988; Frank & Goyal, 2009; Fan *et al.*, 2012), la taille de la firme (*capitalisation financière*) et enfin une mesure liée à l'utilisation des fonds levés (*croissance de l'actif total*) (Titman & Wessels, 1988).

Pour définir les effets du pays d'origine de la firme, nous choisissons trois variables au niveau pays. La première variable est le niveau de développement (approché par le *PIB par habitant*) car elle pourrait avoir un lien avec l'*individualisme* (Hofstede, 1980, 2001). La deuxième variable représente la quantité de crédit offerte au secteur privé (*crédit total au secteur privé sur PIB*) indiquent le développement du secteur bancaire (Rajan & Zingales, 1995; Li *et al.*, 2013). Il s'agit donc d'une mesure du développement financier. La troisième variable représente le développement et le respect des règles légales (*qualité d'implémentation des lois*) (Botero & Ponce, 2011), car la protection des investisseurs et créanciers est importante et varie d'un pays à l'autre (Shleifer & Vishny, 1997).

Nous avons ensuite créé six secteurs industriels en regroupant des secteurs SIC. Ainsi, le secteur 1 est celui des *mines & construction* (1000-1799), le secteur 2 est le secteur *manufacturier* (2000-3999), le secteur 3 comprend les *utilities* (4000-4999), le secteur 4 correspond au *commerce de gros & et de détails* (5000-5999), le secteur 5 est celui des financières : banques, assurances et sociétés foncières (6000-6799). Enfin, le secteur 6 est celui des *services* (7000-8999). Notre choix d'inclure les sociétés financières repose sur une étude récente qui souligne l'influence de la culture sur ce secteur (Haq *et al.*,

2018). Notre échantillon est constitué de 6770 firmes issues de 33 pays sur la période allant de 2009 à 2017.

Nous appliquons le choix de ces variables à notre modèle empirique (équation 1) dans chacun des six secteurs industriels. Les résultats obtenus sont décrits dans la section suivante.

Résultats

Les résultats montrent que l'hypothèse H1 se trouve validée. Chacune des quatre dimensions culturelles IDV, MAS, UAI, et LTO a une relation significative avec les ratios de structure financière de court-terme et de long-terme de la structure financière. Ces relations sont validées dans chacun des six secteurs industriels. L'influence de la culture apparaît comme étant plus significative quand on considère la structure financière à court-terme. Nos résultats ajoutent une nouvelle perspective à la littérature existante (Chui *et al.*, 2002; Fauver & McDonald, 2015; Haq et *al.*, 2018).

Notre hypothèse H2a se trouve validée tant au niveau du signe et que de la significativité. L'*individualisme* est négativement relié à la structure financière à court-terme et positivement à la structure financière à long-terme. Cela montre que les firmes des pays avec une culture individualiste préfèrent se financer par une dette à long-terme (Zheng *et al.*, 2012) afin d'atteindre leurs objectifs de performance. Par contre les firmes de pays avec une culture plus collectivistes préfèrent se financer par une dette à court-terme dans leur structure financière. Ce qui permettrait à ces firmes de ne pas laisser de passifs à leurs prochains.

L'hypothèse H2b se trouve validée en signe et significativité. La dimension de *masculinité* a une relation négative avec la structure financière à court-terme. Cela indiquerait que les firmes de cultures plus féminine préfèrent ne pas s'endetter à long-terme afin de pouvoir rembourser leurs dettes au plus tôt. La relation de *masculinité* est positive avec la structure financière à long-terme, suggérant que les firmes de cultures plus masculine souhaiteraient atteindre tous leurs objectifs stratégiques en levant autant de financement que possible par la dette (Chang *et al.*, 2012).

L'hypothèse H2c se trouve validée en signe et significativité. Le *contrôle de l'incertitude* a une relation positive avec la structure financière à court-terme et une relation positive avec la structure financière à long-terme. Ce qui suggère que les firmes de cultures avec un UAI élevé préfèrent prendre peu de risque face à l'incertitude liée au futur et donc choisissent de s'endetter plus à court-terme. Au contraire, les firmes de cultures avec un niveau de *contrôle de l'incertitude* plus faible choisissent de prendre plus de dette à long-terme dans leur structure financière (Zheng *et al.*, 2012).

L'hypothèse H2d se trouve validée en signe et significativité. L'*orientation* à *long-terme* a une association positive avec la structure financière à court-terme indiquant que les firmes de cultures de LTO plus élevé préféreraient rembourser leurs dettes au plus tôt et ne pas laisser de passifs à long-terme

(Chang *et al.*, 2012). Les firmes de culture LTO moins élevée (avec une orientation plus court-terme) voudraient créer autant de richesse que possible et aussi rapidement que possible même si ce choix les amène à s'endetter le plus possible dans leur structure financière à long-terme.

Tous nos résultats sont conformes aux hypothèses défini. Ils confirment l'influence de la culture nationale de la firme dans les choix de sa structure financière à court-terme et à long-terme.

Conclusion

Nos résultats offrent de nouvelles connaissances à la littérature existante (Gleason *et al.*, 2000; Chui *et al.*, 2002; Fauver & McDonald, 2015; Haq *et al.*, 2018). Notre analyse montre que la culture nationale de la firme influe de manière plus importante sur ses choix de structure financière à court-terme que sur ses choix de structure financière à long-terme. De plus, nous montrons que cette influence varie d'une industrie à une autre.

Notre analyse porte sur un grand échantillon de firmes et de pays. De plus, les permutations (96) que nous avons construites entre les quatre dimensions culturelles, les quatre mesures de structure financière, et les six secteurs industriels, tendent à démontrer la validité empirique de nos résultats. Ces résultats restent stables à tous nos tests de robustesses au niveau de la firme, des pays, et de l'échantillon.

L'analyse des résultats de notre premier essai souligne que malgré la globalisation croissante des firmes, l'influence de leurs cultures nationales persistent sur leur choix de structures financière. Notre analyse est d'autant plus pertinente au vue de notre échantillon ne comportant que des firmes cotées en bourse.

Ce premier essai analysait l'influence de la culture sur la finance d'entreprise, dans une période de stabilité économique, voire de croissance. A cette opposition, notre deuxième essai se porte autour d'une période de crise financière. En effet, il analyse l'influence de la culture sur les choix financiers de la firme post-crise financière.

Présentation du deuxième essai

Cet essai analyse l'influence de la culture nationale sur les besoins de financement à court-terme de l'entreprise. Notre analyse se porte sur l'influence de la culture (Hofstede, 2001) sur la variation du crédit fournisseur autour de la crise financière de 2008.

Introduction

Le crédit fournisseur est considéré comme un des piliers du financement à court-terme de l'entreprise en particulier et du système économique de manière plus générale (Petersen & Rajan, 1997). Ce pilier

repose en très grande partie sur la qualité de la relation entre fournisseurs et clients (Petersen, & Rajan, 1994). Lors d'une période de difficulté financière, cette relation semblerait jouer un rôle-clé dans l'extension du crédit fournisseur (Wilner, 2000). Or, le rôle du crédit fournisseur dans le financement à court-terme de la firme et des économies a joué un rôle de premier plan après l'éclatement de la crise de 2008, une crise plus connue sous le nom de crise des *subprimes* (Coulibaly *et al.*, 2013).

Selon la littérature académique, il semblerait que la fréquence des crises ne cesse d'augmenter. Ainsi, la période de 1970 à 2011 a vue plus de 400 crises financières de types bancaires, monétaires, et souveraines (Laeven & Valencia, 2013). Chacune de ces crises déclenche, entre autres choses, des pertes de production. A ce titre, elles sont considérées comme des « manifestations extrêmes » des transmissions de chocs entre le secteur financier et l'économie réelle (Claessens & Kose, 2013). Ces crises impactent aussi le commerce mondial et l'industrie manufacturière s'en trouve généralement la plus affectée (Atsebi *et al.*, 2019). La transmission des effets de la crise aux firmes s'effectue par deux canaux que sont les *canaux financiers* et *commerciaux* (Claessens *et al.*, 2012).

Les effets de ces crises contraignent les firmes à repenser les stratégies de financement de leurs besoins à court-terme (Gómez, 2018). Le crédit fournisseur joue alors un rôle de substitut au crédit financier et permet de répondre aux problématiques de financement à court-terme de la firme post-crise (Love *et al.*, 2007; Yang, 2011). Nous choisissons de croiser les deux littératures sur la base de que la culture nationale influe sur le niveau des provisions comptable du crédit fournisseur (El Ghoul & Zheng, 2016). Ainsi, notre étude porte sur l'influence de la culture nationale sur les ajustements de crédit fournisseur en amont et en aval de la crise financière majeure de 2008.

Hypothèses

Après le déclenchement de la crise, le crédit fournisseur est considéré comme étant très important dans le financement à court-terme des firmes (Chava & Purnanandam, 2011). Cette importance est associée au fait que le crédit fournisseur remplacerait partiellement la réduction du crédit bancaire à court-terme (Blasio, 2005; Molina & Preve, 2012). Ainsi, les firmes n'ayant plus ou peu accès au crédit bancaire court-terme pourraient le remplacer par du crédit fournisseur. De ce fait, le rôle du crédit fournisseur s'en trouve accentué post-crise (Love *et al.*, 2007; Yang, 2011). Cet état de fait met la relation client fournisseur au centre des débats. En effet, la qualité de cette relation doit permettre au fournisseur et à son client de pouvoir arriver à un accord sur le contrat du crédit (Fabbri & Klapper, 2016).

Cette relation fournisseur-client est centrale pour le développement du crédit fournisseur (Burkart & Ellingsen, 2004). La qualité de cette relation à un impact très important sur le contenu des modalités de crédit (Klapper *et al.*, 2011). Le rôle joué par cette relation est accentué post-crise (Petersen & Rajan, 1994), où la confiance dans la relation est particulièrement importante (Wu *et al.*, 2014). La culture nationale peut influencer ce niveau de confiance (Doney *et al.*, 1998). De plus, la culture nationale du

fournisseur influence sur son engagement à long-terme avec ses clients, ainsi que sur la qualité de ses relations (Cannon *et al.*, 2010).

D'ailleurs, nous savons que la culture nationale influence les provisions de crédit que font les fournisseurs (El Ghoul & Zheng, 2016). Nous pensons que lors de la période de stress économique liée à l'après crise de 2008, la culture nationale a pu influencer le choix financier des firmes d'une manière différente de celle des périodes de stabilité économique et financière. De ce fait, la culture nationale (Hofstede, 2001) du fournisseur influencerait de façon différente les ajustements des contrats de crédit et une firme pourrait choisir de fournir plus ou moins de crédit à ses fournisseurs dans la période post-crise. Ce qui nous emmène à définir nos hypothèses. Notre hypothèse principale est la suivante :

H1 : Il y a une relation entre la culture nationale et la variation du crédit fournisseur post-crise.

Nous étendons l'étude de cette hypothèse à chacune des quatre dimensions culturelles que sont l'*individualisme* (IDV), la *masculinité (*MAS), le *contrôle de l'incertitude* (UAI), et l'*orientation long-terme* (LTO). Ainsi, nos hypothèses secondaires s'écrivent de la manière suivante:

H2a : Plus *l'individualisme* est élevé, plus la baisse du crédit fournisseur post-crise est élevée.

H2b : Plus la *masculinité* est élevée, plus la baisse du crédit fournisseur post-crise est élevée.

H2c : Plus le *contrôle de l'incertitude* est élevé, plus la baisse du crédit fournisseur post-crise est élevée.

H2d : Plus l'*orientation à long-terme* est élevée, plus l'augmentation du crédit fournisseur post-crise est élevée.

Suite à la définition des hypothèses, nous présentons dans la section suivante notre choix de la méthodologie de test empirique ainsi que le choix de nos variables.

Méthodologie et variables

Nous choisissons de tester nos hypothèses sur un échantillon de firmes de l'industrie manufacturière. Ce choix est guidé par le fait que l'industrie manufacturière se trouverait être la plus affectée post-crise (Atsebi *et al.*, 2019).

Notre méthode empirique s'appuie sur la littérature qui soulignent l'intérêt de prendre en considération la situation financière de la firme avant la crise, après la crise, ainsi que les variations d'avant-à-après la crise (Coulibaly *et al.*, 2013; Levine *et al.*, 2018). Conformément à cette littérature, le nos choix de nos

variables s'effectue de deux façons. D'une part, certaines variables sont mesurées avant-crise ou après-crise. D'autre part certaines variables restantes sont mesurées comme la variation autour de l'année de crise (*i.e.* variation pré-cris – post-crise).

La variable d'intérêt est la variation pré-crise – post-crise du crédit fournisseur (Levine *et al.*, 2018). Nos variables de contrôles de la firme sont la variation de trésorerie et des stocks de post-à-avant crise (Campello *et al.*, 2010; Claessens *et al.*, 2012). La variable de dette court-terme de la firme est mesurée avant-crise (Coulibaly *et al.*, 2013). La variable de profitabilité de la firme est prise avant-crise (García-Teruel & Martínez-Solano, 2010). La taille de la firme est mesurée avant-crise (Fabbri & Klapper, 2016).

Nos variables au niveau des pays sont les dimensions culturelles (Hofstede *et al.*, 2010), la variation du PIB, à prix constant, d'après-à-avant crise (Claessens *et al.*, 2012; Atsebi *et al.*, 2019), la richesse du pays, le développement de son système bancaire, de son marché financier, et de son environnement légal (Levine *et al.*, 2018).

Notre échantillon est constitué de 4491 firmes issues de 27 pays sur la période allant de 2007 à 2012. Les données de l'année de la crise financière (*i.e.* 2008) sont exclues. Nos mesures de niveaux des variables avant-crise sont prises à la fin de l'année 2007, et celles d'après-crise sont prises à la fin de l'année 2009. Les mesures des variations des variables explicatives de contrôles financières sont faites entre l'année 2007 et l'année 2009. Ainsi, pour la variable d'intérêt de la variation du crédit fournisseur, nous utilisons quatre mesures de variation entre 2007 et 2009, entre 2007 et 2010, entre 2007 et 2011, et entre 2007 et 2012. Ce choix tient compte du fait que le retour d'un pays au niveau économique d'avant-crise peut prendre jusqu'à quatre années post-crise (Dell'Ariccia *et al.*, 2008).

En appliquant ces variables et en adoptant la méthode d'estimation des moindres carrées ordinaires (MCO), notre modèle empirique (équ. 6) combine les équations (1), (2), (3), (4), et (5). Ce modèle avec pays *j*, firme *k*, année *n* (1, 2, 3, ou 4), et ε étant le terme d'erreur, s'écrit de la manière suivante:

(1) $\quad \Delta Y_{jk(t+n)} = \frac{(Accounts\ Receivable_{jk(t+n)} - Accounts\ Receivable_{jk(t-1)})}{TA_{jk(t-1)}}$

(2) $\quad \Delta Sales_{k(t+n)} = \frac{(Sales_{k(t+n)} - Sales_{k(t-1)})}{TA_{k(t-1)}}$

(3) $\quad \Delta Cash_{k(t+n)} = \frac{(Cash_{k(t+n)} - Cash_{k(t-1)})}{TA_{k(t-1)}}$

(4) $\quad \Delta Inventory_{k(t+n)} = \frac{(Inventory_{k(t+n)} - Inventory_{k(t-1)})}{TA_{k(t-1)}}$

(5) $\quad \Delta GDP_{j(t+n)} = \frac{(GDP_{j(t+n)} - GDP_{j(t-1)})}{GDP_{j(t-1)}}$

$$(6) \quad \Delta Y_{jk(t+n)} = \alpha_0 + \alpha_1 Culture_j + \alpha_2 Firm_{level} Control\ Variables_{jk(t-1)}$$
$$+ \alpha_3 \Delta Firm_{level} Control\ Variables_{jk(t+n)}$$
$$+ \alpha_4 \Delta Country_{level} Control\ Variable_{j(t+n)}$$
$$+ \alpha_5 Country_{level} Control\ Variables_{j(t-1)} + \varepsilon_{jk(t)}$$

Nous appliquons ce modèle empirique sur notre échantillon. La section suivante présente les principaux résultats obtenus en lien avec nos d'hypothèses de recherche.

Résultats

Les résultats montrent que la culture nationale est significative dans sa relation avec la variation du crédit fournisseur d'après-à-avant crise. Cela valide notre hypothèse H1. Les signes des relations entre les dimensions culturelles MAS, UAI, et LTO valident nos hypothèses H2b, H2c, et H2d. La dimension d'*individualisme* n'est par contre pas significative.

Les résultats soulignent que la culture nationale peut contribuer à stabiliser ou à accentuer les effets de la crise financière sur les firmes. En effet, une réduction du crédit fournisseur après la crise réduit l'accès au financement court-terme des clients, accentuant ainsi les effets de la crise économique et financière. Au contraire, une augmentation du crédit fournisseur augmente l'accès aux financements à court-terme des clients, donc stabilisent les effets de la crise.

Ces résultats principaux sont stables quand l'on considère les tests de robustesses qui sont effectués au niveau de la firme, au niveau des pays, et au niveau de l'échantillon. Au niveau de la firme, nous effectuons les tests avec la variable de dette à long-terme. Au niveau des pays, nous effectuons les tests en introduisant les variables de protection légale des créanciers et des investisseurs. Nous vérifions aussi les effets du niveau de confiance existant dans la société (Levine *et al.*, 2018). Au niveau de l'échantillon, nous effectuons deux test. Le premier test exclue les firmes américaines et le deuxième test consiste à diviser l'échantillon en quantiles par la taille de la firme.

Ces résultats viennent compléter les connaissances issues d la littérature sur la culture et les provisions du crédit fournisseur (El Ghoul & Zheng, 2016) en venant étudier le comportement des fournisseurs autour d'une période de crise financière. Cela montre que la culture nationale influence le crédit fournisseur en période de crise. De plus, nous montrons que cette influence est différente de celle observée pendant une période de stabilité économique. Nos résultats démontrent aussi que la culture nationale est un autre des déterminants pouvant expliquer le comportement des firmes post-crises. En cela ces résultats viennent compléter la littérature existante (Coulibaly *et al.*, 2013; Campello *et al.*, 2010; Claessens *et al.*, 2012; Levine *et al.*, 2018).

Conclusion

Nos résultats montrent que la culture nationale ne joue pas de la même manière sur le crédit selon que l'on considère une période de crise financière ou une période de stabilité comme c'est le cas dans les travaux de El Ghoul et Zheng (2016). Nous montrons ainsi que la culture nationale peut aider à stabiliser les effets de la crise ou peut au contraire les accentuer au travers de son influence sur l'augmentation ou la réduction du crédit fournisseur d'après-à-avant crise.

Nous résultats contribuent ainsi à enrichir la connaissance de la littérature existante sur le crédit fournisseur autour d'une période de crise financière. Ces résultats peuvent aider les responsables de firmes internationales et les fournisseurs à mieux utiliser le crédit fournisseur post-crise en comprenant mieux les tenants et les aboutissants. Les gouvernements peuvent aussi se baser sur ces résultats pour adopter des politiques d'utilisation du crédit fournisseur post-crise afin de protéger le commerce et les firmes d'un pays.

La section suivante présente notre troisième essai qui, *in fine*, combine les résultats du premier et du deuxième essai. Il analyse les liens de la culture nationale du pays d'origine de la firme sur sa valeur financière.

Présentation du troisième essai

Cet essai analyse l'influence de la culture nationale (Hofstede, 2001) sur la valeur de marché de la firme en se fondant notamment sur l'approche proposée dans les travaux de Ohlson (1995). En effet, dans ce cadre-ci, la valeur de marché de la firme est la somme de son actif net comptable et de la somme des revenus résiduels actualisés. Toujours selon Ohlson, si ces revenus résiduels sont positifs, alors il existe un goodwill qui explique ce pourquoi la valeur de marché est supérieure à l'actif net comptable. Nous postulons dans cet essai que la culture nationale pourrait influencer ce *goodwill* au travers du capital humain de la firme

Introduction

Plusieurs aspects du capital humain de la firme pourraient contribuer au *goodwill*. Un premier aspect pourrait être le développement du capital humain en lien avec le niveau de responsabilité sociale de l'entreprise (Weber, 2008). Un autre aspect pourrait être le capital intellectuel que sont les idées, les savoir-faire et la connaissance liée du capital humain (Sullivan, 2000; Veltri & Silvestri, 2011). Un aspect supplémentaire pourrait être la compétence des managers et la compétence technique spécifique des employées (Chauvin & Hirschey, 1994). Dans chacun des cas la culture nationale pourrait jouer un

rôle important au travers du capital humain et qui participerait au *goodwill*. Nous analysons donc *in fine* l'influence de la culture nationale sur la valeur de l'entreprise aux travers du *goodwill*.

La valeur de la firme peut être analysée comme la somme de sa valeur nette comptable plus un *goodwill* (Ohlson, 1995). Ce *goodwill* peut avoir plusieurs sources, soit liées aux choix financiers de la firme ou liées à son capital humain (Chauvin *et al.*, 1994). Les choix financiers de la firme peuvent être influencés par le capital humain de ses fondateurs ou de ses managers (Pan *et al.*, 2017). Les compétences spécifiques du capital humain de la firme peuvent aussi contribuer à la valeur du *goodwill* (Sullivan, 2000).

Nous essayons de relier la dimension du capital humain de la firme au cadre conceptuel de la NEI de Williamson (2000). Ce cadre d'analyse décrit, que le niveau-1 des contraintes sur l'agence est constitué par les aspects sociaux, incluant entre autres les traditions, les pratiques, et les croyances. Ce niveau contraint le développement des instituions d'un pays. À leur tour, les institutions imposent des contraintes sur la gouvernance, qui elle-même impose des contraintes sur les choix que fait la firme. Les constituants du niveau-1 – que sont les traditions, les pratiques, et les croyances – font aussi partie de la définition de la culture nationale (Hofstede, 1980, 2001). Ainsi, la culture nationale de la firme se transmettrait dans sa valeur financière, au travers des choix de l'agence influençant le *goodwill*. C'est précisément ce que nous nous proposons d'analyser dans cet essai

Hypothèses

Les institutions d'un pays imposent des contraintes aux firmes (Williamson, 2000). Ces institutions forment ce que l'on appelle le « business systèmes » du pays (Whitley, 1999). Le *business system* est la combinaison de l'ensemble des institutions du pays qui forment le contexte dans la quelle opèrent les firmes. Ces institutions sont de nature financière (de banques et marchés financiers), de nature légale, et sont aussi liée au niveau de développement du capital humain (Redding, 2005). L'ensemble de ces institutions se développent sous la contrainte des valeurs de la culture nationale du pays (Witt & Redding, 2009).

Nous pensons que l'influence de la culture nationale se transmet à la valeur de la firme aux travers de ces institutions ou « *business system* ». En effet, la littérature montre que la culture influence le développement du système financier d'un pays (Kwok & Tadesse, 2006). Le système financier peut être de type bancaire ou fondé sur les marchés financiers. La culture influence aussi le type de système légal du pays (Porta *et al.*, 1998), ainsi que le développement des mécanismes de gouvernance (Licht *et al.*, 2005). Enfin, la culture influence les institutions contribuant aux développement du capital humain spécifique du pays (Redding, 2005).

Ainsi, nous constatons que l'ensemble des institutions formant le « *business systeme* » d'un pays sont influencées par sa culture nationale (Breuer & Salzmann, 2012). Ces *business systems* facilitent le développement de certaines industries plus que d'autres (Haake, 2002). L'influence de ces *business systems* est telle que les industries se développant dans un contexte qui leur serait favorable seraient au final plus compétitives. Cette compétitivité serait la conséquences d'un type de « business system » qui faciliterait le développement d'un capital humain spécifique, de même que d'un système financier et légal approprié (Haake, 2002; Breuer & Salzmann, 2012).

Nous en déduisons donc que la compétitivité d'une industrie au niveau national devrait aussi se retrouver, dans un pays donné, dans toutes les firmes de cette même industrie (Porter, 1985, 2000). Cela pourrait donc participer de la valeur financière de ces firmes. La culture nationale se transmettrait donc aux *business systems*. À leur tour, ces derniers la transmettraient aux industries et aux firmes, créant le cas échéant une survaleur. Sur la base de ce fondement théorique, nous établissons nos deux hypothèses de recherche :

H1 : La culture nationale a une relation positive avec la valeur de la firme au travers des « business systèmes ».

H2 : Les différences de cultures nationales amènent à des différences de valeurs des firmes, à cause des différences dans les « business systèmes ».

La section suivante décrit la méthodologie de test de ces hypothèses, nos choix des variables ainsi que notre échantillon.

Méthodologie et variables

Le cadre de de l'analyse empirique repose sur le NEI de Williamson (2000). Dans ce cadre, nous adoptons une approche en deux temps en appliquant la méthode d'estimation MCO. D'abord nous testons notre hypothèse H1. Puis nous testons l'hypothèse H2 en suivant la méthodologie par quantile de Fama et French (1993).

Notre échantillon est constitué de 4714 firmes cotées issues de 32 pays. Toutes ces entreprises sont elles-même issues de l'industrie manufacturière (codes SIC 2000-3999). Nos variables de contrôle portent sur les caractéristiques économiques et financières des firmes ainsi que sur les caractéristiques économiques et institutionnelles de leur pays d'origine. La culture nationale est notre variable d'intérêt. Ces estimations portent sur l'année 2017. Nous justifions le choix d'une seule année de mesure, car la culture nationale est présente dans l'entreprise depuis sa création (Pan *et al.*, 2017). De ce fait, nous postulons que son influence serait présente sur la valeur financière de la firme en tout point du temps.

Notre variable expliquée estla valeur financière de la firme. Elle est approchée par trois mesures différentes. La première mesure est le ratio du cours de l'action sur sa valeur nette comptable par action (P2B) ; la deuxième mesure est le ratio du cours de l'action sur le bénéfice net comptable par action(P2E). Enfin la troisième mesure est le Q de Tobin (Varaiya *et al.*, 1987). Les variables de contrôles sont la croissance de la firme telle que mesurée par ses investissements en capital fixe (Varaiya *et al.*, 1987), sa profitabilité mesurée par les profits avant impôt (Chauvin & Hirschey, 1994), sa structure du capitale (Masulis, 1983), son fond de roulement (Deloof, 2003), et sa taille (Martínez-Sola *et al.*, 2013). Pour la variable représentant le niveau de risque fianncier de la firme, nous prenons l'écart-type de son EBITDA (Ammann *et al.*, 2012).

Nos variables au niveau du pays sont les variables explicatives de la culture nationale que sont IDV, MAS, UAI, et LTO (Hofstede, 2001). Il s'agit de la variable d'intérêt liées aux hypothèses que nous avons formulées. Les indicateurs économiques du pays sont le PIB par habitant, le crédit total sur PIB, et la capitalisation boursière du pays rapportée au PIB (Demirgüç-Kunt & Maksimovic, 1998). La mesure de l'environnement légal est approchée par l'index du World Justice Project (Botero & Ponce, 2011).

Notre modèle empirique s'écrit de la manière suivante:

(1) *Value = Book Value + Goodwill (Human Capital (Culture), Natural institutions, Firm characteristics)*

L'équation (1) peut s'écrire de la manière suivante:

(2) *Value / Book Value = 1+ Goodwill / Book Value*

Le côté gauche de l'équation est remplacée par le ratio de valorisation telle que:

(3) *Value ratio = 1 + Goodwill / Book Value*

En combinant les équation (1), (2) et (3) nous obtenons notre modèle de base qui s'écrit comme suit:

(4) *Value ratio = β_0 + β_1 Culture + β_1 Quality of institutions + β_2 Firm characteristics + ε*

Ce modèle avec pays j, firme k, année t, et ε étant le terme d'erreur, s'écrit de la manière suivante:

(5) $\quad Y_{jk(t)} = Value\ ratio$

(6) $\quad Y_{jk(t)} = \alpha_0 + \alpha_1 Culture_j + \alpha_2\ Firm_{level} Control\ Variables_{k(t)}$
$$+ \alpha_3\ Country_{level} Control\ Variables_{j(t)} + \varepsilon_{jk}$$

Résultats

Les résultats principaux montrent que la culture nationale a une influence significative sur la valeur financière de la firme, validant ainsi notre hypothèse H1. Les quatre dimensions culturelles de IDV, MAS, UAI, et LTO sont significative à 1% quand l'on considère les trois mesures de valeur que sont le P2B, le P2E, et le Q de Tobin. Les coefficients des dimensions culturelles ont une valeur maximum quand on considère le P2B. Quand on rentre dans le détail des différentes dimensions culturelle, on trouve que IDV a une relation positive avec la valeur de la firme, MAS une relation négative, UAI une relation négative, et LTO une relation positive.

Notre hypothèse H2 est validée car la relation de la culture avec la valeur financière change de signe pour les firmes les moins chères en comparaison avec les firmes les plus chères. Cela semble indiquer que la culture nationale de la firme influence différemment sa valeur financière. Notre mesure de développement du capital humain (HCD) est significative. Il semble jouer un rôle plus important sur les firmes de plus petite taille, mais de valeur financière plus élevée.

Nos tests de robustesses effectués au niveau de la firme prennent en compte par les dépenses de R&D, de marketing et vente, ainsi que le niveau de trésorerie. Ils ne changent pas nos résultats principaux. Les tests effectués au niveau du pays, prennent en compte les mesures légales de protection des créanciers (Nini *et al.*, 2012). Ils ne changent pas nos résultats principaux. Notre test effectué sur la base de mesures alternatives des dimensions culturelles (Tang & Koveos, 2008) ne change pas non plus nos résultats principaux. Nos tests au niveau de l'échantillon, effectués par l'ajout d'une variable binaire pour le continent de la firme (Boasson *et al.*, 2005), ou par l'exclusion des firmes de deux pays (USA & Japon) ne changement pas nos résultats principaux.

Conclusion

Nous trouvons donc que la culture nationale de la firme influence sa valeur financière. La culture influence le développement des « *business system* » du pays. Le *business system* correspond à l'ensemble de ses institutions financières, légales ainsi qu'au niveau de développement du capital humain. Ces institutions contraignent les firmes quant à l'accès au capital financier et aussi quant à au capital humain spécifique. L'alignement de toutes ces institutions avec la culture nationale rend les industries et leurs firmes plus compétitives. Cette compétitivité se retrouve dans la valeur financière des firmes de ces pays au travers du *goodwill*.

Nos résultats confirment donc la littérature qui montre que la culture nationale et les institutions d'un pays sont propices au développement d'un type d'industrie et favorise la compétitivité des firmes (Porter, 2000; Breuer & Salzmann, 2012). Nos résultats ajoutent une nouvelle perspective et montre que la culture nationale de la firme influe sur sa valeur financière. Cette littérature lie essentiellement la

valeur financière aux constituants financiers comptable de la firme (Varaiya *et al*., 1987; Masulis, 1983) et au *goodwill* de la firme en lien avec le capital humain (Chauvin & Hirschey, 1994; Sullivan, 2000; Veltri & Silvestri, 2011). De plus, notre troisième essai semble être la première recherche analyser le lien entre la valeur financière de la firme et la culture nationale (Chen *et al*., 2015; El Ghoul & Zheng, 2016).

Nos résultats peuvent aider les entrepreneurs et les grandes entreprises voulant développer de nouveaux produits à s'implanter dans le pays ayant la culture nationale la plus propice à leurs besoins en capital financier et en capital humain. Ce choix pourrait les emmener à optimiser leur valeur actionnariale.

Suite à la présentation de nos trois essais, nous présentons enfin comment nous tentons de les relier au sein d'une structure mathématique de topologie. La section suivante présente brièvement cette approche.

Présentation de la topologie

L'espace topologique lie des ensembles qui sont conformes à la de *continuité* (Munkres, 2000; Krantz, 2009). Cette caractéristique est vérifiée par les propriétés de *connectivité*, de *compacité*, et d'*homéomorphisme*. La proposition de l'application de la topologie générale à l'ensemble de travaux de cette thèse de doctorat.

Introduction

Chacun de nos trois essais relie trois ensembles que sont la culture, la finance et les secteurs industriels. Sur la base des relations entre ces trois ensembles, nous essayons de vérifier les propriétés d'un espace topologique. Cette section décrit comment ces propriétés peuvent être appliquées à notre recherche qui porte, nous le rappelons sur l'influence de la culture sur la finance d'entreprise.

Une propriété fondamentale d'un espace topologique est celle de *continuité* (Leinster, 2014-2015). En effet, quand deux points appartenant à deux ensembles sont liés par une relation de voisinage « *neighborhood relationship* » (Alexandrov, 1961), la *continuité* signifie que chacun des points adjacents dans l'ensemble de départ trouve un point correspondant dans l'ensemble de destination. Le passage entre l'ensemble de départ et celui d'arrivé s'effectue par une fonction de transformation.

Nous postulons que cette propriété de *continuité* s'appliquerait très bien aux deux ensembles que forment les dimensions de la culture nationale et celui des éléments financiers qui décrivent une firme. Ces deux ensembles seraient liées par la fonction de transformation du secteur industriel. En effet, la culture nationale se transmet à la firme par le capital humain et les institutions. Ces derniers sont spécifiques à chaque secteur industriel. Ainsi, cette transformation des dimensions culturelles serait propre au secteur industriel auquel appartient la firme.

La validation de cette caractéristique fondamentale de *continuité* requière que les propriétés de *connectivité*, de *compacité* et d'*homéomorphisme* soient à leur validées par les deux ensembles et la fonction de transformation. Notre objectif est de pouvoir tester ces propriétés pour chacun de nos trois essais. Ces tests nous permettront de montrer l'application du concept de l'espace topologique à l'analyse de l'influence de la culture nationale sur la finance d'entreprise.

La section suivante décrit brièvement l'application des propriétés de l'espace topologique à nos trois essais. Nous nous excusons par avance de la présentation un peu technique qui sera faite mais il semblait difficile de ne pas l'inclure pour poser ici les bases de cette topologie.

L'espace topologique

L'espace topologique T peut être défini comme la combinaison d'un ensemble S et la relation entre les éléments de S. Ainsi, le binôme (S, T) est appelé espace topologique. Cet espace doit satisfaire au propriétés de *connectivité*, de *compacité* et d'*homéomorphisme*. L'ensemble S doit satisfaire aux trois axiomes de la topologie générale. Ces axiomes sont définis de la manière suivante :

- L'union de tous les sous-ensembles de (S, T) appartient à (S, T).
- L'intersection de sous-ensembles de (S, T) appartient à (S, T).
- S appartient (S, T) et un sous-ensemble nul appartient aussi à (S, T).

Dans cet espace (S, T), chacun de nos essais pourrait être représenté comme un des sous-espaces (S_n, T_n). Dans ce cas, l'ensemble S serait l'union de toutes les valeurs culturelles et de toutes les mesures de la finance d'entreprise. La topologie T pourrait donc être définie comme l'ensemble des combinaisons possibles de S.

L'ensemble S est l'union des n sous-ensembles que sont les S_n. Chaque sous-ensemble S_n serait alors constitué des valeurs culturelles nationales et des résultats financiers de la firme. Ainsi, chacun de nos trois essais forme un espace topologique, des espaces que nous pourrions noter : (S_1, T_1), (S_2, T_2) et (S_3, T_3). Chacun de ces trois espaces doit vérifier les propriétés de *connectivité*, de *compacité* et d'*homéomorphisme*.

Connectivité

Un espace topologique (S, T) est *connecté* si l'intersection de ses sous-espaces n'est pas « vide » (Munkres, 2000). Par exemple, si (S_1, T_1), (S_2, T_2), (S_3, T_3), et (S_n, T_n) ont leur intersection égale à « rien », alors (S, T) n'est pas *connecté*.

Dans le cas de nos trois essais, (S, T) est *connecté*. En effet, les trois sous-espace correspondant (S_1, T_1), (S_2, T_2), et (S_3, T_3) ont en commun les dimensions culturelles, donc ils ne sont pas « vide ». La fonction de transformation F, correspondant à l'industrie, « transforme » les dimensions culturelles en résultats

financiers. Cette transformation repose sur la spécificité des canaux de transmissions de l'agence et des institutions de chaque pays.

La caractéristique de *continuité* de l'espace topologique est centrale. Cette caractéristique est définie par un théorème appelé « *Intermediate Value theorem* » (Munkres, 2000, p147), qui peut être énoncé de la manière suivante :

$$if\ F: (X1) -> Y\ is\ continuous\ and\ if\ y \in (Y), then\ there\ exists\ c \in (X1), such\ that\ F(c) = y$$

En suivant ce théorème, tout ensemble de mesures *c* issu de dimensions culturelles peut être transformé en résultats financiers *y* par la fonction *F*.

Compacité

Le théorème vérifiant la propriété de *compacité* (Munkres, 2000, p147) s'appelle *Maximum Value Theorem* (*MVT*). En notant *X1*, les dimensions culturelles et *Y*, les résultats financiers, on peut écrire que :

$$If\ F: (X1) \rightarrow Y\ is\ continuous, the\ there\ exists\ c \in (X1), for\ x \in (X1),$$

$$such\ that\ F(x) \leq F(c), for\ every\ x \in (X1)$$

La fonction de transformation *F* transforme les dimensions culturelles *X1* en résultats financiers *Y*. Ainsi, tout jeu de mesures des dimensions culturelles *c* pourrait être transformé en résultats financiers de façon à vérifier *y1*$=F(x)$ et *y2*$=F(c)$, tel que y1$\leq$ y2.

Prenons un exemple lié à notre premier essai. Deux firmes ayant des jeux de scores différents de dimensions culturelles (*x*, *c*) appartenant à l'ensemble *X1* pourraient avoir des structures financières différentes telle que *y1*$\leq$ *y2*. Ce qui voudrait dire que les firmes de culture nationale avec un jeu *x* auraient un ratio de structure financière plus faible que les firmes de culture *c* au sein d'un secteur industriel *F*.

Homéomorphisme

La troisième propriété de l'espace topologique est celle d'*homéomorphisme*. Elle décrit le processus de transformation d'un espace dans un autre (Krantz, 2009). Ce processus de transformation peut inclure la torsion, l'extension, sans qu'il n'y ait de « déchirure » de l'espace de départ. On illustre souvent cette propriété la transformation d'un cercle en ellipse. Si la propriété d'homéomorphisme est vérifiée alors tous les points du cercle auront une représentation dans l'ellipse.

Il est donc important de ne pas « déchirer » le cercle lorsqu'on le transforme en ellipse afin de préserver la caractéristique de *continuité* d'un espace topologique. L'*homéomorphisme* est défini (Babinec, 2014, p14; Leinster, 2014-2015, p20) de la manière suivante :

A homeomorphism is a function f: TSx -> TSy between two topological spaces TSx and TSy where

> • *f is a continuous bijection,*

> • *and has a continuous inverse function f*[1]

Un *homéomorphisme* signifie qu'on peut transformer un espace *TSc* en un espace *TSi* dans une direction comme dans l'autre. Nous estimons que cet homéomorphisme est présent dans nos trois essais.

Cet homéomorphisme, lorsqu'il est validé signifie que l'influence de la culture nationale sur les résultats financiers est la même que l'influence des instituions d'un pays sur les résultats financiers des firmes de ce pays. Une telle relation pourrait s'expliquer dans le cadre théorique défini par Williamson (2000) et Alesina et Giuliano (2015).

Conclusion générale de la thèse

Au travers de nos trois essais empiriques, nous avons montré que la culture nationale influence la dimension financière de la vie des entreprises. Cette influence se retrouve sur les choix de structure financière des entreprises (essai 1), les ajustements de crédit commercial en période de crise (essai 2) et la valeur de marché des firmes (essai 3). Ces recherches offrent de nouveaux résultats qui viennent compléter la littérature qui analyse déjà la culture et la structure financière (Chui *et al.*, 2002) ainsi que la littérature qui analyse la culture et le crédit fournisseur (El Ghoul & Zheng, 2016). Notre troisième essai, quant à lui, est à notre connaissance le premier travail de recherche à s'intéresser au lien pouvant exister entre culture nationale et valeur de la firme et vient compléter en cela des taux existants (Varaiya *et al.*, 1987; Fama & French, 1998; Veltri & Silvestri, 2011; Nini *et al.*, 2012).

La recherche effectuée dans cette thèse de doctorat s'inscrit dans le cadre de la théorie de la structure sociale de l'économie de Weber (1947). Cette recherche s'inscrit aussi dans le cadre théorique défini par Williamson (2000), et intègre notamment ses travaux dans le choix des variables qui figurent dans les spécifications économétriques. Au final, nos trois essais contribuent à la littérature grandissante sur la relation existant entre culture et finance.

Ce travail doctoral offre aussi une cadre mathématique issue de la topologie pour relier les différents essais entre eux. Les fondements de la topologie s'appliquent aux trois ensembles formés par les dimensions culturelles, par les mesures financières de l'entreprise et par les industries. Nos recherchent

s'alignent sur les critères de définition des espaces topologiques; à savoir la *connectivité*, la *compacité* et l'*homéomorphisme*.

Le travail de recherche effectué dans cette thèse m'aura permis au final d'établir les bases de mon programme de recherche pour les années à venir. Il m'a conforté dans l'idée que la finance d'entreprise n'est pas indépendante de la culture nationale du pays d'origine de la firme et en cela, a apporté des réponses aux questions que je me posais sur le sujet. Des pistes de recherche reste pour autant ouverte et feront l'objet de travaux ultérieurs.

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1 General introduction

Over the past few decades, globalization of trade brought with it increasing internationalization of firms' production and sales. Firms' growing profit and value maximization ambitions drove this internationalization. This evolution seems to have brought the common perception that corporate money matters hidden behind these ambitions are boundary-less and culture-free. I hit into this wall of perception through my international career. However, what I could observe and analyze challenged this perception of standardization and homogeneity.

1.1 A personal research journey

Indeed, I could observe that the black-box of production function –between the same input and the same output– operates differently depending on the country where this production function is located. Similarly, the sales function –selling the production output– operates differently accordingly to the country in which it tries to sell the output. The two functions –production and selling– belong to the same international firms that produced in any country and sold the output in any other country. Through this process, these firms extracted competitive advantages in their market places. As a result, some countries became richer than others did.

I could also note that within an industry, firms from some countries took far more business risks than firms from other countries. One such example is the high technology domain of software and electronics, in which I worked. I noted that firms from US and UK were taking enormous business risk by undertaking new products development while firms from India, China, Japan, or even South Korea. These Asian countries firms were rather –mostly– improving on existing technologies or even preferring to provide engineering services to their western competitors. These are low business-risk choices. It highlights that there are differences in business choices firms make in regards to risk-taking.

I could observe first hand differences in countries I happened to travel regularly for my work over a twenty-year period. Some of these countries are Japan, India, Taiwan, China, South Korea, France, Germany, Italy, USA, Singapore, Malaysia, Thailand, and Australia. The differences were political, institutional, historical, or I seem to put it all behind a single word that is cultural.

I found the complete process intriguing and challenging my thinking: why some firms –in some industries– end up being better than other firms are in the same industry? Could it be linked to their risk-taking? How could it influence firms profit and value maximization objectives? On the other hand, why some industries all-together are more successful coming out of some countries than from some others? What roles these firms and industry play in some countries growing and prospering more than others do?

These unanswered discoveries about "doing business around the world" are the genesis of my profound desire to seek answers. To find answers, I came back to the place where I felt most comfortable to start

this quest, Clermont-Ferrand. Indeed, my formal education pedestal was built here. I feel –to do good research– one has to be at ease in and with the environment where the research journey is done, to hopefully meet those research goals. Hence, my research journey starts.

1.2   Find the footing

In which direction should I proceed? At the beginning of my research, in summer 2017, I was guided towards Williamson (2000) New Institutional Economics (henceforth NIE) framework. Indeed, his description of the latch-cascading flow of constraints seemed to me like a "perfect" match to answer my questions. He describes that country's "*social embeddedness level*" (p596) –social needs, beliefs, traditions, and religion– constrains institutions, which constrains governance, which constrains agency choices. Culture forms a large part of this social level (Hofstede, 1980; Baldwin *et al.*, 2006).

This doctoral dissertation finds its footing in the NIE framework. We analyze the influence of firms' *country-of-origin* national culture (Noorderhaven & Harzing, 2003) on firms' financial choices and their financial outcomes. Our steps investigating these choices are constantly tracking Williamson (2000) NIE framework (see figure 1-1) and building our research around his scaffolding.

Figure 1-1: Representation of Williamson's (2000) NIE constraints framework.
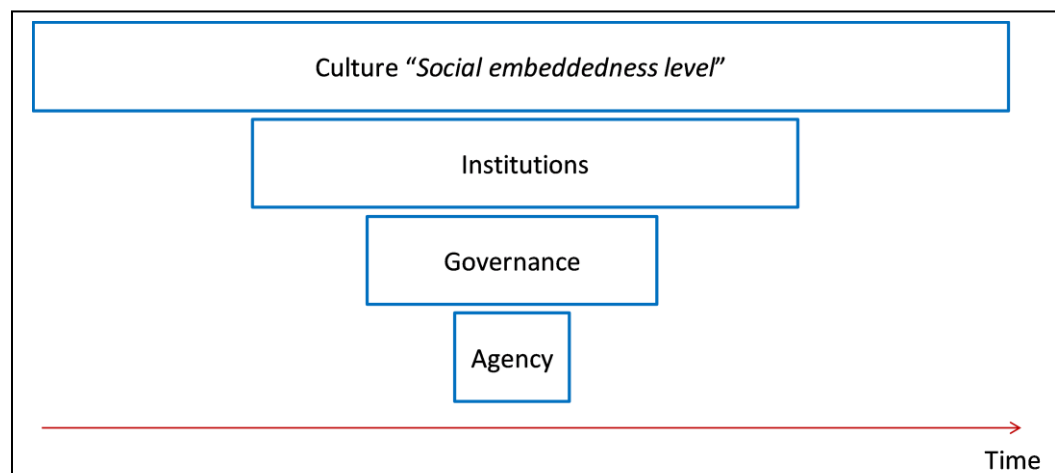
A nation's culture, institutions, industries, and wealth are linked together in different ways (Voltaire, 1773; Smith, 1776). They describe a country's values, beliefs, traditions, and practices lead to the development of certain type of institutions, certain type of industries, and bring wealth to the specific nations. The links between people in a nation and their economic contribution are also present in the work of Weber (1904/05, 1947). We also find links between culture, institutions, firm's activities, and nations prosperity in a more recent economic literature (Porter, 2000; Tabellini, 2010).

Hofstede (1980, 2001) defines culture as "*the collective programming of the mind that distinguishes the members of one group or category of people from another*". Cultural values acquired during childhood are deep rooted in people's unconscious mind and express themselves throughout life as "*broad tendencies to prefer certain states of affairs over others*" (Hofstede, 1980), changing only over "*centuries or millennia*" (Williamson, 2000).

Firms' country-of-origin national culture conditions the country's context in which firms' grow. National culture influences the development of a country's institutions of finance, legal, policies, governance, and education (Witt & Redding, 2009). The national context constrains firms through access to types of financing (Kwok & Tadesse, 2006), of legal framework (Porta *et al.*, 1998), and of governance policies (Licht *et al.*, 2005). National context also constrains firms' access to specific human capital, through education, employment distribution, and employee dismissal policies (Redding, 2005).

Furthermore, firms founded in a country embed the national culture values through their founders (Pan *et al.*, 2017). Founders' preferences become firms' practices and policies over time. Consequent firms' management is constrained by these policies and practices in their financial choices. Firms' financial choices seem to be influenced by the institution and its agents. It leads us to question whether the only choice firms have in their country-of-origin's context is to do best with what they can access in terms of financial capital, human capital, and legal framework.

This question gets some early hints of possible answers from culture's influence on institutional development (Williamson, 2000) and on human capital development (Breuer & Salzmann, 2012). Over firms' lifecycle, national contexts differences seem to find their way into firms' practices and policies (Witt & Redding, 2009; Pan *et al.*, 2017). If true, then national culture could indeed have an important influence on their financial choices, which may become persistent[4] management practices. This doctoral dissertation explores the persistence of national culture values on corporate finance.

This doctoral dissertation is constituted of four major chapters. The first chapter sets the stage of the research context. It also binds together the three empirical essays done in this dissertation. The next three chapters present three empirical essays analyzing culture's influence on three outcomes of corporate finance. These are firms' choices of capital structure, of the supply of trade credit around a financial crisis, and the outcome of firms' market value. The first two essays analyze culture's influence on firms' short-term and long-term financing, either in a period of economic stability or economic crisis. The third essay presents how culture could influence firms' market value, as market value could be the outcome of financing choices. The general introduction chapter presents a prelude of each of the four key chapters of this dissertation.

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[4] Culture as an informal institution pervasiveness in North (1991) sense.

1.3   The quest starts

The chapter 2 called "*the topology of national culture and corporate finance*" sets the stage for the empirical analysis of the links between national culture (Hofstede *et al.*, 2010) and corporate finance (Brealey *et al.*, 2012), through the lens of the mathematical topological framework (Leinster, 2014-2015). National culture dimensions are a set of values, corporate finance measures are another set of values, and the industries in which the firms operate form another set. Considering that we are handling sets, we found it meaningful to apply on them the principles of topology, which bind sets together in a topological space. Hence, chapter 2 defines and describes the three sets made of national culture values, corporate finance measures, and industry sectors, and the way we bind them together in a topological space. Through this topological framework, we bind together the research work of essay one, two, and three in 'the topology of national culture and corporate finance".

The major chapter 3 presents our first essay that is about how national culture influence firms' financing choices. Culture influences firms' risk-taking (Li *et al.*, 2013; Pan *et al.*, 2017). We measure culture's influence on firms' risk-taking through firms' choice of their capital structure. Firm's capital structure could be measured through different ratios. Irrespective of the ratio used, firms from different country-of-origin seem to have different capital structures within the same industry sector (see figure 1-2). We can observe that two tyres-making companies Michelin (France) and Goodyear (USA) have different capital structures. Similarly, in the high-technology semiconductor industry sector, STMicro (France) and Intel (USA) have differences in their capital structure. Even in the hospitality services industry sector, Accor (France) and Hilton (USA) have very different capital structure ratios.

Figure 1-2 : Capital structure of firms in three industry sectors.

	Michelin	Goodyear	ST Micro	Intel	Accor	Hilton
Total Debt to Total Equity	25.47	124.46	31.48	40.10	54.35	318.63
Total Debt to Total Capital	20.30	55.45	23.94	28.62	35.21	76.11
Total Debt to Total Assets	11.32	33.57	17.57	22.46	24.69	46.14
Long-Term Debt to Equity	21.08	110.28	29.29	37.53	50.46	316.41
Long-Term Debt to Total Capital	16.80	49.13	29.29	26.79	32.70	75.58

Source: Data as of October 10, 2018 extracted from https://www.marketwatch.com/

These differences in firms' capital structure, in spite of their belonging to the same industry, raises questions on how differently they are managed. Could it be due to country context where they were founded and grew? Would their country context condition their choices of financial capital and human capital? Or rather, should we say their access to the financial capital and the human capital? On the other hand, could it be that a type of financial capital and a type of human capital was more easily available to them? How does national culture influence the national context?

For large listed companies, as the ones we considered in our analysis, their capital structure is said to move towards their industry's "target ratio", which is the industry's long-term average capital structure (Bradley *et al.*, 1984). However, some examples show that it may not be so (see figure 1-3). Firms in the same industry sector, from different country-of-origins are close or far away from their industries' *target ratios*. Could the firms' capital structure gap to their industry's *target ratio* be a result of national culture's influence on their risk-taking?

Figure 1-3 : Firms' capital structure and their industry target ratio.

Company	Firm's Capital Structure (Tdebt/Tequity)	Industry Sector "Target Ratio"	Industry Sector
ST Micro (FR)	31.48	18.43	Manufacturing
Intel (US)	40.10	18.43	Manufacturing
Accor (FR)	54.35	61.74	Services/Hotels
Hilton (US)	318.63	61.74	Services/Hotels

Source: Data as of October 10, 2018 extracted from https://www.marketwatch.com/ and https://www.zacks.com/stock/research/STOCK_SYMBOL/industry-comparison.

We answer this question by analyzing the influence of national culture (Hofstede *et al.*, 2010) on the firms' capital structure gap with their industry's target ratio. We check this influence for all major industry sectors covering the complete SIC[5] code range.

The set of national culture dimensions we select, the set of measures of capital structure we adopt, and the set of industry sectors in which we analyze would comply with the topological space characteristics we define in chapter 2. While finding answers to this first essay's questions, more questions arose in our mind, which we set to explore in our second essay.

Our second essay presented in chapter 3 analyzes how culture influences corporate financial choices in a period of great economic stress, such as the 2008 mortgage financial crisis. Post the financial crisis, firms are in an economic context of demand reduction, credit supply reduction, and reduced access to

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[5] Standard Industry Classification.

the stock market (Claessens & Kose, 2013). This economic situation affects firms through multiple channels that are the *financial channel*, the *trade channel* and the *business cycle channel* (Claessens *et al.*, 2012). Under the multiple channels stress, it becomes crucial for firms to get through the immediate short-term effects of the crisis. Indeed, firms' short-term financing becomes critical. It is said that trade credit plays a very important role in firms' short-term financing helping them to get through the financially constrained post-crisis period (Molina & Preve, 2012; Coulibaly *et al.*, 2013).

Indeed, firms buy and sale products from/to other firms through trade credit (see figure 1-4). That allows a firm A to sale products to firm B, under the condition that firm B pays the amount of products purchased within a stipulated number of days as specified by the trade credit contract (Klapper *et al.*, 2011). This amount is called accounts receivable for firm A and accounts payable for firm B. Trade credit supply contracts are claimed to build upon suppliers-customers relationships, whose role is heightened post the financial crisis (Wilner, 2000).

Figure 1-4: What is trade credit?
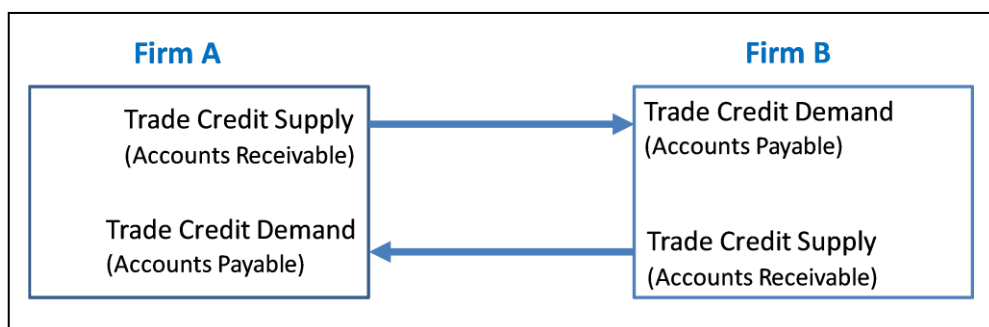
We explore how could the national culture of the supplier influence the way it extends trade credit to its customers? How could national culture play on suppliers-customers relationships in their trade credit dealings? How national culture influences firms in managing their short-term financing through the variation of trade credit supply, from pre-to-post the 2008 mortgage crisis? How does the financial crisis change the "normal" ways of firms extending trade credit because of suppliers' country-of-origin national culture values?

With our essays one and two, we answer how firms' country-of-origin national culture values could influence firms' financing choices. These choices could be of financing through debt or equity. It could be the long-term or the short-term financing in periods of economic stability, reflected in the capital structure. It could also be the critical short-term financing required in a period of severe financial constraints –a financial crisis– through trade credit supply. We are now set to describe our third essay, where cultural values could influence firms' financial value.

Firm's financial choices and access to financing could influence firm value. Literature show that firms financing choices of debt or equity (Fama & French, 1998), or its cash holding (Martínez-Sola *et al.*, 2013) could influence firm value. Moreover, firms' country-of-origin institutional context of banking sector or the stock market development could condition firms' ease-of-access to a type of financing (Demirgüç-Kunt & Maksimovic, 1998). The institutional context could also constrain firms' access to meet its specific human capital requirements (Redding, 2005). This literature sets the stage for our third essay in chapter 5.

The essay three explores how firms' country-of-origin national context could influence firm value. How the national context made of national culture, institutions of finance, law, and governance, as well as the institutions constraining the human capital could influence firm value? This research question arises from the presumption that firms' country-of-origin national context provides firms with a specific environment for it to start, grow, and produce value.

We try to describe our presumption by analogy to agriculture. Indeed, a grape's shrub requires a specific agricultural context (see figure 1-5). It needs a specific type of soil, climate, water, and fertilizers, along with specifically skilled human capital. This context allows the grape shrub to take root, grow, and give fruits creating value. Of course, the market value of the fruits would be subject to the competitive environment.

Figure 1-5: Seed, Nurture, and Grow. The effects of national context.

Source: Images sourced from multiple websites.

Similarly, a specific national context allows a specific industry to foster, grow, produce value and be competitive (Voltaire, 1773; Smith, 1776; Porter, 2000; Haake, 2002; Witt & Redding, 2009). We look at how a country's specific context could enable a specific firm to establish, grow, and create value that could lead to its market value. Could the differences in firms' country-of-origin national context lead to differences in firm value?

As an example, we present (see figure 1-6) the market value of some of the largest car manufacturing companies from different countries. At the first level, we can observe differences in firms' values between the Japanese, Chinese, European, and their American counterparts.

Figure 1-6: Automotive firm value from different country-of-origin.

Company	Country	Price-to-Book	Price-to-Earnings
SAIC Motor	China	1.1817	9.92
Toyota Motor	Japan	1.0842	11.46
Renault SA	France	0.3249	4.58
Peugeot SA	France	0.9820	5.57
General Motors	USA	1.1186	5.76
Volkswagen	Germany	0.8571	6.75

Source: Data as of January 17, 2020 extracted from https://www.bloomberg.com/quote.

Could a specific national context made of institutions of finance, legal, governance, and human capital influence their market values? What role national culture plays in the national context? How does national culture values find their way into the firms' financial value? We set to answer these questions in chapter 5.

The empirical analyses findings of our three essays assist us in checking the key properties of our topological space that are *connectedness*, *compactness*, and *homeomorphism*. We shall present in the conclusion chapter 6 of this doctoral dissertation, whether our results enable us to validate these properties. As such, each of the three empirical essay is independent in nature. However, there is a continuity in the choice of research topics treated and there are many links through the questions raised in one essay, which are answered in another.

The remaining of this dissertation is organized as follows. Chapter 2 sets the stage of the research context of this doctoral dissertation, which is "the topology of national culture and corporate finance". Chapter 3 presents the first empirical essay of "national culture, industries, and capital structure choice". Chapter 4 presents the second essay that is "crisis, culture, and trade credit". Chapter 5 presents the third and last essay that is "the financial value of cultural values". The transition from each essay to the next is described with some transition explanations of possible linkages between two consecutive essays. The general conclusion Chapter 6 closes the doctoral dissertation by highlighting our key findings and learnings through this research journey.

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2 From National Culture to Corporate Finance: A Topological Approach

2.1 Doctoral dissertation scope

Culture is used to describe common habits in people behavior (Voltaire, 1773). National culture values influence a country's people preferences (Hofstede, 1980, 2001). These preferences influence people choices while founding firms and further influence firms' financial choices during their lifecycle (Pan et al., 2017). It leads to firms' *country-of-origin*'s cultural values permeating their financial choices irrespective of their country of operation (Noorderhaven & Harzing, 2003).

The framework defined by Williamson (2000) proves to be very insightful for this doctoral dissertation. It builds the foundation of our empirical research, as we look to analyze the influence of national culture on firms' financial choices. Within his framework, the three empirical essays we perform access a large set of bodies of knowledge from the management, finance, and economics literature. The culture and finance literature, to which this doctoral dissertation belongs, is at the intersection of these bodies of knowledge. We present these broad sets of literature in figure 2-1. The figure is certainly not meant to be exhaustive, rather to help better understand this chapter 2 and to set the scope for this doctoral dissertation.

2.1.1 Setting the stage

At first glance, firms' financial choices are industry specific (Harris & Raviv, 1991; MacKay & Phillips, 2005). We expect industries' specificities to constrain national culture's influence on firms' financial choices. It means culture, financial choices, and industries are linked. We adopt the general topological space framework (Leinster, 2014-2015) to describe these links between culture, firms' financial choices, and industry sectors. The main scope of chapter 2 is to define this topological framework providing a reading lens for my doctoral dissertation.

I thought of the concept of building a topology between culture and corporate financial outcomes while defining my doctoral project proposal in June 2017[6]. My thought process to build a topology arose from our 21st century digital world. I felt we could describe culture through a numerical model. Then, we could study culture in its relationship with corporate financial outcomes through the mathematical concept of general topology. Therefore, topology would allow us to englobe theoretically as many relationships as we wish to study, between culture differences and corporate finance.

The approach of adopting a quantitative model of national culture and combining it with corporate finance would fit well within the neo-positivist research framework (Kraft, 1953; Weber, 1900/20). This framework highlights the study of social issues along with their economic contribution through quantitative modeling. Within this framework, our topological concept could test the neo-positivist quantitative borders. Therefore, neo-positivism gives us a theoretical starting point to the introduction

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[6] I presented this project to the doctoral project selection jury on 8 September 2017 at IAE-Clermont-Auvergne.

of mathematical topology in this doctoral dissertation. The neo-positivist approach has greatly benefited from the early 20th century scholarly work (Weber, 1904 & 1905; Weber 1947; Tawney, 1922).

Their researches highlight the influence of social context and group beliefs on the organization of economic activity, including corporate organization, and on the forms of capitalism. Their approach gets reflected in the more contemporary literature of the new institutional economics (NIE) (North, 1991; Williamson, 2000; Ménard & Shirley, 2014). Williamson (2000) described social constraints have very permeating influence on all aspects of economic activity as North (1991, p.111) highlights, "*What is it about informal constraints that gives them such a pervasive influence upon the long-run character of economies?*". Culture, as an important constituent of these informal social constraints, is described as a *slow moving* institution (Roland, 2004).

These informal social constraints are very persistent (Guiso *et al.*, 2016) over "*centuries or millennia*" (Williamson, 2000). Some key constituents of these social constraints are *customs, traditions, norms religion* (Williamson, 2000). These constituents are the building blocks of the description of national culture (Hofstede, 1980; Schwartz, 1994). Firms are considered the building blocks of a country's economic activity (Smith, 1776; Porter, 1993). Culture is described to influence this economic activity (Guiso *et al.*, 2006; Tabellini, 2010). More particularly to our interest area, culture affects corporate financial outcomes (Chui *et al.*, 2002; El Ghoul & Zheng, 2016).

Therefore, our research seek to understand the influence of culture on corporate finance. We measure this influence through firms' financial outcomes.

2.1.2 Opening the stage

Literature highlights that national culture influences the development of institutions (Williamson, 2000; Alesina & Giuliano, 2015), such as financial (Kwok & Tadesse, 2006), legal (Porta *et al.*, 1998), and governance (Licht *et al.*, 2005). Culture also influences industries development (Porter, 1993; Haake, 2002) and firms' financial choices (MacArthur, 2006; Zheng *et al.*, 2012; Levine *et al.*, 2018). Indeed, this literature adopts discrete measures of national culture to test its influence on firms' financial outcomes. This widely accepted usage of quantitative measures of culture in the finance literature vindicates our attempt to build a general topology framework between national culture, corporate finance, and industry sectors.

To build our topology, we need to define its three constituents of firm's national culture, financial outcomes, and industry. First, we define national culture. Most of the contemporary literature on culture

and finance applies four major models of national culture. Some of these models are the result of analyzing culture in an *Etic*[7] approach while others do in an *Emic*[8] way.

The two *Etic* approaches of analyzing culture are the national culture dimensions model (Hofstede, 1980, 2001; Hofstede *et al.*, 2010) and the human values types model (Schwartz, 1994). The two *Emic* approaches are the World Values Survey[9] model (Inglehart, 2014) and the GLOBE[10] model (House *et al.*, 2004). However, GLOBE also present and *etic* view of the cultural values they identify. From these, we adopt Hofstede's national culture model (Hofstede *et al.*, 2010). In order to better explain our choice, we describe in details these four cultural models in section 2.2.

Second, we identify the corporate finance scope. Indeed, financial literature describes that firm's managers make financing choices to meet the primary objective of firm's value maximization. These choices are between internal cash flows and/or external financing, such as bond issuance, equity issuance, bank credit, and trade credit (Coase, 1937; Modigliani & Miller, 1958; Jensen & Meckling, 1976; Fama, 1980; Brealey *et al.*, 2012). Firm managers carry their national cultural values into their financial choices (Pan *et al.*, 2017). Therefore, firms' national cultural values permeates firms' financial choices, since firms' founding. It brings firm's national culture influence into firm's financial outcomes.

Third and last constituent of our topology is industry. Each country inhabitants produce goods to meet their needs (Voltaire, 1773; Smith, 1776). Geographical constraints leads to the production of specific goods in some regions which are then exchanged against goods from other regions. This result in the development of specific labor skills in each region. This labor supports the development of industries for producing specific goods. Specific labor skills and a specific supply chains (Harris & Raviv, 1991) characterize an industry. The quantum of employment of labor and of financial capital is specific to each industry (MacKay & Phillips, 2005). We consider industry as the economic building bloc of a nation's competitive advantages (Porter, 1993).

A country's environment brings constraints on how business is conducted (Witt & Redding, 2009). These constraints lead to the development of a country's business systems (Haake, 2002). A business system development embeds all the specificities of a country's context of geography, labor, finances, and cultural values (Porter, 2000). These business systems fosters the development of specific human capital skills and the development of specific industries (Haake, 2002). It brings competitive advantages to firms in these industries (Porter, 1985, 1993). Culture values do get transformed into firms' financial choices through the industry sector constraints. We define these constraints as the *industry*

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[7] In cross-cultural research, *Etic* level studies culture from an outside view of it.
[8] *Emic* level's research analyzes culture from within the society.
[9] World Values Survey Association: http://www.worldvaluessurvey.org/
[10] Global Leadership & Organization Behavior Effectiveness: http://globeproject.com/

transformation function. This *function* conditions the transmission of cultural values influence to firm's financial outcomes.

The three constituents of our general topological space are now defined. We can now formalize the definition of a "mathematical" topology (Munkres, 2000; Krantz, 2009; Leinster, 2014-2015). Topology could simply be described as *"the mathematical study of the properties that are preserved through deformations, twistings, and stretchings of objects, without tearing"*[11]. This perspective of "preserving the properties" means that in a topological space two sets are continuously linked to each other through a relationship where each point in a set has a corresponding representation in the other set (Leinster, 2014-2015). And each adjacent point in the first set will have a representation in the second set. This correspondence between each point of a set into a point in another set is called a *neighborhood* relationship (Alexandrov, 1961, p8). Continuity is a fundamental concept of a topological space, which binds two sets through the *neighborhood* relationship (Leinster, 2014-2015).

Continuity requires that the two sets' relationship validates the topological space properties of *connectedness, compactness*, and *homeomorphism* (Munkres, 2000; Krantz, 2009). First, *connectedness* describes the property that each element in one set finds its representation in the other set (Munkres, 2000). Second, *compactness* is that any gap between two elements in one set finds a representation in the other set (Munkres, 2000). Third, *homeomorphism* could be like transforming a circle into an ellipse and vice-versa. It is the process of bending and stretching, without tearing, of a geometrical space into another, keeping certain properties and modifying others (Krantz, 2009). In *homeomorphism*, any point in one set is linked to a point in another set and the reverse is true as well.

We believe that this topological framework can apply well to the relationships between culture and corporate finance through the *industry transformation function*. The two sets of culture and firms financial outcomes linked with the industry function could satisfy the topological space's properties of *connectedness, compactness, and homeomorphism*. This assumption finds support in the literature showing that culture influences firms' financial decision-making (Carr & Tomkins, 1998; Li *et al.*, 2013) leading to firms' financial outcomes (Chui *et al.*, 2002; El Ghoul & Zheng, 2016), within industry sectors.

We look to prove the three key topological space properties of *connectedness, compactness*, and *homeomorphism* through our three empirical essays presented in chapter 3 to chapter 5. The three essays are empirical in nature and based on international samples of firms. The international samples facilitates the analysis of cross-countries cultural differences on firms' financial outcomes.

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[11] http://mathworld.wolfram.com/Topology.html. We took this reference because most definitions given in the literature (Munkres, 2000; Krantz, 2009; Leinster, 2014-2015) are described in a very technical manner. We refer to those in section 2.5 of this dissertation.

Our first study is linking national culture dimensions to firm's capital structure choice (see chapter 3). Second one linking culture to firm's short-term financing through the variation of trade credit supply around a financial crisis (see chapter 4). And the third is investigating culture's influence on firm's market value (see chapter 5). With these three essays, we look to establish a proof-of-concept of the applicability of topological framework to research in culture and finance.

Figure 2-1: Multiple literature bodies meeting to build the "culture and finance" literature.
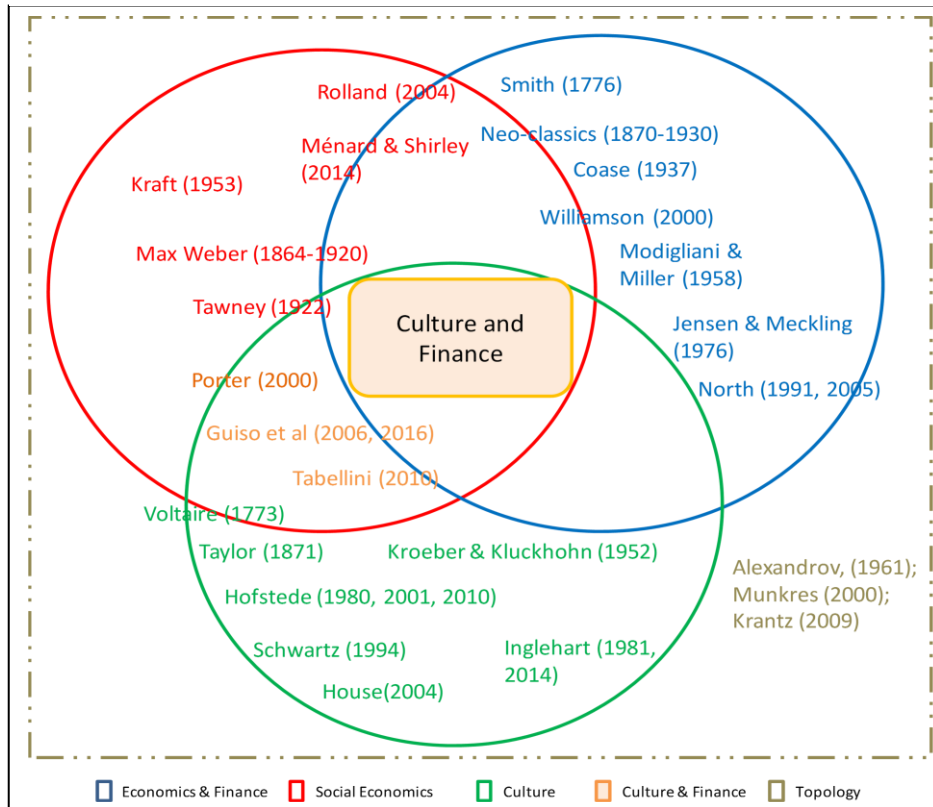
In red is the social economics literature. In green is the culture literature. In blue is the finance literature. In light and dark orange is the culture, economics, and/or strategy literature. In dark green-ocean is the topology literature.

We believe that, with our proof-of-concept of the applicability of the topological space to the culture and corporate finance research, this topological approach could possibly serve to construct a foundation for our future research in culture and corporate finance with the industries functions (see section 2.5).

The section 2.2 defines corporate finance and industry specificities. Section 2.3 defines national culture. Section 2.4 describes links between culture and corporate finance. Section 2.5 defines the topology between national culture and corporate finance with the industry transformation function. Section 2.6 concludes.

2.2 Corporate finance and industry specificities

Corporate finance and industry specificities are intimately linked (MacKay & Phillips, 2005). Firm's financial choices are constrained by the industry in which it operates. These constraints are on firm's employment of its financial capital and human capital. The optimal ratio of the human capital to the financial capital makes the firms competitive. With this background, we analyze the fundamentals of corporate finance, of industries and the links between the two.

2.2.1 What is corporate finance?

Corporate finance is intimately tied to the theory of the firm. The neoclassical economists (1870 -1930) (Hennings & Samuels, 2012) describe the key reason of firm's existence is to make profits. Firms achieve profit maximization by selling products at the highest price minus producing it at the lowest costs. The lowest cost of production is obtained by optimal resources allocation to achieve maximum profits. The optimal price is constrained by external forces with the objective of highest marginal revenue. The difference between the marginal revenue and the marginal cost would be firm's optimal profit. The best ways to optimize costs and revenues are what the firms' founders set to achieve.

This process can start from the time of firm's creation by its founders (Coase, 1937). He defines the fundamental existential role of the firm is to enable optimal transaction costs for the entrepreneur. This is required in an environment where the entrepreneur contractually engages labor for the short to medium-term in order produce goods internally rather than buying externally. He defines the firm as "*systems of relationships that comes into existence when the direction of the resources is dependent on the entrepreneur*" (Coase, 1937, p393). He mentions that the "*economic man*" or the entrepreneur enters in a long-term contractual agreement with a resource (or agent) and can decide of what the resource is to do for him.

Firms need to raise financing for their operations. It leads them to evaluate the costs and choices of firms' financing to maximize their profit and market value (Modigliani & Miller, 1958). Choosing the sources of financing leads to examine the problems in the agency's framework from ownership structure (Jensen & Meckling 1976). These problems arise from the manager's (agent) incentives in the firms' choices of its financing sources (Fama, 1980). This literature highlights that corporate finance is primarily about the firms' financing choices with the objective of profit and value maximization. But these choices are critically tied to the decisions of its agents and shareholders. The intermediaries (agents and shareholders) differing preferences have a key role in firm's financial lifecycle (Modigliani & Miller, 1958).

Under perfect market's conditions, firms having equal access to sources of financing and perfect competition, Modigliani and Miller (1958) develop the model of the firm based on financing choices, their costs and their investments' expected rate of return. They look at the possible impacts of financing sources, which in turn drives firm's choice of financing through debt or equity, considering tax benefits,

for the lowest average cost of capital. Firm's financing choices serves as the foundation for our first essay testing culture's influence on capital structure choice, through the conditioning of firms' risk-taking attitude (Li *et al.*, 2013; Pan *et al.*, 2017).

Furthermore, capital structure choice affects firm's value maximization objectives (Modigliani & Miller, 1958; Masulis, 1983). Firm value is also constrained by the country's context in which the firm operates (Fama & French, 1998). We analyze the effects of national culture on firm value in our third essay.

Firm financing sources and choices are key to its profit maximization. These financial choices can be for its short-term working capital or long-term investment needs (Titman & Wessels, 1988; Deloof, 2003). In our second essay, we analyze culture influence on firms short-term financing through a constituent of working capital that is trade credit.

This literature on corporate finance highlights that firms makes financial choices for maximizing profits. These choices are influenced by firms' founders and their agents. Firm choices are practices that are often engrained since firm's foundation, though they could get attenuated over long periods (Pan *et al.*, 2017). In this doctoral dissertation, the primary focus is on national cultural values of firm's country-of-origin that become a part of its financial practices. These practices persists due to the informal constraints of culture (North, 1991).

Our analyses focuses on the overall effects of national culture on firms' financial practices, resulting in their financial outcomes. These persistent financial practices are collectively carried overtime by its agents in operating the firm. This is important to us because the collective behavior is what national culture is about, of common beliefs and practices of people of a nation (Hofstede *et al.*, 2010).

For example, post the 2008 financial crisis, French bank suffered little losses as structurally they embed the French national cultural value of high *uncertainty avoidance* (Hofstede, 1980). This value is about preparing for the uncertain furture. France *uncertainty avoidance* score on the Hofstede index is 86, while USA is 46.

As financial choices are build-in practices in the firm since its foundation, its' agents carry-on with these practices (Pan *et al.*, 2017). The founders and their agents makes financial choices aligned to their national culture values. They do these financial choices following corporate financial theory of profit maximization. Their choices are influenced by their national culture values leading to firm's financial outcomes. These financial choices are constrained by firm's industry specificities.

2.2.2 Industry specificities

Firms are the basic units of an industry. An industry is a fundamental economic building bloc of a nation (Porter, 1993). In turn, the competitive advantage of an industry gives a competitive advantage to the nation where it is born. Indeed, Porter (1993) highlights that an industry's existence and its

competitiveness is due to the national context of where it is born. He describes this context to be constituted of "*national values, culture, economic structures, institutions, and histories all contribute to competitive success*" (Porter, 1993, p3).

An important constituent of firm's competitiveness is its industry (Porter, 1985). Some industries may be more competitive arising in one national context than another (Haake, 2002). National context is a key determinant of an industry development and competitiveness. An industry competitiveness comes from its specific human capital (Harris & Raviv, 1991). The value of the human capital arises from is specific intellectual capital and skills (Sullivan, 2000). The optimal combination of this human capital with the financial capital are specific to an industry (MacKay & Phillips, 2005).

It does mean that national context is important to the development of an industry (Whitley, 1992, 1999). The national context is the combination of institutions that enables firm's financing sources, contribute to human capital skills development, and defines the framework for firms and employees relationships (Redding, 2005). The existence and the development of these institutions is quite dependent on the national culture values (Witt & Redding, 2009). National culture values and a country's institutions are aligned to meet a country's social needs (Williamson, 2000).

