International trade patterns, trade potentials, national institutions and cross-border networks

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Părinţilor mei
(To my parents)

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The University of Paris I does not give any approval, nor disapproval to the opinions stated in this dissertation. These opinions must be regarded as those of the author.

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Contents

Résumé en français

Malgré la forte globalisation actuelle de l'économie mondiale, le commerce international est réalisé à des coûts non-négligeables. Les coûts liés aux échanges occupent une place centrale dans la littérature moderne sur le commerce international, et peuvent être divisés en deux catégories : des coûts traditionnels, identifiés avec les coûts de transport et les coûts de la politique commerciale, tarifaires et non-tarifaires, et des coûts non-traditionnels, comprenant les coûts d'information, de communication, institutionnels, etc.

Les déterminants non-traditionnels des échanges ont reçu une attention particulière dans la littérature récente, surtout à cause des deux choses. D'un coté, il semble y avoir beaucoup moins de commerce international qu'on ne le pensait pas. Trefler (1995) et McCallum (1995) montrent qu'il y a une importante différence entre le niveau des flux commerciaux observés et les prévisions de la théorie du commerce international, ainsi qu'entre les flux internationaux et le commerce interne. D'après ces travaux, le commerce est divisé en moyenne entre 10 et 20 fois. De l'autre, le rôle des coûts traditionnels à l'échange est assez faible par rapport à la quantité du commerce manquant. Anderson et van Wincoop (2004) montrent par exemple qu'une grande partie des coûts liés aux échanges entre les pays développés, estimés à un équivalent tarifaire de 74%, s'explique par des coûts non-révélés relatifs aux devises, à l'information, au respect des clauses contractuelles, à la législation et à la régulation.

Dans ces conditions, l'expansion de la gamme des coûts considérés dans la littérature s'impose, afin d'englober dans l'analyse les barriers informelles aux échanges. De même, ces résultats suggèrent qu'il y a probablement assez peu à gagner en termes de commerce de l'élimination des coûts traditionnels à l'échange, et certainement beaucoup plus de la

suppression des coûts moins traditionnels.

La *présente thèse* étudie l'importance des coûts non-traditionnels liés à l'échange en mettant l'accent sur les institutions nationales et sur les réseaux transfrontaliers sociaux et d'affaires. Au-delà de la nécessité d'identifier les coûts non-traditionnels, la question se pose également de les quantifier afin de pouvoir estimer la création de commerce associée à leur réduction et de formuler des recommandations précises en termes de politique économique. Les institutions et les réseaux augmentent la sécurité et assurent l'application des clauses contractuelles dans les transactions internationales, fournissent des contacts et des informations sur les partenaires potentiels étrangers, fait qui implique des coûts liés à l'échange inférieurs et moins d'incertitude dans les échanges internationaux. On montre que les potentiels de commerce sont généralement sous-estimés dans la littérature : l'intégration économique régionale peut créer beaucoup plus de commerce que l'on estime traditionnellement, et même quand la réduction totale des barrières aux échanges est achevée. L'amélioration et l'harmonisation des cadres institutionnels peuvent générer autant de commerce international que la libéralisation commerciale. Les réseaux sociaux favorisent l'échange par l'intermédiaire de liens ethniques, linguistiques etc. communs, mais aussi du à l'information et aux préférences acquises par la consommation des biens culturels d'origine étrangère. Les réseaux d'affaires sont illustrés par des associations de migrants et ont un effet positif sur le commerce plus fort que celui des réseaux sociaux.

La *première partie* de la thèse s'intéresse à l'évaluation des potentiels de commerce et des coûts spécifiques à l'environnement institutionnel. Les applications empiriques développées dans cette partie considèrent le cas particulier du commerce de l'UE à 15 et des PECO.

Dans le *premier chapitre* on estime la magnitude des coûts totaux liés à l'échange international et on développe une nouvelle méthode pour calculer les potentiels de commerce. Nous appliquons des techniques spécifique à la littérature des effets frontière qui permettent d'exprimer ces coûts en termes de volume d'échanges, et intégrons les progrès récents dans la dérivation des équations de commerce de type gravitationnel à partir des différents cadres théoriques. En particulier, on considère le modèle de concurrence monopolistique

à la DSK, et celui de concurrence parfaite avec différenciation nationale des produits à la Armington. Nous estimons ensuite la création potentielle de commerce en utilisant comme référence le commerce de chaque pays avec lui-même et en supposant que les coûts liés aux échanges bilatéraux Est-Ouest européens convergent à long terme vers le niveau plus bas des coûts à l'intérieur de l'UE à 15. Nos résultats surpassent considérablement ceux trouvés dans la littérature traditionnelles : en 2000 le commerce Est-Ouest européen représentait environ 50% de son niveau potentiel. On construit également un test pour discriminer entre les deux modèles de commerce et on trouve plus de soutient au modèle de concurrence monopolistique.