This literature suggests that culture influences the national context, which influences the development of specific industries, in which a firm has to be competitive. Hence, culture, industry, and corporate finance share a link. We look to structure this link through our topological framework (see section 2.5).

All industries irrespective of their country-of-origin have to constantly re-invent themselves on the path of innovation (Porter, 1993). The competitive advantages of an industry could be learnt by another industry due to lowering international boundaries of trade (Whitley, 1992). Firm from a country weaker in an industry could decide to develop itself in another country where the said industry's national context is more suitable (Porter, 1993).

The literature supports the perspective that a firm country-of-origin matters for its competiveness, as does the industry to which it belongs to (Haake, 2002). An industry could be more competitive depending of the country-of-origin of its inception and development, which lead to its competitive advantage (Porter, 1993). Country boundaries limitations may be breaking, as firms from one country could develop their activities in another country (Porter, 2000). It leads to an industry competitiveness context to be replicated in another country with specific institutional support, as national competitive advantages are becoming a core concern of governments (Porter, 1993; Whitley, 1999).

In the new globalized economic context, where national boundaries are becoming more transparent for trade, a different way of looking at firms and industries development beyond their national context maybe the future order (Hall, 2015). However, for this doctoral dissertation, I adopt the view that

national context is important for firm's financial choices. These choices are constrained by industry characteristics and by national culture values.

Our view is based on the literature describing that over long periods of time, the development of a national context of institutions (Williamson, 2000; La Porta *et al.*, 2008), governance (Licht *et al.*, 2005), and business systems (Breuer & Salzmann, 2012) is influenced by national culture values. These national culture values are pervasive (North, 1991) and persistent over "*centuries and millennia*" (Williamson, 2000; Hofstede *et al.*, 2010).

National culture influences firms' financial choices leading to firms' financial outcomes. These choices are industry specific as is its human capital. These choices differ from one industry to another. The industry sector act as a transformation function of national culture values, through national contexts and human capital, into firms' financial outcomes (see section 2.5).

We assume from our literature description that there are potentially two channels of transmission of national culture values to the firm (see figure 2-3). One is through the human capital that we call "*agency channel*". Second is through the institutions that we call "*institutional channel*" (see section 2.4). The "*agency channel*" carries national culture values of its founders and managers (Pan *et al.*, 2017). The "*institutional channel*" carries national culture values embedded in the institutions (Kwok *et al*., 2006; La Porta *et al*., 2008). The institutions are conceived and developed to meet social needs that are aligned with a nation's people values (Porta *et al.*, 1998; Williamson, 2000). Both channels of transmission would co-exist and influence industry development and firms' financial choices. The transmission of culture effects through these channels would differ due to differences in industry sectors. It would lead to differing firms' financial outcomes from one industry to another.

This section lead us to understand about firms financial choices, being constrained by the industry and country's context. The industry and country' context embed national culture values. It could lead to culture's pervasive influence on firm's financial choices. This brings to our next section defining culture and how it is linked to a country's industries, firms and to its economy.

2.3   Defining culture

The word "culture" is old, first described around 1774-1793 (Kroeber & Kluckhohn, 1952). It highlights common traits in people behavior and their cross-country differences (Voltaire, 1773). The modern description of national culture also defines differences between common behaviors of people from one country to another (Hofstede, 1980; Schwartz, 1994; Inglehart, 1997; House *et al.*, 2004).

Indeed, Voltaire (1773) describes the natural environment of people in different nations, which conditioned the way people lived and grew their knowledge in each nation. People habits and knowledge moved from one nation to another nation through trade and conquests. He describes that common habits

in each nation differ from another due to their natural environment. Voltaire uses the word "culture" to describe agriculture and the art of writing. The latter he says gives the intellectual superiority to a nation over another. Overall, his work highlights the idea of common behaviors of people in a nation

Furthermore, he describes agriculture as the primary economic activity of nations. Each nation differs in their common way of doing agriculture, which may provide them more or less wealth. It provides them wealth to build ships to search for new agriculture lands. As people of a nation build ships for commerce, it gives them the ship industry. As they travel to other nations, they find other industries in those nations, such as textile in India. Voltaire (1773) description of the world shares the fundamentals of economic development of nations described by Adam Smith (1776). This description meet the modern literature on competitiveness of nations (Porter, 1993).

Tylor (1871) reviews culture from the perspective of different gods around different aspects of life, primarily underlining a religious perspective of culture. He links the transmission of beliefs and practices across generations through rebirth. His description of culture is very primitive from the modern definitions of culture. Although, the modern descriptions of culture as common practices of a group of people englobe all these primitive cultural descriptions. Tylor is referred to be the first to use and describe the word "*culture*" in English (Kroeber & Kluckhohn, 1952).

Kroeber and Kluckhohn (1952) review the history of the word "culture" in different western languages with the oldest use being referred in German by "*Kultur*" around 1774-1793, referring to developments in agriculture. They link the origin of the word "*culture*" in western languages to the word "civilization". Around 1530-1596, "civilization" in the English perspective more or less meant, bringing ones practices to other people in order to "civilize" them. However, in French "*civilisé*" referred to the polished and sociable manners, further linking it to the city life. "*Civiliser*" is also referred to bringing development to another lower developed nation. Furthermore, western scholars seem to be using the words "*civilization*" and "*culture*" interchangeably until the 1930s. These historical descriptions highlighted by Kroeber and Kluckhohn (1952) primarily show "culture" meant development of a society. However, the contemporary definitions describe it as a common set of behaviors of people in a group (Hofstede, 1980; Schwartz, 1994; Baldwin *et al.*, 2006).

In this contemporary culture's description of common behavior, Baldwin *et al.* (2006) explain that the definition of culture keeps evolving with time passing. They highlight about 300 definitions of culture, from which we choose this definition: "*it is a group shared collective meaning system through which the group's collective values, beliefs, customs and thoughts are understood.*" (Baldwin *et al.*, 2006, p13). This concept of shared values and beliefs by a group is the most common culture description that appears in the four main contemporary studies about cultural values (Hofstede, 1980; Schwartz, 1994; House *et al.*, 2004; Inglehart, 2014).

They all define culture through shared values and beliefs, which Hofstede (1980, 2001, 2010) calls *cultural dimensions*, Schwartz (1994, 2006) calls *human value types* or *cultural value orientations*, House *et al.*(2004) describe them under *culture and leadership values*, and Inglehart *et al.* (2014) identifies them under the *World Values Surveys*. They describe culture through four models that are most applied in financial management research over the last 20 years (Chui *et al.*, 2002; Fauver & McDonald, 2015; Karolyi, 2016; Haq *et al.*, 2018).

The next sub-sections introduce the different approaches taken in describing culture by Hofstede, Schwartz, GLOBE, and WVS. We also describe the reasons for which we choose Hofstede culture model for this doctoral dissertation.

2.3.1 Hofstede cultural dimensions

Hofstede (1980) defines culture as "*a collective programming of the human mind which distinguishes the members of one group from another*". He develops this definition at the country-level as *national culture dimensions* starting with a survey of 117,000 IBM employees across 50 countries, in the period 1967-1973, by analyzing their behavior in the workplace. By studying the variations in responses, he first developed four cultural dimensions as *Power Distance* (PDI)*, Uncertainty Avoidance* (UAI)*, Individualism vs. Collectivism* (IDV)*, Masculinity vs. Femininity* (MAS). Later, a fifth dimension is defined as *Long/Short Term Orientation* (LTO) (Hofstede, 2001). Finally, a sixth dimension is defined as *Indulgence/Restraint* (IVR) (Hofstede *et al.*, 2010). Each of these dimension has a country-level score between 0-100 with over 100 countries currently on the cultural dimensions index[12].

Hofstede explains that this "*collective programming*," is stable over long periods as culture changes happens over centuries. Extending his initial work in the "*software of the mind*" (Hofstede G., & Hofstede J., 1991), he describes the impact of culture dimensions on corporate culture and even goes on to describes the type of industries that could be more successful in relation to the country's cultural dimensions scores. Hofstede (2011) adds that societal cultures, acquired during childhood, are deep rooted in the people's unconscious minds and cultural values express themselves throughout life as "*broad tendencies to prefer certain states of affairs over others*" (Hofstede, 2011, p3).

Hofstede's dimensions influence on corporate culture can be significant when compared with firms' management lifespan. From Hofstede's (1980) initial survey sample to the recent addition of the sixth dimension (Hofstede *et al.*, 2010), his culture's model has been linking culture and management, with wide applications in management research (Newman *et al.*, 1996; Doney *et al.*, 1998; Noorderhaven & Harzing, 2003; Chui e*t al.*, 2010; Duong *et al.*, 2016).

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[12] *VSM100* dated 8dec2015: https://geerthofstede.com/research-and-vsm/dimension-data-matrix/

Hofstede's (Hofstede *et al.*, 2010) six cultural dimensions are defined as,

(i) **Power distance:** this is about the expression of hierarchy in a group. It is how one can observe the relationship between position of authority and the position of subordination. Higher the gap observed, higher is the power distance. In egalitarian countries, this gap would be lower.

(ii) **Individualism vs. Collectivism**: importance of self vs. the group. In individualist cultures, the expression of self is heightened, while in collectivist cultures, the expression of the group prevails over the individual's.

(iii) **Masculinity vs. Femininity:** gender differences viewed through the Task orientation vs. People orientation lens. This particular dimensions qualifies as masculine, the behavior of task oriented-ness, while feminine is the behavior that values people more than tasks.

(iv) **Uncertainty Avoidance**: this is about the level of acceptance of the unpredictable future. It describes the behavioral tendency to prefer stable/predictable outcomes vs. unknown outcomes, irrespective of the time horizon.

(v) **Long-term vs. Short-term orientation**: it represents the strategic perspective of one's act vs. short-term results. This dimension develops about a culture's acceptance that whatever decision taken, it will have a long-term impact, rather than looking for the outcomes immediately.

(vi) **Indulgence versus Self-restraint**: self-gratification and enjoyment vs. controlling of one's emotions and desires. National cultures that are high on indulgence index are more accepting on the display of one's wealth. On the contrary, the ones that value self-restraint prefer not to display in order not to upset others.

These six dimensions could be applied in any type of management research to study cross-national differences in cultural influence. Complementary research exists to handle potential applications of Hofstede's culture dimensions (Sivakumar & Nakata, 2001). An updated index is developed by Tang and Koveos (2008) considering the fast economic changes over the last twenty years, which could have impacted some of the dimensions of *individualism*, *long-term orientation*, and *power distance*. Despite many criticism (Shenkar, 2001; McSweeney, 2002; Schwartz, 1994), Hofstede cultural model's large acceptance in management research supports its empirical validity.

Schwartz (1994) represents culture with more values by describing lower level nuances of culture. However, his model is less widely used in management literature and doesn't include significant culture research contributions from third parties.

2.3.2   Schwartz cultural values

Schwartz (1994) research builds on a survey conducted in 44 countries on 25863 respondents, between 1988 and 1993, across a broad sample of school teachers, students and diversified adults groups. Schwartz (2012) further updates his research validation over 80 countries. He analyzes "*conflicts and*

compatibilities" among the cultural values to define 4 higher order value types grouped under two major value themes as:

(i) *Openness to Change* vs. *Conservation*
(ii) *Self-Enhancement* vs. *Self-Transcendence*

He details these higher order value types into ten major value types that are cross-culturally valid (see table 2-1).

Table 2-1: Schwartz culture values types[13].

Four higher orders	Value Types Definitions
Self-Enhancement (Mastery & Hierarchy)	**Power**: Social status and prestige, control **or** dominance over people and resources
	Achievement: Personal success through demonstrating competence according to social standards
Openness to Change (Autonomy)	**Hedonism**: Pleasure and sensuous gratification for oneself
	Stimulation: Excitement, novelty, and challenge in life.
	Self-Direction: Independent thought and action-choosing, creating, exploring.
Self-Transcendence (Egalitarian Commitment)	**Universalism**: Understanding, appreciation, tolerance, and protection for the welfare of all people and for nature.
	Benevolence: Preservation and enhancement of the welfare of people with whom one is in frequent personal contact.
Conservatism (Harmony with Nature)	**Tradition**: Respect, commitment, and acceptance of the customs and ideas that traditional culture or religion provide.
	Conformity: Restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms.
	Security: Safety, **harmony**, and stability of society, of relationships, and of self.
Un-Attributed	**Spirituality**: Spiritual life, devout, inner harmony, meaning in life, detached

(i) *Openness to change* represents the idea of not being closed on oneself but rather be open to embrace changes for the self-betterment.

(ii) *Conservatism* on the contrary characterises the tendency of being in harmony with what exists without looking to break it for self-pleasure or enhancement even if it requires status-quo.

(iii) *Self-Enhancement* is the attitude of focusing on the self, which is how I can gain more or possess more for my own gratification.

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[13] Extracted from (Schwartz, 1994, p22 & p24) - "Are there universal aspects in the structure and content of human values?"

(iv) *Self-Transcendence,* at the opposite values going beyond self-importance and help others while accepting their differences. It goes up to the extent that the well-being of others matters more than the self.

However, Schwartz's survey on the *spirituality* value did not come out to be a cross-culturally consistent value type. He did not include it in his list of ten value types. In our literature review, we found few financial researches adopting religion as a key impact variable (Hilary & Hui, 2009; Baxamusa & Jalal, 2014).

Schwartz's cultural values types have a much lower adoption in management research than Hofstede's dimensions. Both survey a large number of countries' respondents which gives them cross-national validity. However, their surveyed sample type differs. Schwartz surveys students and general population, while Hofstede surveys corporate employees in his first survey. This means that Hofstede sample is more aligned to our analysis of culture influence on firms' financial choices. Nevertheless, Schwartz's ten value types allows for characterizing of more nuances in people behavior.

2.3.3   GLOBE leadership values

GLOBE[14] (House *et al.*, 2004) has done two major studies to assess the influence of national culture on corporate middle-managers and CEOs. The middle-managers' survey covered 62 countries with 17000 respondents in 951 organizations and the *CEO survey* (CEO and senior executives) was done in 24 countries with 100 CEOs and 5000 seniors executive level respondents. Its two survey studies datasets are available on their website[15].

A key characteristic of their studies is that they also created 10 clusters of societies clubbing several countries, which share similar values, rather than focusing only on national culture values. From this societal perspective, the study analyzes the links between *societal culture, societal effectiveness* and *organizational leadership.*

From their first study "*Understanding the Relationship Between National Culture, Societal Effectiveness and Desirable Leadership Attributes*" (House *et al.*, 2004), they identify nine societal practices value types: *Performance Orientation, Assertiveness, Future Orientation, Humane Orientation, Institutional Collectivism, In-Group Collectivism, Gender Egalitarianism, Power Distance, Uncertainty Avoidance.*

Their second study (Chhokar *et al.*, 2013) focused more on organization leadership in relation to societal culture, that they call "*culturally endorsed leadership theory (CLT)*". They identify six leadership values that are, *Charismatic/Value-Based Leadership, Team-Oriented Leadership, Participative Leadership, Humane-Oriented Leadership, Autonomous Leadership*, and *Self-Protective Leadership*.

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[14] Global Leadership & Organizational Behavior Effectiveness
[15] http://globeproject.com/results

Their study focusing primarily on corporate population shall be very relevant to analyzing firms' financial choices. However, Hofstede (2006) criticizes GLOBE that its nine societal values are primarily similar to his six dimensions. Furthermore, GLOBE's perception gap measures[16] for each of the nine values are rarely found in the management literature.

2.3.4   World Values Survey

The World Value Survey (WVS) organization started as the European Value Survey organization in the 1980s by Ronald Inglehart, to track the evolution of personal values influenced by economic development and modernization (Inglehart *et al.* 2000). Inglehart's body-of-research (Inglehart, 1997; Inglehart, 2000; Inglehart, 2015; Inglehart, 2018) on societal values largely served as the basis of the development of the WVS surveys over the years.

The latest survey (*WVS wave7*) is carried from 2017-2020 covering about 80 countries. WVS is an independent non-profit organization based at Tilburg University in the Netherlands. WVS exhaustive dataset is available on its website[17]. An interesting feature of the website is an animated world map[18] showing the evolutions of cultures around the world since 1981. We can observe that these changes have been few over this period.

The WVS survey is built around 14 sub-themes measuring cultural values and other societal characteristics as *social values, attitudes & stereotypes; societal well-being; social capital, trust and organizational membership; economic values; corruption; migration; post-materialist index; science & technology; religious values; security; ethical values & norms; political interest and political participation; political culture and political regimes; demography*. Each of these themes is further subdivided into a total of 290 sub-items.

The worldwide scope of the WVS survey and its frequency makes it the most exhaustive database available to researchers on cross-cultural studies. Its large number of cultural values makes it difficult to use to overall characterize each country's culture and comparing them in a large cross-country analysis. For this reason, most research using WVS choose only few values that meet their specific scope (Fauver & McDonald, 2015; Levine *et al.*, 2018).

2.3.5   Which culture model to adopt?

The four models of culture presented are the most used in financial literature. They all converge on the definition of national culture values that of shared and common beliefs among the people in a country. Although, they model culture through a larger or smaller set of values. Hofstede (2010) model has six

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[16] The difference between the *Etic* and *Emic* view of the same GLOBE leadership value.
[17] http://www.worldvaluessurvey.org
[18] Inglehart - Welzel's Cultural Map**:** http://www.worldvaluessurvey.org/WVSContents.jsp

values, Schwartz (1994) defines ten values, GLOBE (2004) has nine, and *WVS*[19] (2018) has fourteen sub-themes further divided into 290 items. Table 2-2 summarizes these four models.

Table 2-2: Summary of the four culture models.

	Hofstede	Schwartz		GLOBE	WVS
	6 National Culture Dimensions	10 Culture values types	4 higher order	9 Societal culture values	14 Sub-themes
	Power Distance	Power	*Mastery*	Performance Orientation	Social Values, Attitudes & Stereotypes
	Individualism vs. Collectivsm	Achievement	*Mastery*	Assertiveness	Societal Well-Being
	Masculinity vs. Feminity	Hedonism	*Autonomy*	Future Orientation	Social Capital, Trust and Organizational Membership
	Uncertainty Avoidance	Stimulation	*Autonomy*	Humane Orientation	Economic values
	Long-term vs. Short-term Orientation	Self-Direction	*Autonomy*	Institutional Collectivism	Corruption
6	Indulgence vs. Restraint	Universalism	*Egalitarian*	In-Group Collectivism	Migration
		Benevolence	*Egalitarian*	Gender Egalitarianism	Post-materialist index
		Tradition	*Harmony*	Power Distance	Science & Technology
9		Confirmity	*Harmony*	Uncertainty Avoidance	Religious values
10		Security	*Harmony*		Security
					Ethical values & Norms
					Political Interest and Political Participation
					Political Culture and Political Regimes
14					Demography

Choosing one of these models for any research depends on the objectives of the said research. Therefore, for research work looking to test the overall influence of national culture across many countries, Hofstede (2010), Schwartz (1994), and GLOBE (2004) are well suited. The main advantage of these three cultural models is that they have a small number of values describing a country's national culture. This make it easy to handle them in a large sample of cross-country analysis, where one wishes to consider the overall culture of a country. The main concern for each one of these models is the potential

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[19] World Values Survey, *WVS7*: http://www.worldvaluessurvey.org

loss from omitted cultural variables when using only few from a model, though solutions exists addressing the concern. On the other hand, *WVS* (2018) is proposing the largest number of cultural values, with each possibly being considered independently from the other. Their large number of values makes it difficult to model a country's overall culture.

For this doctoral dissertation, analyzing a large cross-country firms' dataset, a smaller set of national cultural variables would be suitable like Hofstede, Schwartz, or GLOBE. Hofstede six dimensions and GLOBE nine values are very close in their definitions. They have been defined based on survey of company employees, hence very suitable to our dissertation. However, Hofstede (2006) describes that GLOBE values could well be regrouped under his five dimensions (Hofstede, 2001). Schwartz (1994) values types provide higher level of details compared to (Hofstede, 2001). Schwartz (1994) value types have been developed from a sample of students and school teachers, which reduces their suitability to our research in this dissertation. Few other reasons tend to favor adopting Hofstede (2001) culture dimensions.

First, we could only find few references of GLOBE values usage in the culture and finance literature. A number of significant culture and finance research are applying Schwartz (1994) value types (Chui *et al.*, 2002; Licht *et al.*, 2005). Others (Li *et al.*, 2013) are applying them along with Hofstede (2001). Overall, Hofstede (2001) dimensions have a very large empirical validation across management studies, to just name a few (Chang & Noorbakhsh, 2009; Chui *et al.*, 2010; Zheng *et al.*, 2012; Li *et al.*, 2013; Chen *et al.*, 2015, Haq *et al.*, 2018). Hofstede cultural dimensions research work has over 140,000 citations as per google scholar (Karolyi, 2016).

Second, GLOBE values are available by cluster of countries with twelve clusters. It limits the size of the overall cultural diversity. Its dataset is available for a fee. Schwartz (1994) value types are available for approximately forty countries but the corresponding dataset is very difficult to access. Hofstede (Hofstede *et al*., 2010) cultural dimensions database has close to 120 countries and freely accessible on his website.

Third, it has a large network of scholars having experience applying them. However, Hofstede's model also has critics showing the limitations of his dimensions framework (Shenkar, 2001; McSweeney, 2002). This review of Hofstede's model indicates that one could adopt it knowing its strengths and weaknesses when applying in a cross-country research.

Based on the above reasons, we adopt Hofstede (2010) cultural dimensions framework suits best our cross-country analysis in this doctoral dissertation. The next few charts (see figure 2-2) map several countries with some of the six cultural dimensions scores (0-100) of *individualism* (IDV), *masculinity* (MAS), *uncertainty avoidance* (UAI), and *long-term orientation* (LTO).

Figure 2-2: Scattered mapping by country of Hofstede culture dimensions.

LTO VS UAI

MAS VS IDV
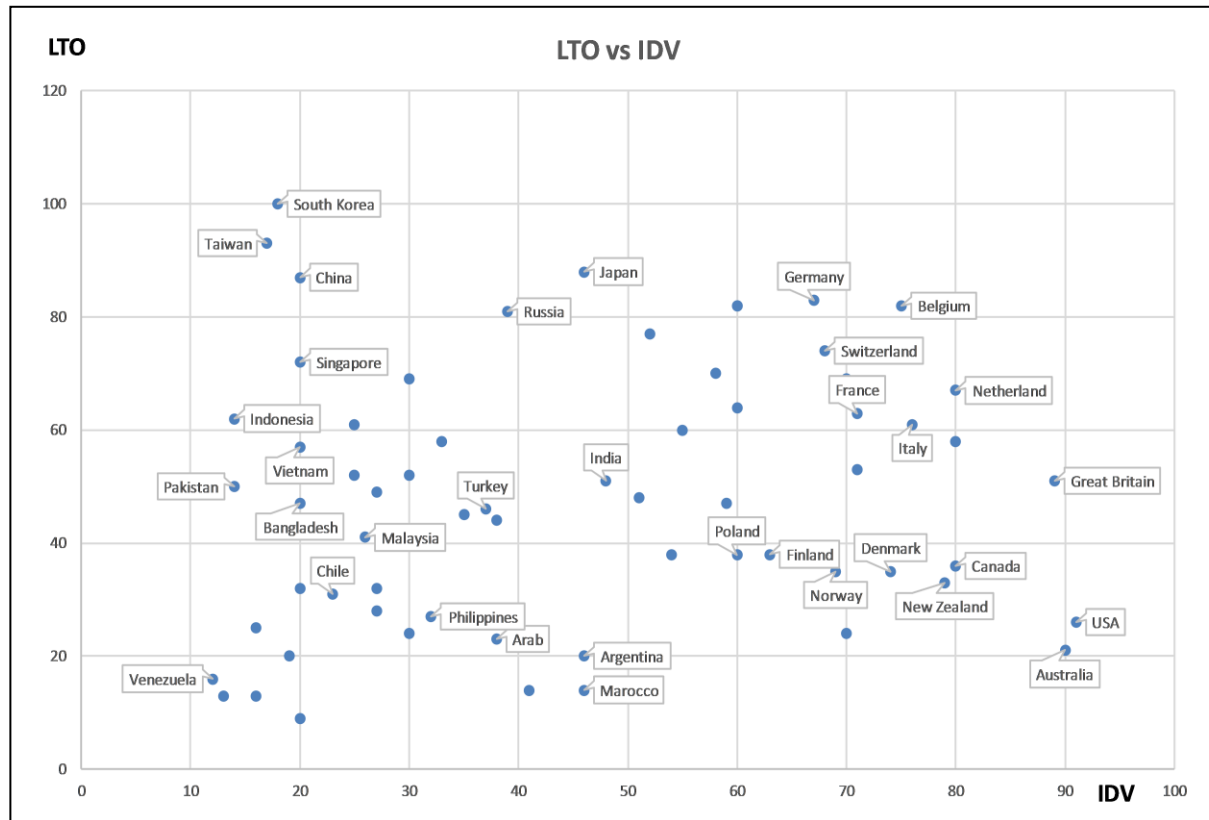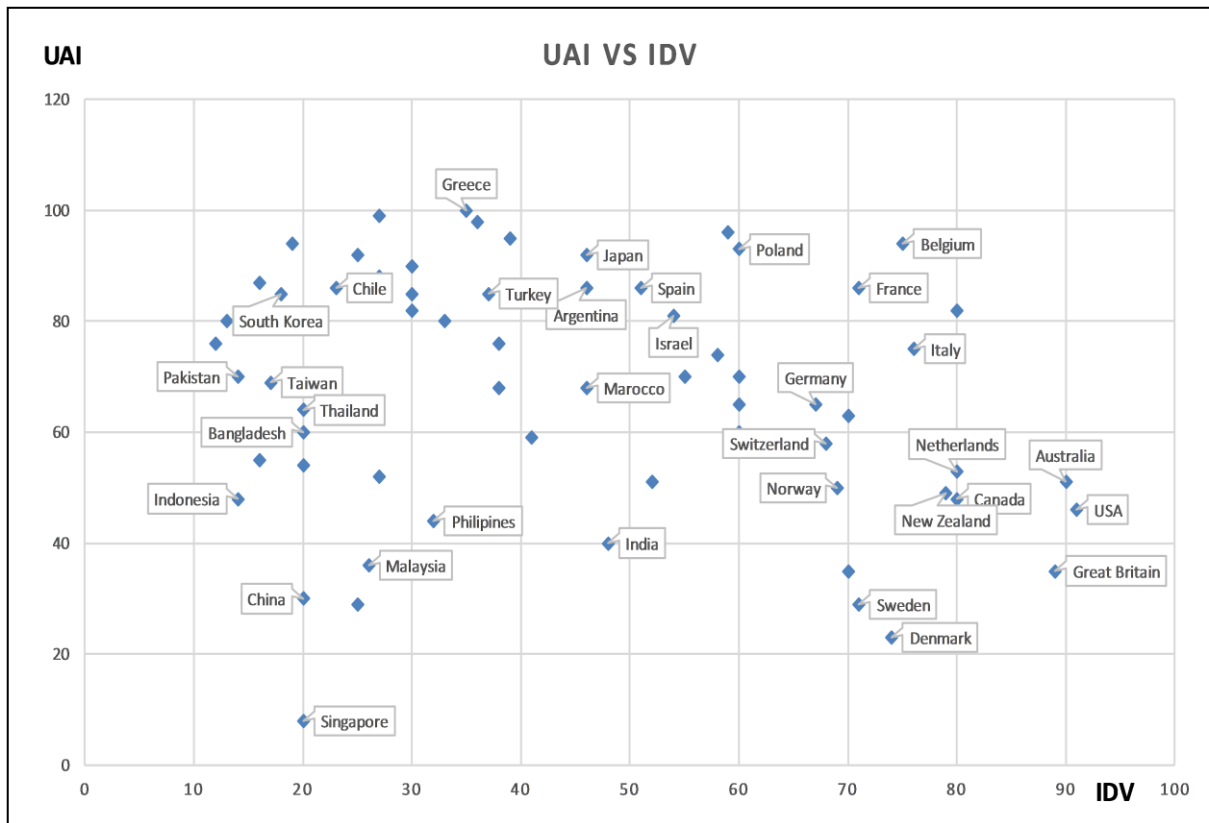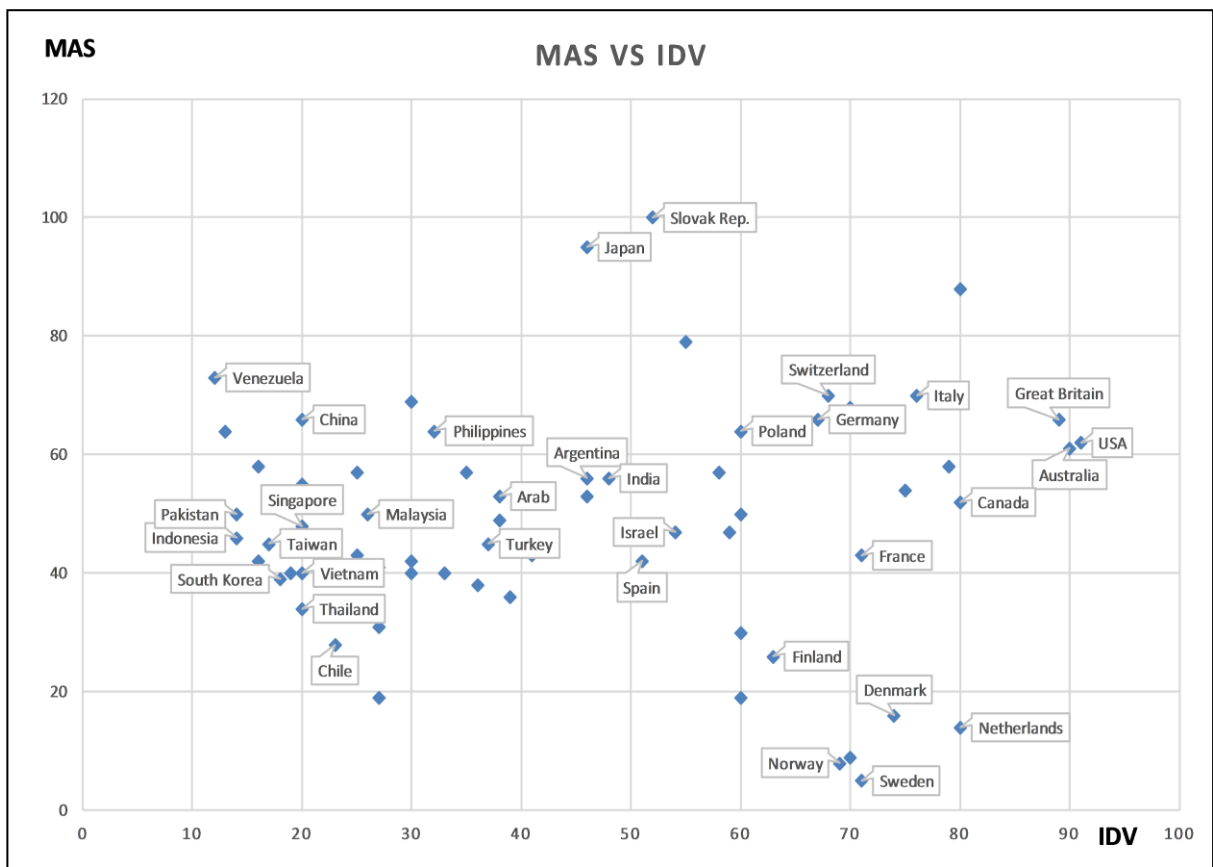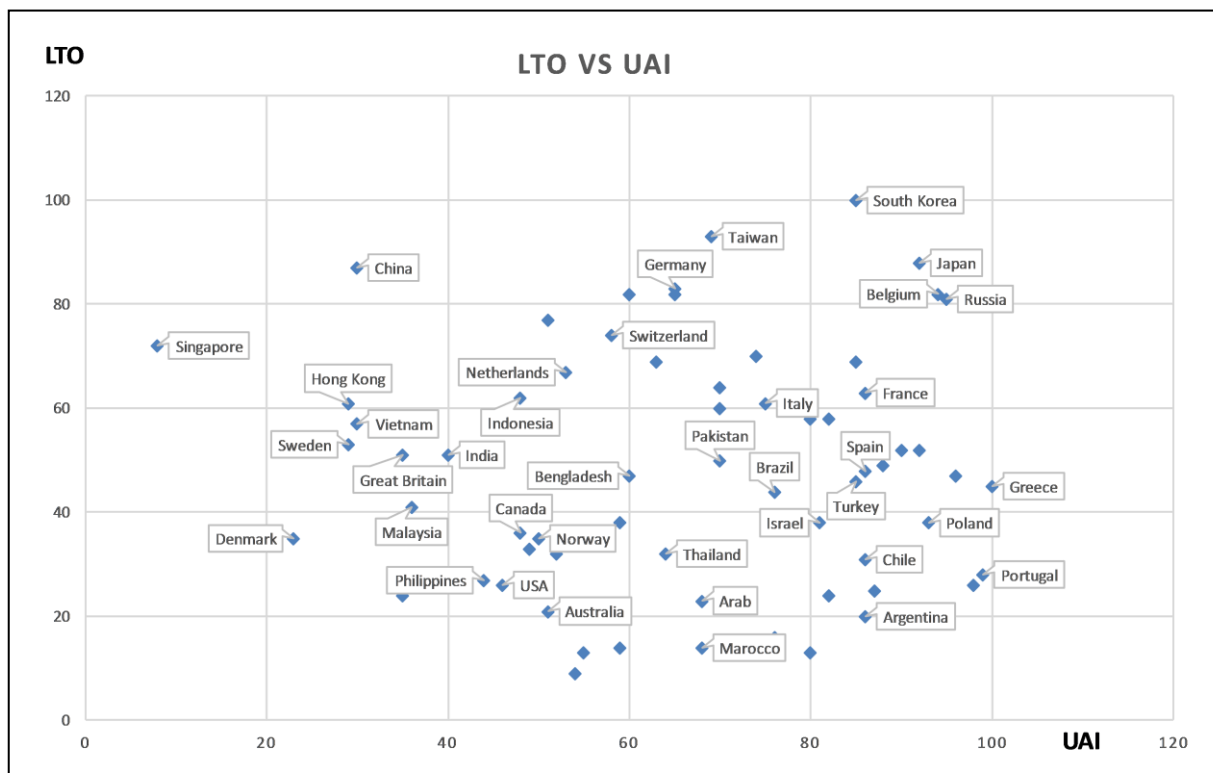
Our culture model is chosen, we move forward to the next section to analyze how national culture influences firms' financial outcomes? How this influence is channeled to the firms through the agents and through the country context in which the firm operates? And, how does the industry constraints play out in this influence?

2.4   National culture's and financial outcomes

National culture may influence corporate financial outcomes through multiple channels (see figure 2-3). One channel is through the culture's influence on firms' agents resulting in their decision-making (Yates & de Oliveira, 2016). We call it the "agency channel". The second channel is through the country's institutional constraints on firms financial decision-making, as institutions design is a resultant of national culture (Williamson, 2000). We call it the "institutional channel". This framework is central in our research in this dissertation.

It may not be possible[20] to clearly distinguish the ratio of infleunce of one channel over the other on firm's financial outcomes. Indeed, corporate risk-taking could be due to founders country-of-origin culture, or the *agency channel (Pan et al., 2017)*. But the research is done in the USA – in high risk-taking culture of *individualism-* where the culture supports corporate risk-taking (Li *et al*., 2013). USA institutions are aligned to its high risk-taking culture, or *institutional channel (Kwok et al., 2006; La Porta et al., 2008)*. The focus of this doctoral dissertation is to investigate the overall infleunce of culture through the *agency* and *insituional channels* on firm's financial outcomes.

2.4.1   The agency channel

Pan *et al*. (2017) show that the founders risk-taking preferences embeds in corporate risk-taking. Founders' country-of-origin culture of *individualism* (Hofstede, 2001) is shown to influence their risk-taking. Founders' culture embeds in the corporate culture as such firms' are shown to hire risk-taking managers, to perpetuate firms' risk-taking culture.

Chen *et al*. (2015) demonstrate that firms hold higher cash levels in higher *uncertainty avoidance* (Hofstede, 2001) culture*s* and hold lower cash in less individualist cultures (higher collectivist). They look at the state-level in the United States and find that corporate cash holding is lower in states valuing *individualism* more compared to states that valued *collectivism* more. They find that the higher the *individualism,* the higher is the *firm's capital expenditures, acquisitions, and repurchases*. On the opposite, the higher the *uncertainly avoidance,* the lower is the corporate to spending on these items*.

Firms' financial choices of cash, equity and debt holding mostly define its capital structure. Chui *et al.* (2002) demonstrate that national cultural values influence firm's capital structure. They use Schwartz's

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[20] To do such an investigation, one may need to know the nationality of the founders of all firms and the nations of their founding. We believe that such a research could only be possible on a very small sample of firms and countries. Our dissertation focuses on a very large sample of firms and countries.

(1994) national culture's values orientation such as *Conservatism (Security, Conformity, Tradition)* and *Mastery (Power, Achievement)* to demonstrate their correlation on the capital structure of firms in a country. They show that, higher the value of *mastery* and of *conservatism* for a country, lower is its debt-ratio, hence lower the financial leverage at the company's capital structure level.

A strong example of the *agency channel* is given by Carr and Tomkins (1998). They find that corporate financial managers in the US, UK, Germany and Japan, view differently their investment decisions based on their national cultural values and the institutional context. They describe that financial managers and CEOs in these countries differ in their strategic investment decisions. In the US (LTO: 26) and the UK (LTO: 51), they have a short-term financial perspective on financial gains compared to Germany (LTO: 83) and Japan (LTO: 88). The financial decision-makers in Germany and Japan value more a long-term return on investment perspective on their financial decisions. In Carr and Tomkins (1998, p122) survey, the responses of a Japanese CEO are very representative of the influence of national culture on corporate agents. It reads "*We want to secure the future of the company in total over the years, much longer than a 5-year horizon.*" and that the USA and UK CEOs are more "*looking at maximization of profits in the short-term, we look to long-term maximization.*".

2.4.2 The institutional channel

Through the *institutional channel*, corporate financial decision-making is constrained by country's financial and legal institutions as well as governance frameworks. These institutions are aligned to national cultural values (Williamson, 2000; Tabellini, 2010; Alesina & Giuliano, 2015) except in the case of very long colonization.

Kwok and Tadesse (2006) show national culture dimension of *uncertainty avoidance* influences the development of countries' financial system. They find that Anglo-Saxon countries (lower *uncertainly avoidance*) are dominated by a stock market-based financial system and that continental Europe and Japan (higher *uncertainty avoidance*) are dominated by the bank-based financial system. They highlight that higher *uncertainty avoidance* cultures prefer a more stable financial system, where unpredictability is lower, hence a bank-based system. On the contrary, national culture with higher acceptance of uncertainty are comfortable with a stock market-based system.

Stulz and Williamson (2003) highlight that a country's institutions, legal and financial, change slowly and keep the cultural values embedded in them, from the time of the institutions building, even though changes to national cultural values might have occurred in that period. Colonization could bring changes to the institutional framework, which could very slowly influence existing cultural values (Alesina & Giuliano, 2015). It highlights the very slow changing nature of culture values confirmed by Licht *et al.* (2005). It brings a very persistent influence of culture on institutions.

National institutional context also plays an important role on corporate financial choices. Gungoraydinoglu and Öztekin (2011) look at firm's capital structure design considering institutional constraints and the cost of doing business[21] in a specific country. They conclude that the country's institutional framework impact can only explain a third, while the larger portion of the decision-making is in the firm's own hands and explains cross-country variation in the firm's capital structure.

The literature mentioned above in this section show that institutions do play a role through the *institutional channel,* but the firm's *own hands* are the agents, which represents the *agency channel.* We could conclude that the *agency channel* and the *institutional channel* are the main channels of transmission of national culture values into corporate financial decision-making leading to firms' financial outcomes. Our three research essays show the effectuation of these channels from national culture dimensions (Hofstede, 2001) to firms' financial outcomes of capital structure choice, variations in trade credit supply, and firm value.

The transmission of national culture values to firms' financial outcomes happens within an industry sector. The industry sector conditions the acquisition of specific human capital skills and employed ratio of this human capital with the financial capital (Harris & Raviv, 1991; MacKay & Phillips, 2005). An industry sector may alter the way in which national culture values do get transmitted to firms' financial outcomes, through the industry's competitive constraints (Porter, 1985; Haake, 2002).

Figure 2-3: National Culture to Financial Outcomes: two channels of transmission.
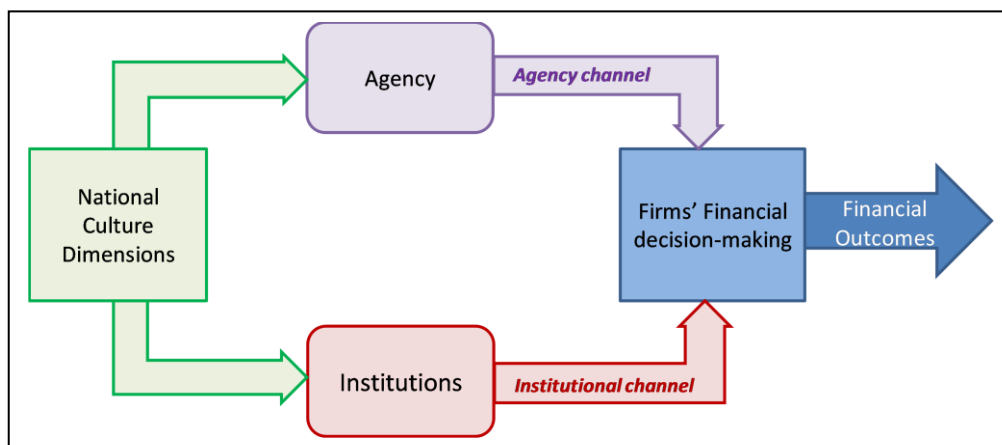
Firms operate in a country and in an industry. Therefore, firms are subject to the country's institutional constraints and their industries' competitiveness constraints. Firms carry their national culture values in their financial practices irrespective of their country of operation. National culture, industries, and firms

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[21] Gungoraydinoglu and Öztekin (2011, p1457): "*bankruptcy costs and tax benefits, agency costs, and information asymmetry costs imposed on firms.*" could differ between countries.

financial outcomes are connected together. We shall characterize these connections through the definition of our topological space between culture, industries, and corporate finance.

2.5   Topological framework

National culture values, industry sectors, and corporate financial outcomes form sets that are linked through relationships, which can be observed in each of our three essays. We set to characterize these relationships within the topological framework. In this section, we define topology and describe how its characteristics could be applied to our research context.

A fundamental property of the topological space is that of *continuity* (Leinster, 2014-2015). In a topological space, as two points belonging to two different sets are connected to each other through a *neighborhood relationship* (Alexandrov, 1961), *continuity* defines that each adjacent point in the starting set finds a corresponding point in the other set through a transformation function.

We posit that this *continuity* property applies very well to the two sets made of national culture values and corporate financial outcomes, where each cultural value can be transformed by the industry transformation function into a corporate financial outcome. It would transform even a variation in the level of a cultural value in a different financial outcome. This transformation would be different from one industry sector to another.

The possible scope of the topological space we define could as well be extended to our future studies associating culture and corporate finance. These studies could look to further validate our topological space properties. Such a framework could possibly enable the enactment of the topological space concept to all possible combinations of culture, corporate finance, and industries. Our research tries to build the foundation for integrating the topological framework.

In this doctoral dissertation, we look validate at a high-level the topological space properties. We associate our three research essays to this topological space. These essays are analyzing culture influence on capital structure (see essay one), on the variation of trade credit after the triggering of the mortgage subprime crisis (see essay two), and on firm value (see essay three).

In the remaining part of this section, we describe the foundations of our topological space and how our three essays could fit into it. The key concepts of topology that are highlighted are the topological space TS, the set S, and the three topological space properties of *connectedness*, *compactness*, and *homeomorphism*.

In the general mathematical topological space (Munkres, 2000; Leinster, 2014-2015), the combination of a set *S* of elements and the relationship between these elements defines a topology *T*. The combination (*S*, *T*) is called a topological space, that we denote *TS* (see figure 2-4). The space *TS* carries certain

properties that are of *connectedness*, *compactness*, and *homeomorphism* (see figures 2-6, 2-7, 2-8). The set *S* follows the three axioms of general topology as:

- The union of all subsets of *TS* belongs to *TS*.
- The intersection of any subsets of *TS* belongs to *TS*.
- *S* belong to *TS*, and a Null subset (No link between culture & corporate finance) also belongs to *TS*.

Within this definition of (*S*, *T*), each of our culture and finance research could be represented by a topological sub-space *TSn*. In this case, the set *S* could be the union of all and any cultural value types and all and any measures of corporate finance.

The industry transformation function *F* could include all the possible sub-industries. For each industry sector that we adopt, the transformation function *Fn* could be assigned. Each *Fn* would transform culture values differently into firm's financial outcomes, forming the topology *T* on *S*. As a result, the topological space (*S*, *T*) would be able to define an overall quantitative framework for the culture and corporate finance research.

A detailed description of mathematical topology would be complex to present in this thesis. It would also be difficult to analyze all possible links between culture, industries, and corporate finance. Hence, we present a very simplified view of topology for application to our research. We integrate the very basic topological space concepts in order to display its possible integration with the culture and finance research. This simple introduction to topology allows us to present it to a broader audience to create awareness, obtain feedbacks, and possibly bring-in the desire to apply it for future studies in the field of culture and finance. We believe that the tools of topology are useful to depict our research in culture and finance.

We broadly adopt this mathematical concept in binding together our three essays. We look to highlight that it is possible to match the definition of a topological space (*S*, *T*) to culture, finance, and industries, as long as these are represented by discrete mathematical measures. We present how we use the topological properties of *connectedness*, *compactness*, and *homeomorphism* to our research. The remainder of this section describes these elementary steps of matching the topological definition to our research.

2.5.1 Defining topological space

We define a set *S*, comprising all the elements of national culture dimensions and all the possible elements of corporate finance. We define *T* equal to all the sub-sets of all possible combinations of elements of national culture and of corporate finance. *T* is called a topology on the set *S* and the combination (*S*, *T*) is called a topological space on *S*, that we denote *TS* (see figure 2-4).

The set *S* is the union of *n* sets *Sn*. Each set *Sn* is made of culture values and corporate financial outcomes. For *TS* to be valid a topological space, it has to verify the key property of *continuity* through *connectedness*, *compactness*, and *homeomorphism*.

Figure 2-4: Topology T on the set S.
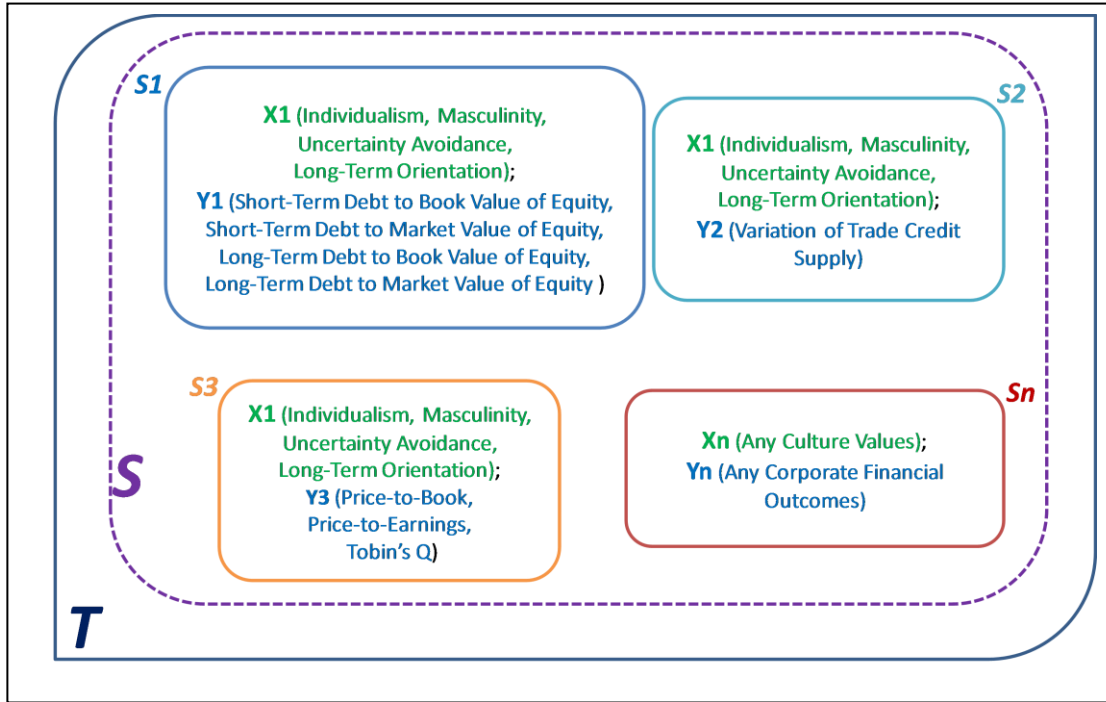
S is the union of all the subsets S1, S2, S3, Sn. T is the topology on S.

Tn indicates the topology on set *Sn*. The combination (*Sn*, *Tn*) form a topological space *TSn*, also defined as a sub-space of *TS*. We explore 3 sub-spaces of the topological space *TS* to match with each of our three essays. Through these essays, we present how the elements of national cultural dimensions and elements of corporate finance are forming sets that follow the principles of topological space that are *compactness*, *connectedness* and *homeomorphism*.

The set *S* is constituted of Hofstede six cultural dimensions and all of firms' financial outcomes. We define a transformation function *F* that represents industry sectors[22]. Each of these industry sector has differing characteristics which transform national cultural values (Breuer & Salzmann, 2012), through its human capital, into firm's financial outcomes (Harris & Raviv, 1991; Haake, 2002; Mackay & Philipps, 2005).

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[22] The industry sector is defined as per the SIC level 1 industry classification.

We define the topological space *TS* as the combinations of elements of national culture, corporate finance outcomes, and the industry function. From all possible subsets of *TS*, we consider three sub-spaces as *TS1*, *TS2*, and *TS3*. Each sub-space is respectively associated with the subset *S1*, *S2*, and *S3*.

Each sub-space include (see figure 2-4) four of Hofstede's cultural dimensions (X1), some elements of corporate finance as firms' financial parameters (Y1, Y2, or Y3). X1 and Yn are respectively linked through the industry transformation functions (*F1*, *F2*, and *F3*). The links between X1, Yn, and *Fn* are represented in figure 2-5. Each sub-space *TS1*, *TS2*, and *TS3* form a topological space and follows the topological space properties of (S, T)[23].

The set X1 is constituted of four elements of national culture (IDV, MAS, UAI, LTO) and set Y1 of four elements of capital structure (short-term & long-term debt divided by the book and market values of equity). The transformation function $F_{\_TS1}$ is constituted of six industry sectors.

The first topological sub-space *TS1* is made of X1, Y1, and $F_{\_TS1}$. The transformation function $F_{\_TS1}$ of industry sectors[24] links X1 to Y1. *TS1* represents our first research essay. This essay investigates the influence of national culture X1 to firms' choices of capital structure Y1, in six industry sectors $F_{\_TS1}$.

Figure 2-5: The topological space TS and its sub-spaces TS1, TS2, and TS3.
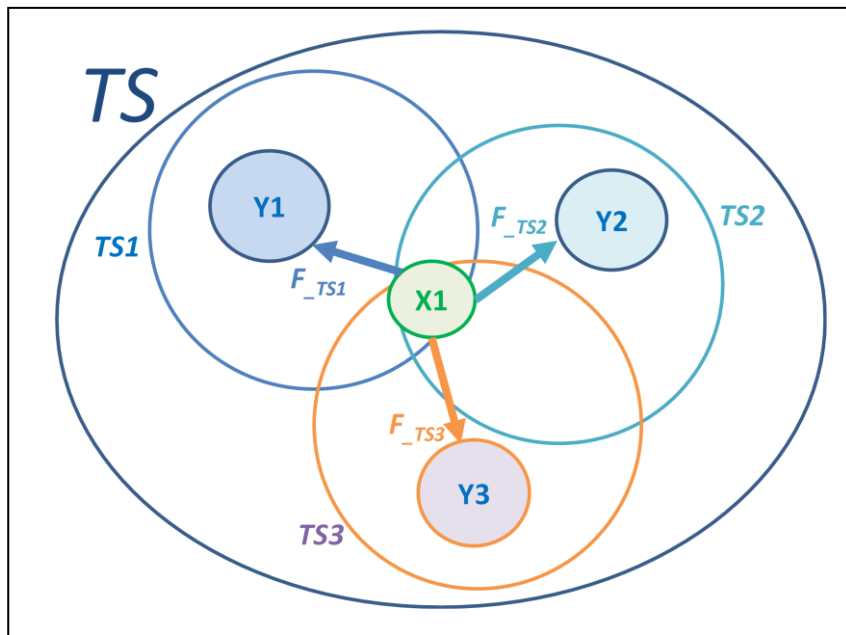
TS is the topological space. TS1, TS2, TS3 are sub-spaces. X1 is the set of four cultural dimensions. Y1 is the set of capital structure measures. Y2 is the set of Variation of trade credit supply. Y3 is the set of measures of firm value. $F_{\_TS1}$ is the industry function representing the six SIC industry sectors. $F_{\_TS2}$ is the industry function for the manufacturing sector. $F_{\_TS3}$ is the industry function for the manufacturing sector.

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[23] The definitions of set *S*, Y, X, and the function *F* are available in the annexure 2 (appendix 2-1).
[24] The six SIC level 1 codes ranges.

The set Y2 is made of the element of the variation of trade credit supply (account receivables). The transformation function F_{TS2} is constituted of one industry sector.

The second topological sub-space *TS2* is constituted of X1, Y2, and F_{TS2}. The transformation function F_{TS2} links X1 to Y2. *TS2* represents our second research essay. This essay checks the influence of national culture X1 on the variation of trade credit Y2, in the manufacturing industry sector F_{TS2}.

The set Y3 is made of the elements of firm's value (Price-to-Book, Price-to-Earnings, and Tobin's Q). The transformation function F_{TS3} is constituted of one industry sector.

The third topological sub-space *TS3* is made of X1, Y2, and F_{TS3}. The transformation function F_{TS3} links X1 to Y3. *TS3* represents our third research essay. This essay analyzes the influence of national culture X1 on the firms value Y3, in the manufacturing industry sector F_{TS2}.

Each of the three topological spaces *TS1, TS2*, and *TS3* need to conform to the topological characteristic of continuity defined by the properties of *compactness*, *connectedness* and *homeomorphism*. We define these properties and their application to our research framework in the following sections.

2.5.2 Connectedness

A topological space *TS* is said to be connected if the intersection of its sub-spaces is different from "empty" (Munkres, 2000). If said another way, *TS* would be called disconnected if the union of its two disjoint sub-spaces is equal to *TS*. For example, if *TS1*, *TS2*, *TS3*, and *TSn* have their intersection as "empty", then TS would not be a connected topological space.

This definition of connectedness is applicable to our sub-spaces *TS1*, *TS2*, and *TS3* as they share X1. It means that *TS* is connected as all its sub-spaces have a common element as X1. Similarly, the sub-space *TS1* is connected, as any subset of *TS1* would have X1 elements as a common. Any element in X1 that is transformed through F_{TS1} is in set Y1, which also belongs to *TS1* (see figure 2-5). So is the case for topological sup-spaces *TS2* and *TS3*.

The following *Intermediate Value theorem* (Munkres, 2000, p147) defines the characteristic of continuity and connectedness in a topological space:

$$if\ F{:}(X1) {-}{>}\ Y\ is\ continuous\ and\ if\ y \in (Y), then\ there\ exists\ c \in (X1), such\ that\ F(c) = y$$

Indeed, the transformation function *F* transforms cultural dimensions X1 into financial outcomes Y. Furthermore, *F* could transform any measures of c –a combination of cultural dimensions– in a financial outcome *y*. This highlights that culture changes get transmitted through the *agency* and *institutional channels* within and industry sector (see figure 2-3).

Each of our topological spaces *TS1, TS2*, and *TS3* are connected, respectively corresponding to our three essays. Indeed, in the first essay, any combination of the dimensions' index scores of cultural dimensions (X1) can be transformed by the industry function $F_{\_TS1}$ in the firm's capital structure outcomes Y1 (see figure 2-6). We observe that different scores of our cultural dimensions result in different capital structure values in an industry. In another industry, the same cultural dimensions scores result in different capital structure values. This shows that industry transforms culture values differently into capital structure values.

In the second essay, any combination of the index scores of cultural dimensions (X1) can be transformed by the industry function $F_{\_TS2}$ in the firm's variation of trade credit supply that is Y2. However, we applied it only for a single industry sector. However, we assume that based on our first essay findings, we could also observe different transformation by industry sector of the same culture values in variation of trade credit supply.

Figure 2-6: Connectedness: from culture dimensions (X1) to financials (Y1, Y2, and Y3) with industry transformation function F.
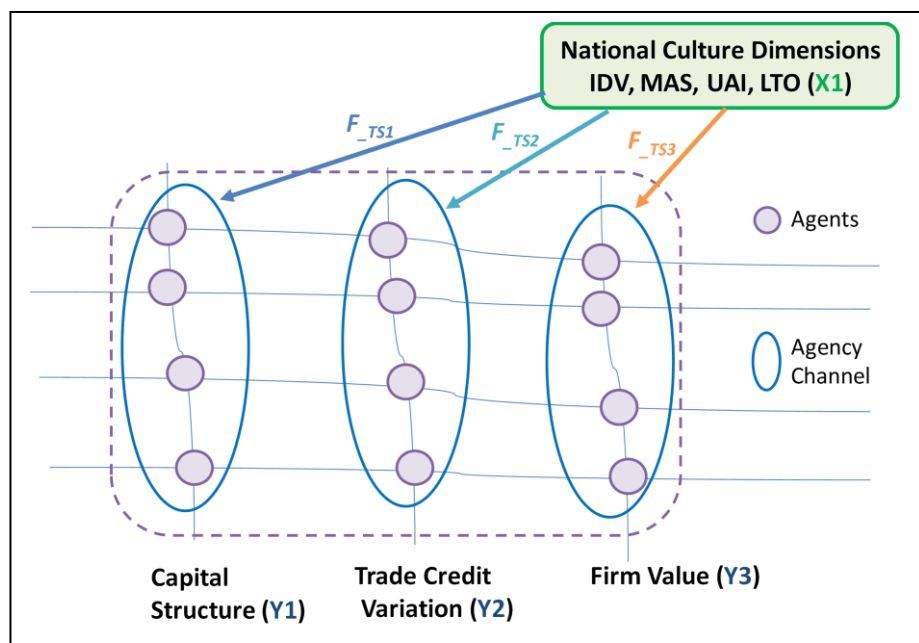
Culture values in X1 are transformed by industry functions F_TS1, F_TS2, and F_TS3 into respectively Y1, Y2, and Y3. The three industry functions represent single or multiple industry sectors. Each of the three function F and the three outcomes Y are associated respectively with our essay 1, 2 and 3. Agents are linked together in the agency channel.

In the third essay (see chapter 4), any combination of the index scores of cultural dimensions (X1) can be transformed by the industry function $F_{\_TS3}$ in the firm's financial value Y3. Similarly to the second essay (see chapter 3), we test this in a single industry sector. We assume that we may get differences due to industry transformation of same culture values influencing firm value.

2.5.3 Compactness

We apply the theorems that verifies compactness (Munkres, 2000, p147) to our doctoral dissertation. Thus, these two theorems can be written as, where F is the transformation function, X1 is the cultural dimensions and Y the firms' financial outcomes:

Maximum Value Theorem (*MVT*) (Munkres, 2000, p147):

$$If\ F: (X1) \rightarrow Y\ is\ continuous, the\ there\ exists\ c \in (X1), for\ x \in (X1),$$

$$such\ that\ F(x) \leq F(c), for\ every\ x \in (X1)$$

The transformation function F transforms cultural dimensions X1 into financial outcomes Y. Furthermore, any measures of c, as a combination of cultural dimensions, could be transformed by F in in financial outcomes $y1 = F(x)$ and $y2 = F(c)$, so that y1≤ y2. This highlights that culture differences are transmitted through the *agency* and *institutional channels* within and industry sector (see figure 2-3).

Taking an example from our first essay on capital structure. Two firms with different index scores (*x*, *c*) of cultural dimensions (X1) may have different capital structures such as y1≤ y2. It indicates that firms from culture with index scores *x* would have a lower capital structure ratio than firms from culture with index scores *c*, in an industry sector *F*.

The *MVT* is applicable to our three essays. Indeed, in *TS1*, *TS2*, and *TS3*, there exists a combination of cultural value c for which the firms' financial outcome F(c) is higher than other firms from different national cultural values *x*. Hence, the *maximum value theorem* would be validated.

Uniform Continuity Theorem (*UCT*) (Munkres, 2000, p147):

$$If\ F: (X1) \rightarrow Y\ is\ contiuous, then\ given\ \varepsilon > 0, there\ exists\ \delta > 0,$$

$$such\ that\ |F(x_1) - F(x_2)| > 0\ , for\ every\ pair\ x_1, x_2\ \in (X1), for\ which\ |x_1 - x_2| < \delta$$

There exists cultural dimensions combinations *x1* and *x2* so that their transformation through *F* results in a positive gap in the financial outcomes Y, such as gap "|*y1* - *y2*| > *0*". Therefore, *UCT* is validated (see figure 2-7) in our three essays.

Taking an example from our first essay on culture and capital structure. Two firms with two different index scores (*x1*, *x2*) of cultural dimensions (X1) would have different capital structures such as |*capital structure1 – capital structure2*| > *0*. It indicates that firms from different cultures with index scores *x1* and *x2* would have different capital structures ratios, such that the ratios difference is different from null.

Figure 2-7: Compactness verifying MVT and UCT theorems.
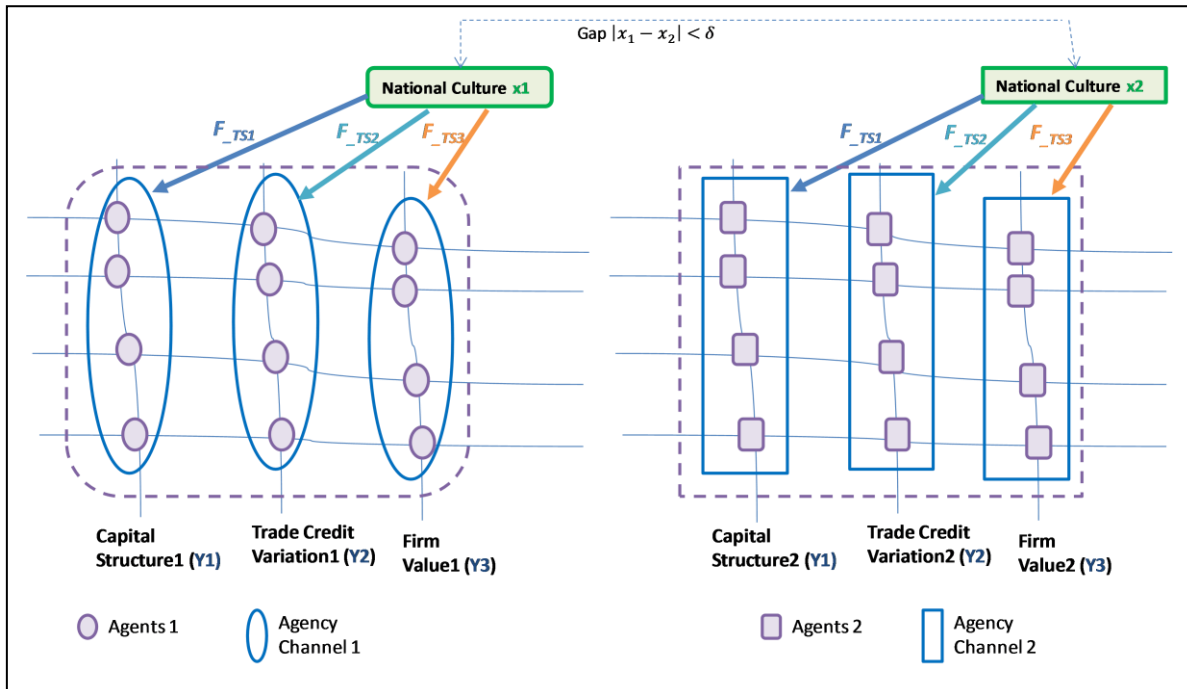
For a gap δ in scores of cultural dimensions, we will find a gap in the resulting financial outcomes in Y. The resulting financial outcomes can be the gap of capital structure in Y1, the gap of variation in trade credit in Y2, or the gap in firm value in Y3.

The last characteristic of continuity of a topological space is *homeomorphism*. It is represents reciprocity between the sets.

2.5.4   Homeomorphism

The third topological property of *homeomorphism* is the process of transforming one space into another (Krantz, 2009). The process of transformation of the first space to the second can include bending, stretching, but without tearing the first space. For example, like transforming a circle into an ellipse. All the points from the circle would be present in the ellipse. The importance of not tearing the circle to make it into an ellipse is important to meet the topological space requirement of *continuity*.

Furthermore, Babinec (2014, p14) writes that *"Homeomorphism is the notion of equality in topology and it is a somewhat relaxed notion of equality. For example, a classic example in topology suggests that a doughnut and coffee cup are indistinguishable to a topologist. This is because one of the geometric objects can be stretched and bent continuously from the other.".* Homeomorphism is defined as (Babinec, 2014, p14; Leinster, 2014-2015, p20):

A homeomorphism is a function f: TSx -> TSy between two topological spaces TSx and TSy where

- *f is a continuous bijection,*

- *and has a continuous inverse function f[1]*

From our literature analysis, we thought of the following two topological spaces that could have a homeomorphic relation. We define the first topological space as *TSc*. This space is constituted of the set *Sc* of culture dimensions and firms' financial outcomes. Hence, the topology *Tc* constitute the topological space *TSc* (*Sc*, *Tc*). The second topological space is denoted *TSi*. This space is constituted of the set *Si* of institutions and firms' financial outcomes. Hence, the topology *Ti* constitute the topological space *TSi* (*Si*, *Ti*).

A perfect homeomorphic relationship would mean that one could move from *TSc* to *TSi* in one direction or the other. It means that the relationship between culture and firms' financial outcomes could be "similar" to the relationship between institutions and firms' financial outcomes. This equivalence of "similarity" between two topological spaces is called *homeomorphism*.

Literature may support the above described homeomorphic relationship. Institutions of a country are created to align to the social norms of people in that country (Williamson, 2000), as a transformation of national cultural values into institutional values. In the other direction, institutions may enforce rules that could become part of shared practices of people in a country, therefore its culture. It may suggest that a country's culture and institutions have a correspondence of "similarity" between them. Therefore, either ones influence may lead to similar firms financing outcomes.

Furthermore, though the transformation of cultural values into institutional values is strong, the reverse is not as strong. Williamson (2000) framework highlights a weak feedback loop from institutions to the upper social level of culture, when institutions are changed through disruptive events such as wars or colonization. The impact of colonization and the imposition of alien cultural values based institutions could have an impact on changing some cultural values of the alienated country (Alesina & Giuliano, 2015). They highlight multiple researches but could not strongly conclude to the embeddedness of alien values as strong as the native cultural values of the alienated country. It may suggest that the homeomorphic relationship between culture and institution may not be complete.

The homeomorphic relation could be described, as any differences in the national culture of countries would reflect in their institutions (see figure 2-8). Vice-versa any differences in countries' institutions would somehow reflect in their cultures. It means that any gap between two cultures would reflect in the institutional differences of these countries. In all cases, these gaps would show on firms financial outcomes in each of the topological space *TSc* and *TSi*.

Figure 2-8: Homeomorphic relationship between culture and institutions influencing firm's financial outcomes.
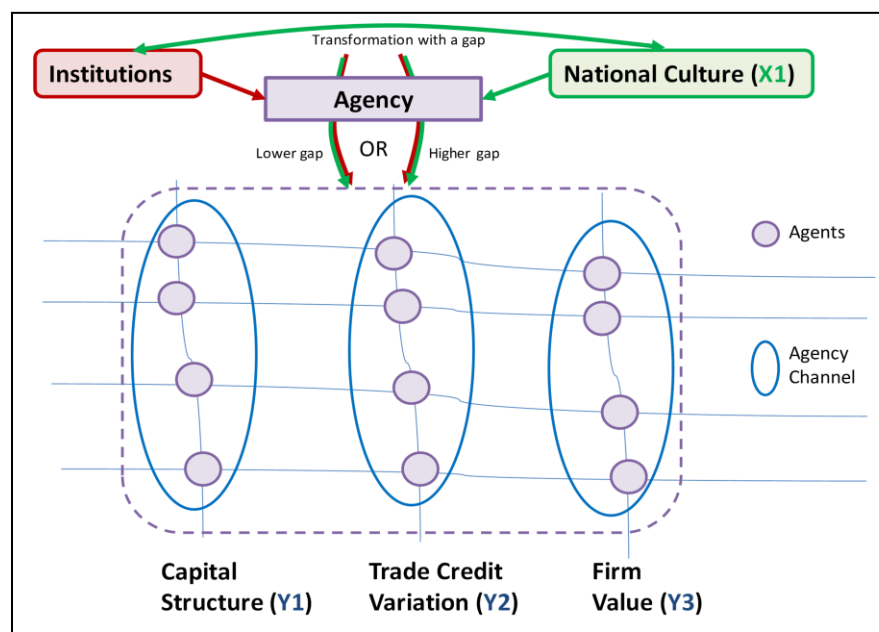
Imposed insitutional values can permeate into national cultural values. The gap between institutions not aligned to cultural values influences the agency framework and show up in the differences in firms financial outcomes.

We check the possibility of the homeomorphic relationship between culture and institutions in our third essay. Differences in culture and institutions would result in differences in these countries business systems. The differences in the business systems would affect the agency framework of the firms. It would result in culture differences to lead to differences in firms' financial outcomes (Y3). Similarly, institutional differences would result in differences in firms' financial outcomes (Y3).

2.6   Conclusion

Chapter 2 allows us to setup a "reading grid" for this doctoral dissertation. It presents the three major streams of literature that are meeting to create the culture and finance body-of-research. First, we base our analysis on the economics and finance literature (Coase, 1937; Modigliani & Miller, 1958; Jensen & Meckling, 1976; North, 1991, 2003, 2005; Williamson, 2000). Second, we look at the culture literature from the perspective of analyzing the firm choices (Hofstede, 1980; Schwartz, 1994; Inglehart, 1997; House *et al.*, 2004). Third, we find deeper foundation for culture and finance research in the social economics literature (Weber, 1904/05, 1947; Tawney, 1922) and more broadly in the historical economics literature (Voltaire, 1773; Smith, 1776).

To bind together these multiple sets of literature, we felt that the concept of mathematical topology treating relationships between sets would be appropriate to consider. Topology (Alexandrov, 1961; Munkres, 2000; Krantz, 2009) help us to treat these multiple body-of-literature with the neo-positivist

approach (Kraft, 1953) in analyzing the relationships between national culture and corporate finance. This is the reason for us to call the chapter 2 as "the topology of national culture and corporate finance".

By setting the scope for this doctoral dissertation, we hope it makes easier to read the next three chapters. The essay one presents the relationships between national culture and firms' capital structure across six industry sectors. The essay two analyzes culture's influence on firms trade credit supply from pre-to-post the mortgage financial crisis. The essay three looks to understand the relationship between national culture and firm's value, through the existence of national business systems. I hope this research dissertation would be interesting to read and would raise novel questions on the "rational" behind firms' financial choices.

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Annexure for Chapter 2

<u>Appendix 2-1</u>: Description of the topological elements.

S = ((IDV, MAS, UAI, LTO) ∪ (Capital Structure, Trade Credit, Financial Value, Working Capital, Debt, Performance, Cash, etc.))

F = (Industry Sector 1, Industry Sector 2, Industry Sector 3, Industry Sector 4, Industry Sector 5, Industry Sector 6)

Y1 = (STD2BVE, STD2MVE, LTD2BVE, LTD2MVE)

$F_{\_TS1}$ = F

Y2 = (ΔTCsupply)

$F_{\_TS2}$ = (Industry Sector 3: Manufacturing)

Y3 = (P2B, P2E, Tobin Q)

$F_{\_TS3}$ = (Industry Sector 3: Manufacturing)

X1 = (IDV, MAS, UAI, LTO)

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Moving from chapter 2 to essay one

Our first essay analyzes the links between firm's country-of-origin culture and their sources of financing. The financing can be through debt and/or equity resulting in firm's capital structure. We measure it by firm's short-term and the long-term debt-to-equity ratios (Titman & Wessels 1988). Capital structure is a fundamental parameter of firms' financial condition (Myers, 1984). Capital structure is said to be very industry specific (MacKay & Phillips, 2005). New capital structure determinants keep adding by scholars (Frank & Goyal, 2009). Our essay analyzes culture's influence on two time-horizons of capital structure and across six major industry sectors. This research extends existing culture and capital structure literature (Chui *et al.*, 2002; Fauver & McDonald 2015; Haq *et al.*, 2018).

Our approach is supported by literature highlighting that firm's choice of capital structure is industry specific (Harris & Raviv, 1991). Furthermore, each industry requires a specific human capital to make it survive and be competitive in its industry sector (MacKay & Phillips, 2005). Firms' founders and agents embed the national culture values that gets transmitted into firms' decision-making (Pan *et al.*, 2017). A country's institutions embed a country's culture values, in the social embeddedness level (Williamson, 2000), which constrain firms financial choices. The transmission of culture values, carried by firms' human capital and by institutions, is conditioned by firm's industry sector. We expect culture to influence firm's capital structure choices differently in each of the six industry sector studied.

Our research linking culture to capital structure fits into our topological framework defined in chapter 2. It links the sets of national culture dimensions (X1) and firms' capital structure (Y1) through the industries transformation functions (*Fn*). This topological relationship is analyzed for six industry sectors (*F1_TS1* to *F6_TS1*) covering the complete SIC classification (see figure 2-5).

Analyzing this framework, we find that culture values influence firms' capital structure. The influence level is different for each of the six industry sector. The influence is different for the short-term capital structure and the long-term capital structure. These results confirm our topological space properties as the culture dimensions (X1) get transformed by six different industry sectors functions (*F1_TS1* to *F6_TS1*) into different firms' capital structure outcomes (Y1).

We find that culture has a higher influence on asset heavy industry sectors. This influence is also higher on the short-term debt-to-equity. Taking clues from this essay, our second essay focuses on analyzing culture's influence on firm's short-term financing in a single industry sector.

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3 Essay One - Culture, Industries, and Capital Structure Choice

Abstract:

This essay studies the influence of national culture on firm's capital structure. Within Williamson's New Institutional Economics framework, applying four of Hofstede's national cultural dimensions, we find new evidence on culture influencing firm's short-term and long-term capital structure. As capital structure is industry specific, our study analyzes this influence for six SIC industry sectors, including 6770 firms from 33 countries over the period 2009-2017. Our results highlight that firm's country-of-origin national culture influences its capital structure gap with its industry's target-ratio. This influence is more significant on the short-term than the long-term capital structure. This influence is higher in asset heavy industry sectors. These results remain stable through our robustness tests at the firms-level, country-level, and sample-level. This paper's new insights should help international corporate managers, creditors, and investors alike in taking informed decisions in regards to capital structure choice's risk-reward ratio in light of firm's country-of-origin.

Keywords: Capital structure, Target ratio, Industry sectors, National culture

JEL Code: G31, G32, G34, Z10

3.1 Introduction

The choice of a capital structure is critical to firms' performance and sustainability, irrespective of the industry sector, and Myers (1984) questions *"How do firms choose their capital structures?"* answering that *"We don't know."*, which the literature is still uncovering (Frank & Goyal, 2009). Classic capital structure literature highlights three theories on capital structure choice, that are the trade-off theory (Kraus & Litzenberger, 1973; Bradley *et al*., 1984), the pecking order theory (Myers, 1984), and the market-timing theory (Baker & Wurgler, 2002).

Capital structure is also characteristic of an industry sector, though firms have different ratios within their industry sector. The capital structure differs among industrial sectors depending on the economic activity and industry's internal dynamics. Some such dynamics are, within industry's competition, stable or growing industry, products supply-chains, and the specific human capital (Harris & Raviv, 1991). These within industry specificities form industry fixed effects.

In the long term, the capital structure ratio of debt-to-equity is supposed to converge to the sector mean, this is the so-called "target ratio" (Bradley *et al.*, 1984). However, differences in capital structure still exist across firms belonging to the same sector. Our research hypothesis is that this gap could be explained by country-of-origin's national culture, which is defined here as "*the collective programming of the mind that distinguishes the members of one group or category of people from another*" (Hofstede's, 1980).

Our paper analysis adopts the trade-off theory. It is adding value to the literature through its analysis of *culture's consequences* (Hofstede's, 1980, 2001) on the choice of capital structure (Titman & Wessels, 1988). Our analysis is based on the flow of constraints from culture, to institutions, to governance, and to agency (Williamson, 2000) (see figure 1-1). We examine this framework by industry sector, checking how national culture influences firms' choice of capital structure in reference to their industry's "target ratio" (Bradley *et al*., 1984).

There is a limited literature on culture and firm's capital structure choice (Chui *et al*., 2002; Li *et al*., 2011; Fauver & McDonald, 2015; Haq *et al*., 2018), which focuses either on a single industry or on a single measure of capital structure. First, our paper extends this literature across industry sectors. Second, it adds new evidence about culture's influence on firms' short-term and long-term capital structure choices.

Following Williamson's (2000) framework, we investigate how culture influences institutions, governance, and agency framework leading to its capital structure choices. Capital structure choice is industry dependent (Bradley *et al*., 1984; MacKay & Phillips, 2005) and firm's "*country-of-origin*" influences its choices (Noorderhaven & Harzing, 2003). Therefore, we analyze culture influence on capital structure across all SIC level-1 industry sectors.

We adopt Hofstede's (2001) cultural dimensions of *individualism*, *masculinity*, *uncertainty avoidance*, and *long-term orientation*, to test their influence on Titman and Wessels (1988) measures of short-term and long-term debt to book and market value of shareholder's equity. The six industry sectors are of mining & construction (1), manufacturing (2), utilities (3), wholesale & retail trade (4), finance, insurance & real estate (5), and services (6).

Hofstede's (2001) defines that in individualist cultures, people value more individual freedom and achievement, whereas in collectivist culture group achievement and care have higher preference. Masculine cultures are more tasks orientated, whereas feminine cultures are more people oriented. Uncertainty avoiding cultures avoid ambiguous situations and prefer clear rules, whereas lower uncertainty avoiding cultures are comfortable living with higher future uncertainty. Long-term oriented cultures prefer to take pain in the short-term for higher long-term gains.

Using these definitions, we first hypothesize that culture has an association with the short-term and long-term capital structure across industry sectors. Second, we hypothesize that *individualism* has a negative (positive) relationship, *masculitnity* has a negative (positive) relationship, *uncertainty avoidance* has a positive (negative) relationship, and *long-term orientation* has a positive (negative) relationship with firm's short-term (long-term) capital structure choice.

We empirically examine these hypotheses for six industry sectors on firms from 33 countries covered by Reuters Datastream database over the period 2009-2017. We control for country's economic and institutional development. With this dataset, we validate our hypotheses, showing the influence of culture on firms' capital structure gap to its industry's "target-ratio".

Our results highlight that each cultural dimension has a higher influence on either the short-term or the long-term debt-to-equity. The culture effects exist across the six industry sectors and has a higher influence on asset heavy industry sectors. All our results show significance of cultural dimensions, which is in the core hypothesis direction, and our secondary hypotheses' results match our expectations.

The robustness test at the firm-level, country-level, and sample-level confirm our main results. At the firm-level, we apply agency costs and collateral value. At the country-level, we check with governance variables of creditors' rights and financial market development. At the sample-level, we remove two countries with highest number of firms. Through these tests, our main findings remain stable or observe even higher significance levels.

Our results add new evidence about culture influence on firm's choice of short-term and long-term capital structure across six major industry sectors. These findings add to the growing literature that despite globalization and technology changes (Noorderhaven & Harzing, 2003; Knight & Cavusgil, 2005), culture influence exists in firm's financial choices (Gleason *et al*., 2000; Chui *et al*., 2002; Li *et al*., 2011; Zheng *et al*., 2012; Fauver & McDonald, 2015; Karolyi, 2016; Haq *et al*. 2018).

The rest of this paper is organized as follows. In section 3.2, we present our theoretical framework and the empirical hypotheses. In section 3.3, we present the data sample and the variables construction. In section 3.4, we present our empirical analysis model design. In sector 3.5, we present our results. Section 3.6 presents the robustness checks. Section 3.7 concludes and suggests some future research directions.

3.2   Literature and research hypotheses

Our literature study and hypothesis building follows Williamson (2000) 4-level NIE framework (see figure 3-1). Williamson (2000) mentions North's (1991, p.111) statement about *level-1* informal constraints as, "*What is it about informal constraints that gives them such a pervasive influence upon the long-run character of economies?*". The next sub-sections look to understand the influence of each of the four level on firm's capital structure.

3.2.1   What leads to capital structure choices?

Three theories of capital structure (Frank & Goyal, 2009) are most used in the financial literature. The trade-off theory (Kraus & Litzenberger, 1973; Bradley *et al*., 1984) where firm's capital structure choice is based on the cost (bankruptcy) vs. the benefits (tax) of debt and the capital structure trends towards an industry average (static) or it drifts unto acceptable limits (dynamic). The pecking order theory (Myers, 1984) says that firms service their financing needs in a preferred order from retained earnings, debt, and lastly equity issuance. Moreover, the market timing theory (Baker & Wurgler, 2002) focuses on the firm's timing its choice of financing based on either the best price of its equity or the lowest cost of debt.

We adopt the trade-off model with the industry "target ratio". Several levers influence capital structure choice such as the national culture of firm's country-or origin (Chui *et al*., 2002; Li *et al*., 2011; Fauver & McDonald, 2015; Haq *et al*., 2018). The country's institutional and economic development (Rajan & Zingales, 1995). Firm's size and growth (Titman & Wessels, 1988). The industry in which the firm operates (Harris & Raviv, 1991; MacKay & Phillips, 2005). The governance mechanisms (Shleifer & Vishny, 1997). The operational constraints on the firm's management (Jensen & Meckling, 1976).

Williamson (2000) connects these levers in a flow of constraints on firms' operational choices in optimally managing their resources. The highest levers at *level-1*, that is the societal fabric, imposes strong constraints to the next level and thus forth going till the levers at *level-4*, that are the firm's objectives of resources optimization. The timescale of changes occurring at each level is ten times higher than its direct upper level. Here follows the detailed description of each level (Williamson, 2000) as,

(i)   *level-1,* represents the *informal institutions, customs, traditions, norms, and religion,* which he calls the *embeddedness* level. This *embeddedness* level changes very slowly at the order of *centuries or millennia* and it has a "*lasting grip on the way a society conducts itself*". He highlights that such strong is the hold of this level on societies that "*Insular societies*" tend to

take steps "*to protect themselves against alien values*". The elements of this level are commonly studied in the sciences of *social theory*, and considered as constituents of societal culture.

(ii) *level-2,* is called the *institutional environment* including *polity, judiciary,* and *bureaucracy*. Williamson calls it as the "*formal rules of the game*". Society defines rules to meet its needs for protection and can design them as per its wishes. The occasions to design rules rarely appear such as when the society faces disruptions through wars, colonization, or to protect itself from external threats. Beside such disruptive occasions, this level remains stable for *decades or centuries*. The ownership rights and their protection are defined here. However, litigations resolution requires an arbitration framework, which is at *level-3*.

(iii) *level-3* is representing *governance* mechanisms that regulates firms' contractual framework to resolve litigations. Williamson's calls it *"playing the game"*, as firms could minimize their litigations costs to reach *mutual gains.* This requires involved parties' incentives to be defined in the agency framework. Hence, governance structures can be aligned to agency's contracts at their renewal, which occurs at timeframes of a *year to a decade.*

(iv) *level-4*, covers the firm's day-to-day management. It describes how the various agents are linked within the contractual framework of the *Agency* to take decisions about *resources allocation and employment*. Firm's agents are required to optimize all resources at their disposal to generate the best returns for the firm's shareholders. The agents' *incentives* constrain them on firm's resources management. It could be choosing between debt and equity financing and hence the choice of capital structure. Incentives contracts are conflict sources as defined *ex-ante* of firm's results audition, with *ex-post* contracts' implementation creates for governance *complications*. Thus, changes at this level occur at the time of agents' contracts renewal that can be a *continuous* process through the year.

We link our Williamsons framework to our empirical framework (see figure 3-1). At *level-1* we select the culture's framework of Hofstede (1980, 2001), where he characterizes national culture with cultural dimensions that are regularly applied in international management research (Kogut & Singh, 1988; Newman & Nollen, 1996 ; Petersen *et al*., 2015) and having a growing influence in financial research (Fidrmuc & Jacob, 2010; Chen *et al*., 2015; Haq *et al*., 2018). At *level-4* for the choice of capital structure, we build upon the work of Titman & Wessels (1988) and followers. They analyze capital structure with multiple measures uncommon in culture and finance literature.

Figure 3-1: From culture to capital structure.
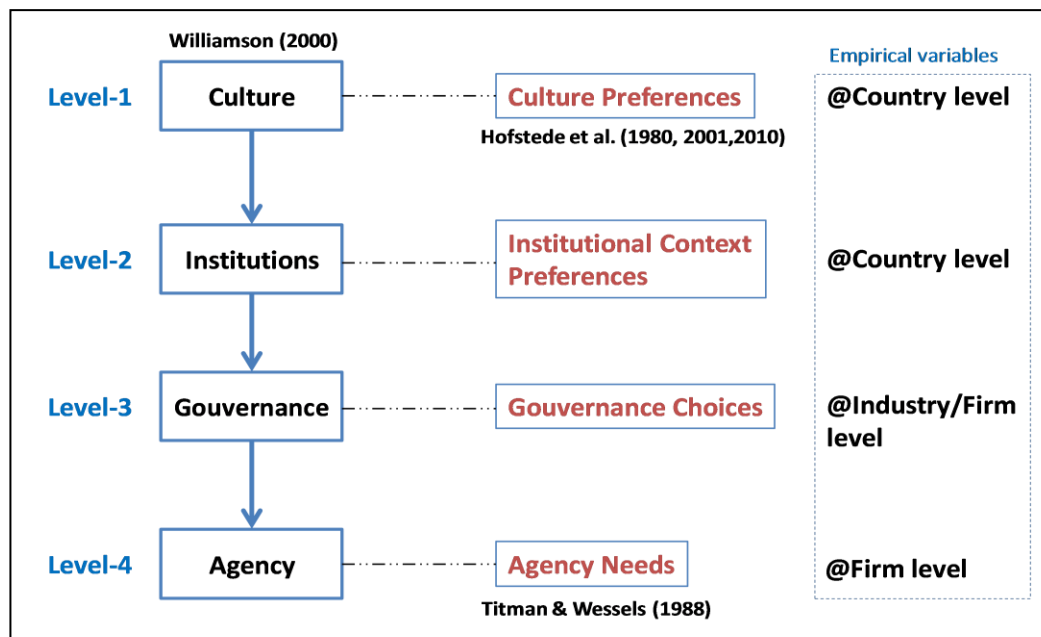
The following sections describe our literature choices fitting in Williamsons NIE framework.

3.2.2   National Culture

We describe the definitions of culture and our choice of Hofstede (2001) cultural dimensions model.

3.2.2.1   Definitions of culture

Culture has many definitions depending on history, and Baldwin *et al.* (2006, p15) define it as "*culture consists of patterns, explicit and implicit, of and for behavior acquired and transmitted by symbols, constituting the distinctive achievement of human groups, including their embodiments in artifacts*". From this definition, we understand culture as a set of group's practices in a specific context, and appearing in a repeatable fashion, over "*centuries or millennia*" (Williamson, 2000).

Furthermore, Hofstede (2011) adds that societal cultures are deep rooted in the people's unconscious mind as they are acquired during childhood, and these values express themselves throughout life as "*broad tendencies to prefer certain states of affairs over others"* (Hofstede, 2011). He initially defines four cultural dimensions (Hofstede, 1980) and later adding two making it a total of six (Hofstede *et al.*, 2010). Schwartz (1994) is another accepted author defining culture with four higher order value types, further split in ten lower level values.

Following Hofstede's and Schwartz's work, the GLOBE[25] project (House *et al*., 2004) defines nine cultural dimensions with three new and six similar to Hofstede's. The World Values Survey

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[25] Global Leadership & Organization Behavior Effectiveness: http://globeproject.com/

Association[26] (WVS) defines 14 major cultural themes, further subdivided in 220 sub items, encompassing many of the earlier definitions. In contemporary financial research, these four culture studies are often the reference for testing culture's influence (Porta *et al*., 1998; Chui *et al*., 2002; Zheng *et al*., 2012, Chen *et al*., 2015, Fauver & McDonald, 2015; Haq *et al*., 2018).

Indeed, we choose Hofstede's model because of its neo-positivist approach in defining national culture with six dimensions making it relevant for cross-cultural analysis in financial research. Furthermore, Hofstede *et al*., (2010) and Williamson (2000) coincide in characterizing culture's evolutionary character at *level-1* and suggesting a *level-0* with the cognitive and psychological aspects, which Hofstede *et al*. (2010) call "*human nature*". Nevertheless, Hofstede's critics point to the fragility of his methodology in defining these dimensions (McSweeney, 2002; Shenkar, 2001). Although, a large spectrum of management research, including finance (Li *et al*., 2013; Zheng *et al*., 2012; Chang & Noorbakhsh, 2009; Chen *et al*., 2015, etc.), applying Hofstede's cultural dimensions is proof of their empirical validity.

3.2.2.2 *Hofstede's Cultural Dimensions*

Hofstede's cultural dimensions should be viewed in an *Etic*[27] rather than *Emic*[28] perspective. For this reason, the dimensions are applicable to a group, not at the individual's level, and are aggregated at the national level. Indeed, Hofstede (1980, p9), defines culture as "*The collective programming of the mind that distinguishes the members of one group or category of people from others*". His definition of culture meets the one given by Baldwin *et al*. (2006, p15). Hofstede calls culture the "*Software of the Mind*" as it is part of the "*collective programming*" of a group. He models this software by six cultural dimensions, each on a 0-100 scale.

Hofstede (1980) defines four cultural dimensions on which cross-national cultures comparison could be done. This first edition of "*culture's consequences*" is the result of a study from 1967 to 1973 on 117,000 IBM employees based over 50 worldwide office locations. The dimensions are "*Power Distance, Individualism vs. Collectivism, Masculinity vs. Femininity, and Uncertainty Avoidance*". In the second edition (Hofstede, 2001), he includes the work of the Chinese Value Survey (Bond, 1988) research project, from which he defines a fifth cultural dimension called "*Long vs. Short-Term Orientation*". Later in 2010 (Hofstede *et al*., 2010), he includes the work of Minkov (2009), and defines a sixth dimension namely *"Indulgence vs. Restraint*".

Hofstede explains that globalization and technology changes are equally touching all countries. These may not fundamentally change cross-country's cultural distance on the *relative scores* of these dimensions (Hofstede, 2011). He adds that national culture contribute to countries handling differently

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[26] http://www.worldvaluessurvey.org/
[27] In cross-cultural research, *Etic* level studies culture from an outside view of it.
[28] *Emic* level's research analyzes culture from within the society.

the impact of globalization and technology, hence the stability of his cultural dimensions. However, to improve efficacy in applying the cultural dimensions model, some authors propose sample design methods. These could help to select optimally the set of dimensions (Sivakumar & Nakata, 2001) or to measure cross-cultural distance (Kogut & Singh, 1988).

The six cultural dimensions[29] (Hofstede *et al.*, 2010) are *Power distance* (PDI)**,** which is about the expression of inequality in the group from the perspective of *the less powerful members*. In low power distance countries, the less powerful feel empowered, but in high power distance countries, higher authority is naturally accepted.

Individualism versus. Collectivism (IDV) is the importance of self versus the group or the "I" vs. the "we" culture. In individualist cultures, the expression of self is heightened where the individual takes care of self and its dependants. Instead, in collectivist cultures, the expression of the group prevails with the caring for each-other, belongingness to the group, and protecting it from splitting.

Masculinity versus Femininity (MAS) is using gender characteristics such as *assertiveness* and *caring* to represent cultures. In a masculine culture, men and women would tend to be more task-oriented than people-oriented, and more *assertive* and *competitive* than *caring*.

Uncertainty Avoidance (UAI) is about the level of acceptance of ambiguity, defined by the level of comfort with *unstructured situations*. It describes the preference for a stable/predictable outcome vs. unknown outcomes, irrespective of the time horizon.

Long-term versus Short-term orientation (LTO) indicates the preference for the future where one expects the most important events to happen. This concept initially came out from Bond (1988), who named it *Confusion Work Dynamism*.

Indulgence versus Self-restraint (IDR), the *indulgence* cultures favour unbounded gratification of human desires for enjoyment, and people are in constant search for activities that can bring them that enjoyment, as they feel that their choices can bring them happiness.

3.2.3 Institutions and Governance

Indeed, Porta *et al.* (1998) and La Porta *et al.* (2008) concur on the links between culture and institutions. Shleifer and Vishny (1997) present that corporate governance is subject to the legal framework of a country confirming Williamson's (2000) model. Furthermore, institutions (North, 1991) are constraints defined by society to govern interactions in-between its members, in different societal context (e.g. legal, political, financial, and social).

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[29] A detailed description of each dimension is available in the annexure (appendix 3-1).

As per La Porta *et al.* (2008), the most spread legal context is common law, originally from England, and civil law, originally from France. The design of these laws have the needs of these countries in-built in them, as per the prevalent societal forces at that time. Indeed, Porta *et al.* (1998) link the existence of the legal framework of a country to the founding origins of that legal framework, which is the country-of-origin of that frame of law.

They identify that the root of modern laws is either of English origins for the common-law, or of Roman origins for the civil-law. From these Roman origins, civil-law bifurcates into three main branches, that are the French, German and Scandinavian civil-laws, with multiple variations in many civil-law countries around the world. The spreading of the common-law and civil-law around the world came either through the imperial conquests of nations, or by willful adoption, or simply by the implicit influences of economic trades.

They highlight that a country's legal framework is critical in protecting shareholders rights, in the development of its financial insitutions, and consequently in putting limits on the degree of freedom for the agents in the agency (firm). Therefore, the origin of law, or rather the type of country's intitutional framework could play a role on the agency framework of the firms, resulting in influencing the capital structure choice. We should also add an arrow of constraints from Williamson's (2000) *level-2* (institutions), to *level-4* (agency), to show for institutional influence on the capital structure choices.

Kwok and Tadesse (2006) find that national culture plays an important role in the preference for a type of financial system. They highlight that Hofstede's dimension of *uncertainty avoidance* influences the development of a country's financial institutions. They find that Anglo-Saxon countries (lower *uncertainly avoidance*) are dominated by a stock market based financial system and that continental Europe and Japan (higher *uncertainty avoidance*) are dominated by bank-based financial systems. It means that national cultures with a lower financial risk-appetite (higher *uncertainty avoidance*) prefer a more stable financial system, where unpredictability is lower, such as the bank-based system, and national cultures with lower *uncertainty avoidance* are more comfortable with a stock market based system. Their findings suggests that culture (*level-1*) contrains the choice of the capital structure (*level-4*) through the development of a certain type of financial insitutions (*level-2*).

Corporate governance is the sum of mechanisms that regulates the formal interactions of the stakeholders in the agency framework related to firm's operations (Shleifer & Vishny, 1997). They say that in practice it essentially deals with the problems linked to *the separation of management and finance*. It leads to corporate governance contributing to protect investors and creditors rights, whether small or large. Corporate governance helps in defining management incentives to mitigate the self-dealing nature of managerial discretion against the objectives of shareholders benefits. Furthermore, corporate governance is subject to the country's legal framework, and to the will of its political leaders. The authors highlight that legal protection is not enough in many countries where the rights of the

investors, the creditors, and the minority shareholders are not respected (Bebchuk & Weisbach, 2010). This situation underlines the importance of country effects on corporate governance mechanism.

In studying culture, law and corporate governance, Licht *et al*. (2005) directly check culture's influence on shareholders and creditors rights protection. They find links that are not completely aligned with Porta *et al*. (1998) findings. Consequently, they conclude that one should look at both the influence of cultural values and the law of the land in analyzing corporate governance in a country. Considering this perspective of Licht *et al*. (2005), we should also have an arrow of constraints from Williamson's (2000) *level-1* (culture), to *level-3* (governance), to show for cultural preferences influence on the governance mechanisms choices.

3.2.4   Agency and capital structure choice

The modern agency framework is about the management of the firm's resources by its managers for optimal returns to its shareholders and creditors (Fama, 1980). The relationship between these agents (managers), the shareholders, and the creditors is defined by contracts. The dutiful implementation of these contracts, or the lack of it, is what creates the agency problems (Jensen & Meckling, 1976). Governance is meant to define the rules to resolve these agency problems, or rather to prevent them from arising. However, corporate governance mechanisms are themselves subject to the country's institutional context. It further increases the "play" in how governance can ensure the good implementation of the agency contracts.

The existence of agency problems linked to firm's "*separation of ownership and control*", along with the requirement to setup governance mechanisms, adds transactions costs to agency's operations (Jensen & Meckling, 1976)[30]. The aim to minimize agency costs and maximizing firm's value is the reason for the perpetual conflict between firm's owners and its managers. It leads to difficulties in the optimal choice of a capital structure. The choice of equity or debt to finance firm's operation has a cost, as most modern firms are multi-owners (*i.e.* shareholders), multi-creditors (*i.e.* debt holders), and firm's managers. All have different self-utility maximizing goals. Hence, JM's claim that the choice of firm's resources allocation is driven by the need to minimize agency costs. The agency costs of raising debt is lower than raising equity. Furthermore, Shleifer and Vishny (1997) point to another agency's cost benefit of debt financing. It comes from higher financial constraints on managers' spending corporate profits. They observe that equity financing mostly occurs in rapidly growing firms or emerging economies.

The primary conflict within the agency is how the manager should manage its resources, which predominantly boils down to his management of financial resources (Fama, 1980). It is important of drafting contracts with equal respect for each stakeholder. It ensures that in the case of conflicts these

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[30] Jensen & Meckling: JM

contracts can be enforced by governance mechanisms. Therefore, the importance of the links between Williamson's *level-3* (governance) and *level-4* (agency). It leads us to find how does the agency framework influence the distribution of resources through the choice of capital structure?

Firms' choice of capital structure is a much-debated topic, starting with the seminal work of Modigliani & Miller[31] (1958). Since then, many authors explored optimal capital structure choice, but none converged to the same conclusions. Rather, each added new dimensions in the understanding of capital structure choices (Bradley *et al*., 1984; Titman & Wessels, 1988; Harris & Raviv, 1991; Rajan & Zingales, 1995; Myers, 2001; MacKay & Phillips, 2005; Frank & Goyal, 2009; Fan *et al*., 2012; Öztekin, 2015). From these studies, we could conclude that capital structure choice is influenced by country determinants (e.g. institutions, economic development), firms' determinants (e.g. size, performance, assets, age) and industry sector determinants.

Bradley *et al*. (1984) find that the optimal capital structure is linked to the average capital structure ratio of a specific industry classification (SIC). Moreover, Rajan and Zingales (1995) look at the determinants of capital structure choice of firms in G7 countries. They find that despite these countries similar economic development levels, firms' financing decisions varied across them and there is no influence on the leverage levels due to a bank based or a market based financial system. Although, based on the country, firms played with equity dilution or debt raising to maintain their leverage levels. They conclude that the debt-to-capital (capital being total debt plus equity) better represents past financing decisions as a measure capital structure. They say its variations could well be due to institutional differences among countries.

Titman and Wessels (1988) argue that a single measure of capital structure is not representative of the financing choices made by firms, thus they look at six measures of debt-to-equity. They highlight that firm's past financing decisions and results affect capital structure choice. However, most papers in the literature linking culture and capital structure look at a single ratio (Chui *et al*., 2002; Fauver & McDonald, 2015; Haq *et al*., 2018).

Myers (2001) summarizes the literature on capital structure choice under three main influencing theories that are the *tradeoff*, the *pecking order*, and the *free cash flow*. He observes that none of these three theories can be applied "generally" to explain firms' capital structure choices. He highlights that the JM's agency frameworks comes to complicate the perfect market theory of MM's, as it adds the problematic of the agents, the corporate managers, in the choice of equity vs. debt leverage. Hence, he suggests that one should look beyond the three theories modeling only the *financial capital,* to rather model together the firm's *human capital* (the corporate managers) along with its *financial capital*.

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[31] Modigliani & Miller: MM

This is precisely the key research objective of our study, as we attempt to connect together the influencing aspects of culture on firms' *human capital* and firms' choice of *financial capital* (capital structure).

3.2.5 Research hypotheses

Our research is adding value to the literature through its analysis of *culture's consequences* (Hofstede, 1980, 2001) on the choice of capital structure (Titman & Wessels, 1988) by industry sector. Therefore, we study the association of Hofstede's cultural dimensions' of IDV, MAS, UAI, and LTO, with Titman and Wessels' short-term and long-term debt to book and market value of equity, within Williamson's (2000) *level-1* (culture) to the *level-4* (capital structure) framework.

3.2.5.1 Core hypothesis

From the above perspective, we expect that firms founded in a country by a group of people originating from the said country, would tend to carry their cultural values into the forming and running of the firm. For example, the French founding members of a firm, headquartered in France, would carry the effects of their "*country-of-origin*" cultural values into the management of their firm around the world (Ferner, 1997; Noorderhaven & Harzing, 2003). Therefore, we expect that cultural preferences represented by the four Hofstede *et al.* (2010) dimensions of IDV, MAS, UAI, and LTO would be persistently embedded in firms' financial risk-taking (Pan *et al.*, 2017).

We expect that culture would share a persistent relationship with the four measures of capital structure (Titman & Wessels, 1988) irrespective of firms' industry sector. Moreover, this relationship would be different across industry sectors due to differences in the human capital to financial capital ratio (MacKay & Phillips, 2005).

Therefore, further extending the current literature on culture and capital structure (Chui *et al.*, 2002; Fauver & McDonald, 2015; Haq *et al.*, 2018), we expect an overall relationship between the four cultural dimensions and the four measures of capital structure across industry sectors leading to our core hypothesis as follows:

> **H1**. There is an association between national culture and firms' short-term and long-term capital structure.

We explore finer aspects of this core hypothesis through four secondary hypotheses. Hypotheses **H2a**, **H2b**, **H2c**, and **H2d** individually associate each of the four cultural dimensions with the four measures of capital structure, in the six industry sectors.

3.2.5.2 Secondary hypotheses

Hofstede (1980, 2001) mentions that in individualist cultures, people are expected to care for their own interests, whereas in collectivist cultures, people are expected to care for the group interests. We further

combine the individualist dimension of culture with the manager's role in the agency framework (Jensen, & Meckling, 1976). The manager would tend to secure higher financing for firm's investments opportunities as it is also linked to his individual performance, and to his *managerial autonomy and self-enhancement* (Li *et al*., 2013).

However, in collectivist cultures, people would prefer to secure their group for the incapacity of debt repayment leading them to be more conservative in the debt levels raised. Furthermore, Zheng *et al.* (2012) mention that firms in collectivist culture tend to issue debt with lower maturity, meaning that firms in collectivist culture wish to repay their debt at the earliest. Therefore, we expect individualism (IDV) to be positively related to the long-term debt-to-equity and negatively with the short-term ratios. It leads to our first secondary hypothesis as:

> **H2a.** There is a negative (positive) association between *individualism* and the short-term (long-term) debt-to-equity ratios.

Moreover, in masculine cultures, Hofstede (2001) describes that men, women are assertive, and there is an emphasis on results, with rewards in line with performance. Also in such cultures, people tend to have higher egos, looking to complete more tasks and being the best is the societal norm. This quest for performance and "ego-petting" could lead the managers to search for "unlimited" financing options for the firm to help them achieve what they think is right do. Furthermore, masculinity is often considered an important characteristic for executive leadership roles (Gleason *et al*., 2000; Appelbaum *et al*., 2003). This attitude would be accentuated in masculine cultures and could incite managers to achieve more by higher borrowing. It leads us to expect masculinity (MAS) to be positively (negatively) related with the long-term (short-term) debt-to-equity ratios. Hence, our next secondary hypothesis as:

> **H2b.** There is a negative (positive) association between *masculinity* and the short-term (long-term) debt-to-equity ratios.

Hofstede (1980, 2001) describes *uncertainty avoidance* as anxiety in people facing ambiguous and unpredictable situations. Higher uncertainty avoiding societies prefer less ambiguous and more predictable outcomes, including predictability of the occurrences of any risky situations. Li *et al.* (2013) show that there is a negative association between UAI and corporate risk taking.

In high UAI cultures, there tend to be rules to define and regulate the outcomes of financial decisions. There is also a preference for debt financing from the banking sector, as it is more predictable, rather than from the stock markets (Kwok & Tadesse, 2006). With these societal preferences, firms in higher uncertainty avoiding cultures would prefer to borrow less and for short-term. Inversely, firms in lower uncertainty avoiding cultures would be fine with higher borrowing despite higher uncertainty of future income to re-pay the debt.

Therefore, we expect UAI to have a positive (negative) relationship with the short-term (long-term) debt-to-equity ratios. As a result, our next hypothesis is:

> **H2c.** There is a positive (negative) association between *uncertainty avoidance* and the short-term (long-term) debt-to-equity ratios.

Firms' sources of financing are to help them meet their investment needs, be it through the sales and marketing expenses, research and development, for plants, machines and equipment's acquisition (Titman & Wessels, 1988). All these activities from firms' financing are to contribute to their long-term sustainability, and are specific to each industry sector (Bradley *et al*., 1984). This indicates that long-term financing should assist for assets creation and short-term financing should support for the sustainability of the organization out of short term operational requirements.

In long-term oriented cultures, people tend to save now in the perspective of spending in the future, while in short-term oriented cultures, people prefer to spend now even if it meant "borrowing" from their future income. This is highlighted in household saving rates as they are higher in long-term oriented cultures, *e.g.* Japan (LTO index: 88) or South Korea (LTO index: 100), compared with the USA (LTO index: 26) (Fuchs-Schündeln *et al*., 2017). These savings rate considerations can also be found in corporate cash holding in LTO cultures (Chang & Noorbakhsh, 2009).

Therefore, we expect LTO to have a positive (negative) relationship with short-term (long-term) debt-to-equity ratios. Our next hypothesis writes as:

> **H2d.** There is a positive (negative) association between *long-term orientation* and the short-term (long-term) debt-to-equity ratios.

In the next section, we define the data, key variables, and our empirical methodology to test these hypotheses.

3.3 Data and key variables

Our variables are aligned with Williamson's (2000) framework (see table 3-1), with culture (*level-1*), law and financial institutions (*level-2*), governance (*level-3*), and capital structure (*level-4*). Our dataset is matching these requirements at the firm and country levels.

3.3.1 Data sample

The sample is a multilevel dataset, including firm-level and country-level determinants. The firm-level determinants are financial data, in an industry sector, and in a country, while the country level determinants are national culture dimensions and economic development indicators. Often such a multilevel dataset is treated with hierarchical linear modelling (Li *et al*., 2013), but we flatten this multilevel structure by computing it at the industry sector level following Titman and Wessels (1988)

methodology. Therefore, we divide the sample into six subsets, each linked to an industry sector as capital structure is industry specific (Bradley *et al*., 1984; Titman & Wessels, 1988; MacKay & Phillips, 2005).

Our dataset is organized by industry sectors for six SIC (Standard Industry Classification) level-1 industry ranges and the financial data is obtained from the Reuters Datastream database. Country's institutional data is extracted from the World Bank Indicator database[32] and the cultural dimensions data from Hofstede[33] index. Our initial sample consists of 18001 firms from 68 countries (see table 3-11), with cross-sectional data over the period 2009-2017.

Furthermore, accounting for sample design with clustered data constraints (Hancock *et al*., 2010), we only keep countries with at least 15 firms in an industry sector. Moreover, to avoid for single year abnormal data, we process firms' financials and country's institutional data to obtain a dataset where each data-point is the simple average of three consecutive years' data-points (Titman & Wessels, 1988) within three periods of 2009-2011, 2012-2014, and 2015-2017. In case of a single year missing point in a period, we complete it by the period's mean value.

Subsequently, on the resulting dataset, we apply trimming on both side of the dependent variable's data distribution tails to remove outliers through the classic rule of thumb method[34] (Navidi, 2008), leading to 6770 firms spread across 33 countries (see table 3-2) constituting our final dataset. We further provide a descriptive overview of the final sample.

Table 3-2 Panel A, provides a country-level summary of our sample. The number of firms per country varies from 51 (Spain) to 1420 (Japan). The countries with the highest and lowest score on individualism are: USA (91) and Indonesia (14). USA (0.0834) short-term debt to market value of equity ratio is lower than Indonesia (0.2155) and a higher USA (0.3074) long-term debt to market value of equity ratio than Indonesia (0.2743). The countries with the highest and lowest score on masculinity are: Japan (95) and Sweden (5). Japan (0.2687) short-term debt to market value of equity ratio is higher than Sweden (0.1276) and a lower Japan (0.2878) long-term debt to market value of equity ratio than Sweden (0.2920). The countries with the highest and lowest score on uncertainty avoidance are: Belgium (94) and Singapore (8). Belgium (0.2284) short-term debt to market value of equity ratio is lower than Singapore (0.2387) and a higher Belgium (0.4489) long-term debt to market value of equity ratio than Singapore (0.3669). The countries with the highest and lowest score on long-term orientation are: Korea (100) and Argentina (20). Korea (0.3933) short-term debt to market value of equity ratio is higher than

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[32] https://data.worldbank.org/indicator
[33] https://geerthofstede.com/research-and-vsm/dimension-data-matrix/ , *VSM100* dated 8dec2015
[34] Left tail trimming of values under (Q2 – 3*(Q3-Q1)) and right tail trimming of values above (Q3 + 3*(Q3-Q1)); where $(Q_3 – Q_1)$ is the interquartile range

Argentina (0.1571) and a lower Korea (0.2560) long term debt to market value of equity ratio than Argentina (0.2978).

Table 3-2 Panel B, provides the summary statistics for firm-level variables. The mean (median) values of our four capital structure measures are, for short-term debt to market value of equity 0.2239 (0.1087), for short term-debt to book value of equity 0.2595 (0.1594), for long-term debt to market value of equity 0.3016 (0.1901), and for long-term debt to book value of equity 0.4136 (0.2866).

Table 3-2 Panel C, presents the pairwise correlations between the dependent and independent variables using firm level observations. We show that there is mostly a significant correlation between the four dimensions of culture (IDV, MAS, UAI, and LTO) and the four measures of capital structure. Similarly, there is mostly a significant correlation between the four independent firm-level financial variables and the four measures of capital structure. Moreover, there is a significant correlation between the three institutional variables of *GDP-per-capita, credit to the private sector*, and *law* with the four measures of capital structure.

< Insert table 3-1 here >

< Insert table 3-2 here >

3.3.2 Industry classification variable

As capital structure is industry specific (Bradley *et al*., 1984; Harris & Raviv, 1991; MacKay, & Phillips, 2005), we select six industry sectors' variables representing for the SIC codes ranges 1000-1799 (sector 1: mining & construction), 2000-3999 (sector 2: manufacturing), 4000-4999 (sector 3: utilities), 5000-5999 (sector 4: wholesale & retail trade), 6000-6799 (sector 5: finance, insurance and real estate), 7000-8999 (sector 6: services). Despite previous literature on capital structure excluding financial firms (Rajan & Zingales, p1424, 1995; Bradley *et al*., 1984; Chui *et al*. 2002), we opt for including them (SIC codes range 6000-6799) (Haq *et al*., 2018), as our angle of study is by industry sector, checking for cross country variations as *culture's consequence*[35].

3.3.3 Capital structure variables

We use four variables of capital structure as the ratios of short-term and long-term debt to the market and book values of equity (Titman & Wessels, 1988). Although, the literature mostly uses a single measure of capital structure, primarily to check the borrowing benefits of debt (Bradley *et al*., 1984; Myers, 1984; Harris & Raviv, 1991; Rajan & Zingales, 1995; Feld et al., 2013), and so does the literature on culture determinants of capital structure choice (Chui *et al*., 2002; Fauver & McDonald, 2015; Haq *et al*., 2018). Our choice of four measures allows us to analyze the influence of culture on two time horizons of debt and two valuation measures of equity. This choice is driven by our consideration that

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[35] Hofstede (1980, 2001)

national culture influences the preference for short term or long-term debt as well as the market and book value of equity. We are not using the convertible debt ratios measures (Titman & Wessels, 1988) due to insufficient data coverage for firms in our sample.

3.3.4 Culture variables

The variables are four measures of **National Culture** from Hofstede *et al*. (2010) as *individualism vs. collectivism (IDV), masculinity vs. feminity (MAS), uncertainty avoidance (UAI), long term vs. short term orientation (LTO)*, and the remaining two, *power distance, indulgence/restraint*, are not used since they exhibit very strong correlation with the chosen four (see table 3-12). The strengths of Hofstede's (1980, 2001) cultural dimensions are that they have been developed from a large countries sample and have been further cross validated with third party studies (Hofstede *et al*., 2010). As per the litterature (Williamson, 2000; Hofstede, 1980, 2001; Schwartz, 1994), we assume the stability of culture over the entire period. Therefore, any changes that might have occurred in the cultural dimensions scores over the period of our study could produce an undetected impact on our measures of culture's influence on capital structure choices. A detailed description of these dimensions is provided in appendix 3-1.

3.3.5 Firm-level variables

Our four firm-level control variables are the financial measures of *capital expenditure over total assets* to represent the financial outflows for which the firm needs to raise financing through debt or equity (Myers, 1984; Frank & Goyal, 2009). To measure profitability, we select *operating income over total assets* as the previous period income affects retained earnings and hence the current capital structure (Titman & Wessels, 1988; Frank & Goyal, 2009; Fan *et al*., 2012). To measure firm's size, we take the *total sales* of the firms as the size affects the cost of debt financing (Titman & Wessels, 1988; Rajan & Zingales, 1995; Frank & Goyal, 2009). Furthermore, to control for firm's growth, we take *total asset growth* that measures *ex-post* the deployment effects of funds raised *ex-ante* (Titman & Wessels, 1988).

3.3.6 Country-level variables

The three country-level control variables. The *country GDP per capita*, as country's wealth is said to be correlated with the national culture (Hofstede, 1980, 2001). The measure of *total credit to private sector* representing the development of the banking sector for its effects on the choices of a capital structure (Rajan & Zingales, 1995; Chui *et al*., 2010; Li *et al*., 2013). The *rule of law* measure from the World Justice Project[36] (Botero & Ponce, 2011), as the implementation of law is important for creditors and investors protection (Shleifer & Vishny, 1997).

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[36] https://worldjusticeproject.org/our-work/wjp-rule-law-index/wjp-rule-law-index-2017–2018

3.4 Methodology

3.4.1 Capital structure "target ratio"

Capital structure of firms in a stable industry tends towards a "target ratio", which is the long-term average of all firms' capital structure in that industry (Bradley *et al*., 1984; Hovakimian *et al*., 2004; Frank & Goyal, 2009). Hence, to highlight the effects of culture on the firms' capital structure, we measure the gap between each firm's capital structure ratios and this sol called "target ratio". For that, we compute two target ratios for each industry sector, one is at the industry-level (*i*) and the second at the country-level (*j*). We call the industry-level target ratio as the Industry Grand Mean (IGM) and the country-level one as the Industry National Mean (INM). The INM is the simple mean of all firms (*k*) in an industry sector in a country to ensure equal representation of all firms irrespective of their size. Moreover, the IGM is computed as the simple mean of all INMs to ensure that each country is equally represented irrespective of the number of firms in that country for an industry sector. Therefore, we have six IGMs, one for each of the six industry sectors, and as many INMs as there are countries in an industry sector (ref. equation 1, 2). Hence, for each industry sector *(i)* at time *t*, we have the following:

(1) $\quad INM_{j(t)} = \frac{1}{K} \sum_k Debt2Equity_{jk(t)}$; $\quad with\ Country\ j \in \{1|\ J\};\ Firm\ k \in \{1|K\}$

(2) $\quad IGM_{(t)} = \frac{1}{J} \sum_j INM_{j(t)}$ $\qquad$; $\quad with\ Country\ j \in \{1|\ J\}$

Furthermore, for each industry sectors, we compute the INM and IGM for each of our four measures of capital structure that are the short-term and long-term debts to the market and book values of equity.

3.4.2 Titman and Wessels' methodology

For each industry sector, the financial data is taken over a nine-year period and then split into three consecutive periods of three years each (Titman and Wessels, 1988). The first period of three years is considered the past $(t-1)$, the next three years period is considered the present (t), and the third consecutive period is considered the future $(t+1)$. At time (t), when the firm choses its capital structure, it bases its decision on firm's results from the previous period $(t-1)$, and the financing raised is deployed in the firm's growth proxied by the assets growth from time (t) to $(t+1)$. Then for each period, they compute the simple mean of each variable, thus leaning out any year's abnormal fluctuation.

Further, we consider the periods 2009-2011 as $(t-1)$, 2012-2014 as (t), and 2015-2017 as $(t+1)$. Following Titman and Wessels (1988) empirical model, we compute average values of all variables for these three periods. Therefore, at the firm-level, at time (t), for our dependent variables of capital structure, at time $(t-1)$, for the independent variables of capital expenditure, operating income, and

total sales, and at time $(t + 1)$ for the total asset growth from time (t) to $(t + 1)$. For the country-level variables, we compute at the time (t), the institutional variables of GDP per capita and the bank credit to private sector. For the culture variables, considered at time (t), though the time is not a constraint as culture is said to be stable over very long periods of centuries to millenniums (Williamson, 2000; Hofstede, 1980, 2001). This empirical model considers that the firm's choice of capital structure at period (t) is conditioned by the firm's results at period $(t - 1)$ and the impact of the choice is visible at period $(t + 1)$.

3.4.3 Model specification

Combining the IGM, INM and Titman and Wessels (1988) model, we construct our empirical model. Therefore, for each industry sector, our observation variable is the gap Y at the firm-level (see equation 3), which is the difference between the firm's capital structure and the IGM. This method of measuring the gap Y annihilates identical effects of the financial control variables on the firm's choice of capital structure and on the industry "target ratio", therefore highlighting the differentiating effects between these two. Hence, at the firm-level, our model helps in extracting the differentiating effects of culture's influence on the distance of each firm's capital structure to its industry's target ratio (IGM).

$$(3) \quad \text{The Firm's Gap(t)} \ = \ Y_{k(t)} = Debt2Equity_{k(t)} - IGM_{(t)} \ ; \quad for \ Firm \ k$$

Therefore, for each of the six industry sector, we run statistical regression[37] on the gap Y, for each of our four measures of capital structure, as per the following (see equation 4), for country (j) and firm (k):

$$(4) \quad Y_{kj(t)} = \alpha_0 + \alpha_1 Culture_j + \alpha_2 \ Firm_{level}Control \ Variables_{k(t-1)}$$
$$+ \alpha_3 \ Firm_{level}Control \ Variables_{k(t+1)}$$
$$+ \alpha_4 \ Country_{level}Control \ Variables_{j(t)} + \ \varepsilon_{k,j,t}$$

We test our empirical model (4) and present the main results as well as the robustness tests in the next section.

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[37] We tested alternate estimation models as well but OLS worked well

3.5   Results and comments

We present our key results and analyze the core and secondary hypotheses results. We expand our analysis of the results by industry sector.

3.5.1   Overview

First, the key finding is that national culture has a significant effect on the choice of capital structure (Chui *et al*., 2002; Fauver & McDonald, 2015), irrespective of the industry sector, consistent with our core hypothesis. The significant relationship is observed with all the debt-to-equity ratios, be it market value or book value of equity (see table 3-3). The influence of the four cultural dimensions (IDV, MAS, UAI, and LTO) is strong and significant in most combinations of these debt ratios (Zheng *et al*., 2012). Further, the results bring the empirical evidence that the ratios of short-term debt to equity have a higher sensitivity to the influence of culture then the ratios of long-term debt to equity. The sign of the relationships between each cultural dimension and these ratios vary based on the industry, giving mixed results in regards to our secondary hypotheses requiring further investigation (see table 3-4).

Second, our results confirm that the capital structure is industry specific (Bradley *et al*., 1984; Harris & Raviv, 1991; MacKay & Phillips, 2005), further adding the cultural dimensions as its determinants. Indeed, our results show that despite a "target ratio" goal for each firm in a stable industry, the firms in that industry tend to have a different capital structure ratio based on their country-of-origin. This key result highlights the differentiating role of national culture in the firm's choice of capital structure, which is more prominent for the short term debt than the long term debt to market value of equity ratios (see table 3-3), and much less significant with the debt to book value of equity ratios.

< Insert table 3-3 here >

< Insert table 3-4 here >

Beside culture, the control variables of firms' financials and the country economic development also show significant association with capital structure choice. At the firm-level, the four financial variables of *capital expenditure to total assets* (positive association), *operating income to total assets* (negative association), *total sales log* (positive association), and *total asset growth* (negative association), all have predominantly a significant association (*p-value*) with the debt to equity ratios. These results are conform in sign and significance to the existing literature on the determinants of capital structure (Titman & Wessels, 1988; Rajan & Zingales, 1995; Chui *et al*., 2002; Frank & Goyal, 2009; Fan *et al*., 2012).

However, the overall significance levels are higher with the long-term debt ratios compared to the short-term debt ratios (Chang *et al.*, 2009). For the country variables, the *GDP per capita* is significant and negatively associated with the short term debt ratios for the most capital intensive industry sectors 1 (mining & construction), 2 (manufacturing), 3 (utilities).

This means that the wealthier a country, the lower is the ratio of short-term debt-to-equity, which sounds reasonable as in wealthy countries asset heavy firms may tend to use more of their equity for financing. However, country's wealth is less significant in the long-term debt to equity ratios, keeping its negative association with capital-intensive industry sectors.

The *banking sector development* variable association is positive and significant for the short term debt ratios and negative and significant for the long term debt ratios, for the three capital intensive industry sectors 1 (mining & construction), 2 (manufacturing), and 3 (utilities) (MacKay & Phillips, 2005).

The *rule of law* is more significant for the long-term than short-term debt-to-equity. It could possibly indicate that the uncertainty for borrowers and creditors in the long-term makes the rule of law implementation quality even more important. In the short-term, culture influence seems to be more significant (see table 3-3, table 3-4).

All our results showing that culture effects flow much deeper to the short-term's and long-term's financial structure and differently affects various industry sectors add to the body of knowledge on culture and capital structure choice (Chui *et al.*, 2002; Fauver & McDonald, 2015; Haq *et al.*, 2018).

3.5.2 Core hypothesis results

The hypothesis **H1** stands validated as there is a strong (*p-value*) association between each of the cultural dimensions of IDV, MAS, UAI, and LTO with the ratios of short-term (or long-term) debt to market value or book value of equity, within each industry sector (see table 3-3). The level of significance (*p-value*) of these relationships is higher for the short-term ratios than the long-term debt-to-equity ratios. These findings confirm the robustness of our results on the influence of national culture on the choice of capital structure. It adds new knowledge about these relationships in all industry sectors and highlights that culture influences differently the short-term and long-term debt-to-equity choices.

The relationship signs of the four cultural dimensions also differ between the short-term and long-term ratios. This could indicate that based on the national culture's preferences, firms in these countries choose more short-term debt or more long-term based on their equity levels. The culture significance (*p-value)* is higher for the short-term than for the long-term ratios (see table 3-3). These findings also support our choice of a detailed measure of capital structure (Titman & Wessels, 1988; Chang *et al.*, 2009) instead of a single aggregated measure prevalent in the literature (Chui *et al.*, 2002; Fauver & McDonald, 2015; Haq *et al.*, 2018).

At the industry sector-level, we observe two categories of industries with each category showing similarities in regards to culture's consequences. One category (A) of industries is characterized by higher intensity of capital employed that are sector 1 (mining & construction), 2 (manufacturing), and 3 (utilities), and the second category (B) being lesser capital intensive such as sector 4 (wholesale & retail trade), sector 5 (finance & real estate), and sector 6 (services).

The category (A) having higher fixed assets employed in production, demonstrates higher sensitivity (*p-value*) to national cultural dimensions of IDV, MAS, UAI, and LTO in its capital structure ratios. While the category (B), with lower fixed assets employed, shows lesser influence to the four national cultural dimensions in regards to its capital structure ratios.

These observations suggest that industry sectors with higher ownership of fixed assets are more influenced by culture than the ones with lower fixed assets ownership. MacKay and Phillips (2005) show that industry characteristics such as competitiveness and *capital-labor ratio* within the industry affect firm's capital structure.

It appears that the fixed assets heavy industry sectors (A) are historically much older than the asset light industry sectors (B) that arose in the last 50 years or so and some are "*born-global*"[38]. It can indicate that the cultural preferences may have deeply *pervaded*[39] (Ferner, 1997; Noorderhaven & Harzing, 2003) the capital structure choice "*real decisions*[40]" tree in the old industry sectors (A) compared to the new industry sectors (B). This historical analysis of industry types and culture's pervasiveness would require a much more detailed analysis that could be the scope of future research.

Our hypothesis **H1** results confirm the influence of national culture on the firms' choice of capital structure (Gleason *et al*., 2000; Chui *et al*., 2002; Fauver & McDonald, 2015; Haq *et al*., 2018). It adds key knowledge to this literature in bringing out new relationships between each cultural dimensions and the short-term and long-term debt-to-equity choices across 6 different SIC industry sectors. These new relationships also highlight the paradigm that culture influences differently based on the type of the industry sector. Indeed, another body of literature inspects this influence of culture on industries (Breuer & Salzmann, 2012) that we explore our essay three of this doctoral research.

3.5.3 Secondary hypotheses results

The overall association (**H1**) between the four cultural dimensions and the four measures of capital structure is strong but the individual association of each cultural dimension with the four measures of capital structure is different in sign and significance. These individual associations are what our

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[38] Knight and Cavusgil (2005)

[39] North (1991, p111) is using *pervasive*. We mean the pervasiveness of culture in North's sense.

[40] MacKay and Phillips (2005)

secondary hypotheses **H2a** (IDV), **H2b** (MAS), **H2c** (UAI), and **H2d** (LTO) seek to understand (see table 3-3, 3-4).

Hypothesis **H2a**, which is *individualism has a positive (negative) association with the long-term (short-term) debt-to-equity ratios*, is validated. IDV has a significantly negative association with the short-term ratios, meaning that more collectivist cultures favor a short-term debt-to-equity choice to avoid leaving any long-term liabilities for their group members, typical of collectivist cultures (Zheng *et al*., 2012). IDV has a positive relationship with the long-term debt-to-equity but the significance level is lower. This confirms our expectation that in individualist cultures firms are higher risk-taking (Li *et al.*, 2013) when they choose to increase the debt levels in their capital structure.

Hypothesis **H2b**, which is that *masculinity has a positive (negative) association with the long-term (short-term) debt-to-equity ratios,* is partly validated. The association is more significant with the short-term debt-to-equity and the negative sign of the relationship indicates that lower masculinity cultures (higher *feminity*) prefer more short-term debt in their capital structure. This result confirms existing literature (Zheng *et al*., 2012; Chang *et al*., 2012). For the long-term debt-to-equity, the association is significant for sector 2 (manufacturing) and sector 5 (financials) while remaining negative, indicating that high masculine cultures don't prefer long-term debt in the capital structure, in line with Zheng *et al.* (2012). Our findings further add value by detailing masculinity dimensions association with four capital structure measures individually in 6 industry sectors.

Hypothesis **H2c**, that *uncertainty avoidance has a negative (positive) association with the long-term (short-term) debt-to-equity ratios* is validated. UAI mostly has a significantly negative association with the long-term debt to equity, meaning that higher uncertainty avoiding culture avoid higher long-term debt**.** The association with the short-term debt ratios is significant and positive**,** which means that firms in higher uncertainty avoiding cultures rather prefer more short-term debt (Zheng *et al*., 2012; Chang *et al*., 2012) in their capital structure choice to avoid the future uncertainty of income to repay the debt. Both results indicate that uncertainty-avoiding cultures prefers lower debt in their capital structure choice. They have a higher preference (*p-value*) for the short-term debt than for the long-term debt in their capital structure.

Hypothesis **H2d**, which is that *long-term orientation has a positive (negative) association with the short-term (long-term) debt-to-equity ratios,* is validated. LTO has a significant and positive association with the short-term debt to equity ratios. This result indicates that firms in long-term oriented cultures prefer higher short-term debt in their capital structure choice that could be repaid early (Chang *et al.*, 2012), hence securing a more stable future. The LTO association with the long-term debt to equity ratios is negative and significant in sectors 1 to 4. Our findings adds to the literature by showing how these associations work in each of the six industry sectors.

The results of our secondary hypotheses, **H2a**, **H2b**, **H2c**, and **H2d,** are consistent with our core hypothesis **H1,** in that culture influences differently the short-term and the long-term debt-to-equity choices. These results show that cultural dimensions have more significant (*p-value*) relationships with the short-term ratios than the long-term ones irrespective of industry sectors. Our findings contribute to extend the literature on capital structure (Gleason *et al*., 2000; Chui *et al*., 2002; Fauver & McDonald, 2015; Haq *et al*., 2018) and on debt maturity (Zheng *et al*., 2012; Chang *et al*., 2012). Our results validate a large set of relationships (96) combining four cultural dimensions, four capital structure measures, and six industry sectors.

3.5.4   Industry sector level analysis

We analyze by industry sector on why and how national culture has a specific influence on each one of them. This is a key new insight to the existing literature. We find that the determinants (Bancel & Mittoo, 2004)[41] of capital structure choice for industry sectors 1, 2, and 3 are influenced by national culture values. Because national culture influences the preference for short-term or long-term debt, where industry determinants (Bancel & Mittoo, 2004) represent the reasons why firms choose a type of debt-to-equity structure.

These determinants transmit further the influence of cultural preferences on the firm's "*real*[42]" choice of capital structure, which may seem from the outside view to be only affected by firms' financial considerations. We find the "*real*" reasons in the questions that Bancel and Mittoo (2004) ask to firms' CEOs, on their choice of capital structure through short-term or long-term debt. The CEOs answers align well with our findings of culture dimensions influence.

Hence, question *(a)* (see appendix 3-2) about taking short-term debt until long-term interest lowers, is a preference linked to the LTO culture dimension, as we found that firms in LTO cultures have a positive relationship with short-term debt (see table 3-3 & 3-4). The question *(f)* (important at 70%), where CEOs take on long-term debt to avoid financing in "*bad times*", meets our findings for firms in the manufacturing and utilities sector, where cultures high on uncertainty avoidance have a positive relationship with the long-term capital structure ratios.

Furthermore, Rampini and Viswanathan (2013) point to the firms with higher tangible assets having higher debt levels in their capital structure, as the cost of financing is lower. It would influence our industry sectors 1 (mining & construction), 2 (manufacturing), and 3 (utilities). The reasons developed are that higher collateral assets mitigates the risk of repayment by the firm and safeguards the creditors. And as described in section 3.5.2, culture influences more fixed asset heavy firms (category A) (Harris & Raviv, 1991) and lesser the asset light ones (category B), which further enhances our perspective of

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[41] Appendix 3-2: Bancel and Mittoo's (2004) CEOs questionnaire is mentioned.
[42] MacKay and Phillips (2005)

"old" vs. "new" industries capital structure choice. This comparison can also be between mature industry sectors vs. disruptive industry sectors as it plays on the competitive nature of the industry (Miao, 2005) and leads to industry effects (MacKay & Phillips, 2005). These findings opens-up a large scope for future research on structure of industry sectors and culture's influence, which we explore in essay three of this doctoral dissertation.

Regarding sector 4 (wholesale & retail trade), our main results show little culture's influence on firms' capital structure in this industry sector. Although, Gleason *et al*., (2000) find that capital structure of retailers in Europe is different based on the culture cluster they belong-to. Further investigations in section 3.6 robustness checks (see table 3-10), show that culture has a significant influence on this industry's capital structure, confirming our overall results that culture is a key determinant of the gap in firms' capital structure to its industry's *target-ratio* based on firm's *country-of-origin* (Ferner, 1997).

In the financial sector 5, banks are required to secure their risks of lending as well as generate safe interests on the certificate of deposits and insurance firms are required to cover for actuarial risks. Their business model tends to inherently distort the capital structure, as banks need to hold cash to mitigate for repayment risks. This artificially inflates their equity levels and influences the capital structure (Cebenoyan & Strahan, 2004). Furthermore, our approach is applicable to this sector, as Gropp and Heider (2010) show that the *invariant* determinants of banks capital structure are similar to non-financial firms, and that their specific regulatory requirements are only secondary.

Our results show that *individualism* has a positive relationship with the long-term debt-to-equity in the financial sector (Haq *et al*., 2018). Whereas, *masculinity* has a positive relationship with the long-term (Haq *et al*., 2018). It means that in lower masculine culture (or higher feminine cultures) there is a "safer" or less aggressive stand towards debt-to-equity levels. *Long-term orientation* and *uncertainty avoidance* have a significant (*p-value*) association with the short-term debt to market value of equity and not significant with the long-term debt to equity ratios, confirming Haq *et al*. (2018) on their single measure of long-term capital structure.

The services industry sector 6, often does not have its own products, uniqueness (Titman & Wessels, 1988), and hence is often more sensitive to environment and the economics swings that affect its customers. This leads services firms to hold larger amounts of cash or equity and lower debt levels. Their profitability is often higher and hence the need for lower debt leverage (Gill *et al*., 2009) in regards to their equity levels. Our results show that UAI has a negative relationship with the long-term debt to equity ratios and a positive relationship to the short-term debt to equity ratio.

Our results demonstrate that national culture is often a differentiating factor as a determinant of firms' capital structure choice, despite the industry fixed effects and firms' financial determinants (MacKay & Phillips, 2005).

3.6 Robustness checks

We explore multiple robustness checks at the firm-level, country-level, and sample-level. At the firm-level, we apply *agency costs* and *collateral value* (Titman & Wessels, 1988) giving additional insights on culture's influence. The *collateral value* of assets is tangibles (inventory, plant, machines, and equipment) plus intangibles, as higher collateral value tends to lower costs of financing while inventory affects the short-term debt (Titman & Wessels, 1988; Frank & Goyal, 2009). The *agency costs* is the sum of research & development plus selling & administration expenses, divided by total sales (Bradley *et al*., 1984; Rajan & Zingales, 1995; Frank & Goyal, 2009).

We first test the research & development (R&D) expenses of the agency costs (see table 3-6) and find a negative association with the debt-to-equity ratios (Titman & Wessels, 1988; Frank & Goyal, 2009) and it is significant for both the short-term and the long-term ratios. Due to limited sample size, the results are meaningful only for sector 2 (manufacturing). We observe that cultural dimensions keep their overall significance and signs as per our main results confirming our earlier findings of culture's influence on capital structure choice. Adding selling, general and administration expenses (see table 3-7) to the agency costs variable does not change the results, though the cultural dimensions significance increases for both the short term and long term debt ratios in industry sectors 1, 2, and 3.

< Insert table 3-6 here >

< Insert table 3-7 here >

The second firm-level robustness check is done with *collateral value* and the results (table 3-8) show that the cultural dimensions signs and significance remain practically unchanged from our main results. The *collateral value* association is positive (Rampini & Viswanathan, 2013) and significant for industry sector 2 (manufacturing) & 6 (services) for the short term debt to equity ratios and for all industry sectors for the long term ratios. These results lead us to deduce that collateral assets value has the cultural influence already in-build, confirming our findings of section 3.5.2 and 3.5.3 for fixed asset heavy industry sectors (category A). Hence, including collateral value in addition to cultural dimensions does not change the outcome on the firm's choice of capital structure. It is a very interesting perspective for future research.

< Insert table 3-8 here >

At the country-level ([table 3-9](#)), we check for governance regulation of creditors and invertors rights protection through the *creditors' rights index* (Djankov *et al.*, 2007) and development of the financial systems through the *financial development index* (Svirydzenka, 2016). The cultural dimensions significance remains overall high for the short-term debt-to-equity ratios, though the financial sector and the services sector observe a reduction in these significance levels from our main results (see [table 3-3](#)).

For the long-term debt-to-equity ratios, we observe for the asset heavy industry sectors (1, 2, and 3) similar significance levels for the culture dimensions. However, the remaining three sectors (4, 5, and 6) observe a decrease in culture significance levels. This could mean that the financial and services sectors are more sensitive to creditors and invertors rights protection as well as at the development levels of country's financial institutions of banking and stock market.

< Insert [table 3-9](#) here >

At the data sample-level, we remove the data of firms from Japan (1417) and USA (1103) as they represent about 37% of our total sample size of 6770 firms and may create an over-representation bias in the results. Our results (see [table 3-10](#)) show either a substantially increased significance of cultural dimensions in multiple industry sectors (3, 4, 5) or a milder increase in some sectors (1, 2, 6) compared to our main results.

We observe that cultural dimensions are significant in all industry sectors for the short-term debt to equity ratios and for the long-term debt to equity ratios, we see an important increase in sector 3 (utilities) and 5 (finance) (Haq *et al*., 2018). There is an increase in the coefficients values for the four cultural dimensions in all of the six industry sectors.

These results further consolidate all our earlier findings that overall culture and of its individual dimensions influence deep unto the short term and long term measures of capital structure choice. This influence is higher on the short-term debt to equity ratios than on the long term debt to equity ratios though all the tests in this paper. These results contribute in extending the current literature on national culture and capital structure choice (Chui *et al*., 2002; Li *et al*., 2011; Fauver & McDonald, 2015; Haq *et al*., 2018).

< Insert [table 3-10](#) here >

Our robustness tests at the firm-level, country-level, and sample-level supports our main results findings in regards to our hypotheses H1, H2a, H2b, H2c, and H2d.

3.7 Conclusion

Our paper presents empirical evidence that culture influences on firms' choice of capital structure goes deeper to the level of short-term and long-term debt-to-equity, irrespective of the industry sector. Furthermore, our paper highlights culture's influence through the various levels of effectuation, such as country's formal institutions, the corporate governance framework, unto the firm's agency dealings leading to firms' choice of their capital structure. These findings adds new knowledge to the existing literature on culture and capital structure (Chui *et al.*, 2002; Li *et al.*, 2011; Fauver & McDonald, 2015; Haq *et al.*, 2018) and culture and debt maturity (Zheng *et al.*, 2012; Chang *et al.*, 2012).

Moreover, our findings of culture's higher influence on industry sectors with higher fixed asset, such as mining, manufacturing and utilities, and a lower influence on industry sectors that are low on fixed asset such as wholesale trade, financial, and services, are key new contributions to the culture and capital structure body-of-knowledge. These findings add to another stream of literature (Whitley, 1999; Breuer & Salzmann, 2012) that we develop in our essay three.

Our key results are that cultural dimensions of *individualism* is positively and significantly associated with the long-term and negatively with the short-term debt-to-equity. *Masculinity* is positively and significantly associated with the long-term and negatively with the short-term debt-to-equity. *Uncertainty avoidance* is negatively and significantly associated with the long-term and positively with the short-term debt-to-equity. L*ong-term orientation* is positively and significantly associated with short-term and negatively with the long-term debt-to-equity. These results are stable to our robustness test at the firm-level, county-level, and at the sample-level.

What seems to be a counter intuitive result –the influence of national culture on large "international" firms– is challenging the view that despite globalization and technological changes, firms' capital structure choices seem to be culture driven.

The findings in our paper are relevant to international corporate finance managers, investors, and creditors in analyzing and comparing firms' financial sheets in the context of culture influence. It allows them to interpret the meaning of the financial data beyond the numbers.

Moreover, our papers raises multiple questions for future financial research such as the effect of cultural dimensions on firms' capital structure within an industry sectors dynamism. The effects of culture on industry with higher fixed assets vs. lower fixed assets, or the effects of culture on the collateral value determinant of capital structure choice.

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Regressions Tables for Essay 1

Tableau 3-1: Summary of variables. Essay one.

Dependent, explanatory and key variables of measures for firms' financials, country's economic development and instiutional development.

Variables	Descriptions	@Time	Sources
Dependent variables: measures of Capital structure			
STD2MVE	Short-Term Debt divided by Market Value of Equity	t	Titmman & Wessels (1988)
STD2BVE	Short-Term Debt divided by Book Value of Equity	t	Titmman & Wessels (1988)
LTD2MVE	Long-Term Debt divided by Market Value of Equity	t	Titmman & Wessels (1988)
LTD2BVE	Long-Term Debt divided by Book Value of Equity	t	Titmman & Wessels (1988)
Explanatory variables: Hofstede's cultural dimensions			
IDV	Individualism vs. Collectivism	t	Hofstede (1980, 2001, 2010)
MAS	Masculinity vs. Feminity	t	Hofstede (1980, 2001, 2010)
UAI	Low-High Uncertainty Avoidance	t	Hofstede (1980, 2001, 2010)
LTO	Long-Term vs. Short-Term Orientation	t	Hofstede (2001, 2010)
Firm-level control variables			
SIC Industry Sector	Industry sector of the Firm as SIC code level 1	t	Bradley et al.(1984) ; Harris & Raviv (1991)
Capex Expenditure/Total Assets	Proxy for firm's investment	t-1	Titmman & Wessels (1988)
Operating Income/Total Asset	Firm's Profitability Indicator	t-1	Titmman & Wessels (1988)
Total Sales (log)	Firm's Size measured by its Total Sales	t-1	Titmman & Wessels (1988)
Asset growth	Assets Growth Rate from *t* to *t+1*	t+1	Titmman & Wessels (1988)
Country-level control variables			
GDP per Capita (log)	Measure of Country's wealth	t	World Bank Development Indicator (2018)
Banking sector development (log)	Domestic Credit to Private Sector (as % of GDP)	t	World Bank Development Indicator (2018)
Law-WJP	Adherance to the rule of law in practice (World Justice Project)	t	Botero & Ponce (2011)
Robusteness test variables			
Collateral value	((Tangible Assets + Intangible Assets)/ Total Assets)	t-1	Titmman & Wessels (1988)
Agency Cost	Agency Costs ((R&D Expenses / Total Sales) + (Sales & Marketing expenses/Total Sales))	t-1	Bradely et al.(1984) ; Rajan & Zingales (1995)
CRI	Creditor Rights Index	t	Djankov et al. (2007)
FDI	Financial Development Index	t	Svirydzenka (2016)

Table 3-2: Descriptive statistics

Descriptive statistics for key variables. Firm-level variables are three year means computed from Reuters Datastream database for the period 2009-2017. The Hofstede dimensions index, VSM2015, is obtained from Hofstede website. Country-level economic variables are three year means coputed from World bank indicators database. Law variable is from the World Justice Project database. We include 6 industry sector firms, *i.e*. Mining, manufacturing, utilities, trade, financial, services (SIC codes 1000-1799, 2000-3999, 4000-4999, 5000-5999, 6000-6799, 7000-8999). Our final sample consists of 6770 firms across 33 countries. Panel A presents country-level summary statistics.

Panel A: Country-level summary statistics

Country	N	Short-term debt to market value of equity	Short-term debt to book value of equity	Long-term debt to market value of equity	Long-term debt to book value of equity	Individualism	Masculinity	Uncertainty avoidance	Long-term orientation	Capital expenditure to total assets	Operating income to total assets	Total sales	Total asset growth	Country GDP per capita	Country private credit	Law_WJP
ARAB	134	0.2091	0.2968	0.3021	0.4369	38	53	68	23	0.0605	0.0512	12.7660	1.1459	10.4957	3.8484	0.6464
ARG	37	0.1571	0.1967	0.2978	0.4437	46	56	86	20	0.0629	0.1081	12.8944	1.1385	9.4518	2.6705	0.5819
AUS	104	0.0648	0.1037	0.2614	0.4308	90	61	51	21	0.0849	0.0844	13.6832	1.1019	11.0946	4.8326	0.8138
BEL	66	0.2284	0.2715	0.4489	0.5479	75	54	94	82	0.0381	0.0479	12.9114	1.0842	10.7415	4.0332	0.7734
CAN	102	0.0577	0.1032	0.4174	0.7530	80	52	48	36	0.0657	0.0702	14.3701	1.1396	10.8549	4.8488	0.8097
CHE	105	0.0853	0.1338	0.2472	0.3915	68	70	58	74	0.0390	0.0641	14.0253	1.0496	11.3514	5.1242	0.8877
CHL	67	0.1613	0.1693	0.3661	0.4950	23	28	86	31	0.0608	0.0877	13.4732	0.9973	9.6419	4.3292	0.6655
CHN	373	0.2553	0.4974	0.2317	0.4205	20	66	30	87	0.0663	0.0520	13.2456	1.8536	8.8584	4.8989	0.4998
DEU	166	0.1100	0.1634	0.3088	0.5066	67	66	65	83	0.0446	0.0548	14.0430	1.0750	10.7410	4.3995	0.8349
DNK	53	0.1206	0.1339	0.2687	0.3244	74	16	23	35	0.0493	0.0354	12.9432	0.9684	11.0145	5.1788	0.8918
ESP	51	0.2042	0.2632	0.4616	0.6431	51	42	86	48	0.0421	0.0522	13.8138	0.9103	10.2796	4.9709	0.7026
FIN	73	0.1657	0.2142	0.3455	0.4611	63	26	59	38	0.0366	0.0533	13.4670	0.9329	10.7994	4.5328	0.8700
FRA	257	0.2140	0.2145	0.3930	0.4483	71	43	86	63	0.0385	0.0456	13.5214	1.0707	10.6482	4.5605	0.7368
GBR	179	0.0512	0.1020	0.2760	0.5379	89	66	35	51	0.0377	0.0876	14.3761	1.0634	10.6866	5.0167	0.8077
IDN	151	0.2155	0.2772	0.2743	0.3841	14	46	48	62	0.0578	0.0898	12.0322	1.2985	8.1887	3.4573	0.5169
IND	236	0.2742	0.3629	0.3085	0.4019	48	56	40	51	0.0776	0.0855	13.0365	1.2819	7.3070	3.9529	0.5178
ISR	45	0.3044	0.3584	0.6491	0.7478	54	47	81	38	0.0303	0.0691	12.7158	1.2608	10.4759	4.2007	0.6000
ITA	43	0.3462	0.3432	0.5266	0.5517	76	70	75	61	0.0396	0.0409	13.8820	0.9245	10.4686	4.5153	0.6483
JPN	1417	0.2687	0.2370	0.2878	0.2763	46	95	92	88	0.0340	0.0458	13.8550	1.0631	10.6545	4.6525	0.7858
KOR	480	0.3933	0.3990	0.2560	0.2609	18	39	85	100	0.0619	0.0557	12.5107	1.2206	10.1666	4.9174	0.7203
MYS	178	0.2727	0.2722	0.2771	0.3062	26	50	36	41	0.0462	0.0624	12.1091	1.2016	9.3010	4.7717	0.5354
NLD	42	0.1646	0.2104	0.3938	0.5765	80	14	53	67	0.0378	0.0625	13.9163	0.9784	10.8409	4.7648	0.8541
NOR	39	0.0945	0.1272	0.4527	0.5862	69	8	50	35	0.0549	0.0431	13.4139	1.0936	11.5193	4.6776	0.8877
PAK	76	0.3805	0.3838	0.3143	0.3075	14	50	70	50	0.0617	0.0921	11.4308	1.3852	7.1574	2.7798	0.3918
PHL	64	0.1618	0.2044	0.3056	0.4633	32	64	44	27	0.0472	0.0520	11.9376	1.2506	7.9115	3.5877	0.4688
POL	139	0.2528	0.2391	0.2392	0.2330	60	64	93	38	0.0511	0.0439	11.8307	1.0218	9.5291	3.9351	0.6707
SGP	101	0.2387	0.2448	0.3669	0.3826	20	48	8	72	0.0355	0.0488	12.6930	1.1497	10.9259	4.8212	0.7959
SWE	110	0.1276	0.1954	0.2920	0.4802	71	5	29	53	0.0332	0.0491	13.4377	1.1001	10.9830	4.8766	0.8634
THA	226	0.2454	0.3519	0.2182	0.3409	20	34	64	32	0.0429	0.0534	11.7081	1.2369	8.6980	4.7067	0.5045
TUR	53	0.2750	0.3628	0.3066	0.4648	37	45	85	46	0.0504	0.0657	13.7388	0.9857	9.4035	4.0145	0.4167
TWN	405	0.3432	0.3814	0.2639	0.3036	17	45	69	93	0.0520	0.0461	12.6876	1.0726	9.9957	4.0254	0.7681
USA	1103	0.0834	0.1373	0.3074	0.6106	91	62	46	26	0.0379	0.0602	13.8901	1.3112	10.8770	3.9045	0.7309
VNM	95	0.5604	0.4507	0.3546	0.3225	20	40	30	57	0.0832	0.0909	10.5364	1.3129	7.5330	4.5779	0.5008
Total	6770	0.2229	0.2586	0.2989	0.4102	51	60	64	62	0.0470	0.0574	13.2693	1.1910	10.1225	4.4129	0.7059

Panel B: Firm-level summary statistics

	Mean	StdDev	5th Percentile	Median	95th Percentile	N
Short term debt to market value of equity	0.2229	0.2841	0.0026	0.1087	0.8656	6770
Short term debt to book value of equity	0.2586	0.2801	0.0052	0.1591	0.8877	6770
Long term debt to market value of equity	0.2989	0.3222	0.0041	0.1882	0.9937	6770
Long term debt to book value of equity	0.4102	0.4095	0.0070	0.2830	1.2779	6770
Capital expenditure to total assets	0.0470	0.0481	0.0015	0.0346	0.1343	6770
Operating income to toal assets	0.0574	0.0772	-0.0233	0.0513	0.1728	6770
Total sales (log)	13.2693	1.9253	10.2657	13.2038	16.5915	6770
Total assets growth	1.1910	1.4322	0.7187	1.0626	1.8277	6770
GDP per capita (log)	10.1225	1.0372	7.5330	10.6545	10.9830	6770
Country private credit (log)	4.4129	0.4843	3.6959	4.6525	4.9709	6770
Law_WJP	0.7059	0.1199	0.4998	0.7309	0.8634	6770

Panel C: Correlation matrix using firm-level observations

	Short term debt to market value of equity	Short term debt to book value of equity	Long term debt to market value of equity	Long term debt to book value of equity	Individualism	Masculinity	Uncertainty avoidance	Long term orientation	Capital expenditure to total assets	Operating income to total assets	Total sales	Total asset growth	Country GDP per capita	Country private credit	Law_WJP
STD2MVE	1														
STD2BVE	0.783***	1													
LTD2MVE	0.383***	0.244***	1												
LTD2BVE	0.0677***	0.200***	0.727***	1											
Individualism	-0.309***	-0.326***	0.0634***	0.239***	1										
Masculinity	-0.00625	-0.0731***	-0.0264*	-0.0838***	0.124***	1									
Uncertainty avoidance	0.151***	0.0180	0.00977	-0.170***	-0.186***	0.405***	1								
Long term orientation	0.246***	0.205***	-0.0424***	-0.227***	-0.578***	0.318***	0.481***	1							
Capital expenditure to total assets	-0.0535***	0.00370	0.0655***	0.115***	-0.117***	-0.114***	-0.0868***	-0.00151	1						
Operating income to total assets	-0.187***	-0.153***	-0.170***	-0.0531***	0.0162	-0.0462***	-0.0789***	-0.0774***	0.186***	1					
Total sales (log)	-0.0800***	-0.0722***	0.132***	0.223***	0.283***	0.211***	0.0399**	0.000126	-0.0292*	0.208***	1				
Total asset growth	-0.0224	0.0439***	-0.0408***	0.00905	-0.0221	-0.00910	-0.0759***	-0.00995	-0.00348	-0.0247*	-0.0753***	1			
Country GDP per capita (log)	-0.178***	-0.255***	0.0401***	0.0863***	0.585***	0.226***	0.244***	0.00713	-0.188***	-0.0864***	0.293***	-0.0589***	1		
Country private credit (log)	0.0633***	0.0526***	-0.0231	-0.101***	-0.159***	0.0635***	0.0784***	0.461***	-0.0178	-0.0620***	0.0715***	-0.0112	0.263***	1	
Law_WJP	-0.122***	-0.233***	0.0276*	0.0177	0.472***	0.208***	0.294***	0.205***	-0.154***	-0.0738***	0.263***	-0.0831***	0.878***	0.308***	1

* p < 0.05, ** p < 0.01, *** p < 0.001

Table 3-3: Culture dimensions and capital structure relationships signs by industry sector.

The table presents, at the firm-level, the signs and significativity of the four cultural variables in regards to the Debt-to-Equity (market & book value) ratios. The estimation includes the four variables of culture, the four firms financial variables, and the thre country-level variables (see table1). Panel A presents this for the Short-term debt to equity and Panel B presents for the Long-term debt to equity ratios. The financial data period is from 2009 -2017.

Panel A. Short-term Debt-to-Equity (Market & Book value)

	Mining & Construction		Manufacturing		Utilities		Wholesale & Retail Trade		Finance, Insurance, and Real Estate		Services	
	Sector 1		Sector 2		Sector 3		Sector 4		Sector 5		Sector 6	
Gap measure	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE
IDV (-)	+	+***	-***	-***	+	+	+***	+	+	-	-***	-***
MAS (-)	-***	-***	-***	-***	+**	+	+	-	-***	-***	-*	-**
UAI (+)	+***	+***	+***	-*	+***	+	-**	-	+***	+**	+***	+
LTO (+)	+***	+***	+**	+***	+***	+***	+***	+*	+***	+	-	+

Panel B. Long-term Debt-to-Equity (Market & Book value)

	Mining & Construction		Manufacturing		Utilities		Wholesale & Retail Trade		Finance, Insurance, and Real Estate		Services	
	Sector 1		Sector 2		Sector 3		Sector 4		Sector 5		Sector 6	
Gap measure	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE
IDV (+)	-***	+**	+	+***	+	-	+**	+	+	+	-	+
MAS (+)	+	-***	-***	-***	+	+	+	-**	-	-**	-	-
UAI (-)	-	-	+***	-***	+	-***	-**	-	+	+	-**	-***
LTO (-)	-*	+**	-	+*	+	-**	+**	+	-	-	-	+

***p < 0.01, **p < 0.05, *p < 0.1.

Table 3-4: Culture's influence on firms' capital structure gap with industry's "target ratio". Baseline model.