Dans le *deuxième chapitre* on s'interroge sur le rôle des politiques de libéralisation commerciale et sur celui des réformes institutionnelles dans l'intégration régionale. L'originalité de l'approche consiste d'abord dans la prise en compte de l'endogénéité entre le commerce et les institutions. Des meilleurs institutions augmentent la sécurité des échanges, réduisent l'incertitude et les coûts de respect des contrats, incitant les entreprises à échanger plus. En même temps, la participation accrue aux transactions internationales augmente la demande pour la réforme des institutions internes et enseigne aux agents économiques du pays des nouveaux moyens pour améliorer les institutions existantes. Apart la qualité des institutions nationales, nous considérons aussi leur hétérogénéité au niveau international, mesurée à l'aide de la distance institutionnelle, et qui représente une barrière supplémentaire aux échanges. Nous comparons ensuite l'effet des réformes institutionnelles sur le commerce international à celui de la libéralisation commerciale, et trouvons que les bonnes institutions sont au moins aussi importantes que la réduction des barrières tarifaires et non-tarifaires. L'accroissement du commerce régional Est-Ouest européen est susceptible de se produire même après l'élimination totale de ces barrières. Des différentes mesures de la qualité des institutions nous permet de distinguer entre les institutions qui favorisent le développement économique général et les institutions spécifiques aux pays en transition. Finalement, l'utilisation des variables quantitatives nous permet de donner des réponses précises aux questions de politique économique. Ainsi, l'augmentation de la part du secteur privé dans l'économie d'un pays en transition par un pour-cent génère en moyenne 1,6%

plus de commerce avec un partenaire de l'EU-15.

Dans la *deuxième partie* on s'intéresse aux réseaux sociaux et d'affaires comme déterminants du commerce international. D'un coté on met en avance l'importance des affinités culturelles en tant que dimension des réseaux sociaux, et de l'autre, on montre que la capacité des migrants de s'associer dans le pays d'accueil a des effets positifs sur le commerce et les IDE.

Le *troisième chapitre* traite l'aspect culturel des réseaux sociaux, et développe une mesure de leur intensité à partir du commerce international de biens culturels. La consommation des produits culturels d'origine étrangère peut augmenter la connaissance et/ou la préférence pour les produits de même origine. On considère 7 catégories de biens culturels : les films, les livres, les autres matières imprimées, les journaux et les périodiques, les cassettes, les autres supports audio enregistré, et certains produits agro-alimentaires. (la vodka est par exemple un bien culturel, alors que le blé ne l'est pas.) On mesure ensuite l'intensité des réseaux sociaux, identifiés avec des liens culturels, par la différence entre le volume réel du commerce de ces biens et la prédiction du modèle de gravité, tout en corrigeant pour la présence des liens bilatéraux sans contenu culturel, tels que la préférence générale des Français pour les produits canadiens. La considération des différents types de produits culturels, ayant des impacts différents sur le commerce, permet de séparer l'effet information de l'effet préférence. Les journaux et les supports publicitaire imprimés ont principalement un rôle d'informer les consommateurs et les clients, alors que les films, les livres et les supports audio gênèrent surtout des modifications dans la structure des préférences des consommateurs. Nous trouvons que l'affirmation de Rauch (1999), selon laquelle les réseaux ont plus d'importance pour le commerce des produits différenciés que pour celui des produits homogènes, est vérifiée seulement en partie.

Le *dernier chapitre* étudie l'impact des réseaux ethniques sur les transactions internationales en mettant l'accent sur *les associations des migrants*. Les migrants ont une connaissance supérieure de leur pays d'origine qu'ils amènent avec eux dans le pays d'accueil. Leur capacité de s'organiser dans le pays de résidence, mise en evidence par la création

des associations, est interprétée ici comme une forme spécifique des réseaux d'affaires, dont la caractéristique principale est la présence des structures organisées. Quant aux réseaux sociaux, similairement à d'autres travaux dans la littérature, ils sont mesurés à l'aide des flux des migrants. De cette manière, on peux distinguer entre les deux types de réseaux et estimer séparément l'effet de chacun d'entre eux sur le commerce. Nous utilisons une base de données nouvelle sur les associations des migrants établies en France (les OSIM) et un panel de 17 pays partenaires de la France : 16 pays africains et le Vietnam. On trouve un effet significatif et positif des associations des migrants seulement sur le commerce des produits différenciés. Dans le cas des importations français cet effet est supérieur à celui des flux des migrants, c'est-à-dire l'information et les contacts fournis par les réseaux non-organisés sont moins fiables que ceux procurés auprès des associations des migrants. L'effet positif de ces structures sur le commerce peut être immédiat ou avec un retard de deux à quatre ans, le temps nécessaire pour établir des contacts locaux en France et à l'étranger. Enfin, on trouve des effets semblables et encore plus importants des réseaux ethniques sur les décisions des entreprises françaises d'investir à l'étranger.