Panel A.
Firm-level effects of culture on the GAP of Short-term debt-to-equity (market value & book value) ratio of firms by industry sectors with the Industry Grand Mean (industry "target ratio").
This panel presents the estimation results under linear regression model with OLS method. The estimation includes four cultural dimensions, four firm-level control variables, and three country-level control variables. The measures for the financial variables are 3 years mean values, from 2009-2011 for capital expenditure to total assests, operating income to total assets, and for total sales,from 20012-2014 for the debt-to-equity measures. For total assets growth, we use the means of total assets for two period of 2012-2014 & 2015-2017. The six industry sectors are classified by SIC values as: sector 1(1000-1799), sector 2 (2000-3999), sector3 (4000-4999), sector 4 (5000-5999), sector 5 (6000-6799), sector 6 (7000-8999).

	Mining & Construction		Manufacturing		Utilities		Wholesale & Retail Trade		Finance, Insurance, Real Estate		Services	
	Sector 1		Sector 2		Sector 3		Sector4		Sector 5		Sector 6	
Gap measure	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE
Hofstede Cultural Dimensions												
Individualism (IDV)	0.0012	0.0079***	-0.0022***	-0.0014***	0.0007	0.0003	0.0313***	0.0146	0.0008	-0.0003	-0.0015***	-0.0016***
	(0.8363)	(5.0160)	(-5.7417)	(-3.6412)	(1.0840)	(0.4273)	(2.7685)	(1.4547)	(0.5523)	(-0.1826)	(-3.5360)	(-2.6943)
Masculinity (MAS)	-0.0079***	-0.0154***	-0.0008***	-0.0013***	0.0011**	0.0009	0.0023	-0.0002	-0.0058***	-0.0063***	-0.0004*	-0.0006**
	(-3.9966)	(-7.0093)	(-2.8804)	(-5.1844)	(2.1215)	(1.5385)	(1.5566)	(-0.1486)	(-3.2657)	(-3.3183)	(-1.8670)	(-2.0330)
Uncertainty Avoidance (UAI)	0.0048***	0.0059***	0.0014***	-0.0005*	0.0026***	0.0009	-0.0055**	-0.0023	0.0026***	0.0020**	0.0007***	0.0004
	(4.7799)	(5.2954)	(4.9117)	(-1.9605)	(4.8857)	(1.4638)	(-2.2443)	(-1.0317)	(2.7698)	(1.9656)	(2.7638)	(1.2562)
Long-Term Orientation (LTO)	0.0060***	0.0140***	0.0009**	0.0024***	0.0018***	0.0019***	0.0396***	0.0199*	0.0050***	0.0019	-0.0003	0.0001
	(4.0948)	(8.5939)	(2.4756)	(6.7153)	(3.5742)	(3.2423)	(3.1111)	(1.7544)	(2.6314)	(0.9267)	(-0.6299)	(0.1869)
Firm-Level Control Variables												
Capital Expenditure/Total Asset	-0.0697	-0.0636	-0.0336	0.3418***	0.1804	0.4793***	-1.3994***	-0.3965	-2.2339***	-2.5644***	0.1464**	0.2968***
	(-0.4198)	(-0.3441)	(-0.2669)	(2.8113)	(1.3697)	(3.1422)	(-3.1790)	(-1.0126)	(-5.8403)	(-6.2343)	(2.2052)	(3.2638)
Operating income/Total Asset	-0.5045***	-0.4582***	-0.7035***	-0.6615***	-0.6066***	-0.5268***	-1.1122***	-0.6773***	-1.6006***	-1.3354***	-0.1803***	-0.1228**
	(-2.6166)	(-2.1340)	(-11.2494)	(-10.9477)	(-6.2551)	(-4.6915)	(-4.3709)	(-2.9920)	(-5.3073)	(-4.1173)	(-4.4538)	(-2.2147)
Total Sales (log)	0.0016	-0.0079	0.0133***	0.0163***	0.0067*	0.0152***	0.0189**	0.0152*	0.0135*	0.0313***	0.0055**	0.0083**
	(0.1815)	(-0.8238)	(4.6331)	(5.8688)	(1.7555)	(3.4598)	(2.1086)	(1.9017)	(1.8976)	(4.0810)	(2.2539)	(2.4834)
Total Asset Growth	0.0019	0.0050*	-0.0400***	-0.0089	-0.0376***	-0.0095	-0.0560*	0.0464	-0.0161	0.0454	-0.0157***	-0.0068
	(0.7207)	(1.7213)	(-5.5259)	(-1.2673)	(-3.6248)	(-0.7918)	(-1.6486)	(1.5355)	(-0.5638)	(1.4816)	(-3.7597)	(-1.1937)
Country-Level Control Variables												
GDP per capita (log)	0.0730	0.1890***	-0.0486***	-0.0149	-0.0214	0.0194	-0.5670***	-0.3854***	0.0415	0.0465	-0.0096	-0.0063
	(1.1294)	(2.6255)	(-4.4823)	(-1.4245)	(-1.4542)	(1.1358)	(-3.3983)	(-2.5968)	(0.8838)	(0.9204)	(-0.8123)	(-0.3859)
Banking Sector Dev. (log)	0.0608*	0.1386***	0.0238*	0.0150	0.0039	-0.0006	-0.5221***	-0.2694*	-0.0366	-0.0043	-0.0136	-0.0181
	(1.9286)	(3.9484)	(1.8209)	(1.1869)	(0.2160)	(-0.0262)	(-3.2695)	(-1.8969)	(-1.0377)	(-0.1122)	(-0.8674)	(-0.8446)
Law - WJP	-0.7634	-2.5855***	0.0828	-0.5057***	-0.3566**	-0.6437***	-6.7978***	-2.9899	-0.5091	-0.5226	0.2036	0.0944
	(-1.5932)	(-4.8445)	(0.8465)	(-5.3523)	(-1.9944)	(-3.1090)	(-2.8342)	(-1.4013)	(-0.8737)	(-0.8339)	(1.3200)	(0.4470)
Intercept	-0.9434***	-1.3551***	0.0761	0.1622**	-0.0011	-0.2694**	9.0606***	5.1901**	-1.3067***	-0.6244**	-0.0715	-0.0398
	(-2.6736)	(-3.4481)	(0.9932)	(2.1925)	(-0.0099)	(-2.1228)	(3.3982)	(2.1882)	(-4.8908)	(-2.1734)	(-0.8232)	(-0.3344)
Number of Firms	496	496	3,157	3,157	589	589	487	487	736	736	587	587
Number of Countries	12	12	28	28	17	17	8	8	15	15	13	13
R2	0.2113	0.3120	0.1822	0.2060	0.2921	0.1719	0.2395	0.2004	0.1710	0.1486	0.1643	0.1040
Adjusted R2	0.193	0.296	0.179	0.203	0.279	0.156	0.222	0.182	0.158	0.136	0.148	0.0868

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Panel B.

Firm-level effects of culture on the GAP of Long-term debt-to-equity (market value & book value) ratio of firms by industry sectors with the Industry Grand Mean (industry "target ratio").

This panel presents the firm-level estimation results under linear regression model with OLS method. The estimation includes four cultural dimensions, four firm-level control variables, and three country-level control variables. The measures for the financial variables are 3 years mean values, from 2009-2011 for capital expenditure to total assess, operating income to total assets, and for total sales, from 20012-2014 for the debt-to-equity measures. For total assets growth, we use the means of total assets for two period of 2012-2014 & 2015-2017. The six industry sectors are classified by SIC values as: sector 1 (1000-1799), sector 2 (2000-3999), sector3 (4000-4999), sector 4 (5000-5999), sector 5 (6000-6799), sector 6 (7000-8999).

	Mining & Construction Sector 1		Manufacturing Sector 2		Utilities Sector 3		Wholesale & Retail Trade Sector4		Finance, Insurance, Real Estate Sector 5		Services Sector 6	
Gap measure	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE
Hofstede Cultural Dimensions												
Individualism (IDV)	-0.0049***	0.0042**	0.0001	0.0027***	0.0006	-0.0017	0.0232**	0.0040	0.0003	0.0023	-0.0010	0.0021
	(-2.8148)	(2.1113)	(0.3657)	(6.9203)	(0.3014)	(-0.6150)	(2.2288)	(0.3130)	(0.1867)	(1.0134)	(-1.0482)	(1.2005)
Masculinity (MAS)	0.0006	-0.0079***	-0.0007***	-0.0022***	0.0014	0.0011	0.0011	-0.0032**	-0.0026	-0.0056**	-0.0006	-0.0006
	(0.2662)	(-2.8561)	(-3.2135)	(-8.0501)	(0.9330)	(0.4982)	(0.8032)	(-1.9786)	(-1.2870)	(-2.0407)	(-1.2283)	(-0.6285)
Uncertainty Avoidance (UAI)	-0.0019	-0.0004	0.0009***	-0.0010***	0.0008	-0.0073***	-0.0051**	-0.0008	0.0008	0.0014	-0.0012**	-0.0034***
	(-1.5404)	(-0.2607)	(4.1440)	(-3.5473)	(0.4805)	(-3.2066)	(-2.2400)	(-0.2787)	(0.7582)	(0.9377)	(-2.0779)	(-3.2322)
Long-Term Orientation (LTO)	-0.0033*	0.0048**	-0.0002	0.0007*	0.0004	-0.0051**	0.0287**	0.0026	-0.0012	-0.0036	-0.0000	0.0006
	(-1.8320)	(2.3261)	(-0.5156)	(1.8423)	(0.2280)	(-2.3496)	(2.4411)	(0.1849)	(-0.5570)	(-1.2117)	(-0.0186)	(0.3231)
Firm-Level Control Variables												
Capital Expenditure/Total Asset	0.1326	0.2362	0.8052***	1.1916***	1.3026***	1.9918***	1.3894***	3.1558***	2.0146***	4.2137***	0.7900***	1.5849***
	(0.6575)	(1.0164)	(7.8066)	(9.2569)	(3.2431)	(3.5585)	(3.3937)	(6.3527)	(4.6629)	(7.1429)	(4.2892)	(4.6811)
Operating income/Total Asset	-0.8407***	-0.9341***	-0.6426***	-0.5595***	-1.7178***	-1.2794***	-1.6301***	-1.3088***	-1.9347***	-1.1596**	-0.4486***	-0.2824*
	(-3.5871)	(-3.4601)	(-12.6306)	(-8.8109)	(-5.8654)	(-3.1347)	(-6.7370)	(-4.4579)	(-5.6602)	(-2.4847)	(-4.8411)	(-1.6578)
Total Sales (log)	0.0484***	0.0596***	0.0326***	0.0485***	0.0560***	0.0881***	0.0334***	0.0391***	0.0192**	0.0634***	0.0279***	0.0531***
	(4.5772)	(4.8996)	(13.8579)	(16.4891)	(4.8188)	(5.4389)	(3.9577)	(3.8093)	(2.3672)	(5.7082)	(5.0013)	(5.1732)
Total Asset Growth	-0.0005	0.0001	-0.0258***	-0.0033	-0.1065***	-0.0012	-0.0723**	0.0226	-0.0968***	-0.0428	-0.0233**	-0.0025
	(-0.1496)	(0.0353)	(-4.4424)	(-0.4540)	(-3.4167)	(-0.0268)	(-2.0567)	(0.5305)	(-2.9852)	(-0.9662)	(-2.4668)	(-0.1415)
Country-Level Control Variables												
GDP per capita (log)	0.0926	0.2349**	-0.0263***	0.0193*	-0.1257***	-0.0987	-0.2382	0.1163	-0.0848	-0.1399*	0.0380	0.1021**
	(1.1519)	(2.5371)	(-2.9509)	(1.7356)	(-2.7841)	(-1.5687)	(-1.5422)	(0.6205)	(-1.5702)	(-1.8984)	(1.4143)	(2.0660)
Banking Sector Development (log)	-0.0876**	-0.0621	-0.0193*	-0.0644***	0.0007	0.1201	-0.3391**	-0.0363	0.0855**	0.0815	-0.0489	-0.0584
	(-2.2452)	(-1.3816)	(-1.8170)	(-4.8551)	(0.0134)	(1.5537)	(-2.3001)	(-0.2030)	(2.1246)	(1.4838)	(-1.3790)	(-0.8956)
Law - WJP	-0.2087	-2.4862***	0.2182***	-0.2393**	0.9269*	2.0950***	-5.4694**	-0.9481	1.1366*	1.5245*	-0.0302	-0.6361
	(-0.3511)	(-3.6305)	(2.7459)	(-2.4136)	(1.7019)	(2.7603)	(-2.4730)	(-0.3533)	(1.6790)	(1.6494)	(-0.0867)	(-0.9941)
Intercept	-0.7176	-1.2428**	-0.3601***	-0.4923***	-0.4593	-1.8447***	4.6906*	-1.1930	-1.8411***	-1.1395***	-0.4692**	-1.2432***
	(-1.6416)	(-2.4684)	(-5.7392)	(-6.2860)	(-1.3795)	(-3.9756)	(1.9084)	(-0.4000)	(-6.0701)	(-2.7515)	(-2.4007)	(-3.4600)
Number of Firms	478	478	3,031	3,031	561	561	467	467	700	700	558	558
Number of Countries	12	12	28	28	17	17	8	8	15	15	13	13
R2	0.0824	0.1659	0.1191	0.2025	0.1495	0.1530	0.1552	0.1978	0.1228	0.1666	0.1266	0.2124
Adjusted R2	0.0608	0.146	0.116	0.200	0.133	0.136	0.135	0.178	0.109	0.153	0.109	0.197

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 3-5: Culture influence on capital structure.

Panel A

At the firm-level, culture effects on the gap of short-term debt-to-equity (market value & book value) ratios with the "target ratio". The regression includes four cultural dimensions with the dependent variables.

	Mining & Construction Sector 1		Manufacturing Sector 2		Utilities Sector 3		Wholesale & Retail Trade Sector4		Finance, Insurance, Real Estate Sector 5		Services Sector 6	
Gap measure	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE
Hofstede Cultural Dimensions												
Individualism (IDV)	-0.0011	-0.0011	-0.0030***	-0.0036***	-0.0013***	-0.0012***	-0.0038***	-0.0038***	0.0000	-0.0005	-0.0008***	-0.0011***
	(-1.2572)	(-1.1214)	(-11.1204)	(-13.8824)	(-3.8377)	(-3.1669)	(-3.3540)	(-3.8972)	(0.0569)	(-0.5373)	(-3.7451)	(-3.6899)
Masculinity (MAS)	-0.0040***	-0.0044***	-0.0004	-0.0003	0.0016***	0.0016***	0.0001	-0.0020*	-0.0046***	-0.0058***	-0.0003	-0.0005*
	(-2.9359)	(-2.7719)	(-1.5521)	(-1.1970)	(3.1304)	(2.8078)	(0.0682)	(-1.7486)	(-2.9235)	(-3.4098)	(-1.6428)	(-1.7429)
Uncertainty Avoidance (UAI)	0.0030***	0.0000	0.0010***	-0.0015***	0.0014***	-0.0002	0.0015	0.0016	0.0029***	0.0025**	0.0005**	0.0003
	(4.9864)	(0.0469)	(4.0367)	(-6.0210)	(3.8845)	(-0.5910)	(1.0118)	(1.3006)	(3.0799)	(2.5102)	(2.4075)	(1.0643)
Long-Term Orientation (LTO)	0.0038***	0.0058***	0.0009***	0.0011***	0.0012***	0.0010**	0.0005	-0.0001	0.0035***	0.0011	0.0003	0.0003
	(3.8038)	(4.9293)	(3.4143)	(4.1512)	(3.1340)	(2.2881)	(0.4579)	(-0.0555)	(3.3573)	(0.9785)	(1.1713)	(0.8764)
Intercept	-0.3864***	-0.1885***	-0.1281***	0.0979***	-0.2372***	-0.1604***	-0.0356	0.1058	-1.2891***	-0.1600**	-0.1071***	-0.0547*
	(-7.1720)	(-2.9839)	(-5.0230)	(3.9513)	(-7.5932)	(-4.4790)	(-0.3593)	(1.2428)	(-19.5699)	(-2.2559)	(-4.7483)	(-1.7981)
Number of Firms	496	496	3,157	3,157	589	589	487	487	736	736	587	587
R2	0.1811	0.2084	0.1340	0.1511	0.2140	0.0990	0.1443	0.1607	0.0774	0.0507	0.1073	0.0737
Adjusted R2	0.174	0.202	0.133	0.150	0.209	0.0928	0.137	0.154	0.0723	0.0455	0.101	0.0673

Panel B.

At the firm-level, Culture effects on the gap of the Long-Term debt-to-equity (market value & book value) ratios with the Industry Grand Mean. The regression includes the four cultural dimensions with the dependent variables.

	Mining & Construction Sector 1		Manufacturing Sector 2		Utilities Sector 3		Wholesale & Retail Trade Sector4		Finance, Insurance, Real Estate Sector 5		Services Sector 6	
Gap measure	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE
Hofstede Cultural Dimensions												
Individualism (IDV)	-0.0011	0.0006	0.0008***	0.0031***	0.0015	0.0058***	0.0006	0.0051***	0.0026***	0.0053***	0.0010**	0.0046***
	(-1.0249)	(0.5288)	(3.3655)	(10.9542)	(1.3871)	(4.0348)	(0.5305)	(3.9289)	(2.8203)	(4.1180)	(2.0405)	(5.0308)
Masculinity (MAS)	0.0008	0.0003	-0.0004**	-0.0014***	0.0015	-0.0002	-0.0000	-0.0037**	-0.0035*	-0.0078***	-0.0002	0.0002
	(0.5065)	(0.1745)	(-2.1366)	(-5.2537)	(0.9384)	(-0.1017)	(-0.0337)	(-2.5079)	(-1.9327)	(-3.1209)	(-0.4865)	(0.2669)
Uncertainty Avoidance (UAI)	-0.0014*	-0.0046***	0.0008***	-0.0013***	0.0016	-0.0027*	-0.0001	0.0004	0.0004	0.0011	-0.0015***	-0.0037***
	(-1.8597)	(-5.2131)	(3.9465)	(-4.9594)	(1.5082)	(-1.7925)	(-0.0408)	(0.2704)	(0.3451)	(0.7068)	(-2.8301)	(-3.9480)
Long-Term Orientation (LTO)	-0.0014	-0.0002	0.0005**	0.0004	0.0020	0.0003	0.0018*	0.0012	0.0037***	0.0026	0.0007	0.0005
	(-1.1302)	(-0.1405)	(2.0206)	(1.3089)	(1.6215)	(0.1859)	(1.6636)	(0.9877)	(3.1194)	(1.5798)	(1.2559)	(0.4981)
Intercept	-0.0650	0.0637	-0.2290***	-0.1060***	-0.6316***	-0.4791***	-0.3263***	-0.2633**	-1.7138***	-0.6553***	-0.1562***	-0.3624***
	(-0.9700)	(0.8123)	(-10.7363)	(-3.9539)	(-6.4776)	(-3.5884)	(-3.5153)	(-2.3635)	(-22.7886)	(-6.3281)	(-3.0329)	(-3.8504)
Number of Firms	478	478	3,031	3,031	561	561	467	467	700	700	558	558
R2	0.0171	0.0787	0.0100	0.0922	0.0276	0.0649	0.0178	0.0871	0.0159	0.0491	0.0337	0.1390
Adjusted R2	0.00875	0.0709	0.00872	0.0910	0.0206	0.0581	0.00925	0.0792	0.0102	0.0436	0.0267	0.133

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 3-6: Robustness checks with the Research and Development expenses.

Panel A.

This table presents firm-level robustness tests with the variable the ratio of research and development expenses to total sales.

The dependent variables are measuring the gap, which is the difference between each firm's Short-Term debt-to-equity with the "target ratio". All firm-level, country-level, and culture variables are identical to our baseline model.

05/06/2019	Mining & Construction Sector 1		Manufacturing Sector 2		Utilities Sector 3		Wholesale & Retail Trade Sector4		Finance, Insurance, Real Estate Sector 5		Services Sector 6	
Gap measure	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE
Hofstede Cultural Dimensions												
Individualism/Collectivism	0.0022	0.0053	-0.0023***	-0.0015**	-0.0008	0.0011	-0.0051	-0.0049	0.0052	0.0038	-0.0006	-0.0013
	(0.2204)	(0.5379)	(-3.5898)	(-2.5494)	(-0.3161)	(0.4109)	(-1.1986)	(-1.2339)	(1.5253)	(1.3115)	(-0.4255)	(-0.7154)
Masculinity/Feminity	-0.0052	-0.0087	-0.0003	-0.0014***	0.0019	0.0018	0.0004	-0.0037	0.0343	0.0238	-0.0004	-0.0008
	(-0.4324)	(-0.7363)	(-0.9950)	(-4.5927)	(1.5136)	(1.4109)	(0.1166)	(-1.1543)	(1.7102)	(1.3973)	(-0.9325)	(-1.2551)
Uncertainty Avoidance	0.0030	0.0046	0.0016***	0.0005	0.0029	0.0010	-0.0043	0.0006	-0.0332	-0.0346	0.0008	-0.0002
	(0.3343)	(0.5261)	(2.7786)	(0.9529)	(1.5574)	(0.5256)	(-0.6158)	(0.0949)	(-1.5273)	(-1.8799)	(0.8051)	(-0.1087)
Long/Short term Orientation	0.0032	0.0058	-0.0001	0.0010	-0.0004	0.0006	0.0024	-0.0006	0.0051	0.0102	0.0000	0.0009
	(0.3797)	(0.6993)	(-0.1537)	(1.4210)	(-0.1464)	(0.2313)	(0.3599)	(-0.0954)	(0.6378)	(1.5086)	(0.0128)	(0.4041)
Firm-Level Control Variables												
Capital Expenditure/Total Asset	-1.0770	-0.7954	0.1135	0.3621**	0.9314	1.5458**	-1.1193	-0.9308	9.8331	9.8314*	-0.1707	-0.1065
	(-0.8664)	(-0.6535)	(0.6971)	(2.3744)	(1.4368)	(2.3811)	(-0.6565)	(-0.5790)	(6.2008)	(7.3142)	(-0.6404)	(-0.2890)
Operating income/Total Asset	-1.6510**	-1.5846**	-0.8789***	-0.7020***	-1.3246**	-1.2189**	-1.2822	0.0301	-0.9078	-1.1600	-0.1936**	-0.2114**
	(-2.3323)	(-2.2863)	(-10.2153)	(-8.7084)	(-2.3733)	(-2.1808)	(-1.4350)	(0.0358)	(-1.1932)	(-1.7988)	(-2.6005)	(-2.0540)
Total Sales (Log)	0.0355*	0.0486**	0.0084**	0.0127***	0.0024	0.0040	0.0098	0.0145	0.0619	0.0883	0.0062	0.0114**
	(1.8047)	(2.5253)	(2.4582)	(3.9513)	(0.1822)	(0.3040)	(0.4079)	(0.6432)	(1.5591)	(2.6259)	(1.5300)	(2.0383)
Total Asset Growth	-0.2200	-0.0744	-0.0923***	-0.0540***	-0.2046**	0.0418	-0.1118	-0.0270	-0.8059	-0.8920	-0.0081	-0.0018
	(-1.3015)	(-0.4494)	(-6.3855)	(-3.9903)	(-1.9931)	(0.4065)	(-1.0713)	(-0.2738)	(-2.6941)	(-3.5181)	(-1.6074)	(-0.2527)
R&D Expenses / Total Sales	0.2034	0.4271	-0.0455***	-0.0351***	-7.0211**	-0.8834	-3.6478	-1.5332	-0.1945	0.8309	-0.0390**	-0.0318
	(0.1417)	(0.3040)	(-4.4256)	(-3.6418)	(-2.4626)	(-0.3094)	(-1.5757)	(-0.7024)	(-0.1008)	(0.5080)	(-2.1610)	(-1.2745)
Country-Level Control Variables												
GDP per capita (Log)	-0.1258	-0.1032	-0.0564***	-0.0344**	0.0132	0.0025	-	-	-	-	0.0168	0.0537
	(-0.4826)	(-0.4041)	(-3.3572)	(-2.1861)	(0.1996)	(0.0380)					(0.4461)	(1.0304)
Banking Sector Development (L	0.0895	0.1126	0.0628***	0.0420**	0.0243	-0.0049	-0.1408	0.0006	-	-	0.0487	0.0252
	(0.4370)	(0.5616)	(3.4001)	(2.4312)	(0.3119)	(-0.0628)	(-0.9661)	(0.0047)			(1.2392)	(0.4629)
Law - WJP	-0.0762	-0.8287	-0.0583	-0.3726***	-0.4615	-0.1536	-	-	-	-	-0.2520	-0.4392
	(-0.0312)	(-0.3465)	(-0.3934)	(-2.6845)	(-0.6175)	(-0.2052)					(-0.5255)	(-0.6624)
Intercept	0.3618	0.1064	0.2527**	0.2882***	0.0259	-0.3991	1.0639	0.2638	-2.5669	-1.2140	-0.3898	-0.5220
	(0.1777)	(0.0534)	(2.2121)	(2.6922)	(0.0586)	(-0.9003)	(1.2179)	(0.3203)	(-2.7823)	(-1.5524)	(-1.5021)	(-1.4551)
Number of Countries	11	11	26	26	12	12	5	5	-	-	10	10
Number of Observations	119	119	2,017	2,017	88	88	74	74	11	11	180	180
R2	0.2027	0.2095	0.2219	0.1972	0.3419	0.1875	0.2472	0.2418	0.9786	0.9892	0.2120	0.1509
Adjusted R2	0.112	0.120	0.217	0.192	0.237	0.0575	0.128	0.121	0.786	0.892	0.155	0.0898

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Panel B.

This table presents firm-level robustness test with the ratio of research and development expenses to total sales.

The dependent variables are measuring the gap, which is the difference between each firm's Long-Term debt-to-equity with the industry "target ratio". All remaining variables are identical to our baseline model.

	Mining & Construction Sector 1		Manufacturing Sector 2		Utilities Sector 3		Wholesale & Retail Trade Sector4		Finance, Insurance, Real Estate Sector 5		Services Sector 6	
Gap measure	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE
Hofstede Cultural Dimensions												
Individualism/Collectivism	-0.0054	-0.0025	0.0005	0.0029***	-0.0063	-0.0007	-0.0012	0.0046	0.0096	-0.0012	0.0024	0.0073*
	(-0.6706)	(-0.2651)	(0.8972)	(4.2986)	(-0.7236)	(-0.0746)	(-0.3072)	(1.0768)	(1.0283)	(-0.1203)	(1.1010)	(1.6950)
Masculinity/Feminity	0.0010	-0.0002	-0.0006**	-0.0022***	0.0051	0.0058	0.0001	-0.0079**	-	-	-0.0013	-0.0010
	(0.1068)	(-0.0153)	(-2.0830)	(-6.1845)	(1.1582)	(1.2210)	(0.0277)	(-2.2751)			(-1.5382)	(-0.6397)
Uncertainty Avoidance	-0.0038	-0.0058	0.0017***	-0.0004	0.0053	-0.0036	0.0003	0.0119*	-0.0606	0.0469	-0.0026	-0.0111***
	(-0.5400)	(-0.6861)	(3.6079)	(-0.6211)	(0.8486)	(-0.5365)	(0.0500)	(1.6833)	(-1.0032)	(0.7051)	(-1.5079)	(-3.2246)
Long/Short term Orientation	-0.0014	0.0012	-0.0008	0.0001	-0.0123	-0.0160*	0.0023	-0.0048	0.0339	-0.0595	0.0038	0.0118**
	(-0.2100)	(0.1512)	(-1.2934)	(0.1270)	(-1.4538)	(-1.7559)	(0.3592)	(-0.6928)	(0.7575)	(-1.2090)	(1.4342)	(2.2844)
Firm-Level Control Variables												
Capital Expenditure/Total Asset	-0.9020	-0.8326	0.8979***	1.1105***	4.3131*	5.0822**	1.5345	3.6189**	28.6714	27.5885	0.0951	1.1628
	(-0.8987)	(-0.7001)	(6.3836)	(6.3297)	(1.9473)	(2.1362)	(0.9231)	(2.0232)	(5.6679)	(4.9502)	(0.2108)	(1.3120)
Operating income/Total Asset	-1.2400**	-1.0588	-0.8627***	-0.6337***	-5.1009***	-3.4466*	-0.6923	0.3347	-2.5291	-2.6896	-0.3498***	-0.3995
	(-2.1734)	(-1.5664)	(-11.6305)	(-6.8494)	(-2.7094)	(-1.7044)	(-0.8221)	(0.3694)	(-1.0421)	(-1.0059)	(-2.7178)	(-1.5795)
Total Sales	0.0846***	0.0949***	0.0303***	0.0463***	0.0911**	0.0886*	0.0517**	0.0573**	0.2030	0.3151	0.0287***	0.0578***
	(5.3973)	(5.1116)	(10.3205)	(12.6390)	(2.0378)	(1.8467)	(2.2859)	(2.3548)	(1.6032)	(2.2590)	(4.1755)	(4.2698)
Total Asset Growth	-0.2176	-0.2708*	-0.0667***	-0.0183	-0.7065**	0.0133	-0.0318	0.1527	-2.5195	-2.8248	-0.0122	-0.0007
	(-1.6065)	(-1.6876)	(-5.4209)	(-1.1904)	(-2.0475)	(0.0359)	(-0.3188)	(1.4241)	(-2.6406)	(-2.6871)	(-1.4251)	(-0.0433)
R&D Expenses / Total Sales	-0.1108	-0.8336	-0.0407***	-0.0228**	-24.9640**	-10.5898	-1.3751	-1.8901	-5.2311	-16.9072	-0.0593*	-0.0256
	(-0.0970)	(-0.6164)	(-4.7060)	(-2.1114)	(-2.6054)	(-1.0290)	(-0.6299)	(-0.8047)	(-0.8498)	(-2.4929)	(-1.9365)	(-0.4263)
Country-Level Control Variables												
GDP per capita	0.2412	0.3414	-0.0624***	-0.0033	0.0456	-0.1916	-	-	-	-	0.1050	0.3474***
	(1.1317)	(1.3520)	(-4.3088)	(-0.1852)	(0.2068)	(-0.8087)					(1.6499)	(2.7792)
Banking Sector Development	-0.0818	-0.2108	-0.0050	-0.0705***	0.0376	0.2391	0.0467	0.0070	-	-	0.1103*	0.1793
	(-0.5016)	(-1.0908)	(-0.3202)	(-3.6050)	(0.1422)	(0.8421)	(0.3394)	(0.0474)			(1.6643)	(1.3760)
Law - WJP	-1.6182	-3.0326	0.3682***	-0.1145	0.2423	3.7818	-	-	-	-	-1.1422	-3.4363**
	(-0.8177)	(-1.2934)	(2.9130)	(-0.7260)	(0.0969)	(1.4086)					(-1.4136)	(-2.1642)
Intercept	-1.5655	-1.1425	-0.1146	-0.2797**	-0.9406	-2.6008	-1.2348	-1.4532	-0.2977	-1.7543	-1.4263***	-3.3833***
	(-0.9489)	(-0.5845)	(-1.1720)	(-2.2923)	(-0.6379)	(-1.6421)	(-1.4918)	(-1.6317)	(-0.2199)	(-1.1764)	(-3.2626)	(-3.9383)
Number of Countries	11	11	26	26	12	12	5	5	-	-	10	10
Number of Observations	118	118	1,942	1,942	79	79	73	73	10	10	177	177
R2	0.3530	0.4331	0.1406	0.2133	0.2749	0.2945	0.1641	0.3295	0.9743	0.9838	0.2035	0.3024
Adjusted R2	0.279	0.368	0.135	0.208	0.143	0.166	0.0293	0.221	0.768	0.854	0.145	0.251

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 3-7: Robustness checks with Agency costs (R&D and Selling, General, & administration expenses).

Panel A.

This table presents firm-level robustness checks with the ratios of research & development expenses by total sales and of selling, general & administrative expenses by total sales.

The dependent variables are measuring the gap, which is the difference between each firm's Short-Term debt-to-equity with the industry "target ratio". All remaining variables are identical to the baseline model.

15/08/2019	Mining & Construction Sector 1		Manufacturing Sector 2		Utilities Sector 3		Wholesale & Retail Trade Sector4		Finance, Insurance, Real Estate Sector 5		Services Sector 6	
Gap measure	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE
Hofstede Cultural Dimensions												
Individualism/Collectivism	0.0042	0.0075	-0.0044***	-0.0029***	0.0021	0.0047	-0.0110	-0.0027	-	-	-0.0019	-0.0023
	(0.3925)	(0.7006)	(-5.4325)	(-3.7203)	(0.5696)	(1.2850)	(-1.1377)	(-0.2909)	-	-	(-1.2148)	(-1.0254)
Masculinity/Feminity	-0.0047	-0.0087	-0.0001	-0.0014***	-0.0005	0.0000	0.0020	-0.0052	-	-	0.0001	-0.0006
	(-0.3831)	(-0.7104)	(-0.4158)	(-4.0402)	(-0.3302)	(0.0179)	(0.4080)	(-1.1056)	-	-	(0.0984)	(-0.7870)
Uncertainty Avoidance	0.0024	0.0043	0.0004	-0.0002	0.0032	0.0014	-0.0009	0.0052	-	-	0.0001	-0.0001
	(0.2583)	(0.4733)	(0.6183)	(-0.3911)	(1.3731)	(0.6119)	(-0.1212)	(0.7456)	-	-	(0.0777)	(-0.0651)
Long/Short term Orientation	0.0042	0.0072	-0.0001	0.0011	0.0017	0.0028	-0.0064	-0.0011	-	-	-0.0006	-0.0003
	(0.4658)	(0.8028)	(-0.0875)	(1.3469)	(0.6594)	(1.0550)	(-0.6340)	(-0.1095)	-	-	(-0.3671)	(-0.1150)
Firm-Level Control Variables									-	-		
Capital Expenditure/Total Asset	-1.5206	-1.1336	0.0079	0.2691*	0.3241	1.0998	-0.3229	-0.0335	-	-	-0.0078	0.0243
	(-1.2044)	(-0.9027)	(0.0467)	(1.6877)	(0.4728)	(1.6031)	(-0.1751)	(-0.0192)	-	-	(-0.0290)	(0.0621)
Operating income/Total Asset	-1.8195**	-1.7079**	-0.9120***	-0.7512***	-0.9605*	-0.9750*	-0.9555	0.3028	-	-	-0.2561***	-0.2580*
	(-2.3428)	(-2.2110)	(-9.8124)	(-8.5257)	(-1.7125)	(-1.7368)	(-1.0983)	(0.3670)	-	-	(-2.7809)	(-1.9146)
Total Sales (Log)	0.0197	0.0394*	0.0121***	0.0165***	-0.0099	-0.0078	-0.0036	0.0028	-	-	0.0050	0.0098
	(0.9108)	(1.8283)	(3.4356)	(4.9298)	(-0.7270)	(-0.5751)	(-0.1411)	(0.1179)	-	-	(1.2298)	(1.6375)
Total Asset Growth	-0.2978*	-0.1195	-0.0890***	-0.0534***	-0.1425	0.0774	-0.1320	-0.0405	-	-	-0.0062	-0.0002
	(-1.7301)	(-0.6978)	(-6.0521)	(-3.8272)	(-1.4149)	(0.7678)	(-1.2957)	(-0.4191)	-	-	(-1.2702)	(-0.0281)
R&D Expenses / Total Sales	1.6514	1.2701	0.0378	-0.0025	-6.8944**	-2.7771	-2.1386	-0.2895	-	-	-0.0086	-0.0696
	(1.0276)	(0.7946)	(0.9302)	(-0.0654)	(-2.2106)	(-0.8897)	(-0.9259)	(-0.1322)	-	-	(-0.2049)	(-1.1339)
SG&A Expenses / Total Sales	-1.1693**	-0.5944	-0.0479**	-0.0190	0.1334	0.4400**	-0.5653**	-0.4616**	-	-	-0.0282	-0.0027
	(-2.0577)	(-1.0516)	(-2.0961)	(-0.8783)	(0.6299)	(2.0760)	(-2.3322)	(-2.0077)	-	-	(-1.2725)	(-0.0842)
Country-Level Control Variables									-	-		
GDP per capita (Log)	-0.1452	-0.1345	0.0778*	0.0521	-0.0140	-0.1285	-	-	-	-	0.0153	0.0308
	(-0.5469)	(-0.5092)	(1.9185)	(1.3563)	(-0.1052)	(-0.9627)	-	-	-	-	(0.3133)	(0.4325)
Banking Sector Development (Log)	0.0678	0.0948	0.0563***	0.0383**	0.0166	-0.0314	-	-	-	-	0.0207	-0.0039
	(0.3256)	(0.4581)	(2.8264)	(2.0283)	(0.1984)	(-0.3737)	-	-	-	-	(0.4832)	(-0.0628)
Law - WJP	-0.2064	-0.9064	-0.3643*	-0.6046***	-0.6473	-0.0271	-	-	-	-	0.0159	0.0288
	(-0.0819)	(-0.3614)	(-1.9466)	(-3.4076)	(-0.7897)	(-0.0331)	-	-	-	-	(0.0300)	(0.0373)
Intercept	1.0210	0.6231	-0.7642***	-0.3616	0.4161	0.8047	1.2969	0.1705	-	-	-0.2950	-0.3640
	(0.4919)	(0.3018)	(-2.6751)	(-1.3353)	(0.4187)	(0.8091)	(1.1451)	(0.1588)	-	-	(-0.8144)	(-0.6870)
									-	-		
Number of Countries	11	11	26	26	12	12	5	5	-	-	10	10
Number of Observations	115	115	1,858	1,858	67	67	71	71	-	-	165	165
R2	0.2295	0.2174	0.2376	0.2033	0.2797	0.2253	0.3133	0.2921	-	-	0.2297	0.1422
Adjusted R2	0.130	0.117	0.232	0.198	0.103	0.0352	0.199	0.174	-	-	0.163	0.0683

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Panel B.

This table presents firm-level robustness checks with the ratios of research & development expenses by total sales and of selling, general & administrative expenses by total sales.
The dependent variables are measuring the gap, which is the difference between each firm's Long-Term debt-to-equity with the industry "target ratio". All remaining variables are identical to the baseline model.

15/08/2019	Mining & Construction Sector 1		Manufacturing Sector 2		Utilities Sector 3		Wholesale & Retail Trade Sector4		Finance, Insurance, Real Estate Sector 5		Services Sector 6	
Gap measure	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE
Hofstede Cultural Dimensions												
Individualism/Collectivism	-0.0071	0.0000	0.0002	0.0029***	-0.0043	0.0083	0.0028	0.0055	-	-	-0.0021	0.0039
	(-0.8260)	(0.0002)	(0.2742)	(3.3645)	(-0.3432)	(0.6349)	(0.2973)	(0.5447)	-	-	(-0.7795)	(0.7369)
Masculinity/Feminity	0.0008	-0.0046	-0.0007**	-0.0028***	0.0013	0.0019	-0.0017	-0.0084	-	-	0.0003	0.0013
	(0.0749)	(-0.3931)	(-2.2792)	(-7.2713)	(0.2599)	(0.3550)	(-0.3558)	(-1.6379)	-	-	(0.3631)	(0.6884)
Uncertainty Avoidance	-0.0034	-0.0019	0.0015***	0.0005	0.0089	0.0045	0.0038	0.0157**	-	-	-0.0054***	-0.0148***
	(-0.4524)	(-0.2190)	(2.7445)	(0.6860)	(1.0988)	(0.5272)	(0.5270)	(2.0632)	-	-	(-2.6098)	(-3.5058)
Long/Short term Orientation	-0.0030	0.0036	-0.0005	-0.0002	-0.0077	-0.0063	0.0047	-0.0059	-	-	0.0018	0.0102*
	(-0.4083)	(0.4218)	(-0.6977)	(-0.1967)	(-0.8524)	(-0.6574)	(0.4712)	(-0.5555)	-	-	(0.6418)	(1.7640)
Firm-Level Control Variables									-	-		
Capital Expenditure/Total Asset	-0.8299	-0.7476	0.8489***	1.0077***	3.5778	3.7368	2.3708	5.4830***	-	-	0.6404	1.9368**
	(-0.8061)	(-0.6236)	(5.8160)	(5.5018)	(1.4891)	(1.4824)	(1.2464)	(2.7248)	-	-	(1.4007)	(2.0970)
Operating income/Total Asset	-1.2493**	-1.2934*	-0.9195***	-0.7112***	-4.2081**	-2.4971	-0.5254	0.4784	-	-	-0.6094***	-0.9663***
	(-1.9947)	(-1.7735)	(-11.4419)	(-7.0526)	(-2.1868)	(-1.2369)	(-0.6169)	(0.5310)	-	-	(-3.7578)	(-2.9493)
Total Sales	0.0966***	0.1070***	0.0328***	0.0474***	0.0918*	0.0883*	0.0442*	0.0407	-	-	0.0285***	0.0570***
	(5.5366)	(5.2651)	(10.7714)	(12.4246)	(1.9503)	(1.7890)	(1.7863)	(1.5571)	-	-	(4.0680)	(4.0230)
Total Asset Growth	-0.1866	-0.1877	-0.0662***	-0.0203	-0.5562	0.0442	-0.0348	0.1462	-	-	-0.0101	0.0025
	(-1.3324)	(-1.1508)	(-5.2732)	(-1.2864)	(-1.6067)	(0.1218)	(-0.3453)	(1.3734)	-	-	(-1.2086)	(0.1497)
R&D Expenses / Total Sales	-0.9930	-1.7987	0.0104	0.0338	-13.5019	-4.7558	-0.5879	-0.9149	-	-	-0.0258	0.0762
	(-0.7674)	(-1.1938)	(0.3028)	(0.7865)	(-1.2376)	(-0.4155)	(-0.2593)	(-0.3814)	-	-	(-0.3610)	(0.5273)
SG&A Expenses / Total Sales	0.6730	1.3201**	-0.0305	-0.0352	-1.0951	0.0477	-0.2853	-0.3829	-	-	-0.0669*	-0.1533**
	(1.4654)	(2.4685)	(-1.5824)	(-1.4553)	(-1.4905)	(0.0619)	(-1.1817)	(-1.4992)	-	-	(-1.7588)	(-1.9948)
Country-Level Control Variables									-	-		
GDP per capita	0.2432	0.3599	-0.0237	0.0151	0.3518	-0.2161	-	-	-	-	0.1106	0.3569**
	(1.0990)	(1.3968)	(-0.6857)	(0.3487)	(0.7707)	(-0.4512)	-	-	-	-	(1.3289)	(2.1216)
Banking Sector Development	-0.0540	-0.1675	-0.0132	-0.0769***	-0.1274	-0.1784	-	-	-	-	0.0284	0.1370
	(-0.3214)	(-0.8556)	(-0.7773)	(-3.6047)	(-0.4436)	(-0.5920)	-	-	-	-	(0.3897)	(0.9289)
Law - WJP	-1.4651	-3.7770	0.2406	-0.1335	-1.9730	1.0475	-	-	-	-	-0.3118	-2.7064
	(-0.7002)	(-1.5503)	(1.4960)	(-0.6616)	(-0.7019)	(0.3552)	-	-	-	-	(-0.3458)	(-1.4857)
Intercept	-1.8958	-1.5816	-0.3980*	-0.4269	-2.2545	0.0033	-1.4109	-1.3816	-	-	-1.2536**	-3.3866***
	(-1.1097)	(-0.7951)	(-1.6474)	(-1.4082)	(-0.6622)	(0.0009)	(-1.2715)	(-1.1770)	-	-	(-2.0281)	(-2.7117)
									-	-		
Number of Countries	11	11	26	26	12	12	5	5	-	-	10	10
Number of Observations	114	114	1,789	1,789	66	66	70	70	-	-	163	163
R2	0.3717	0.4627	0.1479	0.2239	0.3133	0.2600	0.1886	0.3744	-	-	0.2399	0.3429
Adjusted R2	0.290	0.393	0.142	0.218	0.142	0.0750	0.0510	0.268	-	-	0.174	0.286

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 3-8: Robustness checks with Collateral Value.

Panel A.

This table presents robustness checks with the ratio of the collateral value to total assets.

The dependent variables are measuring the gap, which is the difference between each firm's Short-Term debt-to-equity with the industry "target ratio". All remaining variables are identical to the baseline model.

15/08/2019	Mining & Construction Sector 1		Manufacturing Sector 2		Utilities Sector 3		Wholesale & Retail Trade Sector4		Finance, Insurance, Real Estate Sector 5		Services Sector 6	
Gap measure	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE
Hofstede Cultural Dimensions												
Individualism/Collectivism	0.0005	0.0083***	-0.0020***	-0.0013***	0.0010	0.0006	0.0368***	0.0175	-0.0071	-0.0098*	-0.0011**	-0.0012*
	(0.2783)	(4.0420)	(-4.7601)	(-3.2583)	(1.2281)	(0.6057)	(2.9446)	(1.5541)	(-1.2139)	(-1.7402)	(-2.0641)	(-1.8596)
Masculinity/Feminity	-0.0077***	-0.0176***	-0.0009***	-0.0013***	0.0005	0.0011	0.0014	-0.0009	-0.0005	0.0109	-0.0003	-0.0004
	(-2.7873)	(-5.7420)	(-3.2896)	(-5.1926)	(0.7719)	(1.5828)	(0.8798)	(-0.6195)	(-0.0599)	(1.2616)	(-1.0209)	(-1.1252)
Uncertainty Avoidance	0.0046***	0.0069***	0.0015***	-0.0007**	0.0026***	0.0011	-0.0043	-0.0015	0.0040	-0.0010	0.0006**	0.0004
	(3.3698)	(4.5507)	(5.1361)	(-2.3583)	(4.0267)	(1.4800)	(-1.5108)	(-0.5935)	(1.1156)	(-0.2814)	(2.0358)	(1.0504)
Long/Short term Orientation	0.0046**	0.0144***	0.0010***	0.0025***	0.0018***	0.0014*	0.0439***	0.0222*	-0.0080	-0.0146*	0.0004	0.0006
	(2.3792)	(6.6295)	(2.5891)	(6.5329)	(2.9992)	(1.9428)	(3.0812)	(1.7304)	(-0.9848)	(-1.8590)	(0.6759)	(0.8181)
Firm-Level Control Variables												
Capital Expenditure/Total Asset	-0.2104	-0.2889	0.0670	0.4374***	0.1023	0.5270**	-1.0667**	-0.2439	-0.8887	-0.5254	0.1750	0.6540***
	(-0.6006)	(-0.7421)	(0.4830)	(3.2790)	(0.5775)	(2.5460)	(-2.2010)	(-0.5583)	(-0.6336)	(-0.3884)	(1.2781)	(3.7855)
Operating income/Total Asset	-0.7684***	-0.5391*	-0.7551***	-0.7078***	-0.7441***	-0.7232***	-1.2016***	-0.7450***	-1.4451**	-1.3206*	-0.2770***	-0.1953**
	(-2.8661)	(-1.8091)	(-10.3527)	(-10.0899)	(-4.9966)	(-4.1571)	(-4.4065)	(-3.0310)	(-2.1078)	(-1.9971)	(-4.4962)	(-2.5130)
Total Sales (Log)	0.0009	-0.0095	0.0120***	0.0148***	0.0022	0.0163***	0.0204**	0.0174**	-0.0201	0.0113	0.0050	0.0075*
	(0.0835)	(-0.8154)	(3.9709)	(5.1064)	(0.4501)	(2.8067)	(2.1801)	(2.0590)	(-0.8379)	(0.4905)	(1.5775)	(1.8751)
Total Asset Growth	0.0020	0.0049	-0.0350***	-0.0110	-0.0581***	-0.0063	-0.0715**	0.0388	-0.0188	0.0559	-0.0143***	-0.0064
	(0.7048)	(1.5960)	(-4.6128)	(-1.5038)	(-2.9252)	(-0.2701)	(-2.0263)	(1.2212)	(-0.3826)	(1.1775)	(-2.9480)	(-1.0455)
Collateral Value/Total Assets	0.0137	-0.0278	0.0157***	0.0108**	0.0205	0.0155	-0.0392	0.0018	-0.1568	-0.1454	0.0344**	0.0362**
	(0.2517)	(-0.4602)	(3.0373)	(2.1599)	(0.9230)	(0.5988)	(-0.9182)	(0.0465)	(-1.3738)	(-1.3211)	(2.4693)	(2.0601)
Country-Level Control Variables												
GDP per capita (Log)	0.0441	0.2330**	-0.0410***	-0.0077	-0.0127	0.0140	-0.5792***	-0.3949**	-0.1361	-0.4101*	-0.0004	-0.0018
	(0.5137)	(2.4429)	(-3.4346)	(-0.6674)	(-0.6819)	(0.6441)	(-3.2039)	(-2.4238)	(-0.5738)	(-1.7934)	(-0.0243)	(-0.0942)
Banking Sector Development (Log)	0.0913**	0.1736***	0.0292**	0.0155	0.0120	0.0235	-0.5236***	-0.2748*	-0.0465	-0.1008	-0.0106	-0.0144
	(2.1142)	(3.6168)	(1.9660)	(1.0830)	(0.4590)	(0.7712)	(-2.9277)	(-1.7048)	(-0.3450)	(-0.7748)	(-0.5432)	(-0.5829)
Law - WJP	-0.5440	-2.9652***	0.0395	-0.5458***	-0.5130**	-0.7659***	-7.9047***	-3.5526	3.2492	4.6360**	-0.0065	-0.0560
	(-0.8415)	(-4.1267)	(0.3894)	(-5.6000)	(-2.3586)	(-3.0141)	(-2.9295)	(-1.4607)	(1.4945)	(2.2108)	(-0.0336)	(-0.2284)
Intercept	-0.7934	-1.5767***	-0.0199	0.1278	0.0782	-0.2753	9.4276***	5.3909**	-0.9491	1.5486	-0.1149	-0.0886
	(-1.6487)	(-2.9479)	(-0.2239)	(1.4971)	(0.5136)	(-1.5468)	(3.1918)	(2.0249)	(-0.6091)	(1.0304)	(-1.0857)	(-0.6634)
Number of Countries	12	12	27	27	16	16	8	8	13	13	13	13
Number of Observations	382	382	2,785	2,785	423	423	452	452	71	71	423	423
R2	0.1802	0.3094	0.1906	0.2186	0.2567	0.1641	0.2399	0.1848	0.3080	0.2449	0.1602	0.1238
Adjusted R2	0.154	0.287	0.187	0.215	0.235	0.140	0.219	0.163	0.165	0.0887	0.136	0.0981

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Panel B.

This table presents robustness checks with the ratio of the collateral value to total assets.

The dependent variables are measuring the gap, which is the difference between each firm's Long-Term debt-to-equity with the Industry "target ratio". All remaining variables are identical to the baseline model.

	Mining & Construction Sector 1		Manufacturing Sector 2		Utilities Sector 3		Wholesale & Retail Trade Sector4		Finance, Insurance, Real Estate Sector 5		Services Sector 6	
15/08/2019 Gap measure	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE
Hofstede Cultural Dimensions												
Individualism/Collectivism	-0.0070***	0.0028	0.0000	0.0025***	0.0015	0.0002	0.0333***	0.0129	-0.0009	-0.0018	-0.0007	0.0018
	(-3.3433)	(1.1066)	(0.0349)	(5.7455)	(0.6780)	(0.0724)	(2.8367)	(0.9198)	(-0.0957)	(-0.1505)	(-0.6738)	(0.9504)
Masculinity/Feminity	0.0023	-0.0084**	-0.0007***	-0.0021***	-0.0002	0.0005	0.0017	-0.0024	-0.0064	0.0084	-0.0000	0.0004
	(0.7553)	(-2.2709)	(-3.2407)	(-7.5818)	(-0.1024)	(0.2157)	(1.1212)	(-1.3547)	(-0.4552)	(0.4679)	(-0.0149)	(0.3722)
Uncertainty Avoidance	-0.0023	0.0007	0.0009***	-0.0012***	0.0004	-0.0070***	-0.0065**	-0.0025	-0.0010	-0.0096	-0.0020***	-0.0043***
	(-1.4931)	(0.3587)	(3.7287)	(-3.9023)	(0.2257)	(-2.7750)	(-2.4551)	(-0.7942)	(-0.1680)	(-1.2953)	(-3.0548)	(-3.8500)
Long/Short term Orientation	-0.0054**	0.0039	-0.0002	0.0006	0.0005	-0.0054**	0.0407***	0.0146	0.0056	-0.0035	0.0017	0.0026
	(-2.4516)	(1.4943)	(-0.5149)	(1.5406)	(0.3179)	(-2.2488)	(3.0508)	(0.9135)	(0.4364)	(-0.2158)	(1.4733)	(1.3343)
Firm-Level Control Variables												
Capital Expenditure/Total Asset	0.4659	0.4949	0.7758***	1.1797***	1.0009**	2.5972***	1.1082**	2.4485***	0.3470	1.8190	1.1795***	1.9002***
	(1.1730)	(1.0379)	(6.7508)	(8.2203)	(2.0377)	(3.7066)	(2.4170)	(4.4525)	(0.1551)	(0.6389)	(4.0796)	(3.7956)
Operating income/Total Asset	-1.0009***	-0.8946**	-0.7657***	-0.6462***	-2.4710***	-2.0685***	-1.7396***	-1.2974***	-2.6276**	-2.6854*	-0.6253***	-0.4121*
	(-3.3354)	(-2.4827)	(-12.6605)	(-8.5559)	(-6.1258)	(-3.5949)	(-6.5548)	(-4.0758)	(-2.3762)	(-1.9084)	(-4.9196)	(-1.8728)
Total Sales	0.0465***	0.0556***	0.0321***	0.0480***	0.0579***	0.1015***	0.0369***	0.0440***	-0.0069	0.0825	0.0229***	0.0466***
	(3.9533)	(3.9393)	(12.8393)	(15.3909)	(4.2227)	(5.1916)	(4.1437)	(4.1185)	(-0.1685)	(1.5894)	(3.4787)	(4.0933)
Total Asset Growth	0.0003	0.0009	-0.0241***	-0.0021	-0.1718***	-0.0187	-0.0741**	0.0304	-0.0849	-0.0153	-0.0169*	0.0079
	(0.1102)	(0.2478)	(-3.9067)	(-0.2737)	(-3.1814)	(-0.2434)	(-1.9691)	(0.6743)	(-1.1102)	(-0.1569)	(-1.7044)	(0.4596)
Collateral Value/Total Assets	0.0857	0.0924	0.0099**	0.0108**	0.1122*	0.1884**	0.1180***	0.2178***	0.1996	0.3378	0.1352***	0.2187***
	(1.4056)	(1.2619)	(2.3518)	(2.0548)	(1.8317)	(2.1550)	(2.8943)	(4.4543)	(1.0681)	(1.4205)	(4.7101)	(4.3983)
Country-Level Control Variables												
GDP per capita(log)	-0.0364	0.1999*	-0.0185*	0.0270**	-0.0975*	-0.1180	-0.3422**	-0.0007	0.2038	-0.6036	0.0758**	0.1408**
	(-0.3716)	(1.7012)	(-1.8504)	(2.1620)	(-1.9109)	(-1.6205)	(-2.0126)	(-0.0033)	(0.5437)	(-1.2655)	(2.3928)	(2.5683)
Banking Sector Development(log	-0.0242	0.0173	-0.0324***	-0.0833***	0.0354	0.2611**	-0.4692***	-0.1791	0.0965	-0.1951	-0.0720*	-0.0951
	(-0.4937)	(0.2937)	(-2.6520)	(-5.4585)	(0.4943)	(2.5531)	(-2.7951)	(-0.8893)	(0.4389)	(-0.6972)	(-1.7605)	(-1.3429)
Law - WJP	0.8534	-2.1289**	0.1768**	-0.2763***	0.3236	1.6595*	-7.9890***	-3.3715	-0.7519	3.8645	-0.5085	-1.1827*
	(1.1590)	(-2.4080)	(2.1143)	(-2.6466)	(0.5416)	(1.9472)	(-3.1586)	(-1.1113)	(-0.2175)	(0.8784)	(-1.2701)	(-1.7060)
Intercept	-0.3445	-1.4276**	-0.3349***	-0.4335***	-0.4566	-2.4485***	6.8223**	1.0207	-3.0812	2.9952	-0.5640***	-1.2964***
	(-0.6277)	(-2.1661)	(-4.5500)	(-4.7160)	(-1.1004)	(-4.1369)	(2.4643)	(0.3074)	(-1.2423)	(0.9490)	(-2.6035)	(-3.4566)
Number of Countries	12	12	27	27	16	16	8	8	13	13	13	13
Number of Observations	367	367	2,674	2,674	407	407	435	435	63	63	404	404
R2	0.0998	0.1698	0.1249	0.2140	0.1832	0.2158	0.1783	0.2283	0.2324	0.1962	0.2185	0.2763
Adjusted R2	0.0693	0.142	0.121	0.210	0.158	0.192	0.155	0.206	0.0482	0.00332	0.195	0.254

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 3-9: Country-level Robustness checks with Governance and Financial Development indicators

This table presents country-level robustness checks with creditors rights index (Djankov et al., 2007) and financial development index (Svirydzenka, 2016). All other variables are identical to baseline model.

	Mining & Construction Sector 1		Manufacturing Sector 2		Utilities Sector 3		Wholesale & Retail Trade Sector4		Finance, Insurance, Real Estate Sector 5		Services Sector 6	
Gap measure	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE
Hofstede Cultural Dimensions												
Individualism (IDV)	+*	+***	-***	-***	+	+	-***	-***	-	-	-**	-***
Masculinity (MAS)	-**	-***	-***	-***	+**	+**	+**	+	-	-	+	-
Uncertainty Avoidance (UAI)	+***	+***	+***	-*	+***	+	+*	+**	+**	+	+	+
Long-Term Orientation (LTO)	+**	+***	+***	+***	+***	+***	-	-*	-	-	+	-
Firm-Level Control Variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country-Level Control Variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Creditors Rights	0.1268**	0.1155*	0.0006	-0.0020	-0.0147	-0.0127	0.3405***	0.2148**	0.0295	0.0465	-0.0136*	-0.0182*
	(2.2324)	(1.8385)	(0.0767)	(-0.2669)	(-1.2149)	(-0.9106)	(3.3234)	(2.3492)	(1.0610)	(1.5383)	(-1.7786)	(-1.7180)
Financial Dev. Index	-1.2740***	-1.2585**	0.1137*	-0.1495**	-0.0321	-0.0599	-	-	0.4355*	0.4413	-0.2431***	0.2485*
	(-2.8049)	(-2.5050)	(1.6951)	(-2.3013)	(-0.2781)	(-0.4502)			(1.6828)	(1.5669)	(-2.6398)	(1.9484)
Intercept	-4.3478***	-4.7067***	0.3038***	0.0244	-0.0590	-0.3898**	3.0092***	1.3477	-0.9437**	-0.1500	-0.3486***	0.1901
	(-2.8319)	(-2.7715)	(2.7132)	(0.2252)	(-0.3626)	(-2.0777)	(3.0777)	(1.5445)	(-2.2723)	(-0.3318)	(-2.7803)	(1.0948)
Number of Firms	466	466	2,837	2,837	565	565	462	462	708	708	587	587
Number of Countries	12	12	28	28	17	17	8	8	15	15	13	13
R2	0.1899	0.3137	0.1897	0.2155	0.2958	0.1804	0.2317	0.1775	0.1415	0.1336	0.1894	0.1113
Adjusted R2	0.167	0.294	0.186	0.212	0.279	0.161	0.215	0.159	0.125	0.117	0.171	0.0911
Gap measure	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE
Hofstede Cultural Dimensions												
Individualism (IDV)	+	+	+	+***	-	-	-**	+	-	-	-	+
Masculinity (MAS)	-*	-*	-***	-***	+	+	+	-*	-	-	-	-
Uncertainty Avoidance (UAI)	+*	+	+***	-**	-	-***	-	-	+	+	-***	-*
Long-Term Orientation (LTO)	+	+	-	+	-	-***	+	+	-	-*	+	+
Firm-Level Control Variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country-Level Control Variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Creditors Rights	0.1024	0.0241	0.0073	0.0218***	-0.0750**	-0.1059**	0.1695*	-0.0505	0.0165	0.0782*	-0.0107	0.0244
	(1.3973)	(0.2824)	(1.1491)	(2.7227)	(-2.0363)	(-2.0517)	(1.7649)	(-0.4295)	(0.4878)	(1.6854)	(-0.6118)	(0.7569)
Financial Dev. Index	-1.6816***	-0.8070	-0.0799	0.0200	0.2702	0.5258	-	-	0.4940	0.8724**	-0.3844*	0.3385
	(-2.8476)	(-1.1735)	(-1.4482)	(0.2864)	(0.7483)	(1.0389)			(1.5709)	(2.0253)	(-1.8250)	(0.8714)
Intercept	-5.5518***	-3.8460*	-0.4269***	-0.5364***	-0.1928	-1.3233*	1.7063*	-0.3531	-1.1097**	0.1411	-0.8973***	-0.8384
	(-2.8045)	(-1.6683)	(-4.6123)	(-4.5785)	(-0.3832)	(-1.8771)	(1.8629)	(-0.3147)	(-2.2107)	(0.2052)	(-3.1200)	(-1.5809)
Number of Firms	448	448	2,716	2,716	538	538	442	442	672	672	558	558
Number of Countries	12	12	28	28	17	17	8	8	15	15	13	13
R2	0.1049	0.1764	0.1221	0.2145	0.1504	0.1553	0.1499	0.1890	0.1260	0.1763	0.1358	0.2158
Adjusted R2	0.0781	0.152	0.118	0.211	0.129	0.134	0.130	0.170	0.109	0.160	0.115	0.197

All firm-level and country-level variables are as per the baseline model in table 4. t-statistics are noted in parentheses. ***; **; and * is the significance at 1%, 5%, and 10% level.

Table 3-10: Robustness checks at Sample-level.

Culture dimensions and capital structure relationship (minus firms from Japan and USA)

The table presents the signs and significativity of the four cultural variables in regards to the Gap of the debt-to-equity (market & book value) ratios with the Industry "target ratio". Panel A presents the Short-Term debt-to-equity ratios and Panel B presents for the Long-Term debt-to-equity ratios. All remaining variables are identical to the baseline model.

Panel A. Short-term debt-to-equity (market & book value)

Gap measure	Mining & Construction Sector 1		Manufacturing Sector 2		Utilities Sector 3		Wholesale & Retail Trade Sector 4		Finance, Insurance, and Real Estate Sector 5		Services Sector 6	
	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE	STD2MVE	STD2BVE
IDV (+)	-**	+	-***	-**	+***	+**	-	-**	+***	+	-***	-**
MAS (+)	+	-	-	-	-***	-***	+	+***	-***	-***	-***	-*
UAI (-)	+***	+***	+***	-*	-	-*	+***	+**	+	-	-	+
LTO (-)	-	+**	+***	+***	+***	+***	-	-	+***	+**	-**	-

Panel B. Long-term debt-to-equity (market & book value)

Gap measure	Mining & Construction Sector 1		Manufacturing Sector 2		Utilities Sector 3		Wholesale & Retail Trade Sector 4		and Real Estate Sector 5		Services Sector 6	
	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE	LTD2MVE	LTD2BVE
IDV (+)	-***	-	+**	+***	+	+	+	+	+***	+***	-	+
MAS (+)	+***	+	-***	-***	-	-	-	-	-***	-	-	+
UAI (-)	-	-	+**	-***	-	-***	+*	+	+**	+*	-	+
LTO (-)	-***	-	+	+**	+	-	+	+	+***	+	-	+

***p < 0.01, **p < 0.05, *p < 0.1.

Table 3-11: Firms in all SIC industry sectors by country – Initial Sample.

Initial sample of 18001 firms, in 12 SIC industry sectors, in 68 countries.

		0100-0999	1000-1499	1500-1799	1800-1999	2000-3999	4000-4999	5000-5199	5200-5999	6000-6799	7000-8999	9100-9729	9900-9999	Sub-total
1	Argentina	7	3	6	0	37	16	1	3	12	2	0	0	87
2	Austria	0	0	0	0	8	3	0	0	9	0	0	0	20
3	Australia	4	45	3	0	46	27	9	14	68	63	0	0	279
4	Bangladesh	0	0	1	0	17	2	0	0	27	1	0	0	48
5	Belgium	2	1	3	0	42	9	7	2	40	12	0	0	118
6	Brazil	3	1	2	0	13	15	0	7	13	5	0	0	59
7	Bulgaria	0	0	0	0	6	1	0	1	5	2	0	0	15
8	Canada	1	76	2	0	40	32	5	13	52	22	0	0	243
9	Chile	3	2	5	0	34	20	2	7	19	10	0	0	102
10	China	19	51	103	0	630	133	61	54	45	61	0	0	1157
11	Colombia	8	2	2	0	17	12	1	1	16	5	0	0	64
12	Croatia	1	0	1	0	12	5	0	1	1	1	0	0	22
13	Czech Rep	0	0	0	0	7	10	0	0	3	1	0	0	21
14	Denmark	2	2	4	0	44	8	4	2	40	19	0	0	125
15	Estonia	0	0	3	0	5	2	0	2	4	1	0	0	17
16	Finland	1	2	7	0	53	6	6	7	12	27	0	0	121
17	France	2	8	10	0	171	35	14	21	95	114	0	0	470
18	Germany	2	1	5	0	123	20	5	17	34	68	0	0	275
19	Great Britain	1	29	16	0	103	38	13	45	262	78	0	0	585
20	Greece	2	1	4	0	11	11	2	5	10	11	0	0	57
21	Hong Kong	1	2	9	0	5	8	0	1	10	3	0	0	39
22	Hungary	0	0	0	0	6	5	0	1	5	0	0	0	17
23	India	5	12	26	0	251	46	2	7	78	47	0	0	474
24	Indonesia	12	55	52	0	163	63	36	29	112	33	0	0	555
25	Ireland	2	7	1	0	9	3	1	0	8	4	0	0	35
26	Israel	0	8	10	0	27	8	3	8	41	10	0	0	115
27	Italy	1	2	1	0	42	16	2	2	28	4	0	0	98
28	Japan	7	9	136	0	926	117	145	202	175	336	0	0	2053
29	Korea South	6	3	43	0	883	50	38	30	80	178	0	0	1311
30	Lithuania	2	0	2	0	11	6	1	1	4	0	0	0	27
31	Malaysia	19	17	56	0	116	33	18	12	40	34	0	0	345
32	Mexico	20	19	80	0	132	63	19	16	83	36	0	0	468
33	Morocco	0	5	5	0	24	5	5	2	22	8	0	0	76
34	Netherlands	0	2	7	0	33	5	4	4	18	26	0	0	99
35	New Zealand	4	0	2	0	4	15	2	3	10	7	0	0	47
36	Norway	2	23	4	0	43	17	2	3	20	22	0	0	136
37	Pakistan	1	4	2	0	217	24	8	2	75	13	0	0	346
38	Peru	0	5	1	0	11	4	1	1	5	1	0	0	29
39	Philippines	1	31	18	0	49	33	6	11	79	29	0	0	257
40	Poland	2	3	42	0	123	27	23	15	46	58	0	0	339
41	Portugal	0	0	2	0	13	10	2	3	2	11	0	0	43
42	Romania	0	1	0	0	3	5	0	0	7	0	0	0	16
43	Russia	0	9	1	0	7	12	0	3	3	1	0	0	36
44	Serbia	4	1	12	0	46	5	4	3	15	6	0	0	96
45	Singapore	4	7	31	0	57	25	6	10	60	39	0	0	239
46	Slovenia	0	0	0	0	4	2	0	1	3	0	0	0	10
47	Spain	1	0	15	0	44	19	1	3	22	13	0	0	118
48	Sweden	3	3	12	0	112	13	10	14	37	78	0	0	282
49	Switzerland	0	0	4	0	92	13	4	5	68	24	0	0	210
50	Taiwan	0	1	51	0	644	35	35	19	43	29	0	0	857
51	Thailand	1	5	47	0	204	51	25	23	90	55	1	0	502
52	Turkey	1	5	7	0	45	13	1	6	16	4	0	0	98
53	U.S.A.	6	136	49	0	990	263	85	170	758	529	0	0	2986
54	Venezuela	1	1	0	0	11	3	0	1	11	0	0	0	28
55	Vietnam	19	51	153	0	386	146	90	34	120	46	0	0	1045
	Africa East	5	5	2	0	27	14	3	7	45	13	0	0	121
56	Kenya													
57	Tanzania													
58	Botswana													
59	Uganda													
60	Mauritius													
	Africa West	2	2	5	0	79	11	13	6	67	13	0	0	198
61	Ivory Coast													
62	Ghana													
63	Nigeria													
	Arab countries	13	3	16	0	104	29	8	16	150	26	0	0	365
64	Saudi Arabia													
65	Dubai													
66	Qatar													
67	Oman													
68	Abu Dhabi													
	Total Firms	**203**	**661**	**1081**	**0**	**7362**	**1622**	**733**	**876**	**3223**	**2239**	**1**	**0**	**18001**

Table 3-12: Hofstede's cultural dimensions correlation matrix (VSM2015 dataset).

Correlation matrix for Hofstede six cultural dimensions for 66 countries (including the Arab cluster). Highlighting strong correlation for PDI and IVR with other dimensions, which led us to keep the remaining four in our tests.

	PDI	IDV	MAS	UAI	LTO	IVR
PDI	1.0000					
IDV	-0.6473***	1.0000				
MAS	0.1660	0.0083	1.0000			
UAI	0.1671	-0.1599	0.0437	1.0000		
LTO	0.0031	0.1115	-0.0163	-0.0477	1.0000	
IVR	-0.2600**	0.1086	0.1209	-0.0345	-0.5193***	1.0000

***p < 0.01, **p < 0.05, *p < 0.1.

Table 3-12: Hofstede's cultural dimensions correlation matrix (VSM2015 dataset).

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Annexure for Essay 1

<u>Appendix 3-1</u>: Detailed description of Hofstede *et al*. (2010) dimensions:

(i) **Power distance:** this is about the expression of inequality in the group from the perspective of *the less powerful members*. In that context, it describes the gap between positions of high power vs. the less powerful and this gap is accepted by the society. The higher the gap observed, the higher is the power distance. Indeed, in low power distance countries, the less powerful feel empowered, but in high power distance countries, higher authority is naturally accepted, e.g., education is student-centred (low power distance) vs. being teacher-centred. Also as per Hofstede, *Germanic and English-speaking western countries* tend to have a lower score, in regards to *East European* and *Latin countries*.

(ii) **Uncertainty Avoidance**: this is about the level of acceptance of ambiguity, defined by the level of comfort with *unstructured situations*. It describes the preference for a stable/predictable outcome vs. unknown outcomes, irrespective of the time horizon. Indeed, higher uncertainty avoiding cultures would tend to create a rule for everything so as to have a more predictable outcome to any situation, including risky situations. Hence, people from such societies would feel more uncomfortable in an unorganised environment or unknown situation, e.g., in high *uncertainty avoidance* cultures, people tend to stick to their jobs despite disliking it, while people easily change their jobs in the other cultures. As per Hofstede, *English-speaking, Nordic and Chinese culture countries* tend to have lower uncertainty avoidance scores and higher scores for *Latin*, *Germanic* and *Japanese* culture countries.

(iii) **Individualism vs. Collectivism**: importance of self vs. the group or the "I" vs. the "we" culture. In individualist cultures, the expression of self is heightened where the individual takes care of self and its dependants. Instead, in collectivist cultures, the expression of the group prevails with the caring for each-other, belongingness to the group, and protecting it from splitting. Typically, in the Individualist cultures, task completion is more important than relationship, so is expressing what one thinks, though for collectivist cultures, relationship is more important and the expression of individual's thinking should not disturb the group's *harmony*. Furthermore, *individualism* was found to have high correlation with national wealth levels. As per Hofstede, *western and developed countries* tend to have higher scores on *individualism*, with Japan being in the middle of the index.

(iv) **Masculinity vs. Femininity:** through these**,** gender characteristics such as *assertiveness* and *caring* are used to represent cultures. In a masculine culture, men and women would tend to be more task-oriented than people-oriented, and more *assertive* and *competitive* than *caring*. Indeed, Hofstede mentions that in highly *Masculine* cultures, the discussion of this dimension is considered "*taboo",* which further indicates the unconscious level rooting of this dimension, e.g., *Feminine* cultures value work-life balance, and may have many women in position of power, like in politics, while work is primed in *Masculine* cultures, and few women are representing power positions. Indeed, Japan and Germanic countries have high *Masculinity* scores and it is low for Nordic countries.

(v) **Long-term vs. Short-term orientation**: the *long-term orientation* indicates the preference for the future where one expects the most important events to happen; this concept initially came out from the work of Bond (1988), who had named it *Confusion Work Dynamism*. It favours investing for the long term, suggests that the good or bad are circumstantial, that one should be flexible, work hard with dedication

to succeed, and continuously be open to learn from others. On the contrary, the *short-term orientation* gives more importance to the events of the past and the present. It favours spending what one has, suggests that good or bad are clearly defined, and traditions can't be changed. Further, social service is considered an important part of life, and that success or failure is due to luck. Hofstede mentions that the *long-term dimension turned out to be strongly correlated* with economic growth seen in East-Asian countries with strong confusion culture. And the *short term orientated* countries are USA, Australia, and Muslim countries.

(vi)   **Indulgence versus Self-restraint**: the *indulgence* cultures favour unbounded gratification of human desires for enjoyment, and people are in constant search for activities that can bring them that enjoyment, as they feel that their choices can bring them happiness. Instead, the *self-restraint* cultures limit such gratification through societal norms, where people feel that happiness is not in their control, and the expression or fulfilment of their desires is not a priority, e.g., people in *indulgence* cultures are active in sports and highly value freedom of speech, while *self-restraint* cultures have lower sports orientation and freedom of speech isn't important. As per Hofstede, South and North America are high *indulgence* cultures, while Eastern European, Asian and Muslim countries are *self-restraint* cultures.

<u>Appendix 3-2</u>: Bancel and Mittoo's (2004, table V, p41) CEOs questionnaire**:**

b) Matching the maturity of our debt with the life of our assets   (77.01 %)

f) We issue long-term debt to minimize the risk of having to finance in "bad times" (69.77 %)

a) We issue short term when we are waiting for long term market interest rates to decline (31.03 %)

d) We expect our rating to improve, so we borrow short term until it does (7.14 %)

c) We borrow short-term so that returns from new projects can be captured by shareholders (5.75 %)

e) Borrowing short-term reduces the chance that our firm will want to take on risky projects (1.16 %)

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Bibliography for Essay 1

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Moving from essay one to essay two

Our second essay (see chapter 4) analyzes the influence of culture on the variation of trade credit supply from pre-to-post the 2008 financial crisis. In the beginning of their book, Brealey *et al.* (2012) highlight that the 2007-2008 financial crisis tested the fundamentals of modern finance and proved that the failures of the financial system occurred as it disrespected those finance's fundamentals of "*good systems of governance, proper management incentives, sensible capital structures, and effective risk management*". Their perspective made us to seek to understand whether national culture values could influence firm's management financial choices in an environment of high financial stress.

Within this context of financial stress, we study the effects of culture on firms' short-term financing around the 2008 crisis event, through the variation of trade credit supply. We seek to observe how culture could possibly alter the effects of the financial crisis on firms, through is influence on firms' short-term financing. We find support for our research question in the literature highlighting the important role played by trade credit as a source of short-term financing around a financial crisis (Coulibaly *et al.*, 2013; Levine *et al.*, 2018). Our analysis would add new perspectives to the existing research on culture and trade credit provisions in a period of stability (El Ghoul & Zheng, 2016).

This essay fits into our topological framework as we analyze the influence of national culture (X1) on trade credit variation (Y2) around the financial crisis. We focus on a the sole manufacturing industry sector ($F2_{TS2}$), as this sector is said to be the most affected post the crisis (Atsebi *et al.*, 2019). The choice of the industry sector is also based on our essay two findings that culture infleunce is among the highest in the manufacturing sector.

Culture influences trade credit provisions (El Ghoul & Zheng, 2016) and trade credit plays a critical role in firms' short-term financing post-crisis (Coulibaly *et al.*, 2013; Levine *et al.*, 2018). Our analysis focuses on the role of culture on firm's short-term financing choices in an environment of extreme financial stress. These short-term choices could be critical for firms as they may engender their long-term financial sustainability (Westergård-Nielsen & Neamtu, 2012).

Our analysis is based on that trade credit supply is considered strongly tied to suppliers-customers relationship (Wilner, 2000). The sustenance of a long-term suppliers-customers relationships is strongly linked to the suppliers' national culture (Cannon *et al.*, 2010). We expect that culture would influence suppliers-customers relationships affecting trade credit supply from pre-to-post crisis. These differences would result in the differential effects of the crisis on firms across countries.

We find that culture contributes to the differences in the variation of trade credit supply from pre-to-post crisis among countries. Based on cultural dimensions scores, firms in some countries provide higher trade credit post-crisis than pre-crisis, while firms' in other countries supply lower trade credit over the same observation period.

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4 Essay Two - Mortgage Financial Crisis, Culture, and Trade Credit

Abstract:

Our paper investigates Hofstede's cultural dimensions role on the variation of trade credit supply from pre-to-post the 2008 financial crisis. Using a sample of 4491 manufacturing firms from 37 countries, applying four Hofstede's cultural dimensions, our results show that firms' from countries with lower *masculinity*, lower *uncertainty avoidance*, and higher *long-term orientation* increase their trade credit supply from pre-to-post crisis. This result highlights culture's role in lowering/stabilizing financial crisis effects on firms, by influencing the increase in trade credit supply for their short-term financing needs as a substitute to lower bank credit. These results remain stable through our robustness tests at the firm-level, country-level and sample-level. Our findings adds the determinant of culture to the literature on firm's trade credit usage post a financial crisis. Therefore, our paper's key findings could assist manufacturing multinational managers, insurance firms, and countries' policy-makers in establishing processes for trade credit management post-crisis, which could help in stabilizing the crisis' negative effects on firms.

On the 25th January 2019, the president of the USA suggests that Americans, financially affected by the US "Shut down" crisis, should ask for trade credit to their grocers and banks. He explains that as these citizens would have long-term relationships with their suppliers, banks and grocers, they should be able to re-negotiate their payments (account payable) to them. And once the citizens will receive their salaries (accounts receivables) from the USA government, they can pay their grocers and banks. This instance is a perfect contemporary example of trade credit usage, with its dependence on the customer-supplier relationships, and how it can be used in the time of crisis.

4.1 Introduction

This study analyzes the role of national culture on the variation of trade credit (TC) supply from pre-to-post the 2008 financial crisis. Indeed, Petersen and Rajan (1997) highlight that "*Trade credit is the single most important source of short-term external finance*", which is confirmed in our sample as trade credit financing amounts to 51% of the total short-term debt of firms in 2007. However, the level of usage of TC is specific to each industry sector.

Trade credit (TC) is the sum of credit provided (TC supply or accounts receivable) by a firm to its customers for the sale of goods and the credit taken (TC demand or accounts payable) from its suppliers for the purchase of goods (Deloof, 2003). TC is an important constituent of working capital. TC plays a key role in firms' meeting their short-term financing requirements (Maksimovic, 2001). Customer-supplier relationships are important in firms' trade credit contracts' negotiations (Wilner, 2000). In the financial crisis context, these relationships could act on trade credit's heightened role as a substitute for short-term financing (Molina & Preve, 2012).

Trade credit's role is heightened when firms face external short-term financing constraints from banks and/or the financial markets (Campello *et al.*, 2010). These financial constraints become prominent around a financial crisis as the crisis event leads to a double effect (see figure 4-1), of reducing external financing sources and reducing economic demand (Claessens *et al.*, 2012). These effects lead to firms' having lower access to external financing and to a reduction in their sales due to lowering economic demand. This economic environment in the post-crisis scenario results in trade credit usage substituting the reduction of external financing as well as helping to increase sales through longer credit periods (Deloof, 2003).

TC provisions –amount of supply and demand– are said to be influenced by firm's country-of-origin cultural values (El Ghoul & Zheng, 2016). The national cultural values of the suppliers seem to be critical for long-lasting suppliers-customers relationships (Cannon *et al.*, 2010). It brings the focus on suppliers' national cultural values playing an important role in TC supply. In the crisis affected financially constrained environment, the suppliers-customers relationships' importance becomes key in re-negotiating trade credit contracts (Wilner, 2000).

With this background, we build our research on the foundation of national culture influencing trade credit provisions (El Ghoul & Zheng, 2016) and suppliers-customers relationships (Cannon *et al.*, 2010). Our paper investigates the role of suppliers' national culture dimensions (Hofstede *et al.*, 2010) on the variation of trade credit supply from pre-to-post (*ex-ante* to *ex-post*) the 2008 global financial crisis. We hypothesize that culture's influence on the increase in trade credit supply, from *ex-ante* to *ex-post,* acts as a financing substitute for firms. On the opposite, culture's influence on the decrease in trade credit supply may increase financing constraints for firms' *ex-post*.

Our results show that suppliers' national culture influences the variation of trade credit supply from *ex-ante* to *ex-post*. We find that culture influences either an increase or a decrease in trade credit supply. It results in either stabilizing or amplifying financial crisis effects on firms. The stabilizing effects comes from an increase in trade credit supply substituting the reduction in external short-term financing. The amplification effects comes from a reduction in trade credit supply added with firms facing a reduction in external short-term financing.

Our research finds its roots in firms' needing external financing options to support their short-term's working capital requirements and long-term's investments through capital expenditure (Beck *et al.*, 2008). This financing can be through the *financial channel* from banks and capital markets, as well as through the *trade channel* (Claessens *et al.*, 2012) from trade credit.

Trade credit is regulated by contracts between suppliers and customers (Klapper *et al.*, 2011). Suppliers-customers relationships play a central role in trade credit contracts design and re-working (Wilner, 2000). These relationships becomes critical in TC's management in the post-crisis period as firms' face external financing difficulties (Coulibaly *et al.*, 2013). TC is considered a substitute to bank credit when firms' face external financing difficulties (Blasio, 2005; Molina & Preve, 2012).

Financial crises frequency increased since 1970 with over 400 occurring until 2011 (Laeven & Valencia, 2013). Each crisis creates production output losses and are considered "*extreme manifestations*" of the linkages between financial crises and the real economy (Claessens & Kose, 2013). These crisis' consequences also affect world-trade (Atsebi *et al.*, 2019). The *financial channel* and the *trade channel* transfers financial crises effects to firms (Claessens *et al.*, 2012). These effects drive firms to re-assess their short-term and long-term financing sources (Gómez, 2018).

The crisis effects' transmission through the *financial channel* renders firms' access to bank credit difficult and further deteriorating capital markets conditions reduce the opportunities for bonds or equity issuance (Coulibaly *et al.*, 2013; Psillaki & Eleftheriou, 2015). The *financial channel*'s short-term financing constraints adds-up with the economic demand decline. This situation results in lower sales and income flow, which hinders meeting working capital requirements that are aligned to pre-crisis levels (Westergård-Nielsen & Neamtu, 2012).

In the *trade channel*, suppliers-customers relationships play an important role in trade credit financing (Wilner, 2000). These relationships could influence TC contracts design and re-working. National culture plays a significant role on customer's *long-term* engagement with its suppliers (Cannon *et al.*, 2010). National culture also influences TC supply provisions (El Ghoul & Zheng, 2016). This literature leads us to expect that culture's influence on suppliers-customers relationships could further influence the re-working of trade credit contracts from *ex-ante* and *ex-post*, leading to the variation of trade credit supply.

First, we hypothesize that national culture (Hofstede *et al.*, 2010), represented by *individualism* (IDV), *masculinity* (MAS), *uncertainty avoidance* (UAI), and *long-term orientation* (LTO), influence the variation of trade credit supply. Second, we hypothesize that *individualism* influences a decrease, *masculinity* influences a decrease, *uncertainty avoidance* influences a decrease, and *long-term orientation* influences an increase in TC supply.

We test these hypotheses on a sample of 4491 listed manufacturing firms from 37 countries[43] over 2007-2012. Our results show three of the four national culture dimensions having a significant relationship with the variation of trade credit from *ex-ante* (2007) to *ex-post* (2009). The results validate our main hypotheses that culture influences the variation of trade credit around a financial crisis, and each cultural dimension's influence differs in it.

Our results highlight those suppliers in cultures with low *masculinity*, low *uncertainty avoidance*, and high *long-term orientation* increased trade credit supply, contributing to stabilize financial crisis effects on firms. On the contrary, suppliers in cultures with higher *masculinity*, higher *uncertainty avoidance*, and lower *long-term orientation* lowered trade credit supply, as a result amplifying financial crisis effects on firms. These result add new insights to the existing literature on culture and TC (El Ghoul & Zheng, 2016), and culture, TC, and financial crisis (Levine *et al.*, 2018).

Our results show that culture influence observed in *ex-post* (2009) changes as we move away from the crisis year to 2010, 2011, and 2012. We define these years "normalcy" period. Our results show that culture dimensions relationships signs change compared to 2009. Culture relationship signs in "normalcy" supports El Ghoul and Zheng (2016) findings. Besides confirming their findings, our results add a new relationship that suppliers from low *long-term orientation* countries extend higher trade credit in "normalcy" period. These results highlights that culture seem to be influencing differently TC supply shortly after the financial crisis, than in "normalcy" period.

These results support the literature that TC supply observes a surge soon after the crisis event to decrease later-on (Love *et al.*, 2007; Yang, 2011). To this literature, we add the determinants of national culture

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[43] In fact 41 countries, as 5 countries are clubbed under ARAB countries cluster.

(Hofstede *et al.*, 2010). Our results remain stable to the robustness tests at the firm-level, country-level, and at the sample-level. Our findings could help in setting useful guidelines for all stakeholders for managing trade credit supply *ex-post* in order to stabilize crisis' negative effects on firms.

The remaining of this document is organized with section 4.2 presenting the literature, section 4.3 building our hypotheses, and section 4.4 describing the data, variables selection, and the empirical methodology. Section 4.5 presents & discusses the results and section 4.6 concludes.

4.2 Literature review

Financial crises are becoming more frequent since the 1970s (Laeven & Valencia, 2013) with their common effects being lower economic demand and worsening of credit conditions through the financial system (Claessens & Kose, 2013). The negative effects of a financial crisis takes few years to recede, as Dell'Ariccia *et al.* (2008) point that countries' GDP growth reaching its *pre-crisis level* takes about 4 years.

Financial crisis affects firms through multiple channels (see figure 4-1) namely the *business cycle channel*, the *trade channel*, and the *financial channel* (Claessens *et al.*, 2012). The *business cycle channel* represents the transmission of industry sector's cyclical effects to firms. The *trade channel* explains transmission of lower economic demand effects to firms. And, the *financial channel* describes the effects of firms' dependence on external financing from banks and capital markets.

Both of the *trade channel* effects of lower economic demand and *financial channel* effects of worsening credit conditions impact firms in meeting their financing requirements (Claessens *et al.*, 2012). TC supply plays a very important role of substitute to short-term financing through the *financial channel* (Blasio, 2005; Love *et al.*, 2007; Molina & Preve, 2012). TC financing further helps firms' in growing sales (Deloof, 2003). Indeed, trade credit is central to firms' short-term financing as firms of all sizes use it more or less (Petersen & Rajan, 1997; Maksimovic, 2001; Paul & Wilson, 2007; García-Teruel & Martínez-Solano, 2010).

Moreover, provisions of TC supply are found to be influenced by national culture (El Ghoul & Zheng, 2016). National culture (Hofstede *et al.*, 2010) of the supplier's is said to influence suppliers-customers' relationships in their long-term engagements (Cannon *et al.*, 2010). These relationships are key in firms' trade credit contracts design (Wilner, 2000). Culture's stability over very long periods of centuries (Williamson, 2000; Guiso *et al.*, 2006) could have persistent effects. We analyze how national culture could influence the variation of trade credit supply around a financial crisis, therefore playing a role in the transmission of crisis effects to firms?

Figure 4-1 : Financial and Trade Channel effects.
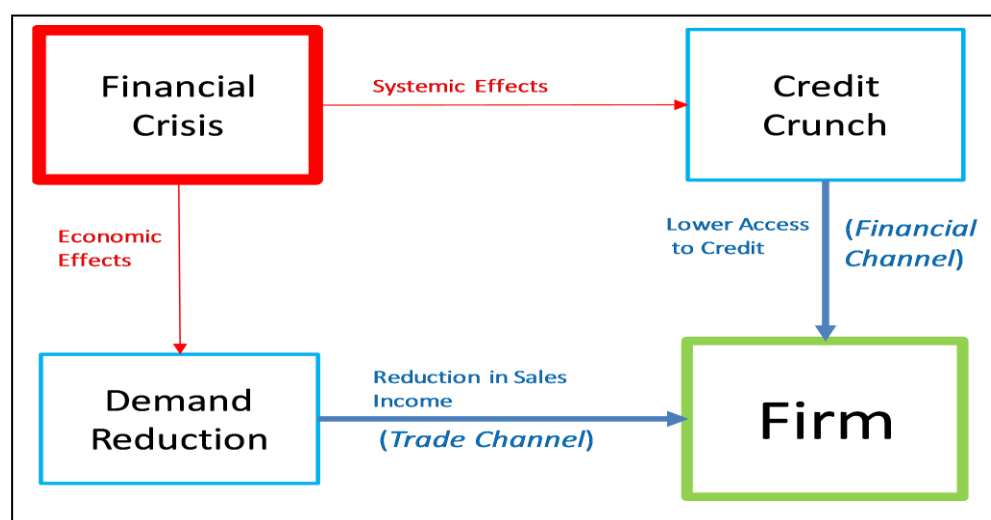
The figure highlights how the financial crisis primary effects of credit crunch and demand reduction ends up affecting firms through the financial channels and trade channels. A representation of effects presented by Claessens et al. (2012), Claessens & Kose, (2013), and *Laeven & Valencia (2013).*

In the next sub-sections, we review the literature in support of this research question. First, we review the crisis' effects on firms coming from the financial, trade, and business cycle channels. Second, we review the role of trade-credit in firms' short-term financing, with the importance of suppliers-customers' relationships. Third, we review the role of culture on suppliers-customers' relationships in trade credit supply from *ex-ante* to *ex-post*, with a heightened role *ex-post*.

4.2.1 Financial channel effects

The *financial channel* role is important in transmitting financial crisis' effects through the reduction in bank credit and unfavorable financial markets (Dell'Ariccia *et al.*, 2008; Claessens *et al.*, 2012). It leads firms most dependent on external finance to be more affected (see figure 4-1). Some countries observes a higher bank credit reduction post the financial crisis (Chava & Purnanandam, 2011). It can affect firms dependent on bank borrowing and with limited access to public debt markets, as their profits and investments decline in the quarters following the crisis. Furthermore, differences in banking sector and capital markets development between developed and developing countries could exacerbate post-crisis financing conditions (Laeven & Valencia, 2013; Claessens & Kose, 2013). It means that the development of a country's financial ecosystem plays an important role on firms' health in the aftermath of a financial crisis.

Moreover, Claessens and Kose (2013) claim that financial crises can lead to deeper economic downturns than business cycles. It adds-up with the banking sector effects of a reduction in credit by 7% and an important decline in asset prices. The banking sector effects further constrain firms, already facing the real economic effects of demand decline. The worsening of credit conditions and decreased cash flow

from sales affect firms' short-term working capital and long-term investment financing (Westergård-Nielsen & Neamtu, 2012). In the short-term, firms' are loaded with pre-crisis' operating levels of accounts payable, accounts receivable, and inventory (Coulibaly *et al.*, 2013). It adds to the reduction in operating income, further constraining firms' borrowing repayments (Campello *et al.*, 2010; Claessens *et al.*, 2012). The post-crisis economic environment leads firms to have lower liquidity and may result in some firms being severely constrained financially (Laeven & Valencia, 2013; Claessens & Kose, 2013).

Financially constrained firms have lower access to external finance as banks follow the "*flight-to-quality*" trend (Psillaki & Eleftheriou, 2015) towards higher repayment capacity borrowers. This situation favors non-constrained firms. Campello *et al.* (2010) find that financially constrained firms are smaller and aware of their bank credit sourcing difficulties. Constrained firms draw at the earliest from their bank credit lines to hold higher cash in view of future borrowing constraints. They find that one year before the crisis, cash levels are similar between constrained and non-constrained firms. The situation changes post-crisis as constrained firms use more cash than unconstrained ones, and even end-up selling assets to support their liquidity needs.

The *financial channel* effects on firms could be accentuated by *trade channel*'s induced constraints on firms in meeting their short-term financing needs.

4.2.2 Trade channel effects

The literature highlights a more prominent role played by the real economy than by the financial sector in propagating the financial crisis' tsunami (Dell'Ariccia *et al.*, 2008; Atsebi *et al.*, 2019). Therefore, the crisis effects on firms could be higher through the *trade channel*. Financial crisis effects could be coinciding with *business cycle channel* effects for some industry sectors (Claessens *et al.*, 2012). Claessens *et al.* (2012) highlight that the 2008 crisis effects got transmitted mostly through the *trade and business cycle channels* and least with the *financial channel*. They describe that the economic demand decline leads to decrease in sales, which further leads to lowering firms' cash inflow. The crisis leading to lower economic demand seems to be a key constituent of the effects transmitted to firms through the *trade channel*. Lower economic demand effects are the highest for firms in the manufacturing industry sector (Atsebi *et al.*, 2019). Therefore, we shall focus on manufacturing firms.

Indeed, firms create supply chain *inter-firms linkages* (Hertzel *et al.*, 2008) through the *trade channel* that affect their trade credit management before, during, and after a financial crisis (Jacobson & von Schedvin, 2015; Seifert *et al.*, 2013). In the *inter-firms linkages* of all sizes firms, Love *et al.* (2007) argue that trade credit is only a mean for larger and financially stronger firms to indirectly transfer their bank credit access to smaller and financially constrained firms. This situation is exacerbated as external financing reduces post-crisis. In such an environment, a large literature supports the view of trade

credit's heightened role in short-term financing post-crisis (Campello *et al.*, 2010; Yang, 2011; Molina & Preve, 2012; Coulibaly *et al.*, 2013; Murfin & Njoroge, 2014; Psillaki & Eleftheriou, 2015; Carbó-Valverde *et al.*, 2016; Fabbri & Klapper, 2016).

Firms' short-term liquidity management could be as much easier as firms' working capital control (*i.e.* TC, inventory) is good and firms cash positions high (Campello *et al.*, 2010; Coulibaly *et al.*, 2013). Higher cash holding could further ease firms' access to bank credit (Kling *et al.*). Furthermore, effective TC's management could bound down to managing suppliers-customers' relationships (Wilner, 2000; Doney *et al.*, 1998; Cannon *et al.*, 2010). Good suppliers-customers' relationships could profit firms having access to lower cost of funds from banks or capital markets, by supplying them to financially constrained firms through trade credit. Therefore, managing TC supply could help mitigate the effects of the financial crisis.

Literature presented in section 4.2.1 and 4.2.2 supports the view that effective trade credit management could be the missing link in the financial crisis differential effects on firms around the world (Carbó-Valverde *et al.*, 2016).

4.2.3   Trade credit financing

Financially constrained firms, having lower access to finance from the *financial channel*, are more dependent on TC than unconstrained ones (Psillaki & Eleftheriou, 2015). Carbó-Valverde *et al.* (2016) find that smaller firms face higher challenges in accessing external finance through the *financial channel* than the larger ones. Larger firms having better access to external financing pass-it-on to more constrained firms through TC supply, playing the role of bank's substitute (Blasio, 2005; Love *et al.*, 2007). TC supply could also be a complement to bank financing, provided the firm can access the latter (Yang, 2011). TC supply's importance as a source of short-term financing is higher with higher the firms' financial constraints (Carbó-Valverde *et al.*, 2016).

Klapper *et al.* (2011) find that larger customers obtain higher maturity TC supply contracts from their smaller suppliers. The large customers may get longer credit time from their smaller suppliers, with the latter trying to lock continuous supply orders to sustain their production resources (Murfin & Njoroge, 2014). The early repayment TC supply's discounts are offered to riskier customers due to the *flight-to-quality* route taken by creditors (Psillaki & Eleftheriou, 2015). Therefore, firm size could play a role in firm's ability to secure short-term financing *ex-post*.

Another common finding in the literature is that bank credit remains the preferred choice for firms due to its lower cost than trade credit (Petersen & Rajan, 1997; Murfin & Njoroge, 2014). It is rather the firms' financial constraints, combined with reduced bank credit, which tends to push them towards more trade credit financing (Ge & Qiu, 2007; Molina & Preve, 2012). It leads financially constrained firms to be increasingly dependent on their suppliers' higher negotiating position in TC supply contracts (Fabbri

& Klapper, 2016). These suppliers are open to extend TC contracts until the point they feel their financially constrained customers could honor it (Wilner, 2000; Molina & Preve, 2012). Otherwise, suppliers may possibly force customers into bankruptcy to protect their receivables payment. Therefore, firms' financial position *ex-ante* is an important determinant in its condition *ex-post*, as it puts them in a higher TC demand or supply situation (Campello *et al.*, 2010).

Trade credit contracts rests on suppliers-customers relationships (Petersen & Rajan, 1994). Building long lasting suppliers-customers' relationships across firms' business cycles is quite central to TC's literature (Wilner, 2000; Burkart & Ellingsen, 2004; Yang, 2011). In the event of customers' financial constraints, Wilner (2000) highlights the importance of these relationships on trade-credit contracts as the supplier wishes to maintain the long-term business. Yang (2011) adds that financial crisis leading to liquidity constraints can strain supplier-customer's relationship. Furthermore, firm's poor relationship with banks could also drive it to use more TC supply than bank credit. However, post-crisis all firms are credit strained, either from restricted bank credit or stressed trade credit or both (Campello *et al.*, 2010). In stressed situations, the strength of suppliers-customers relationships could be critical in re-negotiating TC contracts, enabling firms to get past the crisis (Murfin & Njoroge, 2014).

Suppliers-customers' long-lasting business relationships are influenced by national culture values of the supplier's (Cannon *et al.*, 2010). Firms' TC supply provisions are also influenced by national culture (El Ghoul & Zheng, 2016). National culture (Hofstede *et al.*, 2010) seems to be an important determinant in firms' extending higher or lower TC supply *ex-post*.

4.2.4   Culture and trade credit

Culture is playing an important role in trade credit provisions (El Ghoul & Zheng, 2016). It further influences suppliers-customer long-term relationships (Cannon *et al.*, 2010), which play a fundamental role in TC contracts re-working post-crisis (Wilner, 2000).

El Ghoul and Zheng (2016) show that firms' higher trade credit supply provision is influenced by higher scores of Hofstede's national cultural dimensions of *collectivism, power distance, uncertainty avoidance*, and *masculinity*. They link each major reason found in the finance literature on trade credit usage to a national culture dimension influencing it.

In this context, suppliers extend trade credit to build relationships to lock-in long-term supplies to customers and they share customers' creditworthiness knowledge (Wilner, 2000; Burkart & Ellingsen, 2004), to which El Ghoul and Zheng (2016) link that suppliers in high *collectivist* cultures extend higher TC then in *individualist* cultures.

Suppliers extend trade credit to indirectly price discriminate the customers (Petersen & Rajan, 1997; Westergård-Nielsen & Neamtu, 2012), to which El Ghoul and Zheng (2016) associate suppliers in high

power distance cultures use their power position (large/rich suppliers) in price discriminating smaller or less credit worthy customers.

To trade credit as a warranty for the quality of the goods (Fabbri & Klapper, 2016), El Ghoul and Zheng (2016) associate that suppliers in higher *uncertainty avoidance* cultures offer higher trade credit as a warranty to their product quality.

To indirectly lock customers as trade credit contracts could be more restrictive than bank credit ones (Aktas *et al.*, 2012), El Ghoul and Zheng (2016) associate that in high *masculinity* cultures customers could be more opportunistic, hence suppliers use trade credit extension to reduce customers' flexibility to look for other suppliers.

Moreover, Cannon *et al.*, 2010 buyers' survey shows that culture values influence customer's long-term relationships with suppliers. This influence exists beyond supplier's good performance, as relationships ending quickly adds to transaction costs due to efforts in finding new suppliers. The authors find that different cultures embed differently customer's concerns of *success* and *well-being*, which are critical to customers-suppliers' long-term engagements. Therefore, in an international setting, the negotiating customer, in search of a good supplier for long-term engagement, should understand supplier's national cultural values in order to get him to deliver the desired performance.

Furthermore, Doney *et al.* (1998) find that in the globalized economy, understanding cultural differences between suppliers and customers is key to building trust for a long-term relationship. They explain that long-lasting relationships further influence firms' financial performance, concurring with Cannon *et al.* (2010). Indeed, firms' national cultural values alignment with management practices (Noorderhaven & Harzing, 2003) are said to improve firms' performance (Newman & Nollen, 1996).

These studies linking either suppliers-customers' relationships or TC to national culture apply Hofstede's (1980, 2001) national culture dimensions model[44]. Hofstede defines culture as "*the collective programming of the mind that distinguishes the members of one group or category of people from another*". He models culture at the country-level with six national cultural dimensions on a 0-100 scale named as *Power distance* (PDI), *Individualism vs. Collectivism* (IDV), *Masculinity vs. Femininity* (MAS), *Uncertainty Avoidance* (UAI), *Long-term vs. Short-term orientation* (LTO), and *Indulgence versus Self-restraint* (IDR).

As these culture dimensions influence TC supply provisions and suppliers-customers' relationships, key in negotiating TC contracts, our paper analyzes the influence of four Hofstede's cultural dimensions on the variation of TC supply.

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[44] A detailed description of Hofstede cultural dimensions is available in annexure (appendix 4-1).

4.3 Hypotheses

Our primary goal –core hypothesis– is to check the influence of national culture on the variation of TC supply from *ex-ante* to *ex-post*. Our secondary goal is to analyze whether each cultural dimension of IDV, MAS, UAI, and LTO (Hofstede *et al.*, 2010) influence differently the variation of TC supply. These hypotheses would help us in identifying culture's role in contributing to stabilize or amplify financial crisis' effects on firms, through the variation of TC supply.

If the variation of TC supply is positive, it acts as a short-term financing substitute, hence stabilizing financial crisis effects on firms. If this variation is negative, it could increase short-term financing constraints, contributing to amplify financial crisis effects on firms. A lower decrease in TC supply would amplify lesser the crisis effects on firms.

We develop our hypotheses upon the following literature. First, the influence of national culture on the provisions of TC supply (El Ghoul & Zheng, 2016). Second, on the importance of suppliers-customers' relationships in TC contracts design and re-working (Wilner, 2000). Third, culture's influence on suppliers-customers' long-term relationships (Cannon *et al.*, 2010). On these foundations, we expect that national culture could influence how TC supply contracts can be re-worked soon after the crisis shock. This influence could possibly extend to the post-crisis recovery period, lasting up-to 4 years (Dell'Ariccia *et al.*, 2008). National culture could contribute to stabilize or amplify financial crisis effects on firms, thought its influence on TC supply variation.

Our analysis could first result in extending the literature on culture and trade credit provisions (El Ghoul & Zheng, 2016). Second, it could add the culture determinant to the literature on TC supply's short-term financing role post-crisis (Campello *et al.*, 2010; Love & Zaidi 2010; Molina & Preve, 2012; Coulibaly *et al.*, 2013; Levine *et al.*, 2018). Third, it could enrich the growing body-of-research on culture and finance (Carr & Tomkins, 1998; Guiso *et al.*, 2006; Chen *et al.*, 2015; Wijayana & Gray 2018).

4.3.1 Core hypothesis

We investigate the effects of national culture on the variation of TC supply from pre-to-post crisis contributing to stabilize or amplify financial crisis effects on firms.

Supplier-customer's relationships play an important role in TC contracts (Wilner, 2000). The relationship's strength, *i.e.* customer not switching supplier at the first opportunity, as well as its duration in time, is influenced by the national culture of the supplier (Cannon *et al.*, 2010). The relationship's role becomes more important post-crisis, as the strength of the relationship allows for customers to re-work TC contracts with suppliers (Wilner, 2000). TC contracts reworking could enable customers to meet their short-term financing needs (Carbó-Valverde *et al.*, 2016).

TC supply plays a key role in the firms' short-term financing, often substituting the role of bank credit (Blasio, 2005). Kling *et al.* (2014) show that post financial shocks, firms meet their short-term financing needs primarily from *cash or trade credit* but not from bank. Although, post financial crisis, cash levels decline for all firms (Campello *et al.*, 2010). TC supply becomes a financing substitute when bank credit is less available (Ge & Qiu, 2007) and this substitute role is enhanced post-crisis (Love *et al.*, 2007; Levine *et al.*, 2018). National cultural influence on supplier-customer's relationship could ease re-working of trade credit contracts enabling an increase of decrease in TC supply post-crisis.

The literature findings lead us to expect a relationship between national culture and the variation of trade credit supply from pre-to-post crisis, contributing to stabilize or amplify crisis' effects on firms. Our core hypothesis writes as:

H1: There is an association between national culture and the post-crisis variation of TC supply.

We develop secondary hypotheses to check for the influence of each of the four cultural dimensions on the variation of TC supply.

4.3.2   Secondary hypotheses

Existing culture and finance literature show differing direction and strength for each Hofstede's cultural dimension (Zheng *et al.*, 2012; Chen *et al.*, 2015). It is true as well with trade credit supply provisions (El Ghoul & Zheng, 2016). Therefore, it is meaningful to investigate each dimension's influence on trade credit supply variations.

El Ghoul and Zheng (2016) show that firms in countries high on *collectivism* provide more trade credit, which we believe could protect customers' post-crisis, hence stabilizing the crisis effects on firms. Firms supply lower TC in high *individualist* cultures, hence post-crisis this could amplify financial crisis negative effects on firms. Furthermore, Cannon *et al.* (2010) find that customers' long-term relationship is higher with their suppliers from high *collectivist* cultures than from high *individualist* cultures.

Therefore, we expect crisis effects on firms would be lower in more collectivist cultures (low IDV) as suppliers would increase their trade credit supply helping firms in short-term financing, resulting in stabilizing financial crisis effects on firms. We expect that crisis effects on firms would be higher in individualist (IDV) cultures as suppliers would reduce their TC supply. We expect a <u>negative</u> relationship between IDV and the variation of TC supply from *ex-ante* to *ex-post*, amplifying crisis effects on firms due to lower short-term financing *ex-post*. Our next hypothesis is:

H2a: The higher the individualism, the higher the decrease in TC supply post-crisis**.**

Hofstede (1980) explains that in high masculine cultures (high MAS), men and women tend to be more task-oriented than people-oriented, and more *assertive* and *competitive* than *caring*. Therefore, we

expect that in high feminine cultures (low MAS), firms would tend to show a high *caring* attitude in difficult times as post-financial crisis through the increase of trade credit supply, potentially reducing crisis' negative effects on firms.

Moreover, suppliers could be opportunistic in letting financially constrained customers down in their *flight-to-quality* (Klapper *et al.*, 2011; Psillaki & Eleftheriou, 2015). Saying it from the customer's opportunistic behavior perspective, El Ghoul and Zheng (2016) find that in high masculine cultures (MAS), suppliers provide more trade credit to lock customers as their customers are more opportunistic in switching suppliers.

We expect that suppliers' from high feminine cultures (low MAS) would provide higher trade credit post-crisis, contributing to stabilize crisis negative effects on firms. We expect a negative relationship between *masculinity* (MAS) and variation of trade credit supply from *ex-ante* to *ex-post* leading to amplify crisis negative effects on firms. Hence, our hypothesis is:

H2b: The higher the masculinity, the higher is the decrease in TC supply post-crisis.

Hofstede (1980) describes *uncertainty avoidance* (UAI) as the preference for predictable outcomes vs. unknown outcomes, irrespective of the time horizon. Wuyts and Geyskens (2005) highlight that higher uncertainty avoiding firms define more detailed contracts with their suppliers and customers, confirming the characteristic of high UAI cultures. El Ghoul and Zheng (2016) find that customers in high UAI cultures may demand higher trade credit from suppliers to support supplied products quality.

Therefore, we expect that in high UAI countries, customers and suppliers would define very detailed trade credit contracts to avoid any unknown situation, including in the time of crisis, preventing themselves against unknown outcomes. This leads us to expect that in high UAI cultures, suppliers would be cautious in extending trade credit due to heightened economic uncertainty post-crisis (Claessens & Kose, 2013). We expect a negative relationship between UAI and the variation of trade credit supply from *ex-ante* to *ex-post*, which would result in amplifying crisis' effects on firms. Hence, our hypothesis is:

H2c: The higher the uncertainty avoidance, the higher the decrease in TC supply post-crisis.

Customers' long-term relationships with their suppliers is influenced by the *individualism/collectivism* dimension of the suppliers' national culture (Cannon *et al.*, 2010). Moreover, the Hofstede's cultural dimension of *long-term orientation* (LTO) is about accepting short-term pain for long-term gains (Hofstede *et al.*, 2010).

The post-crisis period corresponds to firms' short-term liquidity difficulties that TC supply could help address, benefiting both suppliers and customers in the long-term. Firms in countries with high LTO

tend to prefer potential long-term gains in helping their customers or suppliers in the short-term even if it is difficult (Carr & Tomkins, 1998), provided it doesn't lead themselves into bankruptcy (Jacobson & von Schedvin, 2015). Therefore, we expect suppliers to provide higher trade credit post-crisis for better long-term gains in their relationships with customers.

We anticipate that *long-term orientation* would have a positive relationship with the variation of trade credit supply from *ex-ante* to *ex-post*, leading to stabilize financial crisis effects on firms. Hence, our last hypothesis is:

H2d: The higher the long-term orientation, the higher is the increase in TC supply.

Following these definitions of our core and secondary hypotheses, we describe the selection of our dataset, key variables, and the empirical methodology.

4.4   Data, variables, and methodology

Following the literature analyzing financial crisis effects on firms (Campello *et al.*, 2010; Coulibaly *et al.*, 2013; Levine *et al.*, 2018), we focus on manufacturing sector (SIC 2000-3999) firms. Atsebi *et al.* (2019) show that post-crisis, manufacturing industry is the most affected of all industries. Furthermore, manufacturing sector firms use both bank credit and trade credit for their short-term financing (Yang, 2011). The choice of manufacturing firms would allow us to better observe the variation of TC supply's substitution role due to decrease in bank credit.

Firm's *ex-ante* financial condition would influence its financial condition *ex-post* (Campello *et al.*, 2010). Changes in firm's financial parameters from *ex-ante* to *ex-post* would also indicate its handling of the crisis period (Levine *et al.*, 2018). Therefore, we control for firm's key financial parameters to check for its financial condition *ex-ante* and their changes *ex-post* (Coulibaly *et al.*, 2013; Levine *et al.*, 2018). Some of our firm-level variables are measured only *ex-ante* (2007) and others are measured *ex-ante* (2007) as well as *ex-post* (2009-2012).

Country's financial institutional development enable firms to access institutional financing (Maksimovic, 2001; Ge & Qiu, 2007). For investors/creditors, legal framework protects their receivables (Levine *et al.*, 2018). Financial crisis also influences a country's economic conditions. Therefore, we control for these country-level conditions *ex-ante* as well as their changes from *ex-ante* to *ex-post*.

Our key firm-level variables represent firm's liquidity position, debt level, cash flow, and performance. Our country-level variables represent institutional development and economic conditions.

4.4.1 Data sample

Our final dataset is constituted of 4491 listed manufacturing sector firms (SIC 2000-3999) from 37 countries[45]. The firms' financial measures are obtained from Reuters Datastream database, the country's real GDP from the International Monetary Fund database[46], the country's economic and financial institutions development from the World Bank Indicators[47] database, and the legal rights protection index from the World Justice Project[48]. The culture dimensions variables' data are obtained from Hofstede[49] index. To test for the 2008 financial crisis' effects, our dataset excludes this year and takes measures of variables for 2007 (*ex-ante*) and from 2009 to 2012 (*ex-post*). On this combined dataset of all our variables, we apply trimming on both sides of the dependent variable's data distribution tails to remove outliers through the rule of thumb method[50] (Navidi, 2008), to obtain our final dataset.

Table 4-2 Panel A & B provides a country-level summary of our sample, organized by decreasing average trade credit supply from 2007 to 2009. The number of firms per country varies from 6 (Ireland) to 794 (Japan). The average change in trade credit is a decrease of 1.02% with a standard variation of 6.34%. Eight countries witness firms' increase in trade credit supply from 2007 to 2009, while 26 countries show an average decrease in trade credit supply. India sees highest increase in TCs (3.47%) with Netherland the lowest (-5.17%). France (-2.66%) and Germany (-2.80%) are close. Greece (-0.24%) and Singapore (-3.18%) have the highest and lowest UAI values (100 vs. 8). Tables 4-2 Panel C presents the pairwise correlations with IDV and UAI negatively correlated, at the 1% level, with the variation of trade credit supply, aligned with our hypotheses. The firms' financial control variables of capital expenditure, variation in inventory, variation in sales, and market capitalization are positively correlated, at the 1% level, with our dependent variable. All the country-level control variables are correlated with our dependent variable and significant at the 1% level.

< Insert table 4-1 here >

< Insert table 4-2 here >

4.4.2 Key variables

We describe the selection of our key variables of interest (see table 4-1).

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[45] In fact, our total countries are 41, but we combine five countries, Saudi Arabia, Dubai, Qatar, Oman, and Abu Dhabi in a single Arab cluster. They all have the same Hofstede's cultural dimensions values of Arab countries.
[46] https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/download.aspx
[47] World Bank Database: https://data.worldbank.org/indicator
[48] https://worldjusticeproject.org/our-work/wjp-rule-law-index/wjp-rule-law-index-2017–2018
[49] *VSM100* dated 8dec2015: https://geerthofstede.com/research-and-vsm/dimension-data-matrix/
[50] "Right-tail" trimming for values below $(Q_1 - 3 \times (Q_3 - Q_1))$ and "left-tail" trimming for values above $(Q_3 + 3 \times (Q_3 - Q_1))$; where $(Q_3 - Q_1)$ is the interquartile range.

4.4.2.1 Dependent trade credit variable

Our dependent variables is the variation of suppliers' extending trade credit to their customers post the financial crisis. National culture directly influence trade credit supply (El Ghoul & Zheng, 2016), and it indirectly influences trade credit supply through the suppliers-customers' relationships (Cannon *et al.*, 2010). National culture also influence the level of social trust (Doney *et al.*, 1998), which further influences trade credit demand post a financial crisis (Levine *et al.*, 2018). We expect national culture dimensions to influence the variation of trade credit supply. Our expectation is supported by the influence of national culture values on trade credit supply (El Ghoul & Zheng, 2016), added with the influence of culture through social trust to the variation of trade credit demand (Levine *et al.*, 2018). Following Levine *et al.* (2018) approach, we measure the variation in trade credit supply from *ex-ante* to *ex-post* and take the measure of the variation of accounts receivable to total assets (*Δ accounts receivable / total assets*) for the observation period.

4.4.2.2 Culture variables

Our explanatory variables for culture's influence (Guiso *et al.*, 2006) are four measures of national culture from Hofstede *et al.* (2010). First, *Individualism* (IDV) from low to high (high to low *collectivism*). In individualist cultures, the individual cares for self and its dependents, and in collectivist cultures, the group prevails with the caring for each other. Second, *Masculinity* (MAS) from low high (high to low *feminity*). In high masculine cultures, men and women tend to be more task-oriented than people-oriented, and more *assertive* and *competitive* than *caring*. Third, *Uncertainty Avoidance* (UAI) from low to high, is about the level of acceptance of ambiguity, describing the preference for predictable outcomes vs. unknown outcomes, irrespective of the time horizon. Fourth, *Long-term orientation* (LTO) from low to high (high to low *short-term orientation*). The *long-term orientation* indicates the preference for the future where one expects the most important events to happen, even if it meant accepting pain in the short-term.

The strengths of Hofstede's national culture's dimensions (Hofstede, 1980, 2001; Hofstede *et al.*, 2010) are that they have been developed from a large countries sample and have been validated in varied management studies (Doney *et al.*, 1998; Ramirez & Tadesse, 2009; Cannon *et al.*, 2010; Chen *et al.*, 2015; El Ghoul & Zheng, 2016). As per the literature (Hofstede, 1980, 2001; Williamson, 2000; Guiso *et al.*, 2006), we assume the stability of culture over our entire period of study. Any changes that might have occurred in the cultural dimensions scores over the period of our study could produce an undetected impact on our measures of culture's influence.

4.4.2.3 Firm-level financial variables

All our firm-level financial control variables' measures are scaled by dividing them by the measure of the *book value of total asset* taken in year 2007 (*ex-ante*).

4.4.2.3.1 Liquidity (debt & cash) variables

Firm's financial conditions prior to the financial crisis shock have an important effect on firms' ability to handle the lower cash flow from sales due to declining economic demand and fewer short-term financing options from worsening bank credit as well as less attractive capital markets (Claessens *et al.*, 2012). Firm's better liquidity position pre-crisis has lower negative effects on it post-crisis (Campello *et al.*, 2010). Higher cash holding levels allows firms easier access to bank credit and trade credit (Kling *et al.*, 2014). It means that levels of debt repayment and available cash *ex-ante* are important parameters in firms' ability to withstand worsening credit conditions *ex-post*. Inventory could also be quickly converted into cash as part of larger asset sale that could be needed by constrained firms (Campello *et al.*, 2010; Coulibaly *et al.*, 2013).

For the measure of debt levels *ex-ante*, we use total short-term debt to total asset (*total short-term debt / total assets*) (Coulibaly *et al.*, 2013). To measure firm liquidity changes, we take total cash-plus-equivalents to total assets *(cash / total assets)* and the inventory to total asset *(cash / total assets)* *ex-ante* and *ex-post* (Campello *et al.*, 2010; Claessens *et al.*, 2012).

4.4.2.3.2 Demand (sales) and Growth (capex)

Crisis affects firms leading to lower sales and lower investments (Claessens *et al.*, 2012). High growth firms have higher usage of trade credit financing (Deloof, 2003; Ge & Qiu, 2007; García-Teruel & Martínez-Solano, 2010). Indeed, García-Teruel and Martínez-Solano (2010) studying UK SMEs, highlight that rapidly growing firms use more trade credit to increase their sales. Ge and Qiu (2007) find the same for Chinese firms. Campello *et al.* (2010) find that all firms reduced their capital expenditures post crisis, though financially constrained firms make a higher cut then unconstrained ones.

We take firm's change in sales from *ex-ante* to *ex-post*, due to the impact of change in economic demand. To control for firm's growth, we take its investment level represented by the capital expenditure to total assets (*capital expenditure / total assets*) (Claessens *et al.*, 2012).

4.4.2.3.3 Performance (ebit/asset)

Deloof (2003) highlights that more profitable firms tend to have more accounts receivable, as higher profits allows them to hold higher levels of cash, which could be used to cushion them against the larger receivables. Furthermore, firms also use higher levels of accounts receivable to increase their sales (García-Teruel & Martínez-Solano, 2010). We control for firm's performance *ex-ante* by firm profits, which is an important parameter for its ability to generate positive cash flow. It contributes to firm's liquidity position, which could keep it financially healthy *ex-post* (Claessens *et al.*, 2012; Levine *et al.*, 2018). We measure firm's profitability *ex-ante* by the earnings before income tax (*ebit / total assets*) (Levine *et al.*, 2018).

4.4.2.3.4 Size

Firm's size impacts the level of trade credit as well as its position in regards to its suppliers and customers (Petersen & Rajan, 1997; Fabbri & Klapper, 2016), further contributing to firm's position in accessing external short-term financing (Kling *et al.*, 2014; Murfin, J., & Njoroge, K, 2014). We take the measure of firm's market capitalization (*log(market capitalization)*), though our literature uses total asset (Levine *et al.*, 2018) or total sales (El Ghoul & Zheng, 2016), as we already use these two measures in constructing other explanatory variables.

4.4.3 Country-level variables

Financial crisis has important effects on countries' economies, with reduction in production output (Coulibaly *et al.*, 2013), shrinkage in economic demand which could even lead to recession (Claessens & Kose, 2013), and reduction in international trade (Claessens *et al.*, 2012; Atsebi *et al.*, 2019). We control for the effects of changes in economic demand by change in country's GDP from *ex-ante* to *ex-post* divided by the GDP *ex-ante*. To avoid effects of currency fluctuations, we take the measure of the real GDP in local currency, measured at constant prices from the International Monetary Fund database[51].

Trade credit levels increase with a higher growth on the country's GDP, which suggests that firms in growing economies would have a higher accounts receivable and payable (Deloof, 2003; Ge & Qiu, 2007; García-Teruel & Martínez-Solano, 2010). Furthermore, the cultural dimension of *individualism* is highly correlated with a country's wealth level (Hofstede *et al.*, 2010). We take the measure, in US dollar, of the gross domestic product per capita *ex-ante* (*log(GDP per capita)*) (El Ghoul & Zheng, 2016; Levine *et al.*, 2018).

Country's financial institutions development could improve or reduce access to bank credit and capital markets (Maksimovic, 2001), as the measure of this development indicates the depth of financial access in the country. Financial sector development is important for firms' access to short-term financing as trade credit is a substitute in countries where access to financing could be difficult for firms (Ge & Qiu, 2007, Wu *et al.*, 2014; Coulibaly *et al.*, 2013). We take the measure *ex-ante* of the total credit to the private credit sector (*log(domestic credit to private sector / GDP)*) (El Ghoul & Zheng, 2016; Levine *et al.*, 2018).

Protection of investors' and creditors' rights is important as the level of legal rights implementation (Levine *et al.*, 2018) can influence the supplier's willingness to extend trade credit. It can also control for customers' asking for trade credit to guarantee the quality of supplied products (Fabbri & Klapper, 2016; El Ghoul & Zheng, 2016). We control for the rule of law with an overall measure of legal

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[51] https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/download.aspx

framework in a country, including political, legal, and corruption provided by the World Justice Project[52] (Botero & Ponce, 2011). In our robustness tests, we also test alternate measures of the *creditor's rights index* (Djankov *et al.*, 2007; El Ghoul & Zheng, 2016) and the rule of law[53] (Porta *et al.*, 1998).

4.4.4   Methodology & model specification

We wish to test the influence of national culture dimensions of IDV, MAS, UAI, and LTO (Hofstede *et al.*, 2010) on the variation of trade credit supply. This method is similar to the one used by Levine *et al.*, 2018 in studying the role of social trust on the financial crisis' effects on firms through the variations of trade credit demand from *ex-ante* to *ex-post*. Furthermore, we need to control for firm's financial condition *ex-ante* as well as its changes from *ex-ante* to *ex-post* (Claessens *et al.*, 2012; Coulibaly *et al.*, 2013; Levine *et al.*, 2018).

Taking cues from the literature on financial crisis effects on firms (Claessens *et al.*, 2012; Coulibaly *et al.*, 2013; Levine *et al.*, 2018), we follow the method of applying some control variables as variations and others as levels *ex-ante* or *ex-post*. In-line with this literature we apply country-level control measures of financial and legal institutional developments. This constitutes our base test model (see equation 6).

In our base model, the dependent variable is the variation of trade credit supply (*accounts receivable*) from *ex-ante* to *ex-post* divided by the book value of *total assets ex-ante*. We take multiple variation periods from *ex-ante* (*t-1*) to each of the four years *ex-post* (*t+1, t+2, t+3, t+4*), as about 4 years *ex-post* the countries' economic conditions tend to return to their *ex-ante* levels (Dell'Ariccia *et al.*, 2008). Hence, our explanatory variable, with firm *k*, and year *n* (1, 2, 3, or 4), writes as:

$$(1) \qquad \Delta Y_{k(t+n)} = \frac{\left(Accounts\ Receivable_{k(t+n)} - Accounts\ Receivable_{k(t-1)}\right)}{TA_{k(t-1)}}$$

At the firm-level, some of our explanatory variables control for firm's financial condition *ex-ante*, such as liquidity (*total short-term debt / total assets*), performance (*ebit / total assets*) and growth (*capital expenditure / total assets*). While others control for the variation in firm's financial condition from *ex-ante* to *ex-post*, such as the variations in the level of firm's sales (*Δ sales / total assets*), cash and equivalents (*Δ cash / total assets*), and inventory (*Δ inventory / total assets*) (Campello *et al.*, 2010; Claessens *et al.*, 2012; Coulibaly *et al.*, 2013; Levine *et al.*, 2018). For these variations, we take the

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[52] https://worldjusticeproject.org/our-work/wjp-rule-law-index/wjp-rule-law-index-2017–2018, measuring 9 dimensions of *limited government powers; absence of corruption; order and security; fundamental rights; open government; regulatory enforcement; access to civil justice; effective criminal justice; and informal justice.*
[53] Porta *et al.* (1998, Table 5, p 1412)

changes in levels from the year *ex-ante* (*t-1*) with each of the four years *ex-post* (*t+1, t+2, t+3, t+4*), with firm *k*, and year *n* (1, 2, 3, or 4).

$$(2) \quad \Delta Sales_{k(t+n)} = \frac{(Sales_{k(t+n)} - Sales_{k(t-1)})}{TA_{k(t-1)}}$$

$$(3) \quad \Delta Cash_{k(t+n)} = \frac{(Cash_{k(t+n)} - Cash_{k(t-1)})}{TA_{k(t-1)}}$$

$$(4) \quad \Delta Inventory_{k(t+n)} = \frac{(Inventory_{k(t+n)} - Inventory_{k(t-1)})}{TA_{k(t-1)}}$$

At the country-level, the changes in the economic growth influence demand (Claessens & Kose, 2013), which maybe further affected by reduced international trade (Claessens *et al.*, 2012; Atsebi *et al.*, 2019), therefore impacting firm's sales. We control for the changes in economic conditions with the variation of country (*j*) GDP from *ex-ante* to *ex-post* divided its GDP *ex-ante* (*Δ GDP / GDP*). To control for the effects of exchange rate changes and inflation, we adopt here the GDP measure in local currency at constant prices.

$$(5) \quad \Delta GDP_{j(t+n)} = \frac{(GDP_{j(t+n)} - GDP_{j(t-1)})}{GDP_{j(t-1)}}$$

Furthermore, country's wealth level influence the culture dimension of *individualism* (Hofstede *et al.*, 2010). For explanatory culture variables, time is not a constrain as culture is considered stable over very long periods of centuries to millennium (Hofstede, 1980, 2001; Williamson, 2000; Guiso *et al.*, 2006), hence we shall keep the Hofstede's dimensions index from year 2015[54].

With this literature framework, using Ordinary Least Squares (OLS) method for coefficients' estimation, we combine our equations (1), (2), (3), (4), and (5) resulting in the equation (6). Therefore, our empirical model specification with country *j*, firm *k*, year *n* (1, 2, 3, or 4), and *ε* denoting the error term, writes as:

$$
\begin{aligned}
(6) \quad \Delta Y_{jk(t+n)} = {} & \alpha_0 + \alpha_1 Culture_j + \alpha_2 \, Firm_{level} Control \, Variables_{k(t-1)} \\
& + \alpha_3 \, \Delta Firm_{level} Control \, Variables_{k(t+n)} \\
& + \alpha_4 \, \Delta Country_{level} Control \, Variable_{j(t+n)} \\
& + \alpha_5 \, Country_{level} Control \, Variables_{j(t-1)} + \varepsilon_{jk}
\end{aligned}
$$

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[54] *VSM100* dated 8dec2015: https://geerthofstede.com/research-and-vsm/dimension-data-matrix/

In the next section, we present the results of our empirical tests using this model and provide analysis comments.

4.5 Results and comments

4.5.1 Overview

The results highlight that national culture is significant in influencing the variation of trade credit supply from the year *ex-ante* (2007) to the year *ex-post* (2009) (see table 4-3). This confirms our hypothesis H1. Three (MAS, UAI, LTO) of the four cultural dimensions are significant, while IDV is insignificant. These three dimensions relationships signs with the variation of trade credit supply confirm our secondary hypotheses (H2b, c, and d).

The majority of our firm-level variables are significant at the 1% level, except for firm's growth and performance. The country-level control variables of the change in economic growth and of legal rights are significant at the 1% level, country's wealth at the 5% level, and financial institutional development at the 10% level.

These key results meet our hypotheses expectations, that culture influences the variation of trade credit supply, contributing to stabilize or amplify financial crisis' effects on firms. The 2008 financial crisis shock is considered as the *"Great Trade Collapse"* (Atsebi *et al.*, 2019). In such an economic environment, our results emphasize the key role played by culture in firms meeting their short-term financing needs (Wilner, 2000; Burkart & Ellingsen, 2004).

With these results, we add the determinant of culture to the literature analyzing trade credit supply's role post-financial crisis (Campello *et al.*, 2010; Coulibaly *et al.*, 2013; Levine *et al.*, 2018). Our findings highlight the influence of suppliers' national cultural values in their choice to increase or decrease TC supply from *ex-ante* to *ex-post*.

Our results also extend El Ghoul and Zheng (2016) findings on culture and trade credit provisions, by showing a different behaviour of suppliers in a peculiar financial situation around the 2008 crisis event. Our findings further increase the body-of knowledge on culture and corporate finance (Chen *et al.*, 2015).

4.5.2 Main results analysis

At the cultural dimensions-level, MAS is significant and its relationship negative with the variation of trade credit supply. This indicates that firms in low masculine (high feminine) cultures show a higher degree of concern post-crisis, as a result providing higher TC. This result would correspond well to MAS definition of a more caring behavior in feminine cultures (Hofstede *et al.*, 2010). As a result, high masculine cultures contribute to amplify financial crisis effects on firms as suppliers extend lower trade credit post-crisis. Therefore, confirming our hypothesis H2b.

Furthermore, UAI has a significant and negative relationship with the increase in trade credit supply. This result highlight that firms in high uncertainty avoiding cultures tend to extend lower trade credit post-crisis, as a result amplifying crisis effects on firms. Therefore, our hypothesis H2c is confirmed.

Lastly, LTO is significant and has a positive relationship with the increase in trade credit supply. This result show that cultures high on *long-term orientation* are ready to accept short-term pains for a better long-term future (Carr & Tomkins, 1998; Hofstede *et al.*, 2010). Higher LTO cultures contribute to stabilize the financial crisis effects on firms. With these results, our hypothesis H2d is confirmed.

We further analyze these main results. For our hypothesis **H2b**, the results are in concurrence with our expectations as MAS has a negative and significant (at the 1% level) relationship with the increase in trade credit supply. In a low MAS (high feminine) cultures such as Denmark (MAS score: 16), Westergård-Nielsen and Neamtu (2012) survey firms (50% in manufacturing) post crisis. They find these firms are overall less affected by the 2008 financial crisis. Their findings could well be due to the specificities of feminine cultures, which have a more caring attitude (Hofstede *et al.*, 2010). Their study would support our findings in regards to our hypothesis **H2b**.

Our hypothesis **H2c**, the results are in concurrence with our prediction as UAI is significant (at the 1% level) and has a negative relationship with the variation in trade credit supply. Indeed, cultures high on *uncertainty avoidance* provide lower trade credit *ex-post*, possibly due to the highly unpredictable financial environment post-crisis. Indeed, as Claessens and Kose (2013) describe that "*for reasons often unknown, small shocks can result significant problems for the entire financial system*". This unknown future financial environment prevents suppliers from higher uncertainty avoiding cultures (Hofstede *et al.*, 2010) to decrease trade credit supply *ex-post*. It result in possibly amplifying financial crisis' effects on firms.

Our hypothesis **H2d**, *long-term orientation* (LTO) shows a positive and significant relationship (at the 5% level) with the increase in trade credit supply from *ex-post*. This result would support the perspective that suppliers from LTO cultures accept to take on short-term pain in order to keep their long-term engagements with customers (Cannon *et al.*, 2010). Indeed, Carr and Tomkins (1998) highlight that firms' CEOs in LTO cultures value more a long-term return on investment in their financial decisions. Indeed, they point (p. 222) to what a Japanese CEO says (Japan LTO index: 88) "*We want to secure the future of the company in total over the years, much longer than a 5-year horizon.*". It would support our results that suppliers in LTO cultures could provide higher trade credit post-crisis to maintain their long-term customers' relationships. In LTO cultures, suppliers' provides support to their customers in their short-term financing needs, which contribute to stabilize financial crisis' effects.

< Insert table 4-3 here >

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4.5.3 Detailed analysis

At the firm-level (see table 4-3), trade credit supply increased despite the decrease in cash levels, as higher cash holding could have facilitated bank credit (Kling *et al.*, 2014). Our result confirms the literature on the importance of trade credit post-crisis as a short-term financing substitute to bank credit (Yang, 2011; Coulibaly *et al.*, 2013; Carbó-Valverde *et al.*, 2016). In addition, the increase in trade credit supply supports the increase in firms' sales (Deloof, 2003; García-Teruel & Martínez-Solano, 2010; Ge & Qiu, 2007). An increase in TC supply sustains suppliers' long-term relationship with their customers (Burkart & Ellingsen, 2004; Cannon *et al.*, 2010; El Ghoul & Zheng, 2016; Gómez, 2018).

The decrease in cash levels show that all sizes firms' burn their cash during a financial crisis confirming the literature (Campello *et al.*, 2010). Firms' size relationship with TC supply variation is positive and significant, showing that larger firms extend more trade credit *ex-post* than smaller firms. This confirms the literature that larger firms provide TC to smaller financially constrained firms acting as bank credit substitute (Love *et al.*, 2007; Fabbri & Klapper, 2016).

Our results show a decrease in total short-term debt with an increase in TC supply, confirming TC's role as a short-term financing substitute for firms post-crisis (Klapper *et al.*, 2011; Claessens *et al.*, 2012). The sign and significance of our short-term debt variable confirm existing literature (Yang, 2011; Coulibaly *et al.*, 2013). The results highlights suppliers' national culture critical role in their relationships with customers (Doney et al., 1998; Burkart & Ellingsen, 2004) in the crisis period. These relationships enable re-working of trade credit contracts to get through the crisis.

The increase in inventory levels along with TC supply shows that firms can support their sales increase with higher inventory and higher trade credit (Deloof, 2003). Higher level of inventory could support an increase in sales, offsetting the effects of lower production due to financial constraints (Coulibaly *et al.*, 2013). Our results confirm that the increase in trade credit supply could support sales increase and compensate for external financing constrains for production.

At the country-level, the increase in GDP is significantly related with the increase in trade credit supply. This suggests that in countries with higher growth observed a lower negative impact of crisis on economic demand. In these countries, firms extended higher trade credit post-crisis (Coulibaly *et al.*, 2013). Our results show that most of these firms are located in emerging countries and/or Asian countries (Coulibaly *et al.*, 2013), where trade credit provisions are also higher (El Ghoul & Zheng, 2016).

Firms in wealthy countries, measured by the *GDP per capita ex-ante*, extend more trade credit. Firms in countries with lower bank credit supply, measured by *private credit*, extend higher trade credit, confirming trade credit's substitute role to bank credit (Ge & Qiu, 2007). This substitution role is possibly enhanced by lower access to credit through the financial channel (Ge & Qiu, 2007; Chava & Purnanandam, 2011).

Lastly, we describe our results for the rule of law, from the world justice project, which represents the level of adherence to a country's laws. We find that lower this adherence, the higher is the increase in trade credit supply. This may confirm the role of trade credit as a short-term financing substitute in countries where creditors' rights are less protected (Maksimovic, 2001; Ge & Qiu, 2007). This is also true when banks follow the flight-the-quality route (Psillaki & Eleftheriou, 2015).

We extend our analysis up to four years *ex-post* (2012), beyond our analysis so far of culture's influence on TC supply variation for the year *ex-post* (2009). This extension is done in support of the literature highlighting post-crisis recovery taking upto 4 years (Dell'Ariccia *et al.*, 2008). Our results (see table 4-4) show that three cultural dimensions (IDV, MAS, LTO) remain mostly significant with TC supply variation for the year 2010, 2011, and 2012. However, their relationships signs are opposite to our hypotheses H2b and H2d tested for 2009. This suggests that firms' usage of TC supply changes as the crisis event moves away.

Firstly, these results from 2010-2012 confirm the findings of El Ghoul and Zheng (2016). They find show that firms in more collectivist (low IDV) and higher masculine (higher MAS) cultures provide higher levels of trade credit. Our results would confirm that firms in high collectivist and high masculine cultures, who provided higher trade credit *ex-ante*, continue to provide higher trade credit from the second year (2010) *ex-post*, continuing until the fourth year (2012) *ex-post*.

Second, our results from 2010 extend El Ghoul and Zheng (2016) findings, by adding the role of *long-term orientation*. We find that LTO is negatively related to the higher trade credit supply, meaning that firms in *short-term orientation* (low LTO) cultures provide higher trade credit from the second year onwards *ex-post*. The increase in TC supply helps firms' to increase sales (Deloof, 2003). These results suggest that in "normalcy" period firms in higher short-term oriented cultures (lower LTO) provide higher trade credit to increase sales. Our result confirms Carr & Tomkins (1998, p. 222) survey findings, where they highlight that CEOs in USA (LTO index: 26) are more "*looking at maximization of profits in the short-term*".

By combining our findings of culture's influence on TC supply variation in "normalcy" period with El Ghoul and Zheng (2016), we could say that firms in high collectivist (low IDV), high masculine (high MAS), and high short-term orientation (low LTO) cultures provide higher trade credit to their customers, enriching the literature.

In summary, our key findings highlight that lower *masculinity* and *uncertainty avoidance* combined with higher *long-term orientation* contribute to stabilize the effects of the financial crisis on firms (see table 4-3). This is done through the increase in trade credit supply *ex-post* (2009), which is in the near aftermath of the 2008 crisis. These key findings confirm a substantially increased TC supply's importance post-crisis as a short-term financing source (Yang, 2011; Coulibaly *et al.*, 2013). We add to

this literature the critical role played by national culture values resulting in influencing crisis effects on firms.

The role of culture is heightened by TC supply's sensitivity to the firm's national cultural values (El Ghoul & Zheng, 2016), reaching its peak sensitiveness soon after the crisis (Blasio, 2005; Yang, 2011). Our results could add to Yang (2011) finding that TC supply observed a peak just at the beginning of the crisis to fall soon after, with culture accentuating this increase in some countries. From the year 2010, firms' usage of TC supply tend to revert back to its "normalcy" period, in line with El Ghoul and Zheng (2016) findings.

Our results add highly valuable insights into TC supply management. These highlight culture's role as being the missing link in the differential effects of financial crisis on firms (Coulibaly *et al.*, 2013; Carbó-Valverde *et al.*, 2016; Levine *et al.*, 2018). Therefore, culture contributes to stabilize or amplify crisis negative effects on firms.

< Insert table 4-4 here >

4.5.4   Robustness tests

In order to test our main results, we perform multiple robustness tests at the firm-level, country-level, and at the sample-level.

At the firm-level, we first test by replacing the short-term debt variable with the long-term debt variable (Levine *et al.*, 2018). Our results show that the long-term debt variable is insignificant and our culture dimensions (MAS, UAI, and LTO) keep their significance levels and signs as per our main results for the years of 2009, 2010, 2011, 2012 (see table 4-5).

Second, we keep both variables in our regressions and find that the long-term debt variable remain insignificant and the short-term debt variable keeps its significance and signs as per our main results. The culture dimensions keep their significance levels and signs as per our main results (see table 4-6). Our results confirm the literature of trade credit importance on short-term financing, especially around a financial crisis event (Yang, 2011; Coulibaly *et al.*, 2013).

At the country-level, we perform four tests (see table 4-7). First, few studies use *Trust*, for social trust level, as a key explanatory variable in their analysis of trade credit. Indeed, Wu *et al.* (2014) highlight the role of trust in the provision of TC and Levine *et al.* (2018) analyze the influence of trust on TC around a financial crisis. Carlin *et al.* (2009) add that higher level of social trust fosters economic growth, as well as investment in the stock market, despite lower legal protection. *Trust* could influence supplier-customer's relationship, therefore affect TC supply. Doney *et al.* (1998) find that higher level of social trust contributes to reduced *transaction costs* in business as it reduces the need to switch suppliers or

search for replacing customers. They highlight that in the globalized economy *trust building* is dependent on the national cultural values. Therefore, we apply the variable of *Trust* with the measure taken from the World Values Survey (Inglehart, 2014). *Trust* is the percentage of respondents giving the answer "*Most people can be trusted*" to the question "*Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?*".

Our results show *Trust* is significant and negative (see table 4-7). Only UAI remain significant for TC supply variation from 2007 to 2009, keeping the sign as per our main result. *Trust* is insignificant for TC supply variation from 2007 to 2010, 2011, and 2012. However, IDV, MAS, UAI, and LTO remain significant as per our main results. These results suggests that cultural dimensions and *Trust* would be partially substitutes. These results would require further investigation following existing literature highlighting culture's influence on the level of trust (Doney *et al.*, 1998). *Trust* also plays a role on a country's legal institutions and its economy (Carlin *et al.*, 2009). Therefore, it would be interesting to investigate whether cultural dimensions are substitutes or complements to *Trust*, in order to understand their differential influence on TC (supply and demand).

< Insert table 4-7 here >

The remaining three country-level tests are measures of legal rights. The first one of the creditors' rights index (CRI) (Djankov *et al.*, 2007), the second of the measure of the Rule of Law (Law-ICRG) (Porta *et al.*, 1998)[55], and of the third of the strength of legal rights index (LRI) from the World Bank Indicators database[56]. Our results show that none of these measures is significant (see table 4-7) for TC supply variation from 2007 to 2009. However, CRI and Law-ICRG are significant for the variation in 2010, and/or 2012. CRI do not change MAS, UAI, and LTO relationship, which stays as per our main results. When applying Law-ICRG, only UAI keeps its relationship as per the main results. We believe it is due to how Law-ICRG is defined, which measures the level of defined laws in a country. However, our measure of Law-WJP applied in our primary tests measures a country's level of implementation of the legal framework. We expect our choice of the measure for the rule of law from the world justice project (Botero & Ponce, 2011) to be more pertinent in defining firms' real legal environment.

At the sample-level, we perform two tests. First, by removing firms from the USA (see table 4-8) as it is the origin of the 2008 financial crisis (Claessens *et al.*, 2012). The results are conform to our hypotheses H1 and H2 (b, c, d) for TC supply variation from 2007 to 2009. For the years 2010, 2011, and 2012, our results are conform to our main findings of the "normalcy" period post-crisis. Second, we divide our sample in three quartile based on firm's size. Our results show (see table 4-9) that culture

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[55] Porta *et al.* (1998, table 5, p1412).

[56] World Bank Database: https://data.worldbank.org/indicator (measure's earliest available year is 2013)

dimensions have a higher significance in the middle quartile and culture relationship with TC supply variation is as per main results. In the first quartile representing smaller firms, the hypothesis H2a is validated, where firms in more collectivist cultures (low IDV) extend higher TC post-crisis. Therefore, higher IDV results in amplifying financial crisis effects on firms. For the third quartile with the largest firms, hypothesis H2b is validated, as larger firms in more feminist cultures (low MAS) extend higher TC.

< Insert table 4-8 here >

< Insert table 4-9 here >

4.6 Conclusion

Our study highlights the key importance of firms' national culture on the variation of trade credit supply around the 2008 financial crisis. Culture contributes to amplify or stabilize financial crisis effects on firms because TC is considered a substitute to bank credit in firms' short-term financing (Blasio, 2005). Post-crisis short-term financing from banks and financial market decreases (Claessens *et al.*, 2012), leading to an increase of TC's role in short-term financing (Molina & Preve, 2012).

Supplier-customer's relationship is important in TC supply, as it plays an increased role post-crisis in TC contracts negotiations (Wilner, 2000). Culture influences supplier-customer's relationships (Cannon *et al.*, 2010) and TC provisions (El Ghoul & Zheng, 2016). Culture influencing TC contracts negotiations, results in suppliers increasing or decreasing TC supply post-crisis. Therefore, national cultural of the supplier contributes to stabilize or amplify financial crisis negative effects on firms.

We find that suppliers from cultures with low *masculinity*, low *uncertainty avoidance*, and high *long-term orientation* extend higher trade credit *ex-post* than *ex-ante*. It contributes to stabilize the financial crisis negative effects on firms. In contrast, suppliers from cultures with higher *masculinity*, higher *uncertainty avoidance*, and lower *long-term orientation*, provide lower trade credit *ex-post*, resulting in amplifying financial crisis negative effects on firms. These key results are robust despite alternate tests at the firm-level, country-level, and sample-level.

Our study confirms that national culture permeates the firms' financial choices (Williamson, 2000), as culture conditions firms' decisions to extend higher or lower trade credit post-crisis. Our findings highlights culture's heightened role during periods of financial constraints such as a financial crisis, in firm's managing their short-term financing through trade-credit. Culture's stabilizing role on financial crisis' effects is most visible soon after the crisis in 2009. From 2010 or "normalcy" period, as the crisis' effects recedes, culture's influence on TC changes from 2009. The changed relationship's sign of culture and TC supply is in-line with existing literature findings (El Ghoul & Zheng, 2016).

Our findings adds to multiple literature. First, it extends El Ghoul and Zheng (2016) findings on culture and TC provisions by providing a new twist to it around a financial crisis. Second, to the literature looking at customer-supplier's relationships' role in TC management during financially constrained periods (Wilner, 2000; Cannon *et al.*, 2010; Wu *et al.*, 2014; Levine *et al.*, 2018). Third, our study adds culture dimensions as a determinant to the literature on TC's role in short-term financing post-crisis (Campello *et al.*, 2010; Yang, 2011; Claessens *et al.*, 2012; Coulibaly *et al.*, 2013; Carbó-Valverde *et al.*, 2016). Lastly, our paper broadly contributes to the increasing body of knowledge on culture and finance (Guiso *et al.*, 2006; Beracha & Skiba, 2014; Chen *et al.*, 2015; Pan *et al.*, 2017).

Our study confirms that despite globalization, culture's role of the firms' *country-of-origin* is significant in differentiating firms' financial choices (Newman & Nollen, 1996; Noorderhaven & Harzing, 2003). We show that culture influence goes to the extent of even stabilizing the negative effects of the most severe financial crisis since the great depression (Claessens *et al.*, 2013; Atsebi *et al.*, 2019).

The implications of our findings support the view of enabling TC management as a policy matter post a financial crisis (Coulibaly *et al.*, 2013; Psillaki & Eleftheriou, 2015; Atsebi *et al.*, 2019). Multinational companies' managers could in-build the learnings from our study in their TC management processes, which could possibly add to firm's resilience level in the aftermath of a financial crisis (Levine *et al.*, 2018).

Our study offers large scope for future research such as analyzing TC supply changes on a monthly/quarterly (Coulibaly *et al.*, 2013) basis, possibly a quarter after the start of the financial crisis. Another research opportunity could look at culture's influence on the propagation of the financial crisis along the TC chain (Kiyotaki & Moore, 1997). Indeed, firms' inter-linkages (Hertzel *et al.*, 2008) along their supply chain of trade credit (Jacobson & von Schedvin, 2015) could possibly create a systemic risk for the chosen industry sector, in the event of a financial disruption.

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Regressions Tables for Essay 2

Table 4-1: Summary of variables. Essay two.

Dependent, explanatory and key variables of measure for firms' financials, national culture, country's economic development and institutional development.

Variables	Descriptions	Sources
Dependent variable: Variation of Trade Credit		
Δ AR09_07 / TA07	Variation in Trade Credit Supply (Accounts Receivable) from *ex-ante* to *ex-post* / Total Assets *ex-ante*	Levine et al. (2018); Claessens et al. (2012)
Explanatory variables: Hofstede's cultural dimensions		
Individualism (IDV)	Individualism vs. Collectivism (Low IDV	Hofstede et al. (2010)
Masculinity (MAS)	Masculinity vs. Feminity (Low MAS)	Hofstede et al. (2010)
Uncertainty Avoidance (UAI)	Low to High Uncertainty Avoidance	Hofstede et al. (2010)
Long Term Orientation (LTO)	Long Term vs. Short Term Orientation (Low LTO)	Hofstede et al. (2010)
Firm-level control variables		
STD07 / TA07	Firm's short term and current portion of long term debt *ex-ante*	Coulibaly et al (2013)
CAPEX07 / TA07	Firm's level of investment (Growth) *ex-ante*	Claessens et al. (2012)
EBIT07 / TA07	Firm's Profitability Indicator *ex-ante*	Levine et al. (2018); Claessens et al. (2012)
Δ INVT09_07 / TA07	Variation of firm's inventory from *ex-ante* to *ex-post*	Coulibaly et al (2013)
Δ Cash&Eqv09_07 / TA07	Variation of cash & equivalent holding measure (Liquidity Position) from *ex-ante* to *ex-post*	Campello et al. (2010); Claessens et al. (2012)
Δ SALES09_07 / TA07	Varitation in sales from *ex-ante* to *ex-post*	Claessens et al. (2012)
Log (Mkt Cap07)	Firm's size measured by market capitalization *ex-ante*	Coulibaly et al (2013); Levine et al. (2018)
SIC Industry Sector	Manufacturing Sector Firms from SIC code level 1 (2000-3999)	Levine et al. (2018)
Country-level control variables		
Δ GDP09_07 / GDP07	Variation of country's nominal GDP from *ex-ante* to *ex-post*	Coulibaly et al (2013)
Log (GDP per capita)	Measure of Country's wealth	Levine et al. (2018)
Log (Private credit / GDP)	Domestic Credit to Private Sector (as % of GDP)	Claessens et al. (2012)
Legal Rights Index (wjp)	Adherance to the rule of law in practice (World Justice Project)	Botero & Ponce, 2011
Robusteness test variables		
TRUST	"*Most people can be trusted*" from World Values Survey 5	Levine et al. (2018)
CRI	Creditors Rights Protection	Djankov *et al*. (2007); El Ghoul & Zheng (2016)
Law_ICRG	Rule of law Index by International Country risk Guide	La Porta et al. (1998)
LTD07 / TA07	Firm's long term debt level *ex-ante*	Levine et al. (2018)

Table 4-2 : Descriptive Statistics.

Panel A: Descriptive statistics for key variables. Firm-level variables are obtained or computed from Reuters Datastream database for the period 2007-2012, for the manufacturing sector (SIC codes 2000-3999). The Hofstede dimension are VSM2015 obtained from Hofstede website. Variation of GDP is computed from International Monetary Fund's GDP data in local currency, with constant prices. Country-level economic indicators are obtained from World Bank Indicators database 2018. The legal rights index is obtained from the World Justice Project 2017-2018.

Country	N	Δ AR09_07 / TA07	IDV	MAS	UAI	LTO	TSTD07 / TA07	CAPEX07 / TA07	EBIT07 / TA07	Δ INVT09_07 / TA07	Δ Cash&Eqv09_07 / TA07	Δ SALES09_07 / TA07	Log (Mkt Cap07)	Δ GDP09_07 / GDP07	Log (GDP per capita)	Log (Private credit / GDP)	Legal rights index (wjp)
INDIA	170	3.4748	48	56	40	51	10.6700	11.4599	14.9669	2.6136	3.2851	20.7301	12.8628	13.0946	6.9258	3.8334	0.5178
BRAZIL	12	3.0992	38	49	76	44	8.3384	8.9344	16.1117	1.9382	5.6397	8.6598	16.2798	4.3802	8.8975	3.7060	0.5368
CHINA	309	3.0089	20	66	30	87	24.4828	6.2345	6.5251	3.4642	7.1625	6.8496	13.5774	18.2777	7.8993	4.6607	0.4998
MOROCCO	11	2.08	46	53	68	14	15.7191	5.6254	13.1137	2.7038	-1.5446	-1.9945	11.8897	10.8656	7.8218	4.0156	0.5086
ARGENTINA	22	1.6631	46	56	86	20	5.4364	8.1766	12.6808	2.3552	0.6553	2.2133	11.5122	4.0644	8.8809	2.5347	0.5819
ISRAEL	26	1.2701	54	47	81	38	9.3265	5.2972	7.9352	-1.4330	3.8012	2.6822	12.7851	3.9113	10.1222	4.2186	0.4691
AUSTRALIA	26	0.6864	90	61	51	21	7.4737	4.2512	11.1155	1.5943	-3.3856	17.0326	14.1462	-1.8546	10.6211	4.7932	0.8138
ARAB	60	0.4009	38	53	68	23	9.2780	9.0446	13.2176	2.0359	0.2658	5.9635	13.4094	7.9593	10.0512	3.7089	0.6464
VIETNAM	75	-0.1213	20	40	30	57	18.3839	9.1509	11.1503	4.1282	3.0171	9.5544	10.0343	11.0657	6.8039	4.4501	0.5008
INDONESIA	100	-0.1459	14	46	48	62	16.3942	5.0814	9.1075	1.3392	2.3485	14.5392	10.9832	10.2940	7.5884	3.1627	0.5169
AUSTRIA	7	-0.1629	55	79	70	60	6.5264	10.2814	13.1890	1.1500	5.8474	0.2162	15.2336	3.1037	10.7548	4.5283	0.8138
GREECE	10	-0.2398	35	57	100	45	15.1202	6.4446	9.3825	0.2002	-0.6848	-3.6357	13.2257	2.1575	10.2691	4.4356	0.6021
NORWAY	27	-0.3949	69	8	50	35	9.2725	5.4224	-2.0218	2.0500	-2.7176	3.8733	13.2617	0.1848	11.3524	4.5989	0.8877
PHILIPPINES	21	-0.4627	32	64	44	27	9.3728	3.0374	5.6734	-1.0984	-4.1188	-12.0007	11.4760	4.8714	7.4222	3.3626	0.4688
PAKISTAN	120	-0.4966	14	50	70	50	19.0878	6.9943	10.8476	-0.7677	-3.7554	-1.5755	10.2092	4.0443	6.8569	3.3228	0.3918
MALAYSIA	85	-0.8631	26	50	36	41	11.7280	5.4624	11.3723	0.6079	2.4021	2.7359	11.6726	0.8330	8.8914	4.6193	0.5354
UNITED STATES	644	-1.0793	91	62	46	26	3.2756	4.1244	1.1485	-0.5068	2.1047	-6.1513	13.9984	-2.3036	10.7802	4.0837	0.7309
SOUTH KOREA	492	-1.1043	18	39	85	100	13.6646	6.6365	5.9838	-0.1745	1.2659	-2.1418	11.9148	1.2149	10.0459	4.9044	0.7203
THAILAND	146	-1.4251	20	34	64	32	15.1314	5.0608	7.4693	-0.8512	2.5160	-4.6546	10.6680	-0.9537	8.2871	4.4570	0.5045
UNITED KINGDOM	84	-1.6277	89	66	35	51	6.5602	4.6201	11.6573	-0.8817	1.6710	-3.2609	14.2315	-3.6759	10.8225	5.1410	0.8077
TURKEY	37	-1.6309	37	45	85	46	10.2901	7.3678	12.5118	-1.5137	2.6860	-20.9636	13.3051	-5.6610	9.1809	3.3410	0.4167
JAPAN	828	-1.6416	46	95	92	88	9.0478	4.7572	7.2013	2.4253	3.3044	13.2434	13.3353	-6.0367	10.4709	4.5532	0.7858
CHILE	29	-1.6458	23	28	86	31	7.3624	5.9475	9.1220	-1.1902	7.7814	-8.5068	13.2189	1.3730	9.2617	4.2318	0.6655
TAIWAN	489	-2.0144	17	45	69	93	12.4395	5.7565	8.4348	-1.5856	4.3016	-10.6923	12.1297	-4.0759	9.7877	4.0943	0.7681
CANADA	27	-2.0829	80	52	48	36	3.5228	7.0747	7.4062	1.8675	0.2815	-10.4503	14.2895	-2.0745	10.7042	4.8191	0.8097
SWITZERLAND	77	-2.1851	68	70	58	74	6.4869	4.2375	10.7853	-0.5824	1.0852	-5.9622	13.7959	-0.2053	11.0597	5.0566	0.8877
FRANCE	123	-2.6623	71	43	86	63	8.7836	4.3799	7.0799	-1.0488	-1.9329	-8.0674	13.3452	-2.0434	10.6359	4.4839	0.7368
GERMANY	97	-2.7954	67	66	65	83	6.0715	5.4398	7.9888	-1.2057	1.5301	-8.2903	13.6173	-4.1148	10.6410	4.5706	0.8349
DENMARK	37	-2.9169	74	16	23	35	9.6932	6.0831	9.3460	-0.5591	-3.8002	-10.4335	12.9527	-3.6056	10.9766	5.2176	0.8918
SINGAPORE	40	-3.1767	20	48	8	72	11.6085	5.5608	9.3209	-1.1010	4.5772	-7.9041	12.7489	-2.2164	10.5770	4.4521	0.7959
SWEDEN	58	-3.2587	71	5	29	53	7.5164	3.3587	4.9046	-2.5123	-2.0953	-13.3938	12.9708	-4.9754	10.8841	4.7164	0.8634
ITALY	39	-3.4784	76	70	75	61	12.6773	5.4042	7.5021	-1.6055	-0.0374	-14.8342	13.0827	-6.1310	10.5374	4.4041	0.6483
POLAND	62	-3.5327	60	64	93	38	11.5899	8.8650	10.6713	-1.3607	-3.9073	-10.4325	11.8504	5.9118	9.3290	3.6139	0.6707
FINLAND	45	-4.203	63	26	59	38	10.1027	5.5225	10.5713	-2.8799	2.3534	-24.5200	12.9696	-5.3811	10.7849	4.3369	0.8700
BELGIUM	30	-4.3851	75	54	94	82	8.6749	4.8290	11.4718	-1.3883	0.5814	-16.3962	13.2454	-2.2440	10.7011	4.2228	0.7734
IRELAND	6	-4.651	70	68	35	24	2.7873	5.9263	12.6292	-2.5156	1.1324	-30.8100	15.0301	-10.3082	11.0245	5.0625	0.8100
NETHERLANDS	20	-5.1655	80	14	53	67	7.2103	4.5834	13.9780	-3.8143	-2.5646	-25.2261	14.6215	-2.2602	10.8443	4.7402	0.8541
Total	4491	-1.0193	45	59	64	66	10.9303	5.7033	7.3722	0.4147	2.3070	-0.0239	12.8282	0.2706	9.7363	4.3534	0.6952

Panel B: Firm-level summary statistics

Variable	Mean	StdDev	5th Percentile	Median	95th Percentile	N
Δ AR09_07 / TA07	-1.0193	6.3421	-11.4413	-0.9603	9.7919	4491
IDV	45.1490	27.3515	17.0000	46.0000	91.0000	4491
MAS	58.5765	21.3473	34.0000	56.0000	95.0000	4491
UAI	64.4903	22.6235	30.0000	69.0000	92.0000	4491
LTO	66.2704	27.5837	25.6927	73.5516	100.0000	4491
TSTD07 / TA07	10.9303	12.7675	0.0000	7.1023	34.7967	4491
CAPEX07 / TA07	5.7033	5.5829	0.5783	4.0526	16.4919	4491
EBIT07 / TA07	7.3722	24.5996	-5.0776	8.0558	22.7366	4491
Δ INVT09_07 / TA07	0.4147	7.2043	-9.2102	0.0000	10.6976	4491
Δ Cash&Eqv09_07 / TA07	2.3070	16.1151	-14.8168	1.1961	20.3766	4491
Δ SALES09_07 / TA07	-0.0239	33.7266	-51.2176	0.9802	49.0301	4491
log (Mkt Cap07)	12.8282	1.9981	9.7588	12.7356	16.3249	4491
Δ GDP09_07 / GDP07	0.2706	6.9912	-6.0367	-2.3036	18.2777	4491
Log (GDP per capita)	9.7363	1.2593	6.9258	10.1222	10.8443	4491
Log (Private credit /	4.3534	0.4638	3.3228	4.4839	4.9044	4491
Legal rights index (wjp)	0.6952	0.1269	0.4998	0.7309	0.8634	4491
LTD07_TA07_pc	10.7759	13.9965	0.0000	6.6188	35.1782	4488
TRUST	34.1431	11.4200	18.1000	36.6000	51.2000	4134
CRI	1.9003	0.8036	1.0000	2.0000	3.0000	4483
Law_ICRG	7.8928	2.1310	3.4120	8.5335	10.0000	3974

Panel C: Correlation matrix with firm-level observations

	Δ AR09_07 / TA07	IDV	MAS	UAI	LTO	TSTD07 / TA07	CAPEX07 / TA07	EBIT07 / TA07	Δ INVT09_07 / TA07	Δ Cash&Eqv09_07 / TA07	Δ SALES09_07 / TA07	Log (Mkt Cap07)	Δ GDP09_07 / GDP07	Log (GDP per capita)	Log (Private credit / GDP)	Legal rights index (wjp)
Δ AR09_07 / TA07	1															
IDV	-0.0654***	1														
MAS	0.0177	0.218***	1													
UAI	-0.118***	-0.202***	0.333***	1												
LTO	-0.0158	-0.615***	0.202***	0.475***	1											
TSTD07 / TA07	0.000238	-0.338***	-0.0827***	-0.0553***	0.190***	1										
CAPEX07 / TA07	0.0865***	-0.122***	-0.0715***	-0.0259	0.0197	0.0329*	1									
EBIT07 / TA07	0.00773	-0.0580***	-0.0109	0.00849	0.0217	-0.0710***	0.0755***	1								
Δ INVT09_07 / TA07	0.312***	-0.0448**	0.146***	-0.00394	0.0529***	-0.0359*	0.0749***	-0.00323	1							
Δ Cash&Eqv09_07 / TA07	0.0277	-0.0488**	0.0473**	-0.0249	0.0566***	0.0218	0.0345*	0.0820***	0.0203	1						
Δ SALES09_07 / TA07	0.507***	-0.0560***	0.183***	0.0373*	0.0680***	-0.0130	0.0889***	0.00908	0.440***	0.127***	1					
log (Mkt Cap07)	0.0598***	0.393***	0.249***	-0.0723***	-0.0908***	-0.220***	0.0267	0.150***	0.0794***	0.0470**	0.0653***	1				
Δ GDP09_07 / GDP07	0.229***	-0.339***	-0.207***	-0.512***	-0.0469**	0.287***	0.170***	0.0356*	0.113***	0.0360*	0.0944***	-0.0989***	1			
Log (GDP per capita)	-0.186***	0.580***	0.203***	0.325***	0.0194	-0.309***	-0.194***	-0.0698***	-0.0896***	-0.0268	-0.103***	0.319***	-0.763***	1		
Log (Private credit / GDP)	-0.0435**	0.00613	0.0725***	0.0885***	0.439***	0.0261	-0.0694***	-0.0201	0.0313*	0.0195	0.0118	0.132***	-0.153***	0.404***	1	
Legal rights index (wjp)	-0.186***	0.421***	0.188***	0.320***	0.232***	-0.266***	-0.145***	-0.0410**	-0.0712***	-0.0165	-0.0713***	0.256***	-0.734***	0.890***	0.442***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4-3: Culture and trade credit variation from 2007 to 2009. Baseline model.

Regression results for dependent variable of the Variation in Trade Credit Supply from 2007 to 2009 for firms in the manufacturing sector (SIC code : 2000-3999), including four Hofstede cultural dimensions, seven firm-level control variables, and four country-level control variables. The Hofstede dimensions are VSM2015 obtained from Hofstede website. Variation of GDP is computed from International Monetary Fund's GDP data in local currency, with constant prices. Country-level economic indicators are obtained from World Bank Indicators database 2018. The legal rights index is obtained from the World Justice Project 2017-2018. The firm-level dependent variable is computed as Accounts Receivable Variation from 2007 to 2009 divided by the book value of Total Assets measured in 2007. Financial data is obtained from the datastream database.

	Δ AR09_07 / TA07	Δ AR09_07 / TA07	Δ AR09_07 / TA07	Δ AR09_07 / TA07	Δ AR09_07 / TA07	Δ AR09_07 / TA07
Hofstede Cultural Dimensions						
Individualism (IDV)		-0.0020				0.0024
		(-0.4728)				(0.3345)
Masculinity (MAS)			-0.0168***			-0.0155***
			(-4.2081)			(-3.1624)
Uncertainty Avoidance (UAI)				-0.0152***		-0.0189***
				(-3.6345)		(-3.4052)
Long Term Orientation (LTO)					-0.0022	0.0138**
					(-0.5853)	(2.0127)
Firm-Level Control Variables						
TSTD07 / TA07	-0.0175***	-0.0181***	-0.0168**	-0.0155**	-0.0169**	-0.0179***
	(-2.6067)	(-2.6486)	(-2.4929)	(-2.2982)	(-2.4723)	(-2.6223)
CAPEX07 / TA07	0.0120	0.0118	0.0080	0.0156	0.0121	0.0127
	(0.8242)	(0.8088)	(0.5475)	(1.0668)	(0.8267)	(0.8693)
EBIT07 / TA07	-0.0022	-0.0022	-0.0027	-0.0015	-0.0021	-0.0020
	(-0.6495)	(-0.6769)	(-0.8051)	(-0.4571)	(-0.6342)	(-0.6139)
Δ INVT09_07 / TA07	0.0785***	0.0784***	0.0830***	0.0800***	0.0787***	0.0831***
	(6.3647)	(6.3552)	(6.7142)	(6.4891)	(6.3795)	(6.7299)
Δ Cash&Eqv09_07 / TA07	-0.0149***	-0.0150***	-0.0143***	-0.0153***	-0.0148***	-0.0156***
	(-3.0022)	(-3.0203)	(-2.8835)	(-3.0824)	(-2.9721)	(-3.1236)
Δ SALES09_07 / TA07	0.0851***	0.0851***	0.0867***	0.0859***	0.0851***	0.0873***
	(32.1194)	(32.1197)	(32.4506)	(32.3550)	(32.1192)	(32.6367)
log (Mkt Cap07)	0.1308***	0.1355***	0.1717***	0.1116**	0.1290***	0.1500***
	(2.9230)	(2.9554)	(3.7578)	(2.4816)	(2.8782)	(3.1991)
Country-Level Control Variables						
Δ GDP09_07 / GDP07	0.1494***	0.1515***	0.1380***	0.1179***	0.1483***	0.1043***
	(7.7173)	(7.6268)	(7.0672)	(5.5650)	(7.6207)	(4.6873)
Log (GDP per capita)	0.2861*	0.3290*	0.2812*	0.2782*	0.2433	0.4919**
	(1.7965)	(1.7947)	(1.7691)	(1.7488)	(1.3882)	(2.5416)
Log (Private credit / GDP)	-0.1694	-0.2011	-0.1633	-0.1293	-0.1141	-0.4273*
	(-0.8338)	(-0.9399)	(-0.8053)	(-0.6361)	(-0.5093)	(-1.8372)
Legal Rights Index (wjp)	-4.5337***	-4.6350***	-4.5588***	-4.7545***	-4.1536***	-7.1293***
	(-3.1334)	(-3.1686)	(-3.1566)	(-3.2876)	(-2.6189)	(-4.0453)
Intercept	-1.4904	-1.6651	-0.9753	-0.2472	-1.4206	0.2990
	(-1.3660)	(-1.4454)	(-0.8899)	(-0.2164)	(-1.2942)	(0.2396)
N Countries	37	37	37	37	37	37
N Firms	4.491	4.491	4.491	4.491	4.491	4.491
R2	0.3040	0.3040	0.3067	0.3060	0.3040	0.3087
Adjusted R2	0.302	0.302	0.305	0.304	0.302	0.306

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 4-4: Culture and trade credit variation from ex-ante in 2007 to ex-post in 2010, 2011, and 2012.

Regression results for dependent variables of the Variation in Trade Credit Supply from 2007 to 2010, 2011, and 2012 for firms in the manufacturing industries sector (SIC code 2000-3999), including four Hofstede cultural dimensions, seven firm-level control variables, and seven country-level control variables. The Hofstede dimensions are VSM2015 obtained from Hofstede website. Variation of GDP is computed from International Monetary Fund's GDP data in local currency, with constant prices. The GDP per capita and the private credit to GDP variables measures for 2007 are obtained from the world bank indicators data and the rule of law variable measure is from the world law project 2017-2018. The firm-level dependent variable is computed as the Accounts Receivable Variation divided by the book value of Total Assets measured in 2007. Finacial dats is obtained from the Datastream database.

	Δ AR10_07 / TA07	Δ AR10_07 / TA07	Δ AR11_07 / TA07	Δ AR11_07 / TA07	Δ AR12_07 / TA07	Δ AR12_07 / TA07
Hofstede Cultural Dimensions						
Individualism (IDV)		-0.0205**		-0.0200**		-0.0558***
		(-2.4443)		(-2.0086)		(-5.0115)
Masculinity (MAS)		0.0385***		0.0356***		0.0476***
		(6.6998)		(5.1781)		(6.2240)
Uncertainty Avoidance (UAI)		0.0048		0.0122		-0.0024
		(0.6990)		(1.4711)		(-0.2505)
Long Term Orientation (LTO)		-0.0166**		-0.0064		-0.0263**
		(-2.0202)		(-0.6463)		(-2.3298)
Firm-Level Control Variables						
TSTD07 / TA07	-0.0174**	-0.0197**	-0.0045	-0.0104	-0.0075	-0.0155
	(-2.1674)	(-2.4366)	(-0.4682)	(-1.0742)	(-0.6954)	(-1.4220)
CAPEX07 / TA07	0.0588***	0.0642***	0.0437**	0.0475**	0.0188	0.0243
	(3.3792)	(3.6841)	(2.1022)	(2.2791)	(0.8005)	(1.0363)
EBIT07 / TA07	-0.0196***	-0.0194***	0.0075	0.0064	0.0002	-0.0028
	(-4.8832)	(-4.8537)	(1.3487)	(1.1525)	(0.0260)	(-0.3895)
Δ INVTyy_07 / TA07	0.0710***	0.0679***	0.0573***	0.0570***	0.0752***	0.0730***
	(5.8670)	(5.6338)	(5.1975)	(5.2014)	(6.7562)	(6.5944)
Δ Cash&Eqvyy_07 / TA07	-0.0069	-0.0092**	0.0043	0.0031	0.0020	-0.0002
	(-1.4993)	(-1.9847)	(1.2234)	(0.8929)	(0.4160)	(-0.0452)
Δ SALESyy_07 / TA07	0.0996***	0.0986***	0.0972***	0.0954***	0.0930***	0.0934***
	(36.7492)	(36.5190)	(37.6541)	(36.9387)	(36.2970)	(36.6644)
Log (Mkt Cap07)	0.1203**	0.0661	0.0404	0.0167	-0.0247	-0.0167
	(2.2600)	(1.1816)	(0.6349)	(0.2494)	(-0.3439)	(-0.2211)
Country-Level Control Variables						
Δ GDPyy_07 / GDP07	0.0544***	0.0863***	0.1081***	0.1362***	0.0987***	0.1167***
	(3.1192)	(4.2886)	(6.7033)	(7.2288)	(6.6067)	(6.5053)
Log (GDP per capita 07)	0.0068	0.1487	0.5029**	0.8087***	0.5474**	1.1990***
	(0.0352)	(0.6562)	(2.1817)	(3.0184)	(2.0775)	(3.9769)
Log (Private credit07)	0.4967**	0.5508**	0.5091*	0.3067	0.9787***	0.7698**
	(2.0299)	(2.0028)	(1.7221)	(0.9340)	(2.9045)	(2.0810)
Legal Rights Index (wjp)	0.0068	1.7091	2.5144	2.2213	-0.2817	0.6118
	(0.0040)	(0.8114)	(1.2297)	(0.8742)	(-0.1225)	(0.2123)
Intercept	-3.5465***	-6.2611***	-9.5944***	-12.8314***	-9.1529***	-13.8118***
	(-2.6665)	(-4.1788)	(-6.0342)	(-7.1682)	(-5.0542)	(-6.7068)
N Countries	37	37	37	37	37	37
N firms	4.491	4.491	4.491	4.491	4.489	4.489
R2	0.3597	0.3678	0.3777	0.3855	0.3968	0.4051
Adjusted R2	0.358	0.366	0.376	0.383	0.395	0.403

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 4-5: Firm-level robustness tests with LTD07/TA07 instead of TSTD07/TA07.

Robustness test at firm-level, applying LTD07/TA07 instead of STD07/TA07. Regression results for dependent variables of the Variation in Trade Credit Supply from 2007 to 2009, 2010, 2011, 2012 for firms in the manufacturing sector (SIC code : 2000-3999), including four Hofstede cultural dimensions, seven firm-level control variables, and four country-level control variables, as per the baseline model.

	Δ AR09_07 / TA07	Δ AR10_07 / TA07	Δ AR11_07 / TA07	Δ AR12_07 / TA07
Hofstede Cultural Dimensions				
Individualism (IDV)	0.0050	-0.0186**	-0.0151	-0.0530***
	(0.6891)	(-2.1950)	(-1.5104)	(-4.7386)
Masculinity (MAS)	-0.0167***	0.0374***	0.0328***	0.0461***
	(-3.3903)	(6.4747)	(4.7465)	(5.9993)
Uncertainty Avoidance (UAI)	-0.0193***	0.0051	0.0118	-0.0022
	(-3.4979)	(0.7518)	(1.4352)	(-0.2377)
Long Term Orientation (LTO)	0.0134**	-0.0175**	-0.0050	-0.0254**
	(1.9665)	(-2.1350)	(-0.5098)	(-2.2670)
Firm-Level Control Variables				
LTD07 / TA07	-0.0075	0.0005	-0.0121	-0.0006
	(-1.2574)	(0.0652)	(-1.3860)	(-0.0613)
CAPEX07 / TA07	0.0161	0.0604***	0.0493**	0.0195
	(1.1049)	(3.4825)	(2.3834)	(0.8379)
EBIT07 / TA07	-0.0014	-0.0185***	0.0066	-0.0025
	(-0.4252)	(-4.6058)	(1.2001)	(-0.3549)
Δ INVTyy_07 / TA07	0.0862***	0.0695***	0.0589***	0.0768***
	(6.9773)	(5.7564)	(5.3814)	(6.9512)
Δ Cash&Eqvyy_07 / TA07	-0.0152***	-0.0085*	0.0044	-0.0000
	(-3.0748)	(-1.8161)	(1.2134)	(-0.0002)
Δ SALESyy_07 / TA07	0.0874***	0.0990***	0.0953***	0.0932***
	(32.7183)	(36.6936)	(36.9666)	(36.7400)
Log (Mkt Cap07)	0.1615***	0.0740	0.0235	-0.0127
	(3.4583)	(1.3276)	(0.3530)	(-0.1687)
Country-Level Control Variables				
Δ GDPyy_07 / GDP07	0.0968***	0.0819***	0.1321***	0.1139***
	(4.3756)	(4.0824)	(7.0524)	(6.3880)
Log (GDP per capita07)	0.5086***	0.1328	0.7671***	1.2034***
	(2.6426)	(0.5884)	(2.8830)	(4.0185)
Log (Private credit 07/ GDP07)	-0.4738**	0.5515**	0.2811	0.7620**
	(-2.0423)	(2.0078)	(0.8594)	(2.0673)
Legal Rights Index (wjp)	-7.0258***	2.1744	2.4234	0.7728
	(-4.0086)	(1.0368)	(0.9604)	(0.2700)
Constant	-0.0058	-6.7270***	-12.6373***	-14.2068***
	(-0.0047)	(-4.4956)	(-7.0814)	(-6.9147)
N Countries	37	37	37	37
N Firms	4.536	4.536	4.536	4.534
R-squared	0.3056	0.3656	0.3847	0.4045
r2_a	0.303	0.364	0.383	0.403

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4-6: Firm-level robustness tests with TSTD07/TA07 and LTD07/TA07.

Robustness test at firm-level, applying both STD07/TA07 and LTS07/TA07. Regression results for dependent variables of the Variation in Trade Credit Supply from 2007 to 2009, 2010, 2011, 2012 for firms in the manufacturing sector (SIC code : 2000-3999), including four Hofstede cultural dimensions, seven firm-level control variables, and four country-level control variables, as per the baseline model.

	Δ AR09_07 / TA07	Δ AR10_07 / TA07	Δ AR11_07 / TA07	Δ AR12_07 / TA07
Hofstede Cultural Dimensions				
Individualism (IDV)	0.0036	-0.0209**	-0.0178*	-0.0560***
	(0.4981)	(-2.4576)	(-1.7649)	(-4.9720)
Masculinity (MAS)	-0.0162***	0.0387***	0.0344***	0.0477***
	(-3.2664)	(6.6789)	(4.9703)	(6.1914)
Uncertainty Avoidance (UAI)	-0.0188***	0.0048	0.0122	-0.0023
	(-3.3944)	(0.6998)	(1.4776)	(-0.2431)
Long Term Orientation (LTO)	0.0140**	-0.0167**	-0.0060	-0.0263**
	(2.0388)	(-2.0267)	(-0.6054)	(-2.3316)
Firm-Level Control Variables				
TSTD07 / TA07	-0.0171**	-0.0200**	-0.0090	-0.0156
	(-2.4872)	(-2.4488)	(-0.9217)	(-1.4228)
LTD07 / TA07	-0.0063	0.0020	-0.0113	0.0014
	(-1.0400)	(0.2698)	(-1.2809)	(0.1408)
CAPEX07 / TA07	0.0149	0.0636***	0.0513**	0.0239
	(1.0043)	(3.6069)	(2.4355)	(1.0088)
EBIT07 / TA07	-0.0025	-0.0193***	0.0064	-0.0027
	(-0.7489)	(-4.7936)	(1.1639)	(-0.3784)
Δ INVTyy_07 / TA07	0.0839***	0.0681***	0.0564***	0.0731***
	(6.7764)	(5.6415)	(5.1375)	(6.5945)
Δ Cash&Eqvyy_07 / TA07	-0.0155***	-0.0094**	0.0042	-0.0002
	(-3.1039)	(-2.0034)	(1.1705)	(-0.0492)
Δ SALESyy_07 / TA07	0.0872***	0.0986***	0.0953***	0.0934***
	(32.5998)	(36.5019)	(36.8724)	(36.6503)
Log (Mkt Cap07)	0.1541***	0.0648	0.0225	-0.0170
	(3.2732)	(1.1545)	(0.3353)	(-0.2244)
Country-Level Control Variables				
Δ GDPyy_07 / GDP07	0.1028***	0.0866***	0.1346***	0.1168***
	(4.6068)	(4.2934)	(7.1296)	(6.4950)
Log (GDP per capita07)	0.4821**	0.1508	0.7915***	1.1991***
	(2.4866)	(0.6640)	(2.9490)	(3.9703)
Log (Private credit 07/ GDP07)	-0.4400*	0.5551**	0.2869	0.7745**
	(-1.8882)	(2.0151)	(0.8722)	(2.0902)
Legal Rights Index (wjp)	-7.1664***	1.7282	2.1343	0.6353
	(-4.0635)	(0.8199)	(0.8394)	(0.2203)
Constant	0.4393	-6.3043***	-12.5583***	-13.8558***
	(0.3494)	(-4.1751)	(-6.9577)	(-6.6748)
N Countries	37	37	37	37
N Firms	4.488	4.488	4.488	4.486
R-squared	0.3088	0.3679	0.3857	0.4051
r2_a	0.306	0.366	0.384	0.403

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4-7: Country-level robustness tests with Trust, Creditors' Rights Index, and Rule of Law (La Porta et al., 1998).

Robusrtness test with TRUST, Creditors Rights Index, and the Rule of Law. The dependent variables are the Variation of Trade Credit Supply from 2007 to 2009, 2010, 2011, 2012, including the main control variables at the firm and country-level, identical to the baseline model.

	TRUST (Levine et al., 2018)				Creditors Rights Index (Djankov et al., 2007)				Rule of Law (La Porta et al., 1998)			
	Δ AR09_07 / TA07	Δ AR10_07 / TA07	Δ AR11_07 / TA07	Δ AR12_07 / TA07	Δ AR09_07 / TA07	Δ AR10_07 / TA07	Δ AR11_07 / TA07	Δ AR12_07 / TA07	Δ AR09_07 / TA07	Δ AR10_07 / TA07	Δ AR11_07 / TA07	Δ AR12_07 / TA07
Hofstede Cultural Dimensions												
Individualism (IDV)	-0.0131	-0.0276**	-0.0169	-0.0665***	0.0001	-0.0207**	-0.0173*	-0.0592***	-0.0003	-0.0283***	-0.0325***	-0.0671***
	(-1.3404)	(-2.4605)	(-1.2903)	(-4.5957)	(0.0169)	(-2.3673)	(-1.6681)	(-5.0980)	(-0.0410)	(-3.0858)	(-3.0636)	(-5.8001)
Masculinity (MAS)	-0.0092	0.0399***	0.0344***	0.0482***	-0.0147***	0.0390***	0.0359***	0.0484***	-0.0215***	0.0385***	0.0468***	0.0509***
	(-1.5898)	(5.9601)	(4.3299)	(5.4401)	(-2.9870)	(6.7638)	(5.2025)	(6.3068)	(-3.9131)	(6.0573)	(6.1504)	(6.0663)
Uncertainty Avoidance (UAI)	-0.0307***	0.0135	0.0291***	0.0178	-0.0183***	0.0062	0.0153*	-0.0027	-0.0067	0.0133	0.0121	0.0076
	(-4.4631)	(1.6141)	(2.8828)	(1.5220)	(-3.2622)	(0.8965)	(1.8297)	(-0.2843)	(-0.9721)	(1.6165)	(1.2264)	(0.6886)
Long Term Orientation (LTO)	0.0043	-0.0247**	-0.0134	-0.0432***	0.0116*	-0.0192**	-0.0103	-0.0278**	0.0035	-0.0305***	-0.0273**	-0.0552***
	(0.4909)	(-2.3220)	(-1.0522)	(-2.9982)	(1.6662)	(-2.2989)	(-1.0253)	(-2.4301)	(0.3936)	(-2.8927)	(-2.1671)	(-3.9367)
Firm-Level Control Variables												
TSTD07 / TA07	-0.0189***	-0.0225***	-0.0110	-0.0159	-0.0183***	-0.0199**	-0.0101	-0.0163	-0.0311***	-0.0216**	-0.0173	-0.0075
	(-2.6448)	(-2.6609)	(-1.0938)	(-1.3929)	(-2.6767)	(-2.4579)	(-1.0488)	(-1.4911)	(-3.9840)	(-2.3685)	(-1.5906)	(-0.6222)
CAPEX07 / TA07	0.0181	0.0852***	0.0576***	0.0445*	0.0128	0.0632***	0.0442**	0.0255	0.0205	0.0785***	0.0511**	0.0245
	(1.1502)	(4.5759)	(2.5926)	(1.7721)	(0.8717)	(3.6078)	(2.1112)	(1.0813)	(1.2963)	(4.2228)	(2.3080)	(0.9964)
EBIT07 / TA07	-0.0023	-0.0199***	0.0058	-0.0023	-0.0019	-0.0195***	0.0061	-0.0026	-0.0015	-0.0193***	0.0065	-0.0018
	(-0.6763)	(-4.9589)	(1.0391)	(-0.3169)	(-0.5844)	(-4.8590)	(1.1117)	(-0.3620)	(-0.4513)	(-5.0284)	(1.2339)	(-0.2660)
Δ INVTyy_07 / TA07	0.0914***	0.0650***	0.0586***	0.0716***	0.0844***	0.0685***	0.0579***	0.0729***	0.1016***	0.0933***	0.1035***	0.1128***
	(7.0059)	(5.1531)	(5.0594)	(6.2957)	(6.8274)	(5.6834)	(5.2846)	(6.5863)	(7.2774)	(6.8444)	(7.8484)	(8.5399)
Δ Cash&Eqvyy_07 / TA07	-0.0142***	-0.0088*	0.0028	0.0002	-0.0158***	-0.0093**	0.0031	-0.0002	-0.0142***	-0.0070	0.0038	0.0005
	(-2.7993)	(-1.8704)	(0.7972)	(0.0315)	(-3.1724)	(-1.9973)	(0.8783)	(-0.0480)	(-2.8098)	(-1.5300)	(1.1069)	(0.1022)
Δ SALESyy_07 / TA07	0.0879***	0.1004***	0.0990***	0.0952***	0.0869***	0.0983***	0.0951***	0.0932***	0.0905***	0.1008***	0.0955***	0.0961***
	(31.5015)	(35.8014)	(36.6606)	(36.1696)	(32.4751)	(36.3591)	(36.8199)	(36.5437)	(32.3676)	(35.6142)	(34.2047)	(34.7837)
Log (Mkt Cap07)	0.1439***	0.0552	-0.0244	-0.0213	0.1485***	0.0655	0.0171	-0.0170	0.1149**	0.0673	0.0234	-0.0040
	(2.9321)	(0.9468)	(-0.3495)	(-0.2699)	(3.1673)	(1.1711)	(0.2553)	(-0.2248)	(2.4125)	(1.2067)	(0.3525)	(-0.0545)
Country-Level Control Variables												
Δ GDPyy_07 / GDP07	0.1388***	0.1108***	0.1713***	0.1524***	0.1119***	0.0924***	0.1431***	0.1184***	0.1076**	0.1121***	0.1814***	0.0974***
	(4.7136)	(3.9002)	(6.4720)	(6.2477)	(4.9478)	(4.5324)	(7.5195)	(6.5314)	(2.4373)	(2.7421)	(4.8927)	(2.9229)
Log (GDP per capita07)	0.7898***	0.4157	1.0153***	1.6749***	0.5473***	0.1757	0.8047***	1.2605***	0.2759	0.2239	1.3150***	1.2780***
	(3.3252)	(1.5075)	(3.1696)	(4.6691)	(2.7839)	(0.7646)	(2.9644)	(4.1256)	(1.1694)	(0.8029)	(4.0452)	(3.5213)
Log (Private credit 07/ GDP07)	-0.3796	0.3155	0.1617	0.5402	-0.4521*	0.4509	0.0630	0.8252**	-0.4806*	0.4705	0.1006	0.2818
	(-1.4819)	(1.0438)	(0.4488)	(1.3268)	(-1.8297)	(1.5417)	(0.1806)	(2.0966)	(-1.8868)	(1.5771)	(0.2849)	(0.7216)
Legal Rights Index (wjp)	-5.0111**	0.7589	1.8551	0.1896	-7.0468***	1.8993	2.6615	0.5157	-4.7963*	3.7927	7.0508*	9.0557**
	(-2.3995)	(0.2987)	(0.6026)	(0.0543)	(-3.9871)	(0.8987)	(1.0443)	(0.1784)	(-1.7825)	(1.2259)	(1.9519)	(2.2768)
TRUST	-0.0213**	0.0046	-0.0145	0.0152								
	(-2.2695)	(0.4141)	(-1.0873)	(1.0182)								
Creditors Rights Index					0.0195	0.1402	0.3570**	-0.0939				
					(0.1541)	(0.9296)	(1.9856)	(-0.4643)				
Law-ICRG									0.0565	0.0042	-0.3220*	-0.3665*
									(0.3847)	(0.0259)	(-1.7505)	(-1.8646)
Intercept	-1.7603	-7.1021***	-14.0028***	-17.8733***	-0.0329	-6.4259***	-12.8301***	-14.1810***	1.4603	-7.6471***	-16.9604***	-14.3978***
	(-1.0563)	(-3.3969)	(-5.6282)	(-6.2690)	(-0.0260)	(-4.2402)	(-7.0978)	(-6.8172)	(0.9014)	(-3.7426)	(-6.9681)	(-5.1803)
N Countries	27	27	27	27	37	37	37	37	32	32	32	32
N firms	4.134	4.134	4.134	4.132	4.483	4.483	4.483	4.481	3.974	3.974	3.974	3.972
R2	0.3154	0.3797	0.4029	0.4172	0.3091	0.3677	0.3858	0.4050	0.3235	0.3955	0.4016	0.4254
Adjusted R2	0.313	0.377	0.401	0.415	0.307	0.365	0.384	0.403	0.321	0.393	0.399	0.423

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 4-8: Sample-level robustness test, excluding firms from the USA.

Sample-level, excluding firms from USA, regression results for dependent variables of the Variation in Trade Credit Supply from 2007 to 2009 for firms in the manufacturing sector (SIC code : 2000-3999), including four Hofstede cultural dimensions, seven firm-level control variables, and four country-level control variables, as in the baseline model.

	Δ AR09_07 / TA07	Δ AR10_07 / TA07	Δ AR11_07 / TA07	Δ AR12_07 / TA07
Hofstede Cultural Dimensions				
Individualism (IDV)	-0.0047	-0.0263***	-0.0214**	-0.0589***
	(-0.6110)	(-2.9369)	(-2.0008)	(-4.9636)
Masculinity (MAS)	-0.0176***	0.0386***	0.0351***	0.0490***
	(-3.4254)	(6.4479)	(4.8363)	(6.1447)
Uncertainty Avoidance (UAI)	-0.0135**	0.0095	0.0136	-0.0017
	(-2.1558)	(1.2442)	(1.4762)	(-0.1644)
Long Term Orientation (LTO)	0.0130*	-0.0168**	-0.0058	-0.0249**
	(1.8312)	(-1.9730)	(-0.5616)	(-2.1394)
Firm-Level Control Variables				
TSTD07 / TA07	-0.0142*	-0.0135	-0.0048	-0.0173
	(-1.9244)	(-1.5439)	(-0.4585)	(-1.4758)
CAPEX07 / TA07	0.0136	0.0691***	0.0562**	0.0459*
	(0.8667)	(3.7039)	(2.5048)	(1.8321)
EBIT07 / TA07	-0.0036	0.0089	0.0304**	0.0015
	(-0.3745)	(0.7773)	(2.1955)	(0.1000)
Δ INVTyy_07 / TA07	0.0776***	0.0495***	0.0409***	0.0549***
	(5.7322)	(3.8393)	(3.4747)	(4.5993)
Δ Cash&Eqvyy_07 / TA07	-0.0371***	-0.0195***	0.0022	-0.0099
	(-4.8299)	(-2.6236)	(0.2835)	(-1.2634)
Δ SALESyy_07 / TA07	0.0924***	0.1034***	0.0990***	0.0996***
	(30.2309)	(34.2421)	(33.8245)	(34.5898)
Log (Mkt Cap07)	0.2120***	0.0658	-0.0028	-0.0458
	(3.9086)	(1.0203)	(-0.0363)	(-0.5265)
Country-Level Control Variables				
Δ GDPyy_07 / GDP07	0.0994***	0.0862***	0.1364***	0.1157***
	(4.3104)	(4.1447)	(6.9354)	(6.2031)
Log (GDP per capita07)	0.2238	-0.0249	0.7872**	1.1224***
	(0.9883)	(-0.0933)	(2.4648)	(3.1391)
Log (Private credit 07/ GDP07)	-0.1775	0.8200***	0.4017	0.9021**
	(-0.6785)	(2.6519)	(1.0771)	(2.1580)
Legal Rights Index (wjp)	-5.3995***	3.1419	2.5668	1.2890
	(-2.7705)	(1.3592)	(0.9203)	(0.4115)
Intercept	-0.1684	-7.2209***	-13.4338***	-14.0399***
	(-0.1286)	(-4.6147)	(-7.1271)	(-6.5297)
N Countries	36	36	36	36
N firms	3.847	3.847	3.847	3.846
R2	0.3100	0.3653	0.3765	0.4023
Adjusted R2	0.307	0.363	0.374	0.400

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 4-9: Sample-level robustness tests with sample divided by quartile of firm's size (MCAP07).

Robustness test at the sample-level, with three quartiles. The dependent variable is the Variation of Trade Credit Supply from 2007 to 2009, 2010, 2011, 2012. Other control variables are as in the baseline model.

	Q1				Q2				Q3			
	Δ AR09_07 / TA07	Δ AR10_07 / TA07	Δ AR11_07 / TA07	Δ AR12_07 / TA07	Δ AR09_07 / TA07	Δ AR10_07 / TA07	Δ AR11_07 / TA07	Δ AR12_07 / TA07	Δ AR09_07 / TA07	Δ AR10_07 / TA07	Δ AR11_07 / TA07	Δ AR12_07 / TA07
Hofstede Cultural Dimensions												
Individualism (IDV)	-0.0246*	-0.0585***	-0.0660***	-0.0909***	0.0214	0.0112	0.0145	-0.0344*	0.0117	-0.0037	-0.0094	-0.0377**
	(-1.8243)	(-3.7430)	(-3.5628)	(-4.3967)	(1.6052)	(0.7326)	(0.8216)	(-1.7500)	(1.1247)	(-0.2835)	(-0.5916)	(-2.1017)
Masculinity (MAS)	-0.0001	0.0507***	0.0514***	0.0471***	-0.0182**	0.0365***	0.0376***	0.0540***	-0.0298***	0.0296***	0.0225**	0.0411***
	(-0.0051)	(4.3561)	(3.6682)	(3.0039)	(-1.9890)	(3.5174)	(3.0699)	(4.0125)	(-4.2164)	(3.4046)	(2.1314)	(3.4867)
Uncertainty Avoidance (UAI)	-0.0108	-0.0015	0.0064	0.0240	-0.0329***	0.0056	0.0192	-0.0319*	-0.0088	0.0176	0.0127	-0.0140
	(-1.0643)	(-0.1195)	(0.4345)	(1.4437)	(-3.0682)	(0.4339)	(1.2473)	(-1.8031)	(-1.0032)	(1.5529)	(0.9119)	(-0.8575)
Long Term Orientation (LTO)	-0.0153	-0.0499***	-0.0442**	-0.0803***	0.0376***	0.0161	0.0219	0.0169	0.0110	-0.0188	-0.0111	-0.0053
	(-1.1855)	(-3.2371)	(-2.3797)	(-3.8345)	(2.8490)	(1.0509)	(1.2191)	(0.8344)	(1.0211)	(-1.4002)	(-0.6867)	(-0.2882)
Firm-Level Control Variables												
TSTD07 / TA07	-0.0076	-0.0217*	-0.0017	-0.0064	-0.0336**	-0.0200	-0.0395**	-0.0440**	-0.0256*	0.0111	0.0502**	0.0495**
	(-0.7564)	(-1.8151)	(-0.1196)	(-0.3996)	(-2.4752)	(-1.2791)	(-2.1721)	(-2.1620)	(-1.7405)	(0.6064)	(2.2663)	(1.9767)
CAPEX07 / TA07	0.0223	0.0725**	0.0596*	0.0410	-0.0023	0.0503	0.0316	0.0473	0.0213	0.0529*	0.0240	-0.0500
	(0.9287)	(2.5246)	(1.7295)	(1.0601)	(-0.0822)	(1.5351)	(0.8265)	(1.1061)	(0.8845)	(1.7581)	(0.6583)	(-1.2132)
EBIT07 / TA07	-0.0030	-0.0213***	0.0029	-0.0051	0.0162	0.0207	0.0451**	0.0230	-0.0354***	-0.0203	-0.0104	-0.0054
	(-0.7667)	(-4.3976)	(0.4073)	(-0.4945)	(1.2335)	(1.3778)	(2.5725)	(1.1686)	(-2.6002)	(-1.1925)	(-0.5068)	(-0.2309)
Δ INVTyy_07 / TA07	0.0562***	0.0738***	0.0637***	0.0808***	0.1129***	0.0418**	0.0290	0.0335*	0.0940***	0.1024***	0.0918***	0.1136***
	(2.8391)	(3.5975)	(3.6570)	(4.2307)	(5.2747)	(2.1703)	(1.5165)	(1.8546)	(3.8035)	(4.2387)	(4.1703)	(5.5167)
Δ Cash&Eqvyy_07 / TA07	-0.0105	-0.0044	0.0023	-0.0001	-0.0184*	-0.0279***	-0.0119	-0.0150	-0.0324***	-0.0144	0.0190*	0.0146
	(-1.4393)	(-0.6813)	(0.5157)	(-0.0163)	(-1.8435)	(-2.6915)	(-1.1505)	(-1.3408)	(-3.2023)	(-1.3830)	(1.7650)	(1.3099)
Δ SALESyy_07 / TA07	0.0916***	0.0961***	0.0950***	0.0993***	0.0759***	0.1063***	0.1065***	0.1046***	0.0970***	0.0956***	0.0835***	0.0693***
	(21.2610)	(21.7492)	(22.8008)	(23.5495)	(15.3940)	(21.1577)	(22.0357)	(22.0793)	(19.9876)	(19.0905)	(17.9985)	(15.8394)
Log (Mkt Cap07)	0.4652***	0.4634**	0.6485***	0.6212**	-0.0741	-0.3091	-0.7038*	-0.2205	0.2311**	0.0285	-0.0329	-0.0919
	(2.7791)	(2.3093)	(2.6839)	(2.2929)	(-0.2363)	(-0.8578)	(-1.6777)	(-0.4697)	(2.2927)	(0.2269)	(-0.2173)	(-0.5372)
Country-Level Control Variables												
Δ GDPyy_07 / GDP07	0.1081**	0.1231***	0.2170***	0.1504***	0.0500	0.0575	0.0971***	0.0655*	0.1191***	0.0722**	0.0853***	0.1381***
	(2.5678)	(3.0980)	(5.6999)	(4.0538)	(1.1232)	(1.4596)	(2.6886)	(1.9319)	(3.2015)	(2.0896)	(2.5981)	(4.2501)
Log (GDP per capita07)	0.7277**	0.6639	1.5699***	1.4854**	0.2939	0.0094	0.5878	0.9901*	0.0367	-0.5305	-0.0807	1.1567**
	(1.9757)	(1.5127)	(2.9973)	(2.5080)	(0.7935)	(0.2381)	(1.2223)	(1.8419)	(0.1184)	(-1.4039)	(-0.1789)	(2.2510)
Log (Private credit 07/ GDP07)	-0.4929	0.5186	-0.1316	0.5263	-0.5760	-0.1479	0.4752	0.5093	-0.1763	0.9946*	0.9260	0.3614
	(-1.3624)	(1.2030)	(-0.2542)	(0.9044)	(-1.1294)	(-0.2572)	(0.7107)	(0.6796)	(-0.3936)	(1.7994)	(1.3907)	(0.4764)
Legal Rights Index (wjp)	-4.3907	4.3510	6.1291	5.2540	-10.8920***	-4.9236	-6.4206	-3.8634	-4.6604*	4.6655	3.1962	0.7196
	(-1.2524)	(1.0431)	(1.2223)	(0.9291)	(-3.4853)	(-1.3592)	(-1.5024)	(-0.8018)	(-1.7438)	(1.3890)	(0.7780)	(0.1523)
Constant	-5.4423**	-13.7987***	-24.6003***	-23.1154***	7.1388	3.1731	0.2328	-6.6855	0.9848	-4.2863	-5.9742	-11.6224**
	(-2.2674)	(-4.7953)	(-7.1279)	(-5.8715)	(1.5557)	(0.5972)	(0.0375)	(-0.9534)	(0.3637)	(-1.2463)	(-1.4245)	(-2.3381)
N Countries	33	33	33	33	34	34	34	34	36	36	36	36
N Firms	1.668	1.668	1.668	1.666	1.474	1.474	1.474	1.474	1.349	1.349	1.349	1.349
R-squared	0.2964	0.3619	0.3743	0.4138	0.2762	0.3666	0.3971	0.4111	0.4087	0.4083	0.4268	0.4248
r2_a	0.290	0.356	0.369	0.408	0.269	0.360	0.391	0.405	0.402	0.402	0.420	0.418

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

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Annexure for Essay 2

<u>Appendix 4-1</u>: Detailed description of Hofstede *et al*. (2010) dimensions:

(i) **Power distance:** this is about the expression of inequality in the group from the perspective of *the less powerful members*. In that context, it describes the gap between positions of high power vs. the less powerful and this gap is accepted by the society. The higher the gap observed, the higher is the power distance. Indeed, in low power distance countries, the less powerful feel empowered, but in high power distance countries, higher authority is naturally accepted, e.g., education is student-centred (low power distance) vs. being teacher-centred. Also As per Hofstede, *Germanic and English-speaking western countries* tend to have a lower score, in regards to *East European* and *Latin countries*.

(ii) **Uncertainty Avoidance**: this is about the level of acceptance of ambiguity, defined by the level of comfort with *unstructured situations*. It describes the preference for a stable/predictable outcome vs. unknown outcomes, irrespective of the time horizon. Indeed, higher uncertainty avoiding cultures would tend to create a rule for everything so as to have a more predictable outcome to any situation, including risky situations. Hence, people from such societies would feel more uncomfortable in an unorganised environment or unknown situation, e.g., in high *uncertainty avoidance* cultures, people tend to stick to their jobs despite disliking it, while people easily change their jobs in the other cultures. As per Hofstede, *English-speaking, Nordic and Chinese culture countries* tend to have lower uncertainty avoidance scores and higher scores for *Latin*, *Germanic* and *Japanese* culture countries.

(iii) **Individualism vs. Collectivism**: importance of self vs. the group or the "I" vs. the "we" culture. In individualist cultures, the expression of self is heightened where the individual takes care of self and its dependants. Instead, in collectivist cultures, the expression of the group prevails with the caring for each-other, belongingness to the group, and protecting it from splitting. Typically, in the Individualist cultures, task completion is more important than relationship, so is expressing what one thinks, though for collectivist cultures, relationship is more important and the expression of individual's thinking should not disturb the group's *harmony*. Furthermore, *individualism* was found to have high correlation with national wealth levels. As per Hofstede, *western and developed countries* tend to have higher scores on *individualism*, with Japan being in the middle of the index.

(iv) **Masculinity vs. Femininity:** through these**,** gender characteristics such as *assertiveness* and *caring* are used to represent cultures. In a masculine culture, men and women would tend to be more task-oriented than people-oriented, and more *assertive* and *competitive* than *caring*. Indeed, Hofstede mentions that in highly *Masculine* cultures, the discussion of this dimension is considered "*taboo",* which further indicates the unconscious level rooting of this dimension, e.g., *Feminine* cultures value work-life balance, and may have many women in position of power, like in politics, while work is primed in *Masculine* cultures, and few women are representing power positions. Indeed, Japan and Germanic countries have high *Masculinity* scores and it is low for Nordic countries.

(v) **Long-term vs. Short-term orientation**: the *long-term orientation* indicates the preference for the future where one expects the most important events to happen; this concept initially came out from the work of Bond (1988), who had named it *Confusion Work Dynamism*. It favours investing for the long term,

suggests that the good or bad are circumstantial, that one should be flexible, work hard with dedication to succeed, and continuously be open to learn from others. On the contrary, the *short-term orientation* gives more importance to the events of the past and the present. It favours spending what one has, suggests that good or bad are clearly defined, and traditions can't be changed. Further, social service is considered an important part of life, and that success or failure is due to luck. Hofstede mentions that the *long-term dimension turned out to be strongly correlated* with economic growth seen in East-Asian countries with strong confusion culture. And the *short-term orientated* countries are USA, Australia, and Muslim countries.

(vi) **Indulgence versus Self-restraint**: the *indulgence* cultures favour unbounded gratification of human desires for enjoyment, and people are in constant search for activities that can bring them that enjoyment, as they feel that their choices can bring them happiness. Instead, the *self-restraint* cultures limit such gratification through societal norms, where people feel that happiness is not in their control, and the expression or fulfilment of their desires is not a priority, e.g., people in *indulgence* cultures are active in sports and highly value freedom of speech, while *self-restraint* cultures have lower sports orientation and freedom of speech isn't important. As per Hofstede, South and North America are high *indulgence* cultures, while Eastern European, Asian and Muslim countries are *self-restraint* cultures.

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Bibliography for Essay 2

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Moving from essay two to essay three

The results of our two essays have highlighted the influence of culture on firm's financial choices. These choices are further conditioned by firm's industry sector. These findings lead us to investigate in our third essay (see chapter 5), whether culture influence on firms financial choices could result in influencing firms' market value. Firm value could be considered as an aggregated outcome of all the choices made by the firm.

The first choice is the fundamental objective of firm's value maximization (Coase, 1937; Modigliani & Miller, 1958). This objective passes through firms' managers' choices (Jensen & Meckling, 1976; Fama, 1980). Firm's managers' national culture and country's institutions are important in firms' value maximization objectives (Carr & Tomkins, 1998). Culture values are embedded in firm financial choices since firm's founding (Pan *et al.*, 2017).

Furthermore, a country's specific human capital development is constrained by its business systems (Haake, 2002). The business systems are influenced by national culture values (Witt & Redding, 2009; Breuer & Salzmann, 2012). Human capital skills, conditioned by their business systems and national culture, lead to specific industries being more or less competitive (Porter, 2000). Within an industry, we expect that firms' competiveness influenced by their national context of culture and business systems, could show in their market value.

This essay fits into our topological framework as we analyze the influence of national culture (X1) on firm value (Y3) around the financial crisis. We focus on the sole manufacturing industry sector ($F2_{TS2}$). The choice of the industry sector is also based on our essay one findings that culture influence is among the highest in the manufacturing sector.

We find that culture influences firms' market values through the development of specific business systems (Porter, 2000; Breuer & Salzmann, 2012) and institutions (Witt & Redding, 200; Alesina & Giuliano 2015). Firms' human capital carries the effects of national culture into their competitiveness. The differences in national culture leads to differences into a country's human capital. Human capital skills differences lead to differences in firms' competiveness.

Differences in firms' competiveness lead to differences in firms' values. Firms' values differences exist within the same industry sector due to differences in firms' country-of-origin culture values. Through this theoretical framework, essay three analyzes how culture values find their way into influencing firm's market value.

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5 Essay Three - The Financial Value of Cultural Values

Abstract:

This paper studies the effects of Hofstede's cultural dimensions on firm's value. On a sample of 4714 manufacturing firms from 32 countries, our results show that firms with country-of-origin's cultural values of higher *individualism*, lower *masculinity*, lower *uncertainty avoidance*, and higher *long-term orientation* have a higher market value. The opposite relationship is true with firms having lower market value. Our theoretical backgrounds builds upon culture's influence on a country's institutions and business systems leading to industry and firm's competitiveness. It emphasize culture's role on human capital aptitude in acquiring specific skills, which add value to firm's *goodwill*. Based on firm's country-of-origin's cultural values, this *goodwill* leads to higher or lower financial value. The results remain stable to firm-level, country-level, and sample-level robustness tests. Our findings can help entrepreneurs, multinational firms' managers, and policy-makers, in building industries' and firms' in cultures and countries where their competiveness would be enhanced. It could bring them higher financial value.

Keywords: Firm Value, Goodwill, National Culture, Business Systems.

JEL Code : G15, G32, G20, Z10

5.1 Introduction

This paper investigates national culture's influence on firm value. We could analyze this research question either from a microeconomics perspective that is how culture influences differently each firm value. Alternatively, we could analyze it from a macroeconomics perspective, where all firms in a country maybe influenced by the same national culture values. The macroeconomic environment influence could be checked through the microeconomic measure of firm value.

An important historical macroeconomics' literature highlights that a country's context conditions the development of specific industries contributing to nations' wealth (Smith, 1776). Prominent researchers carry out this stream of literature in 20th century (Porter, 1993, 2000; Whitely, 1992, 1999; Witt & Redding, 2009). They underline that the national context of culture and institutions play a fundamental role in the development and competiveness of specific industries, leading to the creation of wealth.

On the other hand, Williamson (2000) NIE[57] framework explains that the social embeddedness level, where culture is, strongly constrains the development of institutions, which constrains governance, which constrains agency choices. Merging the macroeconomics literature with Williamson's more microeconomics perspective, we approach this paper analysis as follows.

Culture influences national institutions, which form the national business systems (Haake, 2002, Breuer & Salzmann, 2012). Business systems foster the development and competiveness of specific industries. We expect that industry competitiveness would also appear in firms constituting each industry. Therefore, a possible outcome of firms' competitiveness could be their market value. We expect that culture's influence on firm's value may happen through the *goodwill* (Ohlson, 1995).

Shareholder's equity value (V) is the sum of book value (B) of equity plus the sum of discounted net residual (DNRI) incomes (Ohlson, 1995). The sum DNRI is called *goodwill* when V>B (or V/B>1) and *badwill* when V<B (or V/B<1). The valuation ratio V/B can be proxy by different measures. It can be the price-to-book ratio (P/B), which is equal to the market value of equity divided by the book value of equity. The price-earnings ratio (P/E), which is equal to the market value of equity divided by the earning per share, or the Tobin's Q (Chung & Pruitt, 1994).

The *goodwill* is the sum of net residual incomes above the book value (Ohlson, 1995). The *goodwill* can be a resultant of firm's human capital development, as part of its CSR policy (Weber, 2008). In a given industry, this human capital partially relates to the cultural dimensions defined by Hofstede (Hofstede *et al.*, 2010). Firms human capital efficiency is fostered by the existence of national business systems aligned to national cultures (Breuer & Salzmann, 2012).

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[57] New Institutional Economics.

Business systems include financial, legal, and human capital development institutions (Witt & Redding, 2009). Business systems aligned to national culture lead to higher human capital efficiency (Breuer & Salzmann, 2012), and to industry competiveness (Haake, 2002). The higher the human capital efficiency, the higher is potentially firm's *goodwill* (Chauvin & Hirschey, 1994; Veltri & Silvestri, 2011). The higher the *goodwill*, the higher is potentially the firm market value (V) (Ohlson, 1995).

This background brings-up our research question: how does firm's national culture influence firm's financial value?

Following Williamson (2000) framework, we expect that national culture would influence institutions, which would influence governance, and the latter would influence firm's agency choices. In this framework, institutions building and development results from social preferences, which depends on national culture values (Hofstede *et al.*, 2010). These institutions impose regulations on governance mechanisms of firms. Therefore, firms are operating in a country's context constrained by governance bodies, institutions of law and finance, and national culture. National culture *pervades*[58] all aspects of firms' business context, including their human capital (Witt & Redding, 2009).

Differences in national business systems, due to national culture, could lead to differences in firms' competiveness within the same industry sector. Firms in industries aligned with their national context of culture and business systems (Haake, 2002; Breuer & Salzmann, 2012) could have a higher value. Said it differently, firms in an industry may differ in their value depending on their national context. National context is the combination of national culture and business systems. We anticipate that national culture values transmit to firms through business systems (see figure 5-1). The higher the alignment of national business systems with national culture, the higher potentially could be firm's *goodwill* (Porter, 2000). A higher *goodwill* could result in higher firm's value (Chauvin & Hirschey, 1994) or shareholder's equity value.

Hofstede (1980, 2001) defines culture as "*the collective programming of the mind that distinguishes the members of one group or category of people from another*". Cultural values acquired during childhood are deep rooted in people's unconscious mind and express themselves throughout life as "*broad tendencies to prefer certain states of affairs over others*" (Hofstede, 1980), changing only over "*centuries or millennia*" (Williamson, 2000).

To better understand firms' financial choices and outcomes, Myers (2001) recommends to model together firms' human capital and financial capital. Business systems includes human capital and financial capital institutions. Culture influences business systems (Breuer & Salzmann, 2012).

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[58] North (1991, p.111): "*What is it about informal constraints that gives them such a pervasive influence upon the long-run character of economies?*". Culture is an informal constraint Williamson's (2000) framework.

Therefore, this essay investigates the influence of national culture on firm's value by analyzing culture's influence on firm's human capital and its financial capital, through the national business systems.

Figure 5-1 : Culture, Business Systems, and Industry Competiveness.
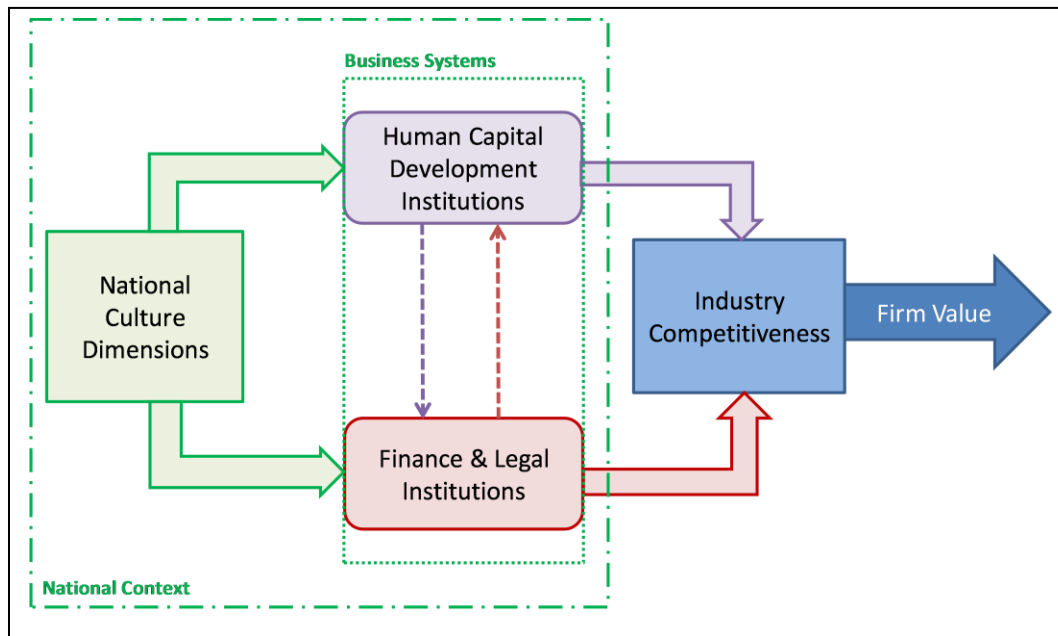
The figure describes the links between national culture, business systems leading to industry competiveness. Industry competiveness leads to firm's competiveness and value. Within business systems, there are cross-effects between the human capital and institutions as per Williamson's framework (2000).

Within the above literature background, we develop our hypotheses. First, we check the influence of national culture (Hofstede, 2001), through national business systems, on firm's market value (see figure 5-2). Second, we check the influence of cultures differences, through differences in national business systems, on firms' market values differences. Our methodology adopts a linear regression modelling approach with firm-level and country-level control variables. To check the differing effects of culture on firms' market value, we follow Fama and French (1993) methodology by splitting our sample. We test our hypotheses with an empirical dataset built of 4714 manufacturing sector firms from 32 countries[59] in 2017.

Our results highlight that culture influences firm's market value. High *individualism*, low *masculinity*, low *uncertainty avoidance*, and high *long-term orientation* lead to higher firm's value. Furthermore, culture dimensions relationships are the opposite between lower value and higher value firms. These results remain stable to robustness tests at the firm-level, country-level and sample-level. These results

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[59] In fact 36 countries, as 5 countries are clubbed under ARAB countries cluster.

confirm our expectations that firms financial value differs based on their national cultural values. Indeed, there is a financial value of cultural values.

Our findings meet what we discovered in essay one of this doctoral dissertation. We found differing cultural influence on the book value and the market value of equity ratios of capital structure. That difference could possibly have been due to firms' *goodwill*, which equals equity market minus book value. Therefore, our first and third essays could have a link through firms' *goodwill* that embeds the effects if national culture.

This essay continues in section 5.2 with our theoretical framework description and hypotheses construction. Section 5.3 describes the dataset and variables selection. Section 5.4 presents and discusses the empirical results. Section 5.5 concludes the essay.

5.2 Literature

We review the literature describing national context and the one describing the possible determinants of firm value. In section 5.2.1, we seek to understand how culture's influence permeates into firms, which could appear in their market values. In section 5.2.2, we describe how firms' national culture values could permeate its *book value* and *goodwill value*.

5.2.1 National Context

The national context, in which the firm is born and develops, is a combination of multiple constituents. National context is a mix of national culture and institutions. Some of the key institutions are of financial development, the rule of law, and human capital development (Redding, 2005). National culture cannot be excluded from defining of the national context (Hawawini *et al.*, 2003, Redding, 2005).

These institutions combined make the national business system (Whitley, 1999; Haake, 2002). The national context of culture and national business systems leads to the development and competitiveness of specific industries (Witt & Redding, 2009). The development of specific industries and firms is based on available human capital skills, which develop in a national context (Redding, 2005).

National culture serves as the foundation for the development of institutions, business systems, human capital, and industries (Witt & Redding, 2009). It highlights that a key constituent of national context is national culture. These findings are close to Williamson (2000) NIE framework. He describes the "*social embeddedness level*" including culture, influences institutions, governance, and the agency. The agency carries culture's influence into firm's financial choices (Pan *et al.*, 2017), leading to firm's financial outcomes (Newman & Nollen, 1996).

In the following four sub-sections, we present the role of national culture, national institutions, human capital development, and business systems in possibly influencing firm value. It also means that national

context differences could leads to differences in firms' financial outcomes (Carr & Tomkins, 1998). The national context influence could contribute to firm's book value and its goodwill value.

5.2.1.1 National Culture

Baldwin *et al.* (2006, p13) define culture as "*a group shared collective meaning system through which the group's collective values, beliefs, customs and thoughts are understood.*". Culture models most used in finance literature adopt this perspective of shared values among people in a group or a country.

There are four major models of culture regularly found in finance literature, that are *national culture dimensions* (Hofstede, 1980, 2001, 2010), human value types or *cultural values orientation* (Schwartz, 1994, 2006), *culture and leadership values*[60] (House *et al.*,2004), and the *World Values Surveys* (Inglehart *et al.*, 2014). Each model defines culture values as shared beliefs among the people of a group or a country. Hofstede's and Schwartz's models characterize the overall culture of a country through a set of few values. Instead, World Values Survey and GLOBE models describe more values but they offer a more inside view of a country's culture.

We prefer a more *Etic*[61] Hofstede's culture dimensions model as our study looks to compare national cultures of firms in influencing firm value. Hofstede's model has been widely applied in financial literature (Kwok & Tadesse, 2006; Chui *et al.*, 2010; Pan *et al.*, 2017) with very well-known strengths (Karolyi, 2016), limitations (Shenkar, 2001), and how to go-past these limitations (Sivakumar & Nakata, 2001).

Hofstede models culture at the country-level with six national cultural dimensions[62] on a 0-100 scale (Hofstede *et al.*, 2010), namely as *Power distance* (PDI), *Individualism vs. Collectivism* (IDV), *Masculinity vs. Femininity* (MAS), *Uncertainty Avoidance* (UAI), *Long-term vs. Short-term orientation* (LTO), and *Indulgence versus Self-restraint* (IVR).

First, PDI is about the expression of inequality in the group from the perspective of *the less powerful members*. Indeed, in low power distance countries, the less powerful feel empowered, but in high power distance countries, higher authority is naturally accepted.

Second, IDV describes the importance of self vs. the group or the "I" vs. the "we" culture. In individualist cultures, the expression of self is heightened where the individual takes care of self and its dependants, and instead in collectivist cultures, the expression of the group prevails with the caring for each-other, belongingness to the group, and protecting it from splitting.

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[60] Global Leadership & Organizational Behavior Effectiveness (GLOBE)
[61] In cross-cultural research, *Etic* level studies culture from an outside view of it. Instead, *Emic* level's research analyzes culture from within the society
[62] A detailed description of Hofstede cultural dimensions is available in annexure (appendix 5-1).

Third, MAS describe culture through gender characteristics such as *assertiveness* and *caring*. In a masculine culture, men and women would tend to be more task-oriented than people-oriented, and more *assertive* and *competitive* than *caring*.

Fourth, UAI is about the level of acceptance of ambiguity, defined by the level of comfort with *unstructured situations*. It describes the preference for a stable/predictable outcome vs. unknown outcomes, irrespective of the time horizon.

Fifth, LTO indicates the preference for the future where one expects the most important events to happen. This concept initially came out from the work of Bond (1988), who had named it *Confusion Work Dynamism*.

Sixth, IVR cultures favour unbounded gratification of human desires for enjoyment, and people are in constant search for activities that can bring them that enjoyment, as they feel that their choices can bring them happiness.

These Hofstede's national culture dimensions have been widely used to analyze firms' financial decision-making and outcomes. Some of these research are describing firm's financial performance (Newman & Nollen, 1996), the choice of debt maturity (Zheng *et al.*, 2012), or the stock-market momentum (Chui *et al.*, 2010). The influence of firm's country-of-origin culture carries unto firm's worldwide subsidiaries (Noorderhaven & Harzing, 2003).

Culture is acknowledged to have multiple-fold effects on firms (see figure 5-2). Some key effects are through firm's management choices and institutional constraints (Witt & Redding, 2009). These effects lead firms to make specific choices, which are permeated[63] by their national culture values. North (2012) highlights how people's beliefs are important in economic changes. Firms are consituents of a country's economy. In a country, people's beliefs are conditioned by their national culture (Baldwin *et al.*, 2006; Hofstede *et al.*, 2010).

> "*The structure we impose on our lives to reduce uncertainty accumulates from prescriptions and proscriptions, which produce a complex mix of formal and informal constraints embedded in language, physical artifacts, and beliefs. It is beliefs that connect "reality" to the institutions*." (North, 2012, p4)

We presented that national culture conditions people's beliefs and influences their choices for institutional development and changes. The next section presents national institutions effects on firms.

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[63] Culture pervasiveness in North (1991) sense.

5.2.1.2 *National institutions*

A country's development of financial institutions, of banking and/or stock market, influences industry competitiveness (Haake, 2002). The rule of law has important implications on firm's financial performance (La Porta *et al.*, 2008). The type of legal system and the development of the financial system enable firms' access to external finance to fund their growth (Demirgüç-Kunt & Maksimovic, 1998). Firm's growth can influence firm value (Varaiya *et al.*, 1987). It means that the development of institutions could result in influencing firm value.

The rule of law through enforcement of creditor rights exert an informal control over firms in improving their corporate governance practices (Nini *et al.*, 2012). It protects firms from possible governance mal-practices and adds value to the firm. The combined effects of creditors and investors rights protection and development of financial institutions have influence on firm's value (Martínez-Sola *et al.*, 2013). They add that lower investor protection weakens the relationship between firm's cash holding and firm value.

Government policies, such as provided tax benefits could potentially help firm's performance (Fama & French, 1998). Taxes could be settled against debt or research expenses, therefore improving firms profitability and hence its value. However, they find that tax benefit effects are silent in regards to debt effects on firm's profitability and value. In our empirical analysis (see section 5.4), we shall only consider the debt effects on firm value.

North (1991) writes, "*Institutions are the humanly devised constraints*". He describes that the development of institutions is a resultant of social needs that he calls "*informal constraints*". Williamson (2000, p596) highlights a quote from Kenneth Arrow "*why economic institutions emerged the way they did and not otherwise*". The *informal constraints* could be included in the *social embeddedness level* (Williamson, 2000). Culture forms a consequential part of this social level. The alignment of a country's institutions with its national culture is the fundamental concept of what we call "natural institutions".

A large literature highlights the influence of culture on the development of various institutions, such as the origin of law (Porta *et al.*, 1998), the development of a governance framework (Licht *et al.*, 2005), and the preference for a type of financial institution of banking or stock market (Kwok & Tadesse, 2006). Such institutions are *natural institutions*. These influence the economic outcomes of countries (Guiso *et al.*, 2006; Tabellini, 2010).

External shocks on a country, wars or colonization or a financial crisis, could lead to changes to its institutions and to some of country's cultural traits (Alesina & Giuliano, 2015). They explain that some of the political crisis of the 20th century and the 21st century financial crises have contributed to alter the

institutions of many countries. They find that over two generations and above, the imposed institutional values tend to become part of the behavior of the people, hence part of the culture.

However, Alesina and Giuliano (2015) find that despite multiple instances of strong external shocks in a number of eastern European countries, the integration of forced alien institutional values do not show persistence into these countries national cultures. The external shocks do not tend to change a country's culture, except if the indigenous population is fully replaced as highlighted for the US (Alesina & Giuliano, 2015). They highlight that the European settlers brought their culture and developed US institutions aligned to their country-of-origin cultural values or *natural institutions*.

Despite external imposition of institutional changes, Witt and Redding (2009) explain that corporate managers still tend to be strongly influenced by their country's cultural values. They point that too much emphasis is given to these institutional changes and institutional differences among countries. They say that the focus should remain on the influence of culture on firms' decision-making.

> "*So, as society is a product of people, people are themselves products of society…. As human conduct comes under the control of the institutions, the predictability of behavior increases, and with it the potential for cooperation. Behind the routines of the institutions lie ideals and values.*" (Witt & Redding, 2009, P863)

We understand that, though a country's institutions could be changed from strong external shocks or by internal choices, cultural values are difficult to change. Culture exerts a strong influence on the alignment of institutions to its values and influences corporate managers decision-making despite institutions. Corporate managers are part of firms' human capital.

5.2.1.3 *Human capital development*

At the country-level, human capital development is linked to the country's context (Redding, 2005). He describes that existence of national institutions, which leads to *employment protection*, *employment distribution*, *income distribution*, and *systems of training and education*, influence the development of specific human capital skills (Redding, 2005, p150). Literature describing business systems highlights similar sources of a country's context leading to the development of specific human capital skills (Whitley, 1999; Haake, 2002; Breuer & Salzmann, 2012). They describe that the development of specific human capital skills leads to the development of specific industries and to their competitiveness.

At the firm-level, Weber (2008) describes that Corporate Social Responsibility (CSR) activities can increase firm's competitiveness. They explain that CSR activities start with an additional investment in firm's human capital development. This investment leads to increased motivation and efficiency of the human capital. It improves firm's performance and competitiveness.

MacKay and Phillips (2005) explain that each industry uses specific human capital skills, which distinguishes it from another industry. These specific skills make the said human capital more efficient for a specific industry. The ratio of the employed human capital and the financial capital makes a firm more or less competitive in its industry. The average ratio of all firms makes an industry more competitive than another.

Specific cultural values foster the acquisition of certain human capital skills leading to increased efficiency (Breuer & Salzmann, 2012). National culture values facilitates the acquisition of specific knowledge required in some industries. It leads to the efficiency of the human capital in some industry over the other (Porter, 2000). The human capital efficiency could add value to firm's *goodwill* (Chauvin, & Hirschey, 1994).

Alesina and Giuliano (2015) extend the analysis of culture and human capital relationship. They describe that cultural traits of *individualism-collectivism* could influence innovation in a country. It can lead to national culture fostering the development of an industry requiring higher innovation. Their findings confirm that national culture can influence the development of an industry over another.

This section highlighted that human capital skills development and efficiency could contribute to an industry competitiveness (Haake, 2002). It also describes that country context eases human capital's acquisition of specific skills needed for some industries (Whitley, 1999; Redding, 2005). The human capital in some countries could be more efficient in performing tasks needed in specific industries (Breuer & Salzmann, 2012). The specific human capital could also make a firm competitive within its industry (MacKay & Phillips, 2005).

The overall mix of the national institutions of finance and law, and the institutions leading to human capital development constitute the national business systems.

5.2.1.4   *National business systems*

A country's business systems are constituted of institutions of finance, legal, and institutions of human capital development (see figure 5-2). Different countries choose to adopt different business systems (Whitley, 1999). He describes six types of business systems as *fragmented, coordinated industrial districts, compartmentalized, collaborative, state organized, and highly coordinated*. Different business systems would facilitate the development of different human capital skills. These differences lead to differences in firm's agents' management choices, including financial ones (Witt & Redding, 2009).

Breuer and Salzmann (2012) show that national culture plays a key role in the development of a country's business systems. Cultures preferring bank-based system tend to have industries that require "*incremental* business strategies, *essential* firm-specific human capital, *high* employee participation, and *strong* dismissal protection" (p102). Cultures preferring financial market-based system tend to foster

the development of "*revolutionary* business strategies, *not mandatory* firm-specific human capital, *low* employee participation, and *weak* dismissal protection" (p102).

Their description matches very closely Haake's (2002) *communitarian* and *individualistic* business systems. *Communitarian* business systems are characterized by human capital's continuous and long-term accumulation of knowledge. At the firm-level, this leads to highly industry specific structured organization with strong ties among its employees. The *individualistic* business systems have loosely knit employee relationships and low-level of organization specific knowledge required. The human capital is frequently re-skilled and redeployed in different tasks, also resulting in changing organization structure.

Culture influences the development of business systems (Breuer & Salzmann, 2012). Business systems are a combination of *business strategies, firm-specific human capital, employee retention, and dismissal protection* (p102). Business systems fosters the access to specific financial capital, through banks or stock markets, and human capital skills to the firms. Specific business systems facilitates the development of specific industries (Whitley, 1999; Haake, 2002). Differences in business systems leads to the development and competitiveness of different industries.

Specific human capital skills, such as the firm's management style or its congruence with national culture, are said to increase firm's performance (Newman & Nollen, 1996). Certain national values are favorable in developing certain human capital skills and industrial practices (Haake, 2002). Such skills development tend to be favorable in developing the competitiveness of some industries over the others.

Figure 5-2 : Culture, Business Systems, and Firm Value.
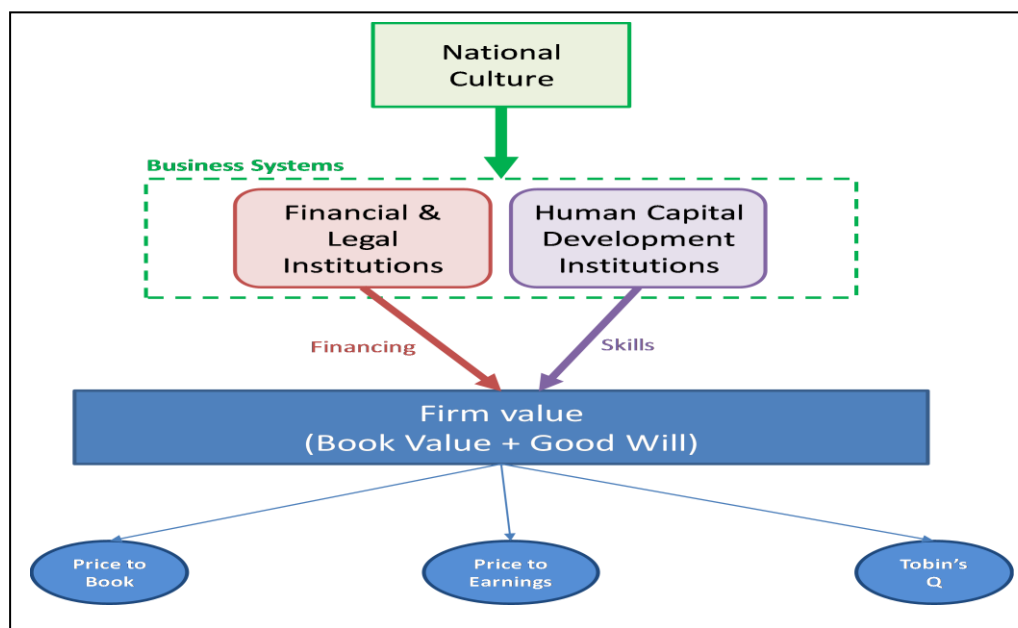
National Culture influences the Business Systems constituted of financial, legal and Human Capital Development institutions. Cultural values are transmitted to firm value, through the business systems.

The specific human capital can contribute to firm's *goodwill* value (Chauvin, & Hirschey, 1994, Sullivan, 2000; Veltri & Silvestri, 2011).

The national context conditions firm's competitiveness through the existence of business systems (see figure 5-1 & 5-2). Specific business systems leads to specific human capital skills. We investigate how these specific human capital skills could add to firm value in a specific industry sector. The possible differences in firm value, within the same industry, could be due to firm's national culture influencing business systems.

5.2.2 Firm value

The determinants of firm value could be linked to its financial capital or human capital (Myers, 2001). Firms' financial capital value is accounted for in its *book value* and firms human capital value appears in its *goodwill*.

Firm value is the sum of its *book value* plus *abnormal earnings* (Ohlson, 1995). Ohlson describes *goodwill* as a function of firm's market value minus its book value. From this perspective, we consider the financial *goodwill* and not the accounting one. The discrepancies in firm's market value often arise from the differences in its *goodwill* value estimation (Chauvin, & Hirschey, 1994). They describe that human capital as a constituent of *goodwill* value could contribute to these differences in firm's value.

First, a country's national context, in which national culture influences national business systems, influences the development of specific human capital skills. The specific human capital skills lead to specific industries development and to their competitiveness (Haake, 2002). Industry competitiveness is the sum of all firms' competeveness (Porter, 1985, 2000). Firm's competiveness may show in its financial outcomes, accounted in its *book value*. The human capital skills and competencies would add to firm's *goodwill* (Sullivan, 2000; Veltri & Silvestri, 2011).

Second, the main human capital determinants linked to firm value are specific technical and managerial skills (Chauvin, & Hirschey, 1994), its creative intellectual capital (Sullivan, 2000), and/or firm's CSR contribution to its human capital development (Weber, 2008). The other human capital determinant is national culture as it influences managers' financial choices (Pan *et al.*, 2017). The human capital contribution is often considered in firms' *goodwill* value (Chauvin, & Hirschey, 1994). The differing influence of national culture on managers' financial preferences may appear in firm's *goodwill*.

As a whole, human capital seems to influence firm value. In firm value, the *book* value is easily assessable but the *goodwill* is more difficult to assess (Chauvin, & Hirschey, 1994), as human capital contributions are difficult to assess. The difficulty in assessing *goodwill* may be the reason why Ohlson (1995) describes it as abnormal earning affecting firm's market value.

In the next two sub-sections, we analyze the contribution of the firm's financials (*book value*) and human capital contribution (*goodwill*) in assessing firm's market value.

5.2.2.1 Book value

Firms' key objective is their values maximization (Jensen & Meckling, 1976). The firms' agents (managers) choices should lead to shareholders' value maximization (Fama, 1980; Myers, 2001). These choices relate to firm's financing for its investment and growth (Demirgüç-Kunt & Maksimovic, 1998). These financing choices contribute to firm's *book value* (Chauvin, & Hirschey, 1994).

Some of the financial capital determinants are firm's capital structure (Masulis, 1983), cash holding (Martínez-Sola *et al.*, 2013), working capital (Deloof, 2003), or its growth and profitability (Varaiya *et al.*, 1987). Firm's debt or equity financing choices that brings changes to its capital structure influence its market value (Masulis, 1983). Firm's cash holding affects its value, with additional inference from firm's growth, leverage and size (Martínez-Sola *et al.*, 2013). Firm's working capital choices contribute to its value (Deloof, 2003). Firms earning growth and increasing profitability affects its value (Varaiya *et al.*, 1987). So does firm's dividend payout or its debt levels (Fama & French, 1998).

There are many interlinks among these financial determinants. For example, cash is deployed in working capital (Deloof, 2003). Similarly, firm's earning growth, working capital, debt-level and its dividend payout have links with its profitability. Each determinant influence on firm value could be positive or negative, and linear or not. Indeed, there seems to be an optimal cash holding level for best firm's value, as cash holding shares a curvilinear relationship with value (Martínez-Sola *et al.*, 2013). Too high or too low a level of cash holding has a negative relationship with firm value.

Both firms' *book value* and *goodwill* constituents influence firm's competitiveness in its industry sector. An industry's internal specificities affect firm's profitability leading to its comparative advantage within the industry (Porter, 1985). Some of these specificities are the human capital, supply chain, and competition levels (Harris & Raviv, 1991). Firms' optimal usage of its human capital in regards to its financial capital (MacKay & Phillips, 2005) could influence their market value.

5.2.2.2 Goodwill value

Firm's abnormal financial outcomes, as a result of its financial choices, get considered in firm's *goodwill* value (Ohlson, 1995). The *goodwill* or *badwill* is the financial resultant of the cumulative contribution of the firms' constituents, which could not be accounted in *book value*.

The *goodwill* constituents could be firm's production systems efficiency, its sales & marketing function, its research and development, and its human capital, which includes its management team (Chauvin & Hirschey, 1994). These constituents' financial contributions are often arising from firms' human capital (Sullivan, 2000).

> *"Managerial scope economies explain the typically long tenure of top executives, and why the value of the managerial team in place constitutes a compelling virtue of successful firms-and a prime economic determinant of the human asset component of economic goodwill."* (Chauvin & Hirschey, 1994, p165)

Chauvin and Hirschey (1994) explain that firm's *goodwill* is difficult to measure as per accounting standards. All that is measurable is accounted for in the books but the firm's value is often different from this accounted value. The human capital value, be it firm's management team quality or its other employees skills, is considered a contributor to *goodwill*. They add that the real market value of *goodwill* is often quantified at the time of firm's sale or acquisition. It is the accounting value of *goodwill*. Our paper analyzes the value of firms' *goodwill* through the financial measures of market value.

Many constituents of firm's human capital are presented in the literature in order to reach a complete measure of it. These constituents can be the intellectual capital that are ideas and knowledge contributed by individuals or a group (Sullivan, 2000; Veltri & Silvestri, 2011). The individual manager's and the combined *managerial synergy* in the firm (Chauvin & Hirschey, 1994). The specific human capital skills acquired over time in a specific industrial context (Haake, 2002; MacKay & Phillips, 2005). Those skills could also result from the human capital's training and development activities as part of firm's CSR activities (Weber, 2008). These different aspects of human capital contribute to add value to firm's *goodwill*.

In spite of the multiple sources of human capital's value addition to firm's *goodwill*, literature presents some common sources. These sources are industry specificities and the national business systems. These two factors lead to human capital value addition in firm's competitive advantage (MacKay & Phillips, 2005). Firm's competitive advantage leads to an increased *goodwill* (Chauvin & Hirschey, 1994). The increased *goodwill* would result in increased shareholder value (Ohlson, 1995). Therefore, the human capital value gets translated into firm's financial value.

A particular constituent of human capital is national culture (Hofstede *et al.*, 2010). National culture fosters the development of national business systems (Breuer & Salzmann, 2012). National business systems lead to the acquisition of specific skills by the human capital (Haake, 2002). Specific human capital skills lead to industry and firm's competeness. It shows that national culture (Hofstede *et al.*, 2010) of firm's country-of-origin is a fundamental constituent of its human capital (Porter, 2000). National culture values are embedded in firm's *goodwill* through its human capital. We could expect firm's national culture to influence its market value.

In the next section, we develop our hypotheses on how culture values could influence firm value.

5.2.3 Hypotheses

National culture influences the development of specific business systems (Breuer & Salzmann, 2012). National business systems influence specific human capital development. It leads to industry's competitiveness (Haake, 2002; MacKay & Phillips, 2005). Specific human capital leads to firm's competitive advantage (Porter, 1985). Specific human capital value addition may contribute into firm's *goodwill* value (Chauvin & Hirschey, 1994).

National culture influences all institutions constituting the national business system (Witt & Redding, 2009). These institutions are Financial (Kwok & Tadesse, 2006), Law (Porta *et al.*, 1998), governance (Licht *et al.*, 2005), and of human capital development (Redding, 2005).

This literature leads us to expect that national culture, first influences the national business systems development, second fosters the acquisition of industry specific human capital skills. Based on these findings, we propose to adopt an underlying hypothesis that there is a relationship between national culture (Hofstede *et al.*, 2010) and national business systems, which leads to industry competiveness. This underlying hypothesis writes as:

> **Underlying Hypothesis (UH)**: National culture has an association with national business systems leading to industry competiveness.

With this UH background, we build and test our key hypotheses H1 and H2. Under UH, national business systems alignment with national culture fosters the competitiveness of industries (Porter, 2000; Haake, 2002). National culture influences human capital skills development (Breuer & Salzmann, 2012). Specific human capital skills adds to firms value (Veltri & Silvestri, 2011).

We build our first hypothesis H1. Redding (2005) highlights about 8 constituents of a business system, which could be split into two parts. First, the institutions linked to the sources of financial capital and legal framewaok. Second, the human capital ones, describing the development of human capital and its relationship with the firm. We adopt this view of a country's business system as the combination of these two parts (see figure 5-2).

In regards to a country's law and finance institutions, literature presents them to be influenced by culture. Culture influences the rule of law (Porta *et al.*, 1998), the financial institutions development (Kwok & Tadesse, 2006), and governance mechanisms (Licht *et al.*, 2005). However, regarding the second constituent of business systems, that of institutions fostering specific human capital development, we could not find any consideration in the culture and finance literature.

Therefore, we investigate the supplementary effects of these human capital development institutions on firm's value. For a country's institutional contributions to human capital development, a common set of constituents are appearing in the literature (Redding, 2005; Breuer & Salzmann, 2012). We adopt four of these human capital development (HCD) constituents of national business systems. These are *employment protection*, *employment distribution*, *income distribution*, *systems of training and education* (Redding, 2005, p150). Similar definitions exists in other literature as well (Haake, 2002; Breuer & Salzmann, 2012). We choose Redding's (2005) description as these are standard indicators used by international organizations[64].

These institutional constituents influence the development of human capital in a country. They also influence the relationships between firm's management and employees (Carr & Tomkins, 1998; Redding, 2005; Witt & Redding, 2009). Differences in these constituents, as part of business systems, would bring differences to the human capital development. In the culture and finance literature, we could not find any study analyzing a country's human capital and firm value as a consequence of business systems.

Firms having the right combination of industry specific human capital and the financial capital makes them more competitive (MacKay & Phillips, 2005). The specific human capital gets transferred into firm's profits (Sullivan, 2000). Firms' profitability leads to firm value (Varaiya *et al.*, 1987). The human capital is a key intangible assets leading to differences in firm value (Sullivan, 2000). Intangibles are constituents of firm's *goodwill*.

Human capital skills (Sullivan, 2000) and firm's management quality form a part of firm's intangible assets (Chauvin & Hirschey, 1994). Human capital development, as part of firms' corporate social responsibility activities, can also contribute to the firms' market value (Weber, 2008). The accounting process generally omits these intangible assets *valuation and recognition* as a part of *goodwill* (Chauvin & Hirschey, 1994). It creates discrepancies between firm's accounting value and its market value. This literature supports firm's human capital contribution to firm value.

National culture (Hofstede *et al.*, 2010), through firm's human capital, contributes to firms profits (Sullivan, 2000). These profits get accounted in the *book value*. The specific human capital brings competitive advantage and adds value through firm's *goodwill* (Chauvin & Hirschey, 1994). We expect that national culture could influence firm value through firm's specific human capital. The specific human capital could be firm's management or its employees' skills. The value addition of firm's human capital could be reflected in the firm's *book value* and *goodwill*.

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[64] United Nations human development reports: http://hdr.undp.org/en/content/education-index , and OECD Indicators: www.oecd.org/employment/protection

Therefore, we expect that cultural dimensions of IDV, MAS, UAI, and LTO would influence firm's value, through business systems. It leads to our first hypothesis as:

H1: National culture has an association with firm value, through national business systems.

We build our second hypothesis H2 to analyze the differences in firms' value due to their country-of-origin cultural differences. Indeed, Whitley (1999) highlights six types of business systems. A more recent literature highlights that business systems are primarily linked to the type of countries' financial system (Haake, 2002, Breuer & Salzmann, 2012), *i.e.* bank or financial market based. Around these two financial systems, Haake (2002) describes two business systems as *individualistic* and *communitarian*. Breuer & Salzmann (2012) highlight specific national cultural values influencing the development of these two types of business systems. Their findings meets Kwok & Tadesse, (2006), who show culture's influence on a country's financial system development.

We find that Haake (2002) description of *communitarian* and *individualistic* national business systems is very close to Hofstede (1980, 2001) definition of cultural dimension of *individualism* vs *collectivism*. It leads us to expect that *individualism* (high IDV) cultures would favor the development of *individualistic* business systems and *collectivism* (low IDV) cultures would favor *communitarian* business systems development.

Communitarian business systems are based on more long-term relationships between the firm and its employees, which favors accumulation of skills (Haake, 2002). Instead, *individualistic* business systems favors more short-term relationships leading to acquisition of more generic skills. This description is close to Hofstede's *long-term orientation* (LTO) dimension, as people in high LTO cultures tend to accept short-term pain for long term-gains. We could expect that high LTO cultures may influence *communitarian* business systems and *short-term orientation* (low LTO) could influence *individualistic* business systems.

Hofstede's cultural dimension of *uncertainty avoidance* (UAI) influences the development of bank based (high UAI cultures) or market based (low UAI cultures) financial systems (Kwok & Tadesse, 2006). The bank-based and market-based financial systems are respectively associated with the *communitarian* and *individualistic* business systems (Haake, 2002). It leads us to expect that *uncertainty avoidance* could influence firm value through these business systems.

With these correspondence between culture dimensions and business systems, we expect that differences in national culture would lead to differences in business systems. Different business systems lead to different industries development and their competitiveness (Porter, 1993; Whitley, 1992, 1999; Haake, 2002). We expect that firms from cultures that foster the development of a specific industry could have

a higher value than firms from different national cultures. Therefore, we expect that cultural dimensions of IDV, MAS, UAI, and LTO could have differing relationships with higher and lower value firms, due to differences in business systems. This brings our second hypothesis as:

H2: Culture's association differ with firm's value, due to differences in business systems.

To test these hypotheses, we define our dataset, select our variables of interest, and define the empirical methodology in the next sections.

5.3 Data, variables, and methodology

Our variables selection fall within Williamson (2000) *4-levels* framework. We select our variables for each of the four levels (see table 5-1). Furthermore, to represent the industry environment, we select firms from the manufacturing sector at SIC level-1 (code range 2000-3999) (Chauvin & Hirschey, 1994). The manufacturing industry uses specific human capital and important financial capital. The financial and the human capital through the capital-to-labor ratio is specific to each industry sector (MacKay, & Phillips, 2005).

For example, Michelin has kept its key development centers at Clermont-Ferrand, where it was founded, in spite of it having become a very large multi-national firm. It is primary due to the specific human capital it employs in these research centers.

In section 5.2, we presented how culture's influence is embedded in a country business systems. From that literature to our hypotheses building, we expect culture's influence to be embedded in the firm from its inception to its later stages. It means that culture values appearing in firm's market value would be persistent, as culture is stable over "*centuries*" (Williamson, 2000; Alesina & Giuliano, 2015). Therefore, we expect culture's influence on firm value to appear in any financial year we may choose.

Our empirical methodology is tested in two steps. First, it looks to test for the overall influence of culture on firm's value. Second, it tests the differences in culture's influence on differences in firm value, by splitting the sample into quantiles by adopting Fama and French (1993) approach. We test our hypotheses for a single year. Our expectations are that within a single year[65] sample our hyptheses would be tested, due to stability of culture.

5.3.1 Data sample

Our sample is composed of firm-level and country-level determinants. Firm-level financial measures are obtained from Reuters Datastream database. Country-level measures of country's economic and

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[65] We do not use multiple years mean values, as our expectation is that culture's influence on the firms would be present in any single year.

financial institutions development are obtained from the World Bank Indicators[66] database, and the rule of law from the World Justice Project[67]. The human capital skills development index are obtained from multiple sources (see table 5-1). The culture dimensions data is obtained from Hofstede[68] index. All our variables are computed for 2017, except for computing *stddev* (*ebitda*), which is computed from data of 2012-2017.

On the combined dataset, we remove countries having less than 15 firms and firms with incomplete measures. We take the *log* of our dependent variable of firm value measures. We apply trimming on both sides of the dependent variable's data distribution tails to remove outliers through the rule of thumb method[69] (Navidi, 2008). Our final dataset is constituted of 4714 listed manufacturing sector firms (SIC 2000-3999) from 32 countries[70]. We further describe this dataset distribution.

At the country-level (see table 5-2, panel A), the number of firms per country varies from 18 (Netherlands) to 794 (Japan). Japan (IDV-46, MAS-95, UAI-92, LTO-88) has the lowest mean P2B (0.1432) and India (IDV-48, MAS-56, UAI-48, LTO-51) the highest (1.4041). Vietnam (MAS-40, LTO-57) has the lowest mean P2E (2.4512) and China (MAS-66, LTO-87) the highest (3.7198). Japan (MAS-95, UAI-92, LTO-88) has the lowest Tobin's Q (-0.2106) and India (MAS-56, UAI-40, LTO-51) the highest (0.8512). For each value measure, the countries with the highest and the lowest firm value have important differences in their cultural dimensions.

At the sample-level (see table 5-2, panel B), average P2B is 0.6238 with a standard deviation of 0.8151. The average P2E is 3.0403 with a standard deviation of 0.8167. The average Tobin's Q is 0.1859 with a standard deviation of 0.6489. Overall, the dataset for the three values measures is within a close range of standard deviations around their mean values.

On the correlation matrix (see table 5-2, panel C), we observe that each culture dimension is correlated at the 1% level with our three measures of firm value, indicating culture's relationship with firm value. Firm-level financial variables and country-level institutional variables are correlated with firm value measures, confirming our choice of these. Their correlation is higher with the P2B and Tobin Q measures than the P2E.

< Insert table 5-1 here >

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[66] World Bank Database: https://data.worldbank.org/indicator
[67] https://worldjusticeproject.org/our-work/wjp-rule-law-index/wjp-rule-law-index-2017–2018
[68] *VSM100* dated 8dec2015: https://geerthofstede.com/research-and-vsm/dimension-data-matrix/
[69] "Right-tail" trimming for values below $(Q_1 - 3 \times (Q_3 - Q_1))$ and "left-tail" trimming for values above $(Q_3 + 3 \times (Q_3 - Q_1))$; where $(Q_3 - Q_1)$ is the interquartile range.
[70] In fact our total countries are 36, but we combine 5 countries, Saudi Arabia, Dubai, Qatar, Oman, and Abu Dhabi in a single Arab cluster, as they all have the same Hofstede's cultural dimensions values of Arab countries.

< Insert table 5-2 here >

5.3.2 Variables selection

We present our dependent variable, key explanatory variables of culture, and control variables at the firm-level and the country-level.

5.3.2.1 Firm value variables

For firm value, we adopt three measures as the *price-to-book* (P2B), the *price-to-earnings* (P2E), and the *Tobin's Q* (Varaiya *et al.*, 1987; Chung & Pruitt, 1994; Ohlson, 1995). Indeed, Ohlson (1995) describes the market value is the sum of *book value* and *abnormal residual income*. He identifies this firm's abnormal income as *goodwill*. This *goodwill* includes firm's human capital value (Sullivan, 2000), which embeds national cutlture's infleunce (Noorderhaven & Harzing, 2003).

Firm value can be represented by *Tobin's Q* (Chung & Pruitt, 1994). Lee *et al.* (1999) highlight the importance of P2B measure of a share value. Varaiya *et al.*, (1987) describe that the measure of *Tobin's Q* and the P2B are theoritically and empirically equal. However, we keep the three measures to represent firm value.

We compute *Tobin's Q* (Chung & Pruitt, 1994) as the ratio of the sum of the market value of shareholders equity (MVE) and *total debt* (short-term + long-term debt) by the book value of total assets (TA). As per Reuters Datastream nomenclature, the liquidation value of *preferred stock* is included in their measure of long-term debt.

We compute *price-to-boo*k as the ratio of firm's market price per-share by its book price. We compute *price-to-earnings* as the ratio of firm's market price per-share by earnings-per-share.

5.3.2.2 Culture variables

Our explanatory variables of culture are four cultural dimensions from Hofstede *et al.* (2010). The strengths of Hofstede's national culture dimensions model are that they have been developed from a large countries sample and have been validated in varied management studies (Doney *et al.*, 1998; Ramirez & Tadesse, 2009; Cannon *et al.*, 2010; Chen *et al.*, 2015; El Ghoul & Zheng, 2016).

The four dimensions we adopt are IDV, from low *individualism* (high *collectivism*) to high *individualism* (low *collectivism*); MAS, from low *masculinity* (high *feminity*) to high *masculinity* (low *feminity*); UAI, from low to high; and LTO, from low *long-term* (high *short-term*) to high *long-term* (low *short-term*). We drop the remaining two dimensions of PDI and IVR, as they have strong correlation with the above four dimensions (see table 3-12).

Furthermore, we assume the stability of culture over our entire period of study (Hofstede, 1980, 2001; Williamson, 2000; Guiso *et al.*, 2006). Any changes that might have occurred in the cultural dimensions

scores over the period of our study could produce an undetected impact on our results of culture's influence. We do check a revised version of these dimensions scores index in our robustness tests (see section 5.2).

5.3.2.3   Firm-level variables

We consider five financial variables that have a possible relationship with firm value. Firm's growth and profitability are said to have an influence on firm's value (Varaiya *et al.*, 1987). For growth, we adopt *capital expenditure* over *total asset*, and for profitability, we consider the *earnings before tax* over *total assets* (Chauvin & Hirschey, 1994).

Capital structure is described to have an influence on firm value (Masulis, 1983), which we represent by *total debt over total asset*. Working capital management also influence shareholder equity value (Deloof, 2003), that we represent by *working capital over total assets*.

Firm's size plays a role on firm's market value (Martínez-Sola *et al.*, 2013), for which we consider the *log* of *total sales*. Finally, firm's risk-taking can contribute to its market value (Ammann *et al.*, 2012), that we represent by the *standard deviation of firm's earnings before income tax and depreciation* (*stddev(ebitda)*), for the period 2012-2017

5.3.2.4   Country-level variables

Financial, legal, and governance constraints influence the agency operations (Williamson, 2000). These are institutional constituents of the country context. Institutional development play an important role in the development of specific industries (Haake, 2002; Witt & Redding, 2009). The type of legal system and the development of the financial systems, banking and capital markets, enable firms to access external finance to fund their growth (Demirgüç-Kunt & Maksimovic, 1998).

To represent countries' banking sector and financial market development, we adopt as variables the (*log*) *private credit-to-GDP* and the (*log*) *market capitalization-to-GDP*. For the *rule of law*, we take the overall measure of legal framework in a country, including political, legal, and corruption provided by the World Justice Project[71] (Botero & Ponce, 2011). A country's wealth has a correlation with the cultural dimension of *individualism* (Hofstede, 2001). We represent country's wealth by the measure of (*log*) *GDP-per-capita*.

For representing the national context conditioning human capital development, we employ a variable named HCD. This variable is the result of a Principal Component Analysis (PCA) (Abdi & Williams, 2010) of the constituents defined by Redding (2005) as employment *protection*, *employment*

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[71] https://worldjusticeproject.org/our-work/wjp-rule-law-index/wjp-rule-law-index-2017–2018, measuring 9 dimensions of *limited government powers; absence of corruption; order and security; fundamental rights; open government; regulatory enforcement; access to civil justice; effective criminal justice; and informal justice.*

distribution, *income distribution*, *systems of training and education*. We compute HCD as the first component of the PCA with the highest eigenvalue, corresponding to 53.93% of the total inertia.

Corporate governance practices is improved when the enforcement of creditor rights (CRI) exert an informal control over firms (Nini *et al.*, 2012). CRI protects firms of possible governance mal-practices possibly influencing firm value. We adopt Djankov *et al.* (2007) measures of *creditors' rights index*. We check for CRI effects in our robustness tests (see section 5.2).

With all our variables so defined, we describe our empirical methodology in the next section.

5.3.3 Methodology

We adopt a two stage approach to testing our hypotheses. First, we check for the overall influence of culture on firm value. Second, we check for the differing influence of culture on firm value within the manufacturing industry sector. In order to identify the differing influence of culture, we test our hypotheses by applying the Fama and French (1993) quantile based methodology. We split our sample into quartiles by firm value measures (Low (Q1), Medium (Q2 & Q3), and High (Q4)). We test our hypotheses with a simple linear regression model (see equation 6).

5.3.3.1 Model specification

First, we check the influence of national culture dimensions of IDV, MAS, UAI, and LTO (Hofstede *et al.*, 2010) on firm value. Second, we check whether culture influence differs based on firm value applying Fama and French (1993) methodology. We apply cultural dimensions along with a set of firm-level financial control variables and country-level control variables on the firm's market value variable.

Firm value is the resultant of multiple determinants, which Ohlson (1995) describes as the sum of the book value plus the discounted net residual income (DNRI). He explains that *goodwill* is a function of the difference between firm's market value with its *book value*. *Goodwill* could contain the value of firm's human capital (Chauvin & Hirschey, 1994). *Goodwill* could also contain the value-addition effects of natural institutions and firm's competeveness (Haake, 2002; Kwok & Tadesse, 2006; Tabellini, 2010).

It leads us to describe firm value or the shareholder equity value (V) as per the equation:

(1) *Value = Book Value + Goodwill (Human Capital (Culture), Natural institutions, Firm characteristics)*

Previous equation can be rewritten as following:

(2) *Value / Book Value = 1+ Goodwill / Book Value*

We then proxy the left side of the equation by a value ratio as described earlier:

(3) Value ratio = 1 + Goodwill / Book Value

Therefore, combining equations (1), (2), and (3) we obtain the following baseline model:

(4) Value ratio = β$_0$ + β$_1$ Culture + β$_1$ Quality of institutions +β$_2$ Firm characteristics + ε

In this model, culture and institutions are country-level variables, whereas the firm-level variables are firms' financial characteristics. All our institutional and firm variables are measured at time t. Culture variables are considered stable over very long periods of centuries to millennium (Hofstede, 2001; Williamson, 2000; Guiso *et al.*, 2006), therefore we keep the Hofstede's dimensions index from year 2015[72].

We build our empirical model specification, using Ordinary Least Squares (OLS) method for coefficients' estimation, with country j, firm k, year t, and ε denoting the error term. The model writes as per the equation 6:

$$(5)\quad Y_{jk(t)} = Value\ ratio$$

$$(6)\quad Y_{jk(t)} = \alpha_0 + \alpha_1 Culture_j + \alpha_2\ Firm_{level} Control\ Variables_{k(t)}$$
$$+ \alpha_3\ Country_{level} Control\ Variables_{j(t)} + \varepsilon_{jk}$$

The empirical model (equation 6) is applied to test our hypotheses H1 and H2.

5.3.3.2 Empirical test strategy

Our test strategy is multi-layered at the firm-level, country-level and sample-level (see figure 5-3).

First, the baseline model tests the influence of culture dimensions on firm value, including or excluding the Human Capital Development (table 5-3a, 5-3b). The baseline model's robustness is tested at the sample-level (table 5-4a, 5-4b) with the Fama and French (1993) quantile based approach.

Second, the model's robustness tests at firm-level and country-level on the control variables are performed (table 5-5, 5-6, 5-7, 5-8). We perform a robustness test on Hofstede's cultural dimensions with re-calibrated values due to counties' economic and wealth changes (table 5-9).

Third, the sample-level robustness test for geographical regions of the firm (table 5-10), for sample size bias by excluding two large sample contributing countries of USA and Japan (table 11), and for single year bias by testing for year 2014 data sample.

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[72] *VSM100* dated 8dec2015: https://geerthofstede.com/research-and-vsm/dimension-data-matrix/

Figure 5-3 : Empirical Test Strategy.
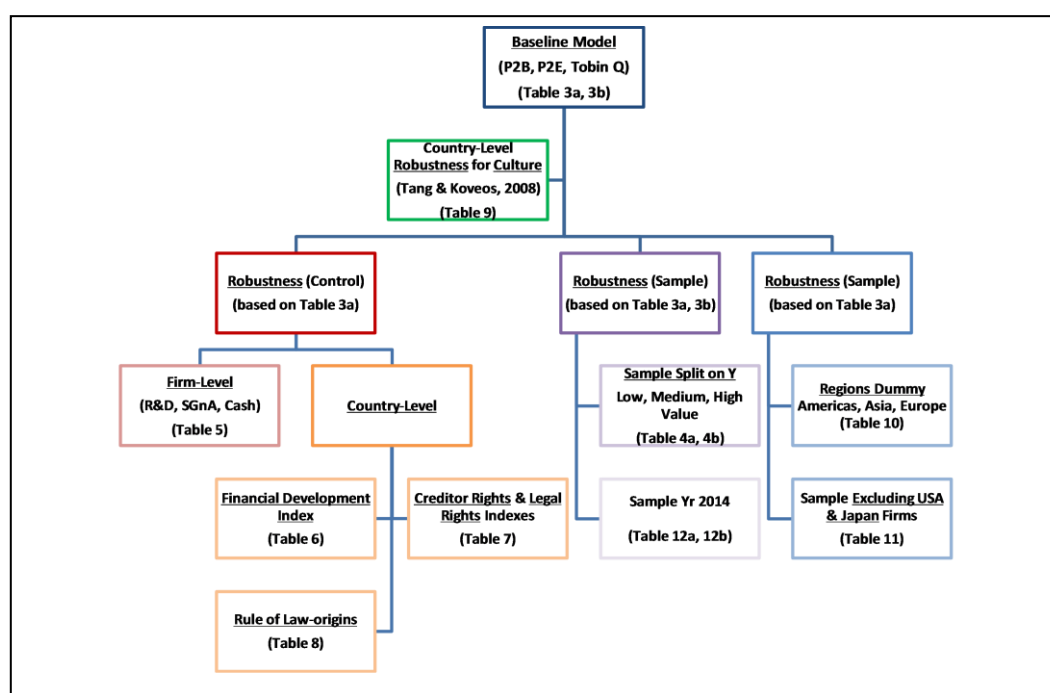
The schematic describes the empirical tests done at the firm-level and country-level, from the baseline test to all the consequent robustness tests.

The next section describes the results of our empirical tests of hypotheses as per our empirical test strategy.

5.4 Results and comments

Literature is increasing highlighting the influence of globalization on firms' competitive advantage, making country barrier irrelevant (Hall, 2015). Despite globalization, our results highlight significant influence of country context factors such as national culture on firm's value.

> "*The results also show that global industry effects are becoming increasingly more important than country effects, while comparative advantage factors, while small, are significant in explaining performance across countries within the same industry.*" (Hawawini *et al.*, 2003)

5.4.1 Main Results and comments

Our key finding is that national culture has a significant influence on firms' value, confirming our hypothesis H1 (see table 5-3). The four culture dimensions of IDV, MAS, UAI, and LTO are significant at the 1% level in their association with the three measures of firm value (P2B, P2E, and Tobin's Q).

The signs of the culture dimensions relationships with the three measures firm value are consistent. The coefficients of culture dimensions' association are the highest for the firm's *price-to-book* value. The

economic significance value-addition is also the highest for *Tobin's Q.* We find that IDV is positively, MAS is negatively, UAI is negatively, and LTO is positively associated with firm value.

Moreover, culture influence differs (see table 5-4) as culture relationship sign changes with higher and lower value firms, confirming our hypothesis H2. The sign of culture dimensions relationship with highest values firms (H) differs from lowest value ones (L). These results meets our expectation that differences in national culture, found in the national business systems, lead to differences in firm value. Later in this section, we analyze these results in more details.

At the firm-level (see table 5-3), firm growth measured by capital expenditure is positively related with firm value (Varaiya *et al.*, 1987). The profitability measure of firm's *ebit* is positively associated with the *price-to-book*[73] and the *Tobin's' q*, but negatively associated with *price-to-earning*. Indeed, Varaiya *et al.* (1987) highlight that a very large number of firms have a high market value despite low levels of profitability. Our results would tend to meet his findings (see table 5-3, Panel A, model (6)) with *price-to-earning*. We observe that the coefficients value of for firms size and performance declines in the presence of culture values. This result may suggest that in the presence of national culture values, the non-financial factors may be playing a role on firm value (Chauvin & Hirschey, 1994).

The national culture influence through firm's human capital maybe adding value through firm's *goodwill*. We do observe (see table 5-3, Panel B) that firm size (*log sales*) relationship becomes negative for *price-to-book*. It may suggest that human capital plays a higher role in small firms resulting in higher value. However, this interpretation could be biased by the sample with HCD, as it does not contain many of the large Asian countries. We analyze HCD and regions effects later in this section.

Continuing our firm-level analysis. Firm's capital structure (*TD/TA*) is positively associated with the *price-to-book* and the *Tobin's Q,* but negatively associated with *price-to-earning*. The *price-to-earning* relationship (see table 5-3, Panel A, model (6)) with capital structure confirms that firms with lower debt have higher market value (Masulis, 1983; Fama & French, 1998).

With HCD (see table 5-3, Panel B), we observe that capital structure relationship becomes positive with *price-to-earning*. It may suggest that firm with specific human capital requires higher debt leading to higher market value. We find working capital (WC) to be positively related to firm value, as the various components of WC can foster sales and firm profitability, which in turn influences firm value (Deloof, 2003).

At the country-level (see table 5-3), country's wealth *GDP-per-capita* is positively related to firm value. Financial market development *market cap-to-GDP* is positively related to firm value, confirming the development of financial market in firm value (Demirgüç-Kunt & Maksimovic, 1998). Banking sector

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[73] Varaiya *et al.* (1987) claim that *price-to-book* and *Tobin Q* are empirically same in term of value measure.

development, measured by *credit-to-GDP*, has a negative relationship, which suggests that listed firms value benefit more from the development of the financial market than the banking sector. This may align with Varaiya *et al.* (1987) findings that irrespective of firms' profitability, firms have a high value in the context of a developed financial market. However with HCD, *credit-to-GDP* relationship with firm value turn positive. It suggests that firms' value in most European countries also depend on the banking sector development.

Moreover, the rule of law (*law_wjp*) association with firm value comes out to be negative, suggesting that firms in our sample could be benefiting from poor rule of law implementation in their country. We know that law and governance are influenced by culture (Licht *et al.*, 2005) and may indirectly infleunce firm value as well. These country-level results represent the institutional components effects of the country context (see figure 5-2), in the presence of national culture (Witt & Redding, 2009). In our robustness test section 5.4.2, we perform additional country-level tests.

< Insert table 5-3 here >

We now present a more detailed analysis of our results of hypothesis H2. To test this hypothesis, we apply Fama and French (1993) sample split methodology. We split our sample in four quantiles based on firm value measures. Our results (see table 5-4) highlight that depending on the firm's value quantile, culture dimensions relationships signs with firm value changes. It may suggest that differences in culture, leading to differences in national business systems, has a differing influence on firm value (Porter, 2000; Breuer & Salzmann, 2012).

Moreover, our results (see table 5-4, Panel A) highlight a mostly negative association of a country's banking sector development on firm value. With HCD (see Panel B), the Q1 quantile presents a positive relationship of the banking sector and HCD with firm Value. It may confirm the link between the specific human capital skills development in a business system based around the banking sector (Haake, 2002; Breuer & Salzmann, 2012). However, there could also be a sample size effect due to low number of countries represented in each quantile.

Country's wealth is positive and somewhat significant for higher value firms (M & L). This result could be due to higher IDV and wealth being correlated (Hofstede, 1980). LTO and IDV are positive with firm value in the H quantile. The rule of law is negative and somewhat significant for M and H quantiles. This result suggests that higher value firms maybe benefiting from lower implementation of the rule of law in their country-of-origin. There could also be indirect effects of culture influencing the rule of law and governance (Porta *et al.*, 1998; Licht *et al.*, 2005).

We extend our analysis of hypothesis H2 results (see table 5-4). We start by comparing the lower value firms' quantile (L) with higher ones (H). We find that culture dimensions relationship are opposite between lower value and higher value firms. Firm's size (*log sales*) is positive with L and negative with M and H. These results suggests that culture influence differs on firms' value based on firm's size. Firms in lower *uncertainty avoidance* cultures have a higher value (M & H). These results confirm our expectations described in hypothesis H2 of differences in firms' national culture resulting in differences in their value, through the differences in business systems.

Concluding our H2 results analysis (see table 5-4, Panel A), we find that lower UAI and lower LTO (short-term oriented cultures) influence firms with lower value (L). Some such countries are USA (UAI: 46, LTO: 26) and Denmark (UAI: 23, LTO: 35). On the opposite, we find that higher IDV (low collectivist cultures), Lower UAI, and higher LTO (low short-term oriented cultures), influence higher value firms (M, H). Some such countries are Singapore (UAI: 8, LTO: 72), China (UAI: 30, LTO: 87), and Vietnam (UAI: 30, LTO: 57).

< Insert table 5-4 here >

In the next section, we describe our robustness tests done at the firm-level, country-level, and sample-level and analyze their results.

5.4.2   Robustness tests and comments

We perform robustness tests at the firm-level (see table 5-5), country-level (see table 5-6, 5-7, 5-8, 5-9) and the sample-level (see table 5-10, 5-11, 5-12). Firm-level tests are done to check for the effects of cash holding, research & development and selling expenses on firm value (Martínez-Sola *et al.*, 2013).

Country-level tests check for alternate measures of country's financial development (Svirydzenka, 2016) (see table 5-6), of creditor rights protection and governance (Nini *et al.*, 2012) (see table 5-7), and of the origins of law (La Porta *et al.*, 2008) (see table 5-8). We also test for alternate measures (see table 5-9) of Hofstede culture dimensions to control for the effect of economic changes that could have an effect on these (Tang & Koveos, 2008).

At the sample-level, we test for the effects of geographical region of the firms (see table 5-10) and by excluding countries with large number of firms, such as Japan and USA from the sample (see table 5-11).

Our firm-level robustness tests results show (see table 5-5) that firm's cash holding is only significant for the P2B value. These results suggest that cash holding only adds value in firms' *price-to-book* ratio

(Martínez-Sola *et al.*, 2013). R&D and selling expenses have a positive and significant relationship with firm value. These significant relationships do not change the culture's significance level or its relationship sign with firm value. However, inclusion of R&D and selling expenses results in a reduction of cultural dimensions coefficients for all firm value measures. These results suggest that innovation and marketing (Chauvin & Hirschey, 1994) have important direct effects on firms' market value. Inspite of these effects, our main results of culture dimensions' association signs and significance with firm value remain stable.

< Insert table 5-5 here >

Continuing our country-level robustness tests analysis. We test for the alternate measures of overall financial development (Svirydzenka, 2016) as well as its sub-index of financial market and financial institutions development (see table 5-6). We find their association to be significant, and bear the same signs as the measures taken from the World Bank.

< Insert table 5-6 here >

We check for the creditor's rights protection effects on firm value (Nini *et al.*, 2012) applying the index from Djankov *et al.* (2007). The results (see table 5-7) show CRI association to be positive and significant with firm value, confirming that creditors and investors protection importance (Nini *et al.*, 2012).

< Insert table 5-7 here >

The measures of the origins of the rule of law (La Porta *et al.*, 2008) have an association with national culture. Our results show (see table 5-8) mostly significant association of the rule of law origins with varying signs. The civil law of France and Germany origins are negatively and of Scandinavian origin positively associated with firm value. The English law is only positively associated with firm value P2E measure. Our main results of culture association with firm value remain stable in sign and significance.

The three countries-of-origins of civil law are characterized by a preference for the banking sector and the common law of English origin for stock market system preference (Kwok & Tadesse, 2006). These

cultural preferences influence the development of these financial institutions in countries according to their origin of the rule of law.

The development of each of these financial systems influence the development of countries' business systems (Haake, 2002). We again find the influence of culture on business systems through the origin of rule of law and countries financial systems (Breuer & Salzmann, 2012). These business systems influence industry development and firms' competiveness, which could lead to firm's value (Porter, 2000).

< Insert table 5-8 here >

The last country-level robustness test is for possible changes of Hofstede dimensions scores due to changes in wealth of countries. We apply revised dimensions' scores described by Tang and Koveos (2008). The number of countries available with these new scores are limited. Despite this limitation, we find that cultural dimensions remain significant in their influence on firm value (see table 5-9).

< Insert table 5-9 here >

At the sample-level, we perform three robustness tests. First, we test the effect of firms' geographical region on the possible effects on over or under value of firms. We do this by adding geographical dummy variables. The results (see table 5-10) show that firms belonging to Asia regions seems to have a lower value. It could be due to differences in stock markets of countries in that region or the investors' perception of that geography in regards to Europe and Americas region (Boasson et al., 2005).

< Insert table 5-10 here >

The second sample-level test is done by removing firms from Japan and the USA as they represent about 28% of the sample. The results (see table 5-11) remain consistent with our main results in sign and significance. However, masculinity is no more significant as both countries have high MAS scores (Japan: 95 and USA: 62).

< Insert table 5-11 here >

The third sample-level test is done using year 2014 dataset (see table 5-12). It is to ensure that our results are not biased by our baseline regression by a single year 2017. As culture is stable over long periods, we expect that its influence would exist on firms from their inception into their lifecycle. Our results with year 2014 data sample match our results for our data sample for year 2017. It confirms our hypothesis validity irrespective of the year.

< Insert table 5-12 here >

5.5   Conclusion

Our paper highlights the influence of national culture on firm's value. National culture influences the development of business systems. Business systems, with their mix of natural institutions of finance, law, governance, and human capital development, foster specific industry competitiveness. The specific human capital adds to firms' *goodwill*.

Differences in firms' country-of-origin cultures brings the differing business systems influence into firm value. Our empirical results highlights this process of national culture's influence transmitting to firm value, through business systems. Our study brings a new insight on firms' financial value due their country-of-origin business systems alignment with their national cultures. This perspective of culture's influence on firm value has not been explored earlier by the culture and finance literature.

Culture influences a country's business systems and fosters the development of specific industries (Breuer & Salzmann, 2012). Specific industry development rests on the foundation of specific human capital skills (Harris & Raviv, 1991; MacKay & Phillips, 2005). National culture influences the human capital's pre-disposition to acquire specific skills. It leads to firms from these cultures to be more competitive in a specific industry (Haake, 2002). Firms' competitiveness brings higher shareholders value through *goodwill* (Varaiya *et al.*, 1987; Chauvin & Hirschey, 1994). It leads to firms to have differing market values within the same industry sector depending on their country-of-origin.

We find that Hofstede cultural dimensions, of firms' country-of-origin, of higher *individualism*, lower *masculinity*, lower *uncertainty avoidance*, and higher *long-term orientatio*n influence higher firm value. Our results show that differences in culture values leads to differences in firm value, as to be higher or lower. Through these results, our paper brings novel perspectives on firms' national cultural values influencing its market value.

Our findings bring to the forefront multiple points. First, that firms' national cultural values predispose them to be more or less competitive through their country's business systems and human capital skills. It potentially leads to their higher or lower market value. These findings are new to the existing culture and finance literature. Second, that culture influence on firms' market value is present irrespective of

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their size. Opposite cultural dimensions' relationships exist between firms having lower value and those having higher value. These results remain stable to multiple robustness tests at the firm-level, country-level, and the sample-level.

Our findings add to the literature on competitive and comparative advantage of firms due to their national cultures (Porter, 1985, 2000; Witt & Redding, 2009). The findings also highlight how firms' national culture values could add financial value from their *goodwill* value (Chauvin & Hirschey, 1994). Our results add new knowledge about culture and firm value to the body of literature on culture and finance (Karolyi, 2016; Pan *et al.*, 2017).

Our findings would be useful to entrepreneurs as it could guide them to develop their firms in the best suited national culture and country. The findings could also assist multinational firms in building new developments in the most suited business system that fosters their growth and creates financial value. Our results could also guide financial analysts, by either discounting or adding to the market value, to compare firms' value based on their country-of-origin. The findings can also help investors in choosing firms to invest-in based on country-of-origin as it predisposes them to have a higher a lower value in an industry. Our paper's work could also push governments in tweaking their national business systems to better suit their existing industries' growth and foster new industry sectors development.

Our findings align with a new body of management and economic literature is suggesting that these national cultural values advantages build into business systems could be taken advantage of by existing or new firms (Hall, 2015). These firms could choose the culture and country best suited to build new skills and competitiveness.

A new perspective linked to globalization is that higher alignment of institutions across countries could prepare them for higher international business cooperation (Witt & Redding, 2009). As has been done by Japan, more than a century ago during the *meiji* era, by aligning their business institutions to the western ones to facilitate their international trade perspectives. This stream of literature could provide enough fodder for future culture and finance research.

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Regressions Tables for Essay 3

Table 5-1: Summary of variables. Essay three.

Dependent, explanatory and key variables of measure for firms' financials, national culture, country's economic development and institutional development.

Variables	Descriptions	Sources
Dependent variable: Firm Value		
P2B	Market Price per share / Book Value per share	Varaiya et al. (1987)
P2E	Market Price per share / Earnings per share	Varaiya et al. (1987)
Tobin's Q	*(MVE + PS + DEBT) / TA*	Chung & Pruit (1994)
Explanatory variables: Hofstede's cultural dimensions		
Individualism (IDV)	Individualism vs. Collectivism (Low IDV)	Hofstede et al. (2010)
Masculinity (MAS)	Masculinity vs. Feminity (Low MAS)	Hofstede et al. (2010)
Uncertainty Avoidance (UAI)	Low to High Uncertainty Avoidance	Hofstede et al. (2010)
Long Term Orientation (LTO)	Long Term vs. Short Term Orientation (Low LTO)	Hofstede et al. (2010)
Firm-level control variables		
Capex / TA	To represent firm's growth	Varaiya et al. (1987)
EBIT / TA	To represent firm's performance	Varaiya et al. (1987)
WC / TA	To represent firm's operational liquidity	Deloof (2003)
TD / TA	To represent firm's overall debt position	Martínez-Sola et al. (2013)
Log_Sales	To represent firm Size	Masulis (1983)
Stddev_EBITDA	To represent firm's risk taking	Ammann et al. (2012)
Country-level control variables		
Log (GDP per capita)	Measure of Country's wealth	Hofstede et al. (2010)
Log (Private credit / GDP)	Domestic Credit to Private Sector (as % of GDP)	Demirgüç-Kunt & Maksimovic (1998)
Log (Stock Mkt Captalization/GDP)	Country's Stock Market Capitalization (as % of GDP)	Demirgüç-Kunt & Maksimovic (1998)
Legal Rights Index (wjp)	Rule of law implementation (World Justice Project)	Botero & Ponce (2011)
HCD	Human Capital Development	Redding (2005)
Robusteness test variables		
Firm-level		
Cash_TA	Cash holding level / Total Assets	Martínez-Sola et al. (2013)
RD_TA	Research and Development expenses / Total Assets	Ammann *et al.* (2012)
SGnA_TS	Selling, General & Administration expenses / Sales	Chauvin & Hirschey (1994)
Country-level		
CRI	Creditors Rights Index	Djankov *et al* . (2007), Nini et al. (2012)
FDI	Financial Development Index	Svirydzenka (2016)
FDI_FII	Financial Insitutional Index	Svirydzenka (2016)
FDI_FMI	Financial Market Index	Svirydzenka (2016)
Law_origin	Origin of law (Eng, Fra, Scan, Ger)	La Porta et al. (1998)
Sample-level		
Dummy_Region	Geographical region of the Firm (Americas, Asia, Europe, RoW)	

Table 5-2: Descriptive Statistics.

Panel A: Country-level summary statistics for key variables. Firm-level variables are obtained or computed from Reuters Datastream database for the period 2012-2017, from the manufacturing sector (SIC codes 2000-3999). The Hofstede dimension are VSM2015 obtained from Hofstede website. Country-level economic indicators are obtained from World Bank Indicators database 2018. The legal rights index is obtained from the World Justice Project 2017-2018. The five firm-level financial control variables are scaled by book value of Total Assets.

Country	N	Price-to-Book	Price-to-Earnings	Tobin Q	IDV	MAS	UAI	LTO	Capital Expenditure	Capital Structure	Working Capital	Total Sales	EBIT	StdDev. (EBITDA)	GDP_PC	MCAP-to-GDP	Credit-to-GDP	Law_WJP	HCD
ARAB	55	0.2536	2.9198	0.0131	38	53	68	23	0.0275	0.2524	0.1720	12.8308	0.0649	0.0308	10.1327	4.1186	4.1284	0.6464	.
AUSTRALIA	34	0.9953	3.0856	0.5210	90	61	51	21	0.0462	0.2137	0.1849	13.7812	0.1125	0.0728	10.8985	4.7305	4.9425	0.8138	-1.0878
BELGIUM	28	0.7589	3.0345	0.2041	75	54	94	82	0.0436	0.2063	0.2110	13.7684	0.0988	0.0380	10.6807	4.4826	4.1892	0.7734	0.5992
CANADA	25	0.8992	2.9717	0.4020	80	52	48	36	0.0522	0.2232	0.1812	14.8229	0.1132	0.0441	10.7160	4.9679	3.6630	0.8097	-1.3072
CHILE	29	0.4168	2.9166	0.0814	23	28	86	31	0.0394	0.2362	0.1979	13.1101	0.0835	0.0312	9.6183	4.6643	4.7216	0.6655	0.9095
CHINA	491	1.0398	3.7198	0.5329	20	66	30	87	0.0437	0.2237	0.1934	13.3861	0.0743	0.0351	9.0778	4.2730	5.0564	0.4998	2.5084
DENMARK	35	1.2223	3.4104	0.6596	74	16	23	35	0.0431	0.1824	0.1310	13.4780	0.1254	0.0362	10.9546	4.8236	5.0932	0.8918	-0.5552
FINLAND	40	0.9204	2.8763	0.4227	63	26	59	38	0.0406	0.2196	0.2104	13.3624	0.1191	0.2742	10.7321	4.6016	4.5473	0.8700	-0.0265
FRANCE	107	0.7125	2.9798	0.1415	71	43	86	63	0.0368	0.2155	0.2238	13.9456	0.0790	0.0366	10.5631	4.6663	4.6197	0.7368	0.9394
GERMANY	100	0.9364	3.0879	0.3219	67	66	65	83	0.0482	0.1854	0.2276	14.4510	0.0903	0.0318	10.7073	4.1150	4.3484	0.8349	0.4077
INDIA	219	1.4041	3.3295	0.8512	48	56	40	51	0.0654	0.2135	0.1633	13.4094	0.1420	0.1836	7.5916	4.4762	3.8873	0.5178	2.0940
INDONESIA	103	0.2649	2.8614	0.0047	14	46	48	62	0.0402	0.2345	0.2242	12.2189	0.1090	0.0456	8.2524	3.9373	3.6569	0.5169	1.5141
ISRAEL	22	0.9580	2.9360	0.3322	54	47	81	38	0.0419	0.2778	0.2209	13.5163	0.0984	0.0316	10.6101	4.1806	4.1835	0.4691	-0.9999
ITALY	31	0.4247	2.8416	-0.0760	76	70	75	61	0.0311	0.2664	0.1824	13.1200	0.0789	0.0425	10.3783	3.6123	4.3971	0.6483	1.2461
JAPAN	794	0.1432	2.8301	-0.2106	46	95	92	88	0.0391	0.1672	0.2734	13.7850	0.0654	0.0238	10.5540	4.8524	5.1329	0.7858	.
MALAYSIA	89	0.7186	2.9354	0.3747	26	50	36	41	0.0561	0.1659	0.2631	12.1968	0.1175	0.0479	9.2220	4.9755	4.7775	0.5354	1.0108
NETHERLANDS	18	1.1158	3.0550	0.4388	80	14	53	67	0.0344	0.2159	0.1325	14.6400	0.0842	0.0269	10.7890	4.8862	4.7123	0.8541	-0.5092
NORWAY	23	0.7936	2.9476	0.2392	69	8	50	35	0.0533	0.1798	0.2117	13.4762	0.0884	0.0377	11.2346	4.2751	4.9842	0.8877	-0.4226
PAKISTAN	131	0.4117	2.6894	0.0658	60	64	93	38	0.0664	0.2904	0.1034	11.3174	0.1101	0.0506	9.5368	3.6444	3.9603	0.6707	.
PHILIPPINES	28	0.3870	2.9577	0.0671	14	50	70	50	0.0548	0.2456	0.1596	12.8629	0.0858	0.0415	7.2909	3.3955	2.8352	0.3918	.
POLAND	89	0.2902	2.8047	-0.0758	32	64	44	27	0.0532	0.1874	0.2011	11.7704	0.0841	0.0450	8.0003	4.5283	3.8663	0.4688	0.5986
SINGAPORE	41	0.2653	2.7362	-0.1012	20	48	8	72	0.0371	0.1615	0.2866	13.1765	0.0928	0.0504	11.0071	5.4495	4.8099	0.7959	.
SOUTH KOREA	565	0.2644	2.9298	-0.0262	18	39	85	100	0.0524	0.1992	0.1916	12.7378	0.0772	0.0520	10.3003	4.7514	4.9753	0.7203	0.2936
SPAIN	30	0.8659	2.8378	0.3596	51	42	86	48	0.0492	0.2560	0.2009	13.1411	0.0956	0.0485	10.2474	4.2140	4.6586	0.7026	-0.1773
SWEDEN	74	0.9400	3.0554	0.3825	71	5	29	53	0.0299	0.2197	0.1775	13.5556	0.0936	0.0380	10.8828	4.9783	4.8884	0.8634	-0.4097
SWITZERLAND	74	1.0767	3.2352	0.5512	68	70	58	74	0.0411	0.1476	0.2752	14.0483	0.0957	0.0364	11.2939	5.5150	3.3293	0.8877	-0.5870
TAIWAN	416	0.3920	3.0076	0.0335	17	45	69	93	0.0432	0.2185	0.2528	12.6691	0.0705	0.0424	10.1027	5.2034	3.0709	0.7681	.
THAILAND	127	0.5493	2.9914	0.2436	20	34	64	32	0.0488	0.2049	0.2092	12.0548	0.0897	0.0468	8.7915	4.7920	4.9766	0.5045	1.0530
TURKEY	39	0.8183	2.7392	0.2242	37	45	85	46	0.0785	0.3020	0.1778	13.5002	0.1187	0.0449	9.2591	3.2853	4.2619	0.4167	0.8901
UNITED KINGDOM	80	1.1125	2.9549	0.3705	89	66	35	51	0.0354	0.2362	0.1083	14.2608	0.0966	0.0387	10.5949	4.7719	4.9083	0.8077	-1.4380
UNITED STATES	531	1.2626	3.2883	0.5725	91	62	46	26	0.0358	0.2883	0.2332	14.6142	0.0972	0.0480	11.0009	5.1050	5.2926	0.7309	-1.7876
VIETNAM	246	0.1685	2.4512	-0.1323	20	40	30	57	0.0607	0.3013	0.1633	10.6181	0.0990	0.0417	7.7688	4.0253	4.8731	0.5008	.
Total	4714	0.6238	3.0403	0.1859	43	58	62	67	0.0456	0.2200	0.2144	13.2022	0.0868	0.0487	9.8921	4.6619	4.6341	0.6808	0.4237

Panel B: Firm-level summary statistics

Variable	Mean	StdDev	5th Percentile	Median	95th Percentile	N
P2B	0.6238	0.8151	-0.6120	0.5743	2.0206	4714
P2E	3.0403	0.8167	1.9001	2.9535	4.5857	4714
Tobin Q	0.1859	0.6489	-0.7429	0.1111	1.3536	4714
IDV	42.8148	26.1752	17.0000	46.0000	91.0000	4714
MAS	58.0123	21.0530	34.0000	56.0000	95.0000	4714
UAI	61.8895	24.1811	30.0000	65.0000	92.0000	4714
LTO	67.4139	26.7307	25.6927	82.8715	100.0000	4714
CAPEX17 / TA17	0.0456	0.0452	0.0052	0.0336	0.1240	4714
TD17 / TA17	0.2200	0.1566	0.0077	0.2023	0.5038	4714
WC17 / TA17	0.2144	0.1863	-0.0754	0.2071	0.5285	4714
SALES17 (log)	13.2022	1.8198	10.3814	13.0955	16.3774	4714
EBIT17 / TA17	0.0868	0.0643	0.0177	0.0737	0.1992	4714
stddev (EBITDA)	0.0487	0.4785	0.0079	0.0271	0.1091	4714
GDP per Capita (log)	9.8921	1.0674	7.5916	10.3003	11.0009	4714
Market Cap. To GDP (log)	4.6619	0.4497	3.9373	4.7514	5.2034	4714
Pvt. Credit to GDP (log)	4.6341	0.6938	3.0709	4.9753	5.2926	4714
Law_wjp	0.6808	0.1293	0.4998	0.7309	0.8634	4714
HCD (pc1)	0.4237	1.4497	-1.7876	0.2936	2.5084	3003
R&D17 / Sales17	0.0347	0.0481	0.0009	0.0214	0.1220	3197
SGnA17/ Sales17	0.1807	0.1316	0.0352	0.1481	0.4395	4306
CASHnEQ17 / TA17	0.1498	0.1254	0.0121	0.1194	0.3910	4713
CRI	1.9230	0.7867	1.0000	2.0000	3.0000	4714
WBI_LRI	6.3104	2.3989	4.0000	6.0000	11.0000	4714
FDI	0.6853	0.2131	0.2360	0.7850	0.8770	4298
FDI_FII	0.6934	0.2061	0.3440	0.7890	0.8920	4298
FDI_FMI	0.6636	0.2368	0.1030	0.7480	0.9030	4298

Panel C: Correlation matrix with firm-level observations

	Price-to-Book	Price-to-Earnings	Tobin Q	IDV	MAS	UAI	LTO	Capital Expenditure	Capital Structure	Working Capital	Total Sales	EBIT_TA	RISK	GDP_PC	MCAP_GDP	Credit_GDP	Law_wjp	HCD
P2B	1																	
P2E	0.359***	1																
Tobin Q	0.906***	0.375***	1															
IDV	0.295***	0.0445**	0.201***	1														
MAS	-0.0773***	0.0168	-0.108***	0.215***	1													
UAI	-0.332***	-0.184***	-0.320***	-0.0554***	0.317***	1												
LTO	-0.271***	-0.00411	-0.235***	-0.605***	0.193***	0.411***	1											
CAPEX17 / TA17	0.107***	-0.0336*	0.133***	-0.0833***	-0.0624***	-0.00863	-0.00157	1										
TD17 / TA17	0.0544***	0.0178	-0.0581***	0.0775***	-0.0927***	-0.113***	-0.161***	0.0566***	1									
WC17 / TA17	0.0361*	0.0139	0.162***	0.00533	0.119***	0.0805***	0.0688***	-0.144***	-0.543***	1								
SALES17 (log)	0.182***	-0.0425**	0.0497***	0.373***	0.226***	0.0331*	-0.0418**	-0.0593***	0.136***	-0.182***	1							
EBIT17 / TA17	0.514***	-0.279***	0.574***	0.0981***	-0.110***	-0.143***	-0.196***	0.124***	-0.178***	0.166***	0.0307*	1						
stddev (EBITDA)	0.0562***	0.0195	0.0508***	0.00562	-0.0208	-0.0178	-0.0196	-0.0128	0.00875	0.00707	-0.0191	0.0500***	1					
GDP-per-Capita (log)	0.00470	0.00185	-0.0557***	0.533***	0.197***	0.417***	0.0943***	-0.143***	-0.0586***	0.113***	0.363***	-0.122***	-0.0285	1				
MCap-to-GDP (log)	0.0311*	0.0349*	0.00770	0.228***	0.0763***	0.112***	0.0967***	-0.112***	-0.0937***	0.151***	0.248***	-0.0773***	-0.00619	0.605***	1			
Pvt.Credit-to-GDP (log)	0.0390**	0.0448**	0.00630	0.274***	0.269***	-0.0309*	-0.0697***	-0.0548***	0.00367	0.0113	0.173***	-0.0525***	-0.0183	0.274***	0.0289*	1		
Law_wjp	-0.0803***	-0.0842***	-0.125***	0.454***	0.157***	0.479***	0.198***	-0.111***	-0.0967***	0.103***	0.272***	-0.0953***	-0.0149	0.872***	0.622***	0.0398**	1	
HCD	-0.0749***	0.127***	0.00461	-0.753***	0.0744***	-0.172***	0.524***	0.100***	-0.111***	-0.0458*	-0.260***	-0.0238	0.0130	-0.792***	-0.689***	-0.298***	-0.721***	1

significance levels: ***p < 0.01, **p < 0.05, *p < 0.1.

Table 5-3: Culture effects on firm value, through business systems (Financial, Legal, and Human Capital Development). Baseline model.

Panel A: Regression results for dependent variables firm value for 2017 for manufacturing sector firms (SIC code : 2000-3999), including four Hofstede cultural dimensions, six firm-level control variables, and four country-level control variables. The Hofstede dimensions are VSM2015 obtained from Hofstede website. The GDP-per-capita and the private-credit-to-GDP for 2017 are obtained from the world bank indicators datanase and the rule of law from the world justice project 2017-2018. Firm-level variables are computed from the reuters datastream database.

	Price-to-Book	Price-to-Book	Price-to-Book	Price-to-Earnings	Price-to-Earnings	Price-to-Earnings	Tobin's Q	Tobin's Q	Tobin's Q
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Hofstede Cultural Dimensions									
Individualism	0.0105***		0.0163***	0.0039***		0.0133***	0.0055***		0.0110***
	(18.3304)		(18.9721)	(6.2441)		(12.6707)	(11.5546)		(16.2679)
Masculinity	-0.0024***		-0.0033***	0.0015**		-0.0016**	-0.0020***		-0.0028***
	(-4.1492)		(-6.0251)	(2.4363)		(-2.4456)	(-4.2839)		(-6.3613)
Uncertainty Avoidance	-0.0110***		-0.0070***	-0.0088***		-0.0068***	-0.0081***		-0.0052***
	(-21.5260)		(-13.4172)	(-15.8659)		(-10.6447)	(-19.3092)		(-12.6954)
Long term Orientation	0.0024***		0.0096***	0.0052***		0.0102***	0.0008*		0.0070***
	(4.0203)		(14.1775)	(8.0179)		(12.3455)	(1.7119)		(13.1522)
Firm-Level Control Variables									
CAPEX17 / TA17		1.1058***	1.3859***		0.2293	0.4312*		1.2466***	1.4386***
		(5.0479)	(6.8952)		(0.9006)	(1.7607)		(7.3710)	(9.0997)
TD17 / TA17		0.7454***	0.5585***		-0.1179	-0.2043**		0.3791***	0.2582***
		(10.0739)	(8.1411)		(-1.3708)	(-2.4448)		(6.6379)	(4.7848)
WC17 / TA17		0.2068***	0.1993***		0.1803**	0.1564**		0.4424***	0.4475***
		(3.2148)	(3.3549)		(2.4118)	(2.1608)		(8.9091)	(9.5753)
SALES17 (log)		0.0575***	0.0203***		-0.0145**	-0.0481***		0.0098**	-0.0142***
		(9.6346)	(3.5068)		(-2.0816)	(-6.8145)		(2.1269)	(-3.1123)
EBIT17 / TA17		6.6760***	5.9620***		-3.6936***	-4.0471***		5.6685***	5.1905***
		(42.4060)	(39.9223)		(-20.1822)	(-22.2431)		(46.6411)	(44.1885)
stddev (EBITDA)		0.0597***	0.0505***		0.0607***	0.0546**		0.0343**	0.0282*
		(2.9666)	(2.7441)		(2.5941)	(2.4332)		(2.2092)	(1.9484)
Country-Level Control Variables									
GDP per Capita (log)		0.2497***	0.1980***		0.2230***	0.2077***		0.1822***	0.1525***
		(11.2514)	(9.2541)		(8.6457)	(7.9667)		(10.6377)	(9.0626)
Market Cap. To GDP (log)		0.1874***	0.2055***		0.1859***	0.1895***		0.1659***	0.1683***
		(6.6757)	(7.1414)		(5.6953)	(5.4045)		(7.6514)	(7.4339)
Pvt. Credit to GDP (log)		-0.0348**	-0.1168***		-0.0353*	-0.1128***		-0.0328***	-0.0855***
		(-2.1738)	(-7.5972)		(-1.9004)	(-6.0218)		(-2.6528)	(-7.0733)
Law_wjp		-2.5045***	-3.2405***		-2.6819***	-3.4424***		-2.0312***	-2.5134***
		(-14.5116)	(-17.1515)		(-13.3671)	(-14.9546)		(-15.2449)	(-16.9135)
Constant	0.8298***	-2.4544***	-1.2848***	2.9771***	2.4419***	3.2008***	0.5147***	-1.7136***	-0.9451***
	(15.9001)	(-17.5704)	(-9.4416)	(52.6198)	(15.0370)	(19.3057)	(12.0126)	(-15.8903)	(-8.8299)
Firms	4,714	4,714	4,714	4,714	4,714	4,714	4,714	4,714	4,714
R2	0.1914	0.3473	0.4538	0.0534	0.1214	0.1924	0.1399	0.3862	0.4668
Adjusted R2	0.191	0.346	0.452	0.0526	0.119	0.190	0.139	0.385	0.465

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Panel B: Regression results for dependent variables firm value for 2017 for manufacturing sector firms (SIC code : 2000-3999). Country-level Key added variable is Human Capital Development (HCD). HCD is computed as the highest eigenvalue of the Principle Component Analysis done on constituent of human capital development (Redding, 2005) of Income Inequality, Employee Protection, Employee Distribution, and Education System. All other variables are as per the baseline model.

	Price-to-Book	Price-to-Book	Price-to-Book	Price-to-Earnings	Price-to-Earnings	Price-to-Earnings	Tobin's Q	Tobin's Q	Tobin's Q
Hofstede Cultural Dimensions									
Individualism	0.0145***		0.0164***	0.0068***		0.0126***	0.0087***		0.0114***
	(18.9055)		(16.7044)	(8.1806)		(10.6164)	(13.7401)		(14.7375)
Masculinity	-0.0034***		-0.0039***	0.0008		-0.0024***	-0.0030***		-0.0036***
	(-5.4882)		(-6.6742)	(1.1862)		(-3.3232)	(-5.8052)		(-7.7970)
Uncertainty Avoidance	-0.0091***		-0.0069***	-0.0078***		-0.0071***	-0.0068***		-0.0053***
	(-15.3995)		(-12.7843)	(-12.1487)		(-10.7638)	(-13.8853)		(-12.3988)
Long term Orientation	0.0013**		0.0061***	0.0051***		0.0068***	0.0004		0.0046***
	(1.9727)		(6.3912)	(6.8647)		(5.8533)	(0.6773)		(6.1486)
Firm-Level Control Variables									
CAPEX17 / TA17		1.1112***	1.5032***		0.1058	0.4203		1.2487***	1.5270***
		(4.5374)	(6.7877)		(0.3759)	(1.5622)		(6.5657)	(8.7426)
TD17 / TA17		0.8430***	0.6438***		0.0408	-0.1034		0.4255***	0.2842***
		(10.0349)	(8.4574)		(0.4221)	(-1.1178)		(6.5227)	(4.7340)
WC17 / TA17		0.2303***	0.2306***		0.1954**	0.1991**		0.4651***	0.4888***
		(3.2788)	(3.5850)		(2.4207)	(2.5471)		(8.5281)	(9.6338)
SALES17 (log)		0.0556***	0.0198***		-0.0158**	-0.0446***		0.0094*	-0.0127**
		(8.3336)	(3.1031)		(-2.0604)	(-5.7514)		(1.8194)	(-2.5206)
EBIT17 / TA17		6.5115***	5.8556***		-3.3709***	-3.8525***		5.6348***	5.1332***
		(37.7692)	(37.0463)		(-17.0090)	(-20.0610)		(42.0865)	(41.1756)
stddev (EBITDA)		0.0576***	0.0498***		0.0581**	0.0527**		0.0327**	0.0271*
		(2.7789)	(2.6619)		(2.4385)	(2.3221)		(2.0327)	(1.8364)
Country-Level Control Variables									
GDP per Capita (log)		0.2963***	0.3005***		0.3402***	0.3344***		0.2349***	0.2388***
		(11.1855)	(11.1734)		(11.1726)	(10.2355)		(11.4190)	(11.2590)
Market Cap. To GDP (log)		0.2274***	0.3655***		0.3364***	0.4259***		0.2533***	0.3553***
		(5.6124)	(9.4835)		(7.2234)	(9.0937)		(8.0507)	(11.6866)
Pvt. Credit to GDP (log)		-0.1536***	-0.1202***		-0.1694***	-0.1605***		-0.1291***	-0.1044***
		(-5.9006)	(-4.9813)		(-5.6603)	(-5.4756)		(-6.3851)	(-5.4890)
Law_wjp		-2.6550***	-3.0330***		-2.9382***	-3.2732***		-2.1724***	-2.4081***
		(-14.6543)	(-15.3022)		(-14.1078)	(-13.5923)		(-15.4399)	(-15.4038)
HCD	0.1150***	0.0149	0.1702***	0.0739***	0.1037***	0.1876***	0.0916***	0.0417***	0.1502***
	(8.5785)	(1.0791)	(9.4355)	(5.0681)	(6.5450)	(8.5634)	(8.2569)	(3.8987)	(10.5593)
Constant	0.6350***	-2.4020***	-2.9671***	2.8147***	1.3437***	1.1353***	0.3494***	-2.0906***	-2.5285***
	(10.6369)	(-10.5159)	(-13.3697)	(43.3655)	(5.1176)	(4.2106)	(7.0700)	(-11.7855)	(-14.4456)
Firms	4,112	4,112	4,112	4,112	4,112	4,112	4,112	4,112	4,112
R2	0.2112	0.3437	0.4668	0.0597	0.1254	0.2063	0.1583	0.3835	0.4834
Adjusted R2	0.210	0.342	0.465	0.0586	0.123	0.203	0.157	0.382	0.481

t-statistics in parentheses. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 5-4: Firm Value Quantiles, with Finance, Legal, and Human Capital Development Institutions.

Panel A. Regression results for dependent variables firm value for 2017 for manufacturing sector firms (SIC code : 2000-3999). Following Fama and French (1993) methodology, the sample is split into four quartiles by firm value (L for low, M for medium, H for high). All other variables are as per baseline model.

	Q1 (L)			Q2 (M)			Q3 (M)			Q4 (H)		
	P2B	P2E	Tobin's Q	P2B	P2E	Tobin's Q	P2B	P2E	Tobin's Q	P2B	P2E	Tobin's Q
Hofstede Cultural Dimensions												
Individualism	0.0003	-0.0003	-0.0002	0.0023***	0.0018***	0.0009***	0.0011**	0.0007*	0.0012***	0.0030**	0.0015	0.0041***
	(0.2235)	(-0.2861)	(-0.2806)	(5.6270)	(5.5025)	(3.1114)	(2.2753)	(1.8877)	(2.9868)	(2.2538)	(0.8223)	(3.9891)
Masculinity	0.0002	0.0010	0.0002	-0.0011***	-0.0003	-0.0007***	-0.0003	-0.0001	-0.0001	0.0012	-0.0014	-0.0008
	(0.2770)	(1.6065)	(0.5199)	(-4.3861)	(-1.4582)	(-3.7684)	(-0.9472)	(-0.2069)	(-0.4553)	(1.2107)	(-1.0938)	(-1.0471)
Uncertainty Avoidance	-0.0000	0.0006	-0.0010**	-0.0003	-0.0000	-0.0003*	-0.0008***	-0.0004*	-0.0008***	-0.0023***	-0.0027**	-0.0018***
	(-0.0170)	(0.8469)	(-2.1064)	(-1.3692)	(-0.1333)	(-1.6622)	(-2.8790)	(-1.8351)	(-3.6176)	(-2.7313)	(-2.5673)	(-2.9417)
Long term Orientation	-0.0017*	-0.0016*	-0.0008	0.0013***	0.0007***	0.0005**	0.0005	0.0004	0.0009***	0.0018	0.0033**	0.0032***
	(-1.9255)	(-1.7742)	(-1.2247)	(4.3807)	(2.8154)	(2.3863)	(1.4509)	(1.3273)	(2.9368)	(1.5735)	(2.3345)	(3.8000)
Firm-Level Control Variables												
CAPEX17 / TA17	0.8241***	0.7862***	0.6555***	0.0574	-0.0093	0.0369	-0.0392	0.0055	0.1253	-0.0727	-0.3802	0.3670*
	(3.3316)	(3.7797)	(3.5614)	(0.6309)	(-0.1235)	(0.4527)	(-0.3397)	(0.0486)	(1.4970)	(-0.2703)	(-0.9405)	(1.8033)
TD17 / TA17	0.0978	-0.3372***	0.8417***	-0.0070	0.0213	0.0009	-0.0220	0.0376	0.0115	0.7229***	0.1140	-0.0992
	(1.2853)	(-4.1706)	(14.8704)	(-0.2066)	(0.7345)	(0.0397)	(-0.5611)	(1.2019)	(0.3758)	(7.4032)	(0.8814)	(-1.1941)
WC17 / TA17	0.1999***	0.2385***	0.3092***	0.0379	0.0053	0.0407*	-0.0616*	0.0361	0.0432	-0.1646**	0.0343	0.1671***
	(3.0769)	(3.2257)	(6.4224)	(1.2813)	(0.2147)	(1.8250)	(-1.8766)	(1.3439)	(1.6113)	(-2.0167)	(0.3123)	(2.6243)
SALES17 (log)	0.0366***	0.0148**	0.0130***	0.0055**	-0.0065***	-0.0018	-0.0004	-0.0028	-0.0083***	-0.0202**	-0.0675***	-0.0255***
	(5.8855)	(2.2595)	(3.0506)	(2.0529)	(-2.7883)	(-0.9079)	(-0.1250)	(-0.9711)	(-3.1214)	(-2.2006)	(-5.5438)	(-3.4245)
EBIT17 / TA17	1.7674***	-1.3636***	1.3754***	0.6425***	-0.2130***	0.3666***	0.5449***	-0.0836	0.4513***	3.1384***	-3.3125***	2.5579***
	(7.0281)	(-7.5630)	(7.7210)	(5.6651)	(-2.7832)	(3.9550)	(5.3273)	(-1.2049)	(4.8560)	(17.8806)	(-10.8436)	(19.1663)
stddev (EBITDA)	-0.2114	-0.0963	-0.5075***	-0.0154	-0.1002	-0.0046	-0.0563	0.2678**	0.0137	0.0371**	0.0101	0.0166
	(-0.8692)	(-1.0520)	(-3.0051)	(-0.9748)	(-1.1171)	(-0.3900)	(-1.4138)	(2.0893)	(0.3880)	(2.5788)	(0.5692)	(1.4777)
Country-Level Control Variables												
GDP per Capita (log)	-0.0154	0.0010	0.0149	-0.0003	-0.0050	0.0172**	-0.0022	0.0036	0.0171*	0.0015	-0.0585	-0.0601***
	(-0.4532)	(0.0362)	(0.6835)	(-0.0230)	(-0.5527)	(2.1260)	(-0.1799)	(0.3660)	(1.7414)	(0.0531)	(-1.4078)	(-2.5930)
Market Cap. To GDP (log)	0.1951***	0.0610*	0.0672**	0.0267*	0.0194*	0.0109	-0.0078	0.0187	0.0103	0.0510	0.0213	0.1098***
	(5.1815)	(1.7167)	(2.5199)	(1.9413)	(1.7483)	(1.0872)	(-0.5212)	(1.3372)	(0.8111)	(1.1976)	(0.3614)	(3.3307)
Pvt. Credit to GDP (log)	-0.0298*	-0.0426**	-0.0340***	-0.0062	-0.0093	-0.0101**	-0.0010	-0.0096	-0.0044	0.0153	0.1025***	0.0093
	(-1.8645)	(-2.3515)	(-3.0160)	(-0.9176)	(-1.6125)	(-1.9862)	(-0.1228)	(-1.3024)	(-0.6321)	(0.5389)	(3.0875)	(0.4319)
Law_wjp	0.0437	0.0343	0.1175	-0.2924***	-0.1830**	-0.1931***	-0.0246	-0.1409	-0.1814**	-0.4309	-0.1298	-0.3572
	(0.1291)	(0.1332)	(0.5775)	(-3.3136)	(-2.4754)	(-2.8273)	(-0.2585)	(-1.6308)	(-2.2826)	(-1.4770)	(-0.3156)	(-1.5451)
Constant	-1.5404***	1.9792***	-1.3062***	0.2102***	2.8803***	-0.1465***	0.8845***	3.1818***	0.2520***	1.1475***	5.1820***	1.0091***
	(-9.5173)	(12.9655)	(-11.7859)	(2.9628)	(50.0383)	(-2.8263)	(10.7276)	(46.2794)	(3.7260)	(5.3009)	(18.4975)	(5.9493)
Firms	1,170	1,174	1,172	1,171	1,173	1,169	1,175	1,178	1,175	1,170	1,161	1,170
Countries	29 (14)	31 (19)	31 (17)	32 (22)	32 (22)	32 (23)	32 (21)	32 (19)	32 (21)	32 (21)	32 (19)	32 (22)
R2	0.1401	0.1184	0.2353	0.0801	0.0420	0.0513	0.0513	0.0220	0.0562	0.2645	0.2024	0.3290
Adjusted R2	0.130	0.108	0.226	0.0689	0.0304	0.0398	0.0399	0.0102	0.0448	0.256	0.193	0.321

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Panel B. Regression results for dependent variables firm value for 2017 for manufacturing sector firms (SIC code : 2000-3999). Following Fama and French (1993) methodology, four quartiles are defined by firm value (L for low, M for medium, H for high). We add the Human Capital Development variable to the baseline model.

	Q1 (L)			Q2 (M)			Q3 (M)			Q4 (H)		
	P2B	P2E	Tobin's Q	P2B	P2E	Tobin's Q	P2B	P2E	Tobin's Q	P2B	P2E	Tobin's Q
Hofstede Cultural Dimensions												
Individualism	0.0009	-0.0013	-0.0008	0.0024***	0.0019***	0.0007**	0.0008	0.0008*	0.0012***	0.0024	0.0006	0.0032***
	(0.5730)	(-0.9458)	(-0.8526)	(4.8869)	(5.0830)	(1.9887)	(1.6133)	(1.7858)	(2.6504)	(1.6155)	(0.2862)	(2.9425)
Masculinity	0.0000	0.0010	0.0002	-0.0012***	-0.0004*	-0.0007***	-0.0003	-0.0001	-0.0002	0.0011	-0.0013	-0.0007
	(0.0132)	(1.4335)	(0.5811)	(-4.1615)	(-1.9335)	(-3.2505)	(-0.8223)	(-0.2010)	(-0.5692)	(0.9787)	(-0.9923)	(-0.7965)
Uncertainty Avoidance	0.0000	-0.0007	-0.0012**	-0.0002	-0.0001	-0.0004*	-0.0008***	-0.0004	-0.0009***	-0.0024***	-0.0033***	-0.0015**
	(0.0095)	(-0.8861)	(-2.4693)	(-0.9601)	(-0.4855)	(-1.9184)	(-2.8208)	(-1.7381)	(-3.8759)	(-2.7871)	(-2.9804)	(-2.2883)
Long term Orientation	-0.0022*	-0.0043***	-0.0019**	0.0011**	0.0009**	0.0002	0.0001	0.0006	0.0012***	0.0015	0.0038*	0.0011
	(-1.6987)	(-3.5958)	(-2.1243)	(2.4181)	(2.5625)	(0.4476)	(0.1704)	(1.2871)	(2.9584)	(1.0163)	(1.9307)	(1.0237)
Firm-Level Control Variables												
CAPEX17 / TA17	0.8568***	0.8746***	0.7342***	0.0467	0.0628	-0.0279	-0.0351	-0.0072	0.1431	-0.0964	-0.5409	0.3636*
	(3.0593)	(3.8081)	(3.6742)	(0.4557)	(0.7543)	(-0.2823)	(-0.2692)	(-0.0586)	(1.5863)	(-0.3407)	(-1.2586)	(1.6965)
TD17 / TA17	0.0458	-0.4314***	0.8120***	-0.0299	0.0165	0.0003	-0.0173	0.0228	0.0269	0.7818***	0.2034	-0.0587
	(0.5205)	(-4.7791)	(13.1228)	(-0.7785)	(0.4900)	(0.0093)	(-0.4062)	(0.6858)	(0.8121)	(7.5926)	(1.4836)	(-0.6802)
WC17 / TA17	0.1819**	0.2379***	0.2830***	0.0288	0.0208	0.0406	-0.0467	0.0240	0.0326	-0.1194	0.0578	0.1966***
	(2.4698)	(2.9275)	(5.3555)	(0.8869)	(0.7402)	(1.6095)	(-1.3381)	(0.8591)	(1.1457)	(-1.4046)	(0.5089)	(2.9989)
SALES17 (log)	0.0439***	0.0184**	0.0168***	0.0054*	-0.0047*	-0.0022	0.0009	-0.0041	-0.0080***	-0.0186*	-0.0693***	-0.0303***
	(6.3592)	(2.5573)	(5.3931)	(1.8037)	(-1.8091)	(-1.0213)	(0.2616)	(-1.3345)	(-2.6822)	(-1.9198)	(-5.4525)	(-3.8792)
EBIT17 / TA17	1.8470***	-1.1406***	1.3956***	0.5754***	-0.1941**	0.3000***	0.4569***	-0.0511	0.4363***	3.1119***	-3.2826***	2.5871***
	(6.8836)	(-5.6381)	(7.3425)	(4.5993)	(-2.2945)	(2.9750)	(4.1567)	(-0.7179)	(4.2801)	(17.1395)	(-10.4644)	(18.9912)
stddev (EBITDA)	-0.2256	-0.9742***	-0.5088***	-0.0170	-0.1692*	-0.0056	-0.0128	0.1881	0.1682	0.0367**	0.0089	0.0160
	(-0.8809)	(-4.0818)	(-2.8845)	(-1.0689)	(-1.7757)	(-0.4690)	(-0.1466)	(1.3955)	(1.4646)	(2.5203)	(0.5045)	(1.4319)
Country-Level Control Variables												
GDP per Capita (log)	0.0016	0.1123***	0.0435	0.0033	-0.0026	0.0288***	0.0050	0.0022	0.0164	0.0248	-0.0380	0.0184
	(0.0343)	(2.9479)	(1.5355)	(0.2346)	(-0.2208)	(2.7886)	(0.3454)	(0.1810)	(1.3810)	(0.6985)	(-0.7359)	(0.6445)
Market Cap. To GDP (log)	0.1426**	0.0746	0.0706*	0.0278	0.0372**	0.0174	-0.0002	0.0170	0.0244	0.0944*	0.0846	0.1840***
	(2.4538)	(1.5208)	(1.8870)	(1.4805)	(2.4602)	(1.2695)	(-0.0127)	(0.9883)	(1.4596)	(1.7740)	(1.0793)	(4.3482)
Pvt. Credit to GDP (log)	0.0426	0.0077	-0.0144	-0.0001	-0.0062	-0.0139	-0.0027	-0.0124	-0.0106	-0.0232	0.0392	-0.0635**
	(1.3478)	(0.2412)	(-0.6766)	(-0.0094)	(-0.5804)	(-1.5508)	(-0.2151)	(-1.2613)	(-1.0335)	(-0.6812)	(0.8154)	(-2.3721)
Law_wjp	-0.0472	0.0331	0.2132	-0.2766***	-0.2309***	-0.1718**	0.0142	-0.1548*	-0.2144***	-0.4534	-0.2243	-0.3313
	(-0.1232)	(0.1182)	(0.9536)	(-2.9791)	(-3.0037)	(-2.3951)	(0.1447)	(-1.7577)	(-2.5958)	(-1.4770)	(-0.5322)	(-1.3911)
HCD	0.0319	0.1166***	0.0462**	0.0104	0.0041	0.0120*	0.0109	-0.0042	-0.0038	0.0126	-0.0084	0.0694***
	(1.0365)	(4.6920)	(2.4481)	(1.2012)	(0.5590)	(1.8352)	(1.1624)	(-0.5187)	(-0.4879)	(0.4429)	(-0.2180)	(3.1645)
Constant	-1.8287***	0.8411***	-1.7038***	0.1495	2.7530***	-0.2400***	0.7790***	3.2427***	0.2219**	0.9447***	5.1059***	0.3965
	(-6.2278)	(3.1493)	(-8.8285)	(1.3620)	(29.5496)	(-2.9201)	(6.1402)	(30.8829)	(2.1034)	(2.6497)	(11.0378)	(1.4210)
Firms	989	1,008	1,014	966	964	954	1,027	1,068	1,030	1,103	1,045	1,087
Countries	26 (11)	28 (16)	28 (14)	29 (19)	29 (19)	29 (20)	29 (19)	29 (17)	29 (18)	29 (19)	29 (16)	29 (20)
R2	0.1347	0.1673	0.2303	0.0798	0.0474	0.0555	0.0418	0.0207	0.0624	0.2595	0.2169	0.3474
Adjusted R2	0.121	0.155	0.219	0.0653	0.0324	0.0404	0.0275	0.00677	0.0485	0.249	0.205	0.338

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 5-5: Firm-level robustness tests (R&D, SGA, and Cash).

Robustness test regression results for dependent variables of firm value for 2017 for manufacturing sector firms (SIC code : 2000-3999). Firm-level robustness variables are Research and development divided by sales, Selling & Admin expenses divided by sales, and Cash and equivalent divided by toal assets, obtained from thomson reuters database. All other variables are as per the baseline model.

	Price-to-Book	Price-to-Book	Price-to-Book	Price-to-Earnings	Price-to-Earnings	Price-to-Earnings	Tobin's Q	Tobin's Q	Tobin's Q
Hofstede Cultural Dimensions									
Individualism	0.0124***	0.0109***	0.0165***	0.0074***	0.0056***	0.0134***	0.0071***	0.0055***	0.0111***
	(8.9446)	(9.7786)	(19.2753)	(4.3536)	(4.0858)	(12.7717)	(6.5114)	(6.4642)	(16.4196)
Masculinity	-0.0017***	-0.0027***	-0.0033***	-0.0009	-0.0009	-0.0016**	-0.0014***	-0.0022***	-0.0027***
	(-2.6215)	(-4.6639)	(-5.9794)	(-1.2084)	(-1.2366)	(-2.4134)	(-2.9091)	(-4.8653)	(-6.3273)
Uncertainty Avoidance	-0.0107***	-0.0076***	-0.0069***	-0.0107***	-0.0081***	-0.0067***	-0.0085***	-0.0059***	-0.0052***
	(-16.5021)	(-13.4417)	(-13.3092)	(-13.5798)	(-11.6194)	(-10.5677)	(-16.8447)	(-13.5623)	(-12.6012)
Long term Orientation	0.0058***	0.0072***	0.0091***	0.0044***	0.0064***	0.0099***	0.0034***	0.0045***	0.0068***
	(4.7541)	(9.3811)	(13.3583)	(2.9710)	(6.7169)	(11.9155)	(3.5348)	(7.5914)	(12.6037)
Firm-Level Control Variables									
CAPEX17 / TA17	0.7490***	1.4885***	1.4639***	0.2898	0.7020***	0.4739*	1.2108***	1.5685***	1.4756***
	(3.1139)	(7.3337)	(7.3111)	(0.9837)	(2.7939)	(1.9340)	(6.4114)	(9.9993)	(9.3378)
TD17 / TA17	0.8156***	0.7899***	0.5503***	0.0514	-0.0151	-0.2093**	0.3347***	0.4659***	0.2537***
	(10.1263)	(11.3139)	(8.0636)	(0.5214)	(-0.1747)	(-2.5058)	(5.2929)	(8.6336)	(4.7103)
WC17 / TA17	0.1007	0.2090***	-0.0688	0.1417*	0.1249*	0.0069	0.3144***	0.4502***	0.3171***
	(1.4352)	(3.5007)	(-0.9867)	(1.6497)	(1.6903)	(0.0810)	(5.7077)	(9.7557)	(5.7621)
SALES17 (log)	-0.0327***	0.0279***	0.0177***	-0.1024***	-0.0440***	-0.0496***	-0.0627***	-0.0072	-0.0155***
	(-4.8889)	(4.6970)	(3.0551)	(-12.4936)	(-5.9806)	(-7.0176)	(-11.9268)	(-1.5701)	(-3.3965)
EBIT17 / TA17	6.1056***	5.9180***	5.8511***	-4.7693***	-4.5522***	-4.1080***	5.3837***	5.0071***	5.1377***
	(33.8242)	(38.5598)	(39.1758)	(-21.5712)	(-23.9611)	(-22.4768)	(37.9861)	(42.2147)	(43.5857)
stddev (EBITDA)	0.0367**	0.0532***	0.0482***	0.0402**	0.0648***	0.0533**	0.0167	0.0326**	0.0271*
	(2.1975)	(2.9871)	(2.6327)	(1.9683)	(2.9418)	(2.3777)	(1.2736)	(2.3680)	(1.8740)
R&D17 / Sales17	2.5151***			2.1251***			2.5579***		
	(11.7436)			(8.1010)			(15.2113)		
SGnA17 / Sales17		1.1458***			1.1655***			1.0400***	
		(15.5117)			(12.7467)			(18.2170)	
CASHnEqv17 / TA17			0.6662***			0.3705***			0.3228***
			(7.2390)			(3.2895)			(4.4444)
Country-Level Control Variables									
GDP per Capita (log)	0.0796***	0.2979***	0.1882***	-0.0137	0.3779***	0.2022***	0.0144	0.2576***	0.1477***
	(2.9283)	(10.9037)	(8.8226)	(-0.4112)	(11.1748)	(7.7470)	(0.6735)	(12.1989)	(8.7759)
Market Cap. To GDP (log)	-0.0438	0.1268***	0.1960***	-0.0608	0.0349	0.1843***	-0.0234	0.0738***	0.1637***
	(-1.1004)	(3.9522)	(6.8412)	(-1.2466)	(0.8796)	(5.2549)	(-0.7496)	(2.9776)	(7.2397)
Pvt. Credit to GDP (log)	-0.0953***	-0.1167***	-0.1133***	-0.0127	-0.1055***	-0.1107***	-0.0349**	-0.0833***	-0.0837***
	(-4.9098)	(-7.6990)	(-7.4047)	(-0.5335)	(-5.6225)	(-5.9125)	(-2.2894)	(-7.1171)	(-6.9290)
Law_wjp	-1.5809***	-3.2655***	-3.1538***	-1.0408***	-3.3410***	-3.3946***	-0.8934***	-2.4866***	-2.4719***
	(-6.0517)	(-16.7286)	(-16.7476)	(-3.2528)	(-13.8263)	(-14.7308)	(-4.3558)	(-16.4830)	(-16.6324)
Constant	1.1047***	-1.8716***	-1.1962***	6.1131***	2.4678***	3.2497***	1.1952***	-1.4925***	-0.9025***
	(5.1017)	(-12.3715)	(-8.8011)	(23.0478)	(13.1782)	(19.5392)	(7.0296)	(-12.7663)	(-8.4139)
Firms	3,197	4,306	4,713	3,197	4,306	4,713	3,197	4,306	4,713
R2	0.5426	0.4818	0.4598	0.3052	0.2481	0.1942	0.5755	0.4963	0.4690
Adjusted R2	0.540	0.480	0.458	0.302	0.245	0.192	0.573	0.495	0.467

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 5-6: Country-level robustness tests with Financial Development Index (IMF).

Robustness test regression results for dependent variables firm value for 2017 for manufacturing sector firms (SIC code : 2000-3999). Country-level robustness variables are Financial Development Index, Financial market Index, and Financial Institutions Index obtained from IMF report by Svirydzenka (2016). All other variables are as per the baseline model.

	Price-to-Book	Price-to-Book	Price-to-Book	Price-to-Earnings	Price-to-Earnings	Price-to-Earnings	Tobin's Q	Tobin's Q	Tobin's Q
Hofstede Cultural Dimensions									
Individualism	0.0154***	0.0152***	0.0150***	0.0117***	0.0114***	0.0113***	0.0099***	0.0097***	0.0096***
	(17.7689)	(17.4659)	(17.4589)	(11.1697)	(10.8039)	(10.8770)	(14.5573)	(14.1658)	(14.2172)
Masculinity	-0.0031***	-0.0030***	-0.0023***	-0.0014**	-0.0011	-0.0005	-0.0026***	-0.0025***	-0.0019***
	(-5.6359)	(-5.4071)	(-4.1357)	(-2.1699)	(-1.6126)	(-0.8104)	(-6.0439)	(-5.5781)	(-4.3186)
Uncertainty Avoidance	-0.0073***	-0.0074***	-0.0068***	-0.0071***	-0.0072***	-0.0065***	-0.0055***	-0.0057***	-0.0051***
	(-14.6147)	(-14.8605)	(-13.6635)	(-11.7706)	(-11.8527)	(-10.8364)	(-14.1158)	(-14.3170)	(-13.0224)
Long term Orientation	0.0075***	0.0082***	0.0064***	0.0081***	0.0088***	0.0068***	0.0052***	0.0058***	0.0042***
	(10.9902)	(12.1780)	(9.3280)	(9.8371)	(10.7866)	(8.1178)	(9.6639)	(10.9276)	(7.6901)
Firm-Level Control Variables									
CAPEX17 / TA17	1.4168***	1.4231***	1.3912***	0.3513	0.3516	0.3214	1.4476***	1.4512***	1.4236***
	(6.5498)	(6.5486)	(6.4804)	(1.3420)	(1.3408)	(1.2372)	(8.4886)	(8.4671)	(8.4430)
TD17 / TA17	0.5471***	0.5091***	0.5644***	-0.1993**	-0.2467***	-0.1717*	0.2268***	0.1902***	0.2454***
	(7.3780)	(6.8404)	(7.6737)	(-2.2205)	(-2.7466)	(-1.9298)	(3.8798)	(3.2407)	(4.2483)
WC17 / TA17	0.1905***	0.2162***	0.1873***	0.1496*	0.1844**	0.1405*	0.4586***	0.4842***	0.4539***
	(3.0181)	(3.4085)	(2.9937)	(1.9591)	(2.4095)	(1.8562)	(9.2165)	(9.6799)	(9.2353)
SALES17 (log)	0.0231***	0.0312***	0.0165***	-0.0428***	-0.0337***	-0.0519***	-0.0105**	-0.0030	-0.0172***
	(3.6915)	(5.0311)	(2.6361)	(-5.6515)	(-4.5041)	(-6.8780)	(-2.1290)	(-0.6205)	(-3.5039)
EBIT17 / TA17	5.9796***	5.9353***	5.9729***	-3.7756***	-3.8398***	-3.7735***	5.1914***	5.1458***	5.1884***
	(38.1299)	(37.6490)	(38.4052)	(-19.8938)	(-20.1854)	(-20.0536)	(41.9883)	(41.3851)	(42.4737)
stddev (EBITDA)	0.0517***	0.0539***	0.0476**	0.0554**	0.0572**	0.0504**	0.0291*	0.0310**	0.0252*
	(2.7245)	(2.8300)	(2.5271)	(2.4143)	(2.4882)	(2.2104)	(1.9470)	(2.0593)	(1.7031)
Country-Level Control Variables									
GDP per Capita (log)	0.0728***	0.1821***	0.0084	0.0927***	0.2242***	-0.0029	0.0491**	0.1527***	-0.0179
	(2.8427)	(7.9146)	(0.3328)	(2.9926)	(8.0758)	(-0.0944)	(2.4305)	(8.4175)	(-0.9019)
Law_wjp	-2.5394***	-2.6675***	-2.2030***	-2.6677***	-2.7369***	-2.2639***	-1.8931***	-1.9870***	-1.5743***
	(-14.1879)	(-14.8861)	(-12.0945)	(-12.3157)	(-12.6581)	(-10.2725)	(-13.4158)	(-14.0590)	(-11.0038)
FDI	0.5864***			0.5160***			0.4946***		
	(6.2936)			(4.5760)			(6.7330)		
FDI_FII		-0.0291			-0.2890***			-0.1103	
		(-0.3175)			(-2.6117)			(-1.5247)	
FDI_FMI			0.7642***			0.8479***			0.7017***
			(10.3169)			(9.4608)			(12.0611)
Constant	-0.3838**	-1.0900***	0.0153	3.9242***	3.0694***	4.5232***	-0.1767	-0.8484***	0.2406*
	(-2.3232)	(-7.2906)	(0.0944)	(19.6296)	(17.0149)	(23.0476)	(-1.3571)	(-7.1946)	(1.8884)
Firms	4,298	4,298	4,298	4,298	4,298	4,298	4,298	4,298	4,298
R2	0.4527	0.4477	0.4610	0.1830	0.1803	0.1958	0.4636	0.4582	0.4758
Adjusted R2	0.446	0.459	0.452	0.178	0.193	0.182	0.457	0.474	0.463

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 5-7: Country-level robustness tests with Creditor Rights and Legal Rights Index.

Robustness test regression results for dependent variables firm value for 2017 for manufacturing sector firms (SIC code : 2000-3999). Country-level robustness variables are Creditors Rights Index (Djankov, 2007), and Legal Rights Index is obtained from the World Bank Indicators database. All other variables are as per the baseline model.

	Price-to-Book	Price-to-Book	Price-to-Book	Price-to-Earnings	Price-to-Earnings	Price-to-Earnings	Tobin's Q	Tobin's Q	Tobin's Q
Hofstede Cultural Dimensions									
Individualism	0.0163***	0.0173***	0.0178***	0.0133***	0.0145***	0.0148***	0.0110***	0.0120***	0.0124***
	(18.9721)	(19.5592)	(19.7614)	(12.6707)	(13.4473)	(13.4908)	(16.2679)	(17.2211)	(17.4940)
Masculinity	-0.0033***	-0.0032***	-0.0034***	-0.0016**	-0.0015**	-0.0016**	-0.0028***	-0.0027***	-0.0028***
	(-6.0251)	(-5.8276)	(-6.1186)	(-2.4456)	(-2.2398)	(-2.3957)	(-6.3613)	(-6.1205)	(-6.4282)
Uncertainty Avoidance	-0.0070***	-0.0068***	-0.0070***	-0.0068***	-0.0065***	-0.0066***	-0.0052***	-0.0050***	-0.0052***
	(-13.4172)	(-12.9870)	(-13.2836)	(-10.6447)	(-10.2118)	(-10.3211)	(-12.6954)	(-12.1797)	(-12.5116)
Long term Orientation	0.0096***	0.0093***	0.0091***	0.0102***	0.0098***	0.0097***	0.0070***	0.0067***	0.0065***
	(14.1775)	(13.6904)	(13.2264)	(12.3455)	(11.8549)	(11.5698)	(13.1522)	(12.5708)	(12.0963)
Firm-Level Control Variables									
CAPEX17 / TA17	1.3859***	1.3684***	1.3928***	0.4312*	0.4094*	0.4250*	1.4386***	1.4214***	1.4416***
	(6.8952)	(6.8215)	(6.9419)	(1.7607)	(1.6753)	(1.7376)	(9.0997)	(9.0198)	(9.1474)
TD17 / TA17	0.5585***	0.5907***	0.6246***	-0.2043**	-0.1642*	-0.1425*	0.2582***	0.2899***	0.3180***
	(8.1411)	(8.5848)	(8.9516)	(-2.4448)	(-1.9585)	(-1.6752)	(4.7848)	(5.3639)	(5.8026)
WC17 / TA17	0.1993***	0.2239***	0.2341***	0.1564**	0.1870***	0.1935***	0.4475***	0.4717***	0.4802***
	(3.3549)	(3.7615)	(3.9288)	(2.1608)	(2.5786)	(2.6641)	(9.5753)	(10.0868)	(10.2579)
SALES17 (log)	0.0203***	0.0184***	0.0169***	-0.0481***	-0.0505***	-0.0515***	-0.0142***	-0.0161***	-0.0173***
	(3.5068)	(3.1759)	(2.9016)	(-6.8145)	(-7.1485)	(-7.2568)	(-3.1123)	(-3.5278)	(-3.7933)
EBIT17 / TA17	5.9620***	5.9206***	5.9592***	-4.0471***	-4.0986***	-4.0739***	5.1905***	5.1498***	5.1817***
	(39.9223)	(39.6571)	(39.7824)	(-22.2431)	(-22.5352)	(-22.3108)	(44.1885)	(43.9107)	(44.0402)
stddev (EBITDA)	0.0505***	0.0492***	0.0492***	0.0546**	0.0530**	0.0530**	0.0282*	0.0269*	0.0269*
	(2.7441)	(2.6785)	(2.6798)	(2.4332)	(2.3658)	(2.3657)	(1.9484)	(1.8657)	(1.8664)
Country-Level Control Variables									
GDP per Capita (log)	0.1980***	0.1883***	0.1791***	0.2077***	0.1957***	0.1898***	0.1525***	0.1430***	0.1354***
	(9.2541)	(8.7777)	(8.2624)	(7.9667)	(7.4851)	(7.1803)	(9.0626)	(8.4839)	(7.9492)
Market Cap. To GDP (log)	0.2055***	0.2205***	0.2583***	0.1895***	0.2081***	0.2323***	0.1683***	0.1830***	0.2143***
	(7.1414)	(7.6295)	(8.1287)	(5.4045)	(5.9116)	(5.9971)	(7.4339)	(8.0617)	(8.5877)
Pvt. Credit to GDP (log)	-0.1168***	-0.1269***	-0.1275***	-0.1128***	-0.1253***	-0.1257***	-0.0855***	-0.0954***	-0.0959***
	(-7.5972)	(-8.1864)	(-8.2308)	(-6.0218)	(-6.6379)	(-6.6585)	(-7.0733)	(-7.8402)	(-7.8872)
Law_wjp	-3.2405***	-3.3360***	-3.2937***	-3.4424***	-3.5612***	-3.5341***	-2.5134***	-2.6075***	-2.5724***
	(-17.1515)	(-17.5879)	(-17.3251)	(-14.9546)	(-15.4117)	(-15.2501)	(-16.9135)	(-17.5000)	(-17.2268)
CRI		0.0618***	0.0602***		0.0768***	0.0758***		0.0608***	0.0595***
		(4.5918)	(4.4745)		(4.6891)	(4.6245)		(5.7554)	(5.6321)
WBI_LRI			-0.0150***			-0.0096			-0.0125***
			(-2.8511)			(-1.4948)			(-3.0075)
Constant	-1.2848***	-1.2888***	-1.2746***	3.2008***	3.1958***	3.2049***	-0.9451***	-0.9491***	-0.9373***
	(-9.4416)	(-9.4911)	(-9.3873)	(19.3057)	(19.3183)	(19.3626)	(-8.8299)	(-8.8969)	(-8.7882)
Firms	4,714	4,714	4,714	4,714	4,714	4,714	4,714	4,714	4,714
R2	0.4538	0.4563	0.4572	0.1924	0.1962	0.1966	0.4668	0.4705	0.4716
Adjusted R2	0.452	0.455	0.455	0.190	0.194	0.194	0.465	0.469	0.470

t-statistics in parentheses. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 5-8: Country-level robustness tests with Origin of the Rule of Law.

Robustness tests regression results for dependent variables firm value for 2017 for manufacturing sector firms (SIC code : 2000-3999). Country-level robustness variables are origin of the rule of law as English, French, German, and Scandinanvian (La porta et al. 1998). All other variables are as per the baseline model.

	P2B	P2B	P2B	P2E	P2E	P2E	Tobin's Q	Tobin's Q	Tobin's Q
Hofstede Cultural Dimensions									
Individualism	0.0104***		0.0166***	0.0043***		0.0123***	0.0050***		0.0110***
	(14.9433)		(17.1195)	(5.7118)		(10.4582)	(8.7576)		(14.5156)
Masculinity	-0.0030***		-0.0025***	0.0010		0.0008	-0.0023***		-0.0020***
	(-4.0538)		(-3.7291)	(1.2626)		(0.9562)	(-3.8245)		(-3.8979)
Uncertainty Avoidance	-0.0083***		-0.0041***	-0.0048***		-0.0044***	-0.0059***		-0.0025***
	(-10.0204)		(-4.7751)	(-5.3420)		(-4.1942)	(-8.6409)		(-3.7437)
Long term Orientation	0.0093***		0.0123***	0.0110***		0.0141***	0.0064***		0.0097***
	(10.1191)		(14.7074)	(11.0332)		(13.7804)	(8.5749)		(14.7798)
Firm-Level Control Variables									
CAPEX17 / TA17		1.3821***	1.3651***		0.3956	0.4115*		1.4286***	1.4118***
		(6.5572)	(6.8094)		(1.5685)	(1.6888)		(8.7183)	(8.9773)
TD17 / TA17		0.5675***	0.5910***		-0.2202**	-0.1476*		0.2622***	0.2873***
		(7.9225)	(8.6266)		(-2.5689)	(-1.7723)		(4.7083)	(5.3448)
WC17 / TA17		0.2760***	0.2306***		0.2376***	0.1909***		0.4975***	0.4804***
		(4.4638)	(3.8776)		(3.2108)	(2.6422)		(10.3497)	(10.3003)
SALES17 (log)		0.0561***	0.0208***		-0.0137**	-0.0507***		0.0098**	-0.0133***
		(9.7572)	(3.5508)		(-1.9832)	(-7.1257)		(2.1917)	(-2.9041)
EBIT17 / TA17		6.0168***	5.9312***		-4.1190***	-4.1250***		5.2095***	5.1492***
		(38.4591)	(39.6592)		(-22.0015)	(-22.6956)		(42.8322)	(43.8925)
stddev (EBITDA)		0.0548***	0.0469**		0.0567**	0.0487**		0.0305**	0.0247*
		(2.8451)	(2.5567)		(2.4597)	(2.1871)		(2.0340)	(1.7146)
Country-Level Control Variables									
GDP per Capita (log)		0.2152***	0.2155***		0.2224***	0.2417***		0.1705***	0.1683***
		(9.5378)	(9.6031)		(8.2367)	(8.8650)		(9.7201)	(9.5610)
Market Cap. To GDP (log)		0.1808***	0.2379***		0.1685***	0.2097***		0.1508***	0.1867***
		(5.9235)	(6.7150)		(4.6151)	(4.8708)		(6.3556)	(6.7202)
Pvt. Credit to GDP (log)		-0.0982***	-0.1608***		-0.0880***	-0.1601***		-0.0837***	-0.1260***
		(-6.0113)	(-9.6157)		(-4.5011)	(-7.8784)		(-6.5922)	(-9.6058)
Law_wjp		-1.1744***	-3.6161***		-2.1217***	-3.9775***		-1.2704***	-2.7922***
		(-5.4785)	(-14.3445)		(-8.2714)	(-12.9828)		(-7.6233)	(-14.1199)
Law_ENG	0.3419***	-0.0560	0.0703*	0.1534***	-0.0278	0.2424***	0.3119***	-0.0308	0.0874***
	(7.3459)	(-1.6065)	(1.6484)	(3.0186)	(-0.6654)	(4.6766)	(8.1652)	(-1.1359)	(2.6113)
Law_FRA	0.0523	-0.3143***	-0.1661***	-0.0948	-0.2543***	-0.0256	0.0244	-0.2512***	-0.1603***
	(0.8758)	(-7.2682)	(-3.0369)	(-1.4541)	(-4.9141)	(-0.3847)	(0.4988)	(-7.4714)	(-3.7369)
Law_DEU	-0.2646***	-0.5523***	-0.1822**	-0.3708***	-0.3168***	-0.1246	-0.2008***	-0.3595***	-0.1771***
	(-4.4688)	(-12.8118)	(-2.4398)	(-5.7345)	(-6.1410)	(-1.3727)	(-4.1324)	(-10.7258)	(-3.0229)
Law_SCAN	-0.0555	-0.0131	0.3352***	-0.0105	0.1480*	0.6408***	0.0225	0.0727	0.2941***
	(-0.6756)	(-0.1833)	(4.2547)	(-0.1169)	(1.7333)	(6.6935)	(0.3337)	(1.3102)	(4.7591)
Constant	0.2538***	-2.3347***	-1.5310***	2.4711***	2.5765***	2.8330***	0.0294	-1.5870***	-1.1702***
	(3.0522)	(-16.0444)	(-8.7492)	(27.2156)	(14.7960)	(13.3215)	(0.4307)	(-14.0286)	(-8.5254)
Firms	4,714	4,714	4,714	4,714	4,714	4,714	4,714	4,714	4,714
R2	0.2129	0.4016	0.4599	0.0651	0.1465	0.2055	0.1633	0.4293	0.4756
Adjusted R2	0.212	0.400	0.458	0.0635	0.144	0.202	0.162	0.428	0.474

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 5-9: Country-level robustness tests with re-calibrated Hofstede dimensions by Tang & Koveos (2008).

Robustness test regression results for dependent variables firm value for 2017 for manufacturing sector firms (SIC code : 2000-3999) with Hofstede cultrual diemensions re-calculated by Tang & Koveos (2008). All other variables are as per the baseline model.

	P2B	P2B	P2B	P2E	P2E	P2E	Tobin's Q	Tobin's Q	Tobin's Q
Hofstede Cultural Dimensions									
Individualism_TK	0.0024***		0.0105***	0.0011**		0.0090***	-0.0004		0.0068***
	(4.8454)		(11.3157)	(2.2311)		(8.4474)	(-0.9732)		(9.4269)
Masculinity_TK	0.0073***		-0.0013	0.0020**		-0.0032***	0.0048***		-0.0022***
	(7.0569)		(-1.2846)	(1.9968)		(-2.6577)	(5.7686)		(-2.7329)
Uncertainty Avoidance_TK	-0.0158***		-0.0096***	-0.0078***		-0.0079***	-0.0125***		-0.0076***
	(-16.6719)		(-10.8383)	(-8.4262)		(-7.8257)	(-16.3184)		(-11.1349)
Long term Orientation_TK	-0.0045***		-0.0035***	0.0006		-0.0010	-0.0026***		-0.0023***
	(-7.1717)		(-5.3386)	(0.9550)		(-1.3825)	(-5.2473)		(-4.5179)
Firm-Level Control Variables									
CAPEX17 / TA17		0.9122***	1.2822***		0.4041	0.6458**		1.1542***	1.3795***
		(3.2906)	(4.9553)		(1.3273)	(2.1742)		(5.4446)	(6.8849)
TD17 / TA17		1.0906***	0.7499***		0.2396**	-0.0012		0.6267***	0.3919***
		(12.1716)	(8.8850)		(2.4347)	(-0.0124)		(9.1464)	(5.9960)
WC17 / TA17		0.2121***	0.1981***		0.2632***	0.2593***		0.4469***	0.4745***
		(2.7571)	(2.7017)		(3.1148)	(3.0809)		(7.5952)	(8.3568)
SALES17 (log)		0.0502***	0.0226***		-0.0274***	-0.0497***		0.0017	-0.0124**
		(7.0756)	(3.1614)		(-3.5201)	(-5.8507)		(0.3098)	(-2.2499)
EBIT17 / TA17		7.1474***	6.3132***		-2.5504***	-3.1248***		5.9899***	5.3622***
		(39.6110)	(36.4992)		(-12.8696)	(-15.7391)		(43.4099)	(40.0369)
stddev (EBITDA)		0.0504**	0.0446**		0.0462**	0.0409*		0.0266*	0.0220
		(2.4720)	(2.3544)		(2.0633)	(1.8794)		(1.7075)	(1.4984)
Country-Level Control Variables									
GDP per Capita (log)		0.1447***	-0.2308***		0.0223	-0.2426***		0.0642***	-0.1905***
		(5.3599)	(-7.0968)		(0.7522)	(-6.4977)		(3.1109)	(-7.5642)
Market Cap. To GDP (log)		0.3709***	0.1952***		0.3413***	0.1983***		0.3241***	0.1993***
		(10.6141)	(5.3561)		(8.8913)	(4.7401)		(12.1261)	(7.0605)
Pvt. Credit to GDP (log)		-0.2378***	-0.1228***		-0.1674***	-0.1342***		-0.1807***	-0.1054***
		(-7.9239)	(-3.7795)		(-5.0776)	(-3.6007)		(-7.8725)	(-4.1928)
Law_wjp		-1.1459***	0.3202		-0.6987***	0.0761		-0.7879***	0.2762
		(-5.5154)	(1.4133)		(-3.0617)	(0.2928)		(-4.9589)	(1.5748)
Constant	1.2736***	-2.2693***	1.3987***	3.2529***	2.9312***	6.0351***	0.8420***	-1.4143***	1.1482***
	(18.3948)	(-13.6842)	(4.9562)	(47.9002)	(16.0936)	(18.6301)	(15.0155)	(-11.1522)	(5.2544)
Firms	3,417	3,417	3,417	3,417	3,417	3,417	3,417	3,417	3,417
R2	0.2016	0.3902	0.4754	0.0331	0.0740	0.1300	0.1628	0.4298	0.4972
Adjusted R2	0.201	0.388	0.473	0.0319	0.0712	0.126	0.162	0.428	0.495

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 5-10: Sample-level robustness tests with Firm Value Quantiles and Geographical regions.

Regression results for dependent variables firm value for 2017 for manufacturing sector firms (SIC code : 2000-3999). Following Fama and French (1993) methodology, four quartile defined by firm value (L for low, M for medium, H for high). A Georgraphical dummy is added to check for firm's region. All other variables are as per baseline model.

	Q1 (L)			Q2 (M)			Q3 (M)			Q4 (H)		
	P2B	P2E	Tobin's Q	P2B	P2E	Tobin's Q	P2B	P2E	Tobin's Q	P2B	P2E	Tobin's Q
Hofstede Cultural Dimensions												
Individualism	-0.0010	-0.0003	-0.0010	0.0020***	0.0018***	0.0005	0.0006	0.0005	0.0007	0.0015	-0.0032	0.0018
	(-0.5492)	(-0.2267)	(-0.9484)	(3.8336)	(4.3811)	(1.1890)	(1.0515)	(0.9471)	(1.4198)	(0.8911)	(-1.3836)	(1.3985)
Masculinity	0.0022*	0.0019*	0.0009	-0.0002	-0.0000	-0.0003	0.0002	0.0002	0.0004	0.0019	0.0009	0.0005
	(1.7772)	(1.7845)	(1.2411)	(-0.6045)	(-0.1511)	(-0.8652)	(0.4307)	(0.5335)	(1.0354)	(1.3785)	(0.4693)	(0.4295)
Uncertainty Avoidance	-0.0006	-0.0009	-0.0014***	-0.0003	-0.0001	-0.0004**	-0.0006**	-0.0005*	-0.0007***	-0.0022**	-0.0032***	-0.0014*
	(-0.7148)	(-1.1445)	(-2.6861)	(-1.0378)	(-0.4390)	(-2.0739)	(-2.0466)	(-1.7325)	(-2.6943)	(-2.3072)	(-2.6616)	(-1.9144)
Long term Orientation	-0.0071***	-0.0073***	-0.0037**	-0.0008	0.0002	-0.0008	-0.0008	-0.0000	0.0002	-0.0008	-0.0018	-0.0019
	(-2.7190)	(-3.6499)	(-2.2911)	(-1.1792)	(0.3050)	(-1.4904)	(-1.0644)	(-0.0773)	(0.2726)	(-0.3772)	(-0.5487)	(-1.1212)
Firm-Level Control Variables												
CAPEX17 / TA17	0.8848***	0.8757***	0.7335***	0.0311	0.0625	-0.0363	-0.0373	-0.0274	0.1349	-0.1239	-0.6431	0.3340
	(3.1585)	(3.8431)	(3.6642)	(0.3050)	(0.7509)	(-0.3679)	(-0.2854)	(-0.2223)	(1.5009)	(-0.4364)	(-1.5002)	(1.5572)
TD17 / TA17	0.0767	-0.3759***	0.8208***	-0.0155	0.0202	0.0063	-0.0118	0.0176	0.0211	0.7619***	0.1591	-0.0836
	(0.8621)	(-4.1480)	(13.1126)	(-0.3988)	(0.5933)	(0.2243)	(-0.2760)	(0.5300)	(0.6364)	(7.3503)	(1.1565)	(-0.9644)
WC17 / TA17	0.2080***	0.2737***	0.2887***	0.0421	0.0286	0.0480*	-0.0411	0.0155	0.0336	-0.1366	0.0153	0.1764***
	(2.7921)	(3.3560)	(5.4161)	(1.2875)	(1.0047)	(1.8705)	(-1.1701)	(0.5535)	(1.1821)	(-1.5928)	(0.1341)	(2.6677)
SALES17 (log)	0.0436***	0.0173**	0.0163***	0.0045	-0.0047*	-0.0031	0.0009	-0.0059*	-0.0089***	-0.0199**	-0.0766***	-0.0316***
	(6.2817)	(2.4028)	(3.4567)	(1.4857)	(-1.7960)	(-1.4125)	(0.2467)	(-1.8733)	(-2.9756)	(-2.0254)	(-5.9999)	(-3.9905)
EBIT17 / TA17	1.8373***	-1.1197***	1.3980***	0.6005***	-0.2133***	0.3140***	0.4689***	-0.0562	0.4629***	3.1232***	-3.2924***	2.6099***
	(6.8416)	(-5.5394)	(7.3399)	(4.7957)	(-2.5011)	(3.1123)	(4.2424)	(-0.7920)	(4.5360)	(17.1686)	(-10.5359)	(19.1359)
stddev (EBITDA)	-0.2047	-0.9662***	-0.4985***	-0.0224	-0.1799*	-0.0082	-0.0211	0.1589	0.1471	0.0363**	0.0074	0.0155
	(-0.7989)	(-4.0700)	(-2.8126)	(-1.4094)	(-1.8792)	(-0.6815)	(-0.2401)	(1.1791)	(1.2814)	(2.4923)	(0.4200)	(1.3883)
Country-Level Control Variables	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
HCD	0.0578*	0.1060***	0.0539***	0.0165*	0.0073	0.0187***	0.0137	0.0079	0.0073	0.0350	0.0747*	0.0971***
	(1.7271)	(3.9581)	(2.7061)	(1.7800)	(0.9108)	(2.6752)	(1.3356)	(0.8920)	(0.8480)	(1.1374)	(1.7031)	(4.0181)
Americas	-0.3196**	-0.4476***	-0.1253	-0.1130***	-0.0449	-0.0335	-0.0407	0.0129	-0.0020	-0.0507	0.0993	-0.0498
	(-2.0118)	(-3.6505)	(-1.2142)	(-2.8081)	(-1.4099)	(-1.1126)	(-0.9740)	(0.3490)	(-0.0566)	(-0.4154)	(0.5562)	(-0.5170)
Asia	-0.1876**	-0.1311*	-0.0738	-0.0954***	-0.0423*	-0.0468**	-0.0513*	-0.0385	-0.0607**	-0.1329	-0.2088	-0.1509**
	(-2.0686)	(-1.7435)	(-1.3097)	(-3.5536)	(-1.8980)	(-2.2821)	(-1.6740)	(-1.4245)	(-2.3453)	(-1.4029)	(-1.6379)	(-2.1037)
Europe	-0.1932	-0.1593	-0.1053	-0.1104***	-0.0435*	-0.0607**	-0.0391	-0.0537*	-0.0446	-0.1550	-0.3014**	-0.1825**
	(-1.5694)	(-1.5956)	(-1.3300)	(-3.4014)	(-1.7658)	(-2.4972)	(-1.2003)	(-1.7786)	(-1.6161)	(-1.5518)	(-2.0312)	(-2.3650)
Constant	-1.5239***	1.0088***	-1.5400***	0.3449***	2.8303***	-0.1209	0.8751***	3.3762***	0.3645***	1.2838***	5.7415***	0.7723**
	(-4.4393)	(3.3241)	(-6.7187)	(2.8276)	(27.9120)	(-1.3106)	(6.2862)	(28.2080)	(3.2093)	(3.1495)	(10.6600)	(2.4670)
Firms	989	1,008	1,014	966	964	954	1,027	1,068	1,030	1,103	1,045	1,087
R2	0.1396	0.1837	0.2318	0.0929	0.0514	0.0645	0.0445	0.0319	0.0736	0.2626	0.2287	0.3540
Adjusted R2	0.124	0.169	0.218	0.0757	0.0333	0.0465	0.0275	0.0152	0.0571	0.250	0.215	0.343

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 5-11: Sample-level robustness tests by excluding firms from Japan and USA.

Sample-level robustness tests results for dependent variable of firm value for 2017 for manufacturing sector firms (SIC code : 2000-3999). The sample excludes firms from USA and Japan. All other variables are as per the baseline model.

	Price-to-Book	Price-to-Book	Price-to-Book	Price-to-Earnings	Price-to-Earnings	Price-to-Earnings	Tobin's Q	Tobin's Q	Tobin's Q
Hofstede Cultural Dimensions									
Individualism	0.0098***		0.0158***	0.0022***		0.0121***	0.0051***		0.0104***
	(14.7258)		(15.6948)	(3.0291)		(9.7376)	(9.1578)		(12.9530)
Masculinity	0.0059***		-0.0000	0.0078***		0.0019	0.0045***		0.0010
	(6.3286)		(-0.0430)	(7.5994)		(1.4228)	(5.7370)		(1.1823)
Uncertainty Avoidance	-0.0074***		-0.0062***	-0.0058***		-0.0058***	-0.0054***		-0.0042***
	(-12.5483)		(-10.0633)	(-8.8255)		(-7.7049)	(-10.9220)		(-8.4694)
Long term Orientation	0.0026***		0.0082***	0.0059***		0.0089***	0.0010**		0.0057***
	(4.2064)		(10.8477)	(8.6397)		(9.6280)	(1.9766)		(9.4520)
Firm-Level Control Variables									
CAPEX17 / TA17		1.5330***	1.7437***		0.3869	0.5301*		1.4647***	1.5989***
		(6.4546)	(7.9010)		(1.3716)	(1.9509)		(7.9020)	(9.1127)
TD17 / TA17		0.2653***	0.3475***		-0.3223***	-0.2420**		0.1763**	0.2379***
		(2.8837)	(4.0649)		(-2.9496)	(-2.2990)		(2.4548)	(3.5005)
WC17 / TA17		0.1679**	0.1310*		0.1955**	0.1405		0.4673***	0.4409***
		(2.1980)	(1.8449)		(2.1542)	(1.6069)		(7.8383)	(7.8087)
SALES17 (log)		0.0669***	0.0137**		-0.0077	-0.0542***		0.0179***	-0.0186***
		(9.5501)	(1.9919)		(-0.9252)	(-6.3983)		(3.2824)	(-3.4021)
EBIT17 / TA17		5.7970***	5.6391***		-4.1474***	-4.1100***		5.1732***	5.0929***
		(31.4146)	(32.5557)		(-18.9218)	(-19.2726)		(35.9194)	(36.9825)
stddev (EBITDA)		0.0563***	0.0515***		0.0576**	0.0543**		0.0320**	0.0288*
		(2.7228)	(2.6890)		(2.3428)	(2.3003)		(1.9838)	(1.8900)
Country-Level Control Variables									
GDP per Capita (log)		0.0859***	0.1938***		0.1210***	0.1890***		0.0697***	0.1327***
		(3.4211)	(7.2867)		(4.0552)	(5.7720)		(3.5540)	(6.2771)
Market Cap. To GDP (log)		0.0728**	0.2240***		0.1152***	0.1889***		0.1099***	0.2099***
		(2.4648)	(6.7720)		(3.2827)	(4.6380)		(4.7665)	(7.9811)
Pvt. Credit to GDP (log)		0.0301	-0.0827***		0.0133	-0.0769***		0.0336**	-0.0348**
		(1.6272)	(-3.9204)		(0.6049)	(-2.9614)		(2.3311)	(-2.0727)
Law_wjp		-0.9018***	-3.0021***		-1.6405***	-3.0195***		-0.8913***	-2.1788***
		(-4.4244)	(-11.4771)		(-6.7764)	(-9.3764)		(-5.6028)	(-10.4773)
Constant	0.2609***	-1.6143***	-1.5512***	2.5171***	2.8598***	2.9565***	0.0654	-1.4191***	-1.4389***
	(3.5541)	(-8.5751)	(-7.7061)	(30.9376)	(12.7893)	(11.9298)	(1.0647)	(-9.6583)	(-8.9913)
Firms	3,403	3,403	3,403	3,403	3,403	3,403	3,403	3,403	3,403
R2	0.1241	0.2867	0.3888	0.0644	0.1252	0.1947	0.0789	0.3475	0.4198
Adjusted R2	0.123	0.285	0.386	0.0633	0.123	0.191	0.0778	0.346	0.417

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 5-12: Sample-level robustness tests with dataset from the year 2014 (without & with HCD variable).

Panel A: Regression results, without HCD, for dependent variables of firm value for 2014 for manufacturing sector firms (SIC code : 2000-3999), including four Hofstede cultural dimensions, six firm-level control variables, and four country-level control variables. The Hofstede dimensions are VSM2015 obtained from Hofstede website. The GDP-per-capita and the private-credit-to-GDP for 2014 are obtained from the world bank indicators datanase and the rule of law from the world justice project 2014. Firm-level variables are computed from the reuters datastream database.

	Price-to-Book	Price-to-Book	Price-to-Book	Price-to-Earnings	Price-to-Earnings	Price-to-Earnings	Tobin's Q	Tobin's Q	Tobin's Q
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Hofstede Cultural Dimensions									
Individualism	0.0087***		0.0072***	0.0045***		0.0043***	0.0044***		0.0036***
	(15.2965)		(9.6123)	(7.2295)		(4.7301)	(9.4053)		(6.4539)
Masculinity	-0.0022***		-0.0043***	0.0012*		-0.0032***	-0.0023***		-0.0039***
	(-3.7384)		(-7.3641)	(1.8970)		(-4.5516)	(-4.9211)		(-8.9507)
Uncertainty Avoidance	-0.0116***		-0.0068***	-0.0098***		-0.0059***	-0.0081***		-0.0044***
	(-22.0573)		(-12.1736)	(-17.1186)		(-8.6989)	(-18.7288)		(-10.5838)
Long term Orientation	0.0021***		0.0068***	0.0074***		0.0090***	0.0001		0.0049***
	(3.6605)		(10.2084)	(11.5310)		(11.2773)	(0.2106)		(9.8027)
Firm-Level Control Variables									
CAPEX17 / TA17		0.3753	0.6310***		-0.9191***	-0.7567***		0.7603***	0.9064***
		(1.5776)	(2.7625)		(-3.2810)	(-2.7614)		(4.2981)	(5.3083)
TD17 / TA17		0.4151***	0.3281***		-0.1483	-0.1082		0.2971***	0.2553***
		(5.1795)	(4.2205)		(-1.5714)	(-1.1599)		(4.9855)	(4.3924)
WC17 / TA17		-0.2220***	-0.1538**		-0.2276***	-0.1458*		0.1914***	0.2656***
		(-3.1939)	(-2.2896)		(-2.7815)	(-1.8092)		(3.7033)	(5.2889)
SALES17 (log)		0.0375***	0.0331***		-0.0126	-0.0170**		-0.0042	-0.0020
		(5.7474)	(5.0702)		(-1.6440)	(-2.1649)		(-0.8568)	(-0.4015)
EBIT17 / TA17		6.5479***	6.1097***		-3.5991***	-3.5986***		5.4238***	5.1801***
		(37.4424)	(35.4015)		(-17.4766)	(-17.3807)		(41.7087)	(40.1500)
Country-Level Control Variables									
GDP per Capita (log)		0.4462***	0.3638***		0.4070***	0.4432***		0.2955***	0.2814***
		(18.1455)	(13.3601)		(14.0560)	(13.5662)		(16.1574)	(13.8219)
Market Cap. To GDP (log)		0.2126***	0.1630***		0.1450***	0.2115***		0.1902***	0.1790***
		(7.2485)	(5.4093)		(4.1999)	(5.8512)		(8.7207)	(7.9474)
Pvt. Credit to GDP (log)		0.0528*	0.0291		0.1167***	-0.0397		0.0401*	-0.0102
		(1.8080)	(0.8689)		(3.3926)	(-0.9874)		(1.8471)	(-0.4090)
Law_wjp		-4.3572***	-3.7605***		-4.2652***	-4.4840***		-3.1491***	-2.9781***
		(-25.1442)	(-19.4841)		(-20.9011)	(-19.3659)		(-24.4393)	(-20.6411)
Constant	0.8272***	-3.2969***	-2.5635***	2.8121***	1.2061***	1.2443***	0.5401***	-2.3166***	-2.0014***
	(16.1161)	(-26.5325)	(-18.6224)	(50.1156)	(8.2425)	(7.5347)	(12.8439)	(-25.0715)	(-19.4483)
Firms	4,773	3,835	3,835	4,773	3,835	3,835	4,773	3,835	3,835
R2	0.1829	0.4071	0.4565	0.0636	0.2033	0.2421	0.1436	0.4383	0.4796
Adjusted R2	0.182	0.406	0.455	0.0628	0.201	0.240	0.143	0.437	0.478

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Panel B: Regression results, with HCD, for dependent variables of firm value for 2014 for manufacturing sector firms (SIC code : 2000-3999). Country-level Key added variable is Human Capital Development (HCD). HCD is computed as the highest eigenvalue of the Principle Component Analysis done on constituent of human capital development (Redding, 2005) of Income Inequality, Employee Protection, Employee Distribution, and Education System. All other variables are as per the 2014 model in Panel A.

	Price-to-Book	Price-to-Book	Price-to-Book	Price-to-Earnings	Price-to-Earnings	Price-to-Earnings	Tobin's Q	Tobin's Q	Tobin's Q
Hofstede Cultural Dimensions									
Individualism	0.0083***		0.0088***	0.0087***		0.0055***	0.0023**		0.0050***
	(6.2653)		(6.3211)	(6.1433)		(3.2741)	(2.1357)		(4.8271)
Masculinity	-0.0020**		-0.0037***	-0.0010		-0.0026**	-0.0015**		-0.0037***
	(-2.4858)		(-4.2870)	(-1.1724)		(-2.5073)	(-2.3809)		(-5.7955)
Uncertainty Avoidance	-0.0154***		-0.0108***	-0.0131***		-0.0099***	-0.0114***		-0.0074***
	(-23.2827)		(-13.5433)	(-18.3396)		(-10.2903)	(-21.0396)		(-12.4009)
Long term Orientation	0.0025***		0.0098***	0.0105***		0.0093***	-0.0006		0.0068***
	(2.8192)		(9.7956)	(11.1202)		(7.7969)	(-0.8116)		(9.1194)
Firm-Level Control Variables									
CAPEX17 / TA17		0.0254	0.2889			-1.1473***	-0.9548***	0.5788***	0.7456***
		(0.0931)	(1.1244)			(-3.6147)	(-3.1040)	(2.8532)	(3.9031)
TD17 / TA17		0.4278***	0.5077***		0.0464	0.1135		0.2681***	0.3136***
		(4.7869)	(6.0450)		(0.4466)	(1.1295)		(4.0397)	(5.0242)
WC17 / TA17		-0.2220***	-0.0469		-0.2147**	-0.0599		0.1946***	0.3416***
		(-2.9653)	(-0.6603)		(-2.4695)	(-0.7038)		(3.5013)	(6.4631)
SALES17 (log)		0.0267***	0.0209***		-0.0334***	-0.0348***		-0.0158***	-0.0142***
		(3.7596)	(3.0030)		(-4.0452)	(-4.1720)		(-3.0002)	(-2.7414)
EBIT17 / TA17		6.2465***	6.0021***		-3.0750***	-3.2713***		5.3072***	5.1039***
		(32.6483)	(33.2414)		(-13.8369)	(-15.1361)		(37.3630)	(38.0257)
Country-Level Control Variables		0.2736***	0.2281***		0.2142***	0.2450***		0.1629***	0.1637***
GDP per Capita (log)		(7.3940)	(5.2619)		(4.9841)	(4.7212)		(5.9299)	(5.0793)
		0.0667	0.0136		-0.0691	-0.0516		0.0729*	0.0644
Market Cap. To GDP (log)		(1.3145)	(0.2416)		(-1.1723)	(-0.7636)		(1.9330)	(1.5333)
		0.3220***	0.1491**		0.4302***	0.1850**		0.2503***	0.1036**
Pvt. Credit to GDP (log)		(5.8620)	(2.3072)		(6.7415)	(2.3912)		(6.1361)	(2.1554)
		-4.3198***	-3.0196***		-3.5932***	-2.9934***		-2.9979***	-2.3205***
Law_wjp		(-22.6539)	(-10.7190)		(-16.2228)	(-8.8773)		(-21.1762)	(-11.0813)
HCD	0.0296*	-0.1062***	-0.0442**	0.0903***	-0.0286	-0.0094	0.0040	-0.0619***	-0.0245
	(1.7157)	(-6.6727)	(-2.0781)	(4.8746)	(-1.5482)	(-0.3683)	(0.2859)	(-5.2363)	(-1.5506)
Constant	1.0816***	-2.0123***	-1.5347***	2.7515***	2.3618***	2.6128***	0.8769***	-1.3702***	-1.1630***
	(10.6520)	(-8.1289)	(-5.5918)	(25.2169)	(8.2139)	(7.9535)	(10.5846)	(-7.4551)	(-5.7004)
Firms	3,691	3,363	3,363	3,691	3,363	3,363	3,691	3,363	3,363
R2	0.2661	0.4093	0.4823	0.1361	0.2051	0.2601	0.2291	0.4430	0.5106
Adjusted R2	0.265	0.408	0.480	0.135	0.203	0.257	0.228	0.441	0.509

t-statistics in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

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Annexure for Essay 3

Appendix 5-1: Detailed description of Hofstede *et al*. (2010) dimensions:

(i) **Power distance:** this is about the expression of inequality in the group from the perspective of *the less powerful members*. In that context, it describes the gap between positions of high power vs. the less powerful and this gap is accepted by the society. The higher the gap observed, the higher is the power distance. Indeed, in low power distance countries, the less powerful feel empowered, but in high power distance countries, higher authority is naturally accepted, e.g., education is student-centred (low power distance) vs. being teacher-centred. Also as per Hofstede, *Germanic and English-speaking western countries* tend to have a lower score, in regards to *East European* and *Latin countries*.

(ii) **Uncertainty Avoidance**: this is about the level of acceptance of ambiguity, defined by the level of comfort with *unstructured situations*. It describes the preference for a stable/predictable outcome vs. unknown outcomes, irrespective of the time horizon. Indeed, higher uncertainty avoiding cultures would tend to create a rule for everything so as to have a more predictable outcome to any situation, including risky situations. Hence, people from such societies would feel more uncomfortable in an unorganised environment or unknown situation, e.g., in high *uncertainty avoidance* cultures, people tend to stick to their jobs despite disliking it, while people easily change their jobs in the other cultures. As per Hofstede, *English-speaking, Nordic and Chinese culture countries* tend to have lower uncertainty avoidance scores and higher scores for *Latin*, *Germanic* and *Japanese* culture countries.

(iii) **Individualism vs. Collectivism**: importance of self vs. the group or the "I" vs. the "we" culture. In individualist cultures, the expression of self is heightened where the individual takes care of self and its dependants. Instead, in collectivist cultures, the expression of the group prevails with the caring for each-other, belongingness to the group, and protecting it from splitting. Typically, in the Individualist cultures, task completion is more important than relationship, so is expressing what one thinks, though for collectivist cultures, relationship is more important and the expression of individual's thinking should not disturb the group's *harmony*. Furthermore, *individualism* was found to have high correlation with national wealth levels. As per Hofstede, *western and developed countries* tend to have higher scores on *individualism*, with Japan being in the middle of the index.

(iv) **Masculinity vs. Femininity:** through these**,** gender characteristics such as *assertiveness* and *caring* are used to represent cultures. In a masculine culture, men and women would tend to be more task-oriented than people-oriented, and more *assertive* and *competitive* than *caring*. Indeed, Hofstede mentions that in highly *Masculine* cultures, the discussion of this dimension is considered "*taboo",* which further indicates the unconscious level rooting of this dimension, e.g., *Feminine* cultures value work-life balance, and may have many women in position of power, like in politics, while work is primed in *Masculine* cultures, and few women are representing power positions. Indeed, Japan and Germanic countries have high *Masculinity* scores and it is low for Nordic countries.

(v) **Long-term vs. Short-term orientation**: the *long-term orientation* indicates the preference for the future where one expects the most important events to happen; this concept initially came out from the work of Bond (1988), who had named it *Confusion Work Dynamism*. It favours investing for the long term, suggests that the good or bad are circumstantial, that one should be flexible, work hard with dedication

to succeed, and continuously be open to learn from others. On the contrary, the *short-term orientation* gives more importance to the events of the past and the present. It favours spending what one has, suggests that good or bad are clearly defined, and traditions can't be changed. Further, social service is considered an important part of life, and that success or failure is due to luck. Hofstede mentions that the *long-term dimension turned out to be strongly correlated* with economic growth seen in East-Asian countries with strong confusion culture. And the *short term orientated* countries are USA, Australia, and Muslim countries.

(vi) **Indulgence versus Self-restraint**: the *indulgence* cultures favour unbounded gratification of human desires for enjoyment, and people are in constant search for activities that can bring them that enjoyment, as they feel that their choices can bring them happiness. Instead, the *self-restraint* cultures limit such gratification through societal norms, where people feel that happiness is not in their control, and the expression or fulfilment of their desires is not a priority, e.g., people in *indulgence* cultures are active in sports and highly value freedom of speech, while *self-restraint* cultures have lower sports orientation and freedom of speech isn't important. As per Hofstede, South and North America are high *indulgence* cultures, while Eastern European, Asian and Muslim countries are *self-restraint* cultures.

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6 General Conclusion

While most of these works focus entirely on institutional variations, a number of them also suggest that a full understanding of their origins and evolution requires an in-depth understanding of cultural differences. (Witt & Redding, 2009, p860)

For North, the notion of intentionality stems from the fact that human evolution, unlike that in the animal world as seen by Darwin, is heavily influenced by people acting consciously for a purpose. To have intentions is to have deliberated over why to do something, and to have thought about the consequences of the behavior. (Witt & Redding, 2009, p863)

6.1 Overview

The main objective of this doctoral dissertation was to highlight the transmission of national culture values to firms' financial choices and outcomes. Our research theoretical approach and empirical design foundations are built on Williamson (2000) 4-level NIE top-down flow of constraints, from the *social embeddedness* (culture), to institutions, to governance, until firms' agency dealings. On this foundation, we undertook three essays investigating culture's influence on firms' choices of capital structure, on their choices of trade credit supply around crisis, and on their outcome of market value.

We found that firms' founders carry the culture of their country-of-origin into firms' practices (Pan *et al.*, 2017) and institutions of finance and law transmit national culture to firms during their lifecycle (Witt & Redding, 2009). Hence, firms embed national culture values through the dual influence of their managers (*agency channel*) and the constraints of their national institutions (*institutional channel*). It leads national cultural values to embed into corporate cultures irrespective of firms' subsidiaries locations around the world.

Moreover, firms operate in an industry, which condition their financial choices (MacKay & Phillips, 2005). These choices carry national culture values through the *agency* and *institutional channels* resulting in firms financial outcomes. Therefore, culture, industries, and firms' financial choices and outcomes are linked. We bind these links in a topological space. Our three essays attempted to validate the topological space properties on the sets of national culture values, firms' financial outcomes, and industry sectors.

Overall, this doctoral dissertation inserts in the growing body-of-knowledge of culture and corporate finance (Chui *et al.*, 2002; El Ghoul & Zheng, 2016). Our findings highlight that national culture values are deep rooted in country's institutions (Witt & Redding, 2009) and its people (Hofstede *et al.*, 2010). These findings confirm that Williamson (2000) *social embeddedness level*, where culture resides, finds its way up to firms' agency choices.

In the spirit of Galileo and the neo-positivist approach, we describe the mapping of our three essays in a general mathematical framework, which could also serve as the foundation of our future research in culture and finance. The first essay links national culture dimensions (Hofstede, 2001) to firms' short-term and long-term capital structure choices across six major industry sectors. The second essay links national culture's influence to the variation of trade credit supply from pre-to-post the mortgage financial crisis in the manufacturing industry sector. The third essay links national culture to firms' market value in the manufacturing industry sector. The following section highlights the key learnings from these essays.

6.2 Learnings

Our essays results show that culture influences firms' financial choices of capital structure, variation of trade credit supply, and the outcome of firm value. These findings made us to learn that culture influences corporate finance, in periods of economic stability, as well as in a period of economic instability. Whatever may be the environment, the influence of national culture comes out to be significant on firms' financial choices. The following sections present key findings from the three essays.

6.2.1 Culture and capital structure choice

Our first essay analyzes culture's (Hofstede, 2001) influence across six industry sectors on firms' choice of short-term and long-term capital structure (Titman & Wessels, 1988). We find that culture influences these choices and this influence differs on the short-term compared to the long-term capital structures. Furthermore, culture influence varies across the six major industry sectors, with a higher influence on capital asset heavy industries.

Our key results are that *individualism* (IDV) is negatively associated with the short-term debt-to-equity and positively associated with the long-term debt-to-equity. *Masculinity* (MAS) is negatively associated with the short-term debt-to-equity and positively with the long-term. *Uncertainty avoidance* (UAI) is positively associated with the short-term debt-to-equity and negatively with the long-term debt-to-equity. *Long-term orientation* (LTO) is negatively associated with the long-term debt-to-equity and positively associated with short-term debt-to-equity.

These results validate the topological space characteristics of *connectedness* and *compactness*. For each combination of the four culture dimensions scores of IDV, MAS, UAI, and LTO, we find a corresponding capital structure outcome. *Connectedness* property is validated. The results also validate the *compactness* property as differences in any two combinations of cultural dimensions scores lead to differences in the resulting capital structures between firms. It means *compactness* is validated. National culture's influence on capital structure depends on firm's industry sector. The role of the *industry transformation function* is validated. The third property of *homeomorphism* could not be tested in this essay.

This research contributes new knowledge to the culture and capital structure literature (Chui *et al*., 2002; Fauver & McDonald, 2015; Haq *et al*., 2018). First, we highlight culture's influence on both short-term and long-term capital structures across industry sectors. Second, we bring-in the understanding of culture's influence on the industry sectors in firms' capital structure choices.

This essay confirms Williamson's (2000) framework and conform to the topological space properties, with the sets of four cultural dimensions, the capital structures choices, and the industry transformation

function. This analysis of culture and capital structures during a period of economic stability lead us to extend our research to a period of economic turmoil around a financial crisis.

6.2.2   Crisis, culture, and trade credit supply

Our second essay analyzes national culture's (Hofstede *et al.*, 2010) influence on the variation of trade credit supply from pre-to-post the 2008 financial crisis (Coulibaly *et al.*, 2013). The study focuses on the differing influence of culture on firms' short-term credit requirements in a financially strained economic environment. This analysis is performed for the manufacturing industry sector.

We learn that culture influences an increase or a decrease in trade credit supply from pre-to-post crisis. We find that firms from cultures with low *masculinity* (MAS), low *uncertainty avoidance* (UAI), and high *long-term orientation* (LTO) increase their trade credit supply from pre-to-post crisis. Therefore, culture could contribute to stabilize or amplify financial crisis effects on firms through its influence on the variation of trade credit supply.

The results validate the topological space properties of *connectedness* and *compactness*. For each combination of the three culture dimensions scores of MAS, UAI, and LTO, we find a corresponding variation of trade credit supply. *Connectedness* property stands validated. The results also validate the *compactness* property, as differences in any two combinations of the three cultural dimensions scores lead to differences in the resulting variation of trade credit supply. *Connectedness* and *compactness* are tested for the manufacturing industry sector, thus validating the industry transformation function. The third topological property of *homeomorphism* is not tested in this essay.

The second essay findings of culture's influence on the variation of trade credit supply around a financial crisis contributes new knowledge to existing literature on culture and trade credit provisions (El Ghoul & Zheng, 2016). Culture's influence on the increase in trade credit supply makes trade credit supply to be a substitute to external short-term financing, thus contributing to stabilize crisis effects on firms. Culture influencing a reduction in trade credit supply post-crisis could amplify crisis effects on firms.

Our first and second essays findings set the scope of the third essay. Indeed, capital structure and trade credit –as a component of working capital– influence firm value (Masulis, 1983; Fama & French, 1998; Deloof, 2003). Thereafter, our learnings from the third essay on the financial value of cultural values are presented.

6.2.3   The financial value of cultural values

This essay analyzes the relationships between culture (Hofstede *et al.*, 2010) and firms value (Ohlson, 1995), in the manufacturing sector. The objective is to analyze whether culture influences a higher or a lower value of firms and what are the influence channels.

We learn that national culture influences national business systems (Kwok & Tadesse, 2006; Breuer & Salzmann, 2012). National business system contributes to the development of country's specific human capital skills. The specific skills lead to the development of specific industries and to their competitiveness (Haake, 2002). The combination of the human capital and the financial capital makes firms competitive in an industry (MacKay & Phillips, 2005). This competitiveness transmits to firm value.

We find that firms from culture with higher *individualism*, lower *masculinity*, lower *uncertainty avoidance*, and higher *long-term orientation* have a higher market value. These dimensions share an opposite relationship sign between high value and low value firms. These results show culture values differing influence on firms' value.

This essay takes forward the existing literature on business systems (Porter, 1993; Haake, 2002; Breuer & Salzmann, 2012) by showing that they transmit embedded cultural values of institutions to firms' financial value. Furthermore, we add the determinant of culture to multiple literature. First to the one analyzing firms' financial effects on their value (Varaiya *et al.*, 1987; Martínez-Sola *et al.*, 2013). Second, to the literature on studying human capital relationship with firm value (Chauvin & Hirschey, 1994; Veltri & Silvestri, 2011). Third, to the insitutional effects on firms value (Nini *et al.*, 2012). Our research on culture's influence on firms' value seems to be the first in the culture and finance body of literature.

Moreover, the essay's results validate the topological space properties of *connectedness* and *compactness*. For each combination of dimensions scores of IDV, MAS, UAI, and LTO, we find a corresponding influence on firm value. It validates the property of *connectedness*. The results also validate the *compactness* property, as differences in any two combinations of these cultural dimensions scores lead to differences in firm value.

We are able to theoretically validate the property of *homeomorphism*. Culture strongly influences institutions and there is a weak feedback loop from institutions to culture (Williamson, 2000; Alesina & Giuliano, 2015). Disruptive events like wars or colonization tend to alter institutions and result in enforcing common values that could become part of a country's culture over very long periods.

However, the persistence of this feedback influence from institutions to culture depends primarily on the duration in time. In some countries, post the period of colonization and/or war, the original cultural values took over (Alesina & Giuliano, 2015). Furthermore, in countries such as the USA, the European settlers developed institutions to the image of their country-of-origin, to which all in the land had to comply. It highlights that institutional values are embedded in cultural values and the reverse is true. A case could be the voluntarily changes of a country's institutions, which may not align to national culture

values. Such an example is the changes, during the *meiji* era, to Japan's contractual laws aligned to western values.

Considering this context of institutional influence on culture, we could theoretically state that there could be a homeomorphic relationship between the culture and institutions. This *homeomorphism* could result in influencing firms financial outcomes. However, we could not empirically test it. The following section summarizes our key learnings of matching the mathematical topology to our culture and corporate finance research.

6.2.4   Topology

The three empirical essays validate the topological space's properties of *connectedness* and *compactness.* By *connectedness*, we mean that any aspect of national culture's influence on firms shall find a representation in the firms' financial outcomes. By *compactness*, we mean that any gap due to differences in national cultures of firms shall also correspond to a gap in those firms' financial outcomes. We could partially verify *homeomorphism* in the third essay that too on a theoretical perspective. We associate *homeomorphism* to the relationship between national culture and institutions.

In regards to *homeomorphism*, literature (Porta *et al.*, 1998; Williamson, 2000; Kwok & Tadesse, 2006; Witt & Redding, 2009) presents that national culture influences design and development of institutions. Literature (Williamson, 2000; Alesina & Giuliano, 2015) also made us to anticipate a possibility of forced institutions –from wars or colonization– that may have altered some national culture values. The potentially reciprocal relationship between culture and institutions could form the basis for validating *homeomorphism*.

Indeed, institutions form the national business systems (Haake, 2002; Breuer & Salzmann, 2012). We find that national business systems influence firm value (essay three). Therefore, the reciprocal relationship between culture and institutions would reflect in the business systems, cascading to firm value. On the same approach, we could assume that the homeomorphic relationship between culture and institutions would transmit to the choices of capital structure (essay one) and to the variation of trade credit (essay two). It would certainly need more research to empirically check it.

We find that the *industry transformation function* conditions the transmission of cultural values to firms, through firms' human capital. It leads to differences in firms' financial outcomes in different industry sectors, in-spite of the same national cultural values. Our findings support our topological framework assumptions that the sets of culture values and corporate financial outcomes are linked by the industry transformation function.

These research findings support our expectations that culture and corporate finance research could fit into the topological space framework. It could provide an overall mathematical structure to the culture and finance literature, which would be in the scientific alignment of Galileo (1564-1642) that *"nature*

is written in the mathematical language". This perspective could also align well with the neo-positivist approach (Kraft, 1953). The premises of neo-positivism with the topological approach, combined with the New Institutional Economics (Williamson, 2000), enables national culture to be linked to agency financial choices resulting in corporate financial outcomes.

Our three empirical essays brought us many answers and learnings. These answers also raised many new questions, which would become future research topics. The following section presents some future research directions.

6.3   Future perspectives

This doctoral dissertation focused on the thesis that national culture influences firms' financial outcomes based on Williamson (2000) framework. Our argumentation stood on his description that the *social embeddedness* of culture strongly constrains the different levels of effectuation until agency financial choices. Our three essays are in support of this thesis.

These essays contribute to fill research gaps in the area of culture and finance at its large (Kwok & Tadesse, 2006; Fidrmuc & Jacob, 2010; El Ghoul & Zheng, 2016). Our contributions set the stage for future research by proposing a preliminary mathematical framework of general topology. Our proposal provides structural foundation to the rapidly growing culture and finance literature of corporate finance (El Ghoul & Zheng, 2016; Haq *et al.*, 2018), market finance (Chui *et al.*, 2010; Wijayana & Gray, 2018), personal finance (Fuchs-Schündeln *et al.*, 2017), behavioral finance (Beckmann *et al.*, 2008), and even economics (Guiso *et al.*, 2006).

All our findings confirm the influence of national cultural values on firms' financial choices and their financial outcomes. This influence is increasingly highlighted to go beyond corporate finance to market finance, such as financial transaction in the stock markets (Chui *et al.*, 2010; Wijayana & Gray, 2018). The increasing importance of financial markets in firms financing along with financial markets interlinkages around the world do raise a question: how long would national culture continue to play a role on firms' financial choices?

This question could open the doors for new research as anti-thesis to our doctoral dissertation's thesis. The anti-thesis could be that culture is irrelevant to firms' financial choices and their outcomes. To this question, a new literature framework maybe providing some answers (Hall, 2015). It presents that dramatic changes in international trade along with technological changes are bringing down the national contextual constraints on industries and firms. The consequences are, with no national boundaries, firms are free to go to countries where the national contexts are more suitable to their needs for growth and competitiveness (Porter, 1993).

Internationalization of finance and increased economic dependence on worldwide trade is virtually removing national boundaries, leading to cross-countries permeations of cultural values and practices (Whitley, 1999). It brings the possibility that the cultural gap among countries could disappear in the long-run and reduce in the short-term, or at least some cultural traits may change. Alesina and Giuliano (2015) highlight that changes in institutions could have impact on cultural traits.

Increasing internationalization of economies requires more common institutions and rule of law framework (Hall, 2015). Therefore, increasing influence of these institutions could affect some cultural traits of countries that are engaged in high levels of international trade. The consequences would be a further increase in internationalization of finance. This perspective offers a possible anti-thesis –to our approach– where culture's influence would increasingly lower –and may someday disappear– from firm's financial choices.

However, in support of our main thesis, Whitley (1999) is suggesting that despite increasing globalization of trade and financial markets, countries' business systems cannot change so easily. Culture influences the development of country's institutions (Witt *et al.*, 2009). A country's business-system made of institutions develops intimately under the influence of national culture (Breuer & Salzmann, 2012).

Nevertheless, the proponents of the anti-thesis support the belief that increasing 21st century globalization would require looking at firms' financial decision-making in a different light (Hall, 2015). The emergence of very large multinational firms' with their significant contribution to national GDPs is influencing countries' economics and geopolitics (Knight & Cavusgil, 2005). Many of these firms are in the financial sector. They are investing across industry sectors and among competing firms in the same industry sector. These firms, which could have revenues bigger than many countries-state, represent a source of competitive advantage to their country-of-origin (Smith, 1776; Porter, 1993).

The financial size dominance of these firms is a result of increasing profit maximization for their shareholders, which meets the primary reason of their existence (Coase, 1937; Modigliani & Miller, 1958; Jensen & Meckling, 1976). The rising dominance of profit maximization for all firms' stakeholders is tending to narrow-down the influence of national culture values in firms day-to-day operations. Therefore, the legitimate question could be of how long and how deep the influence of national culture values would continue to exist on corporate financial choices? We do not know[74]!

Backing our main thesis, the last few years may have shown that worldwide financial dominance of some very large firms along with the worldwide expansion of others often goes hand-in-hand with their countries-of-origins' politics. Wouldn't this confirm Williamson (2000) four levels NIE framework that

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[74] In the same meaning as Myers (1984) comment about firm's choice of capital structure.

puts the social norms of culture on the top of firms' agency choices control chain? Of course, the increasing importance of profit maximization by firms and their agents is constantly having a larger role (Jensen & Meckling, 1976; Fama, 1980; Myers, 2003).

Coming again to the anti-thesis perspective. It leads us to ask, is there a culture of finance that dominates the national culture? Does that culture of finance links the world despite all the national cultures differences or would it lead to a world having a single culture, that of finance? For example, the Chartered Financial Analyst (CFA) qualification may be standardizing human capital skills required in the financial industry sector. Similarly, the International Financial Reporting Standard (IFRS) definition and adoption maybe in the process of homogenizing varying account reporting practices around the world. These examples would fit well with Hall (2015) suggesting higher institutions harmonization in the globalizing trade.

There may be some convergence between the anti-thesis questioning and our thesis positioning, the recent geopolitical events would tend to suggest that national culture values would still hold the highest seat in Williamson (2000) 4-level framework. Although, there would be a higher feedback loop from finance to institutions (Hall, 2015) and to possibly national culture (Alesina & Giuliano, 2015). The argumentation between our main thesis and the anti-thesis could offer a large scope for culture and financial research mapped to the blueprint of our topological framework.

This doctoral dissertation has been a great learning experience. It answered many questions I had from my international professional experience. Primarily, that of possible differences in national culture influencing firms financial choices and outcomes. The empirical findings confirmed my field observations of corporate financial choices in an international context. The learnings of this doctoral dissertation raised many more exiting questions that I shall dig into over the next several years.

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