En *conclusion*, nous pouvons affirmer que les coûts non-traditionnels peuvent expliquer une grande partie du commerce international manquant et leur réduction peut générer d'importants effets de création de commerce. Le bon fonctionnement des institutions des pays exportateurs et des pays importateurs, ainsi que leur harmonisation au niveau international est comparable en termes de création d'échanges aux politiques de libéralisation commerciale. Les réseaux sociaux stimulent le commerce non uniquement à travers des liens ethniques, linguistiques et historiques communs, mais aussi via les informations et les goûts acquis par la consommation des produits culturels d'origine étrangère. Finalement, la capacité des migrants de s'organiser en associations a un effet favorable sur le commerce et les investissements directs entre le pays d'origine et le pays d'accueil.

On peut mentionner ensuite quelques *pistes de recherche* future. Premièrement, on peut regarder les interactions entre les différents types de coûts liés à l'échange. La réduction des coûts d'information, par exemple, peut être renforcée par des politiques commerciales

plus libérales, alors que la présence de bonnes institutions peut faciliter les négociations concernant la libéralisation des échanges. Ensuite, on peut considérer les réseaux comme des formes d'organisation créés à l'initiative des agents économiques et analyser la causalité inverse entre les réseaux et le commerce international. Il existe bien d'autres formes des réseaux transfrontaliers qui méritent d'être étudiées, tels que l'emploi des étrangers par des firmes locales. Finalement, on peut élargir ces analyses aux investissements directs à l'étranger.

General Introduction

General motivation

It seems like from ancient times on, trade has been a source of wealth and power, and countries always sought to increase their exchanges with the outside world (Maddison (2001)). History shows that leading trading nations have often acquired regional and even global political supremacy. Nowadays, the economic isolation of a country, its withdrawal from the world economy is virtually impossible, and accompanied by a general decline of its economy. Indeed, trade embargos are the harshest economic sanctions countries can impose on each other. Although the specific reasons for which trade generates welfare have evolved over time (availability of new products, exploitation of technological and factor-specific comparative advantages, scale and rationalization effects), countries continue to regard foreign trade as a factor generating growth, and manifest large interest for its expansion.

Regardless of the amplified integration and globalization marking the present-day world economy, cross-border trade is achieved at non-negligible costs. Trade (transaction) costs occupy a central place in the modern international trade literature, and, in conformity with the sequence in which they have been studied, can be divided into two large classes: traditional and non-traditional costs. The first group of trade costs refers to transport and trade policy costs. Identified in theoretical and empirical works by bilateral distance, tariffs and non-tariff barriers, they have been considered until recently as the only burden for trading partners in a world with a geographically spread economic activity. During the last two decades, this list was completed with other types of costs, conventionally labelled as non traditional. This class of trade costs is very large, and is far from being entirely explored.

Sources of trade costs advanced in the literature include: currency, information, communication, search, contract enforcement, institutional costs, etc. Non traditional costs, according to this definition, have been referred to by some authors as hidden transaction costs. The explanation is simple: they are difficultly identified, and even more difficultly measured. They comprise currency, information and partner search costs, and costs relative to the enforcement of contracts and agreements (Rauch (2001)). Institutional costs, i.e. additional costs induced by the poor quality of domestic importer and/or exporter institutions, and the resulting risk and uncertainty with regard to the outcome of international transactions also enter this category (Anderson and Marcouiller (2002)).

Non-traditional trade determinants received a particular attention in the recent literature. Two main motivations drove economists' interest for new factors causing countries to trade more: (i) the significant drop in importance of traditional trade costs, and (ii) the observation of phenomena that could not be explained by traditional determinants of trade. Anderson and van Wincoop (2004) estimate trade costs between developed countries to a 74% tax equivalent. This figure includes all directly observed and inferred border-related trade barriers, and breaks down as follows: 21% transportation costs (both in terms of freight and time), 8% trade policy barriers (tariff and non-tariff barriers), a 14% currency barrier, and 17% inferred trade costs, which include information, contract enforcement, legal and regulatory costs ($1.74 = 1.21 \times 1.08 \times 1.14 \times 1.17$). With all technological innovations that led to reduced transport costs, the latter still account for a large share of international trade costs. Nowadays's global trade liberalization reduced significantly the friction induced by tariffs and non-tariff barriers, and as a consequence limited the gain in trade associated with their elimination. By the end of 2004, 148 countries of the world have joined the WTO, and have committed themselves to comply with multilateral trade governing rules. Under the auspices of the WTO, negotiations have been extended even to very sensitive issues, such as liberalization of trade in agricultural and textile products, and in services. Moreover, regional trade agreements, increasing in size and scope, developed in the different parts of the globe. Barriers relative to the use of different currencies in the importing and exporting countries are large, but very difficult to reduce due to major

associated macroeconomic costs.

Trefler (1995) shows that there is a large gap between theory's predictions and actual trade flows, and introduces the term "missing international trade". The same year, another Canadian economist, McCallum (1995), established the disproportion between domestic and international trade. This phenomenon, named the *border effect* or the *home bias effect* in the literature, received increased attention in the following years. Authors have not been able to reject the affirmation that there is much less international trade than one would expect with respect to trade within national borders, although several sources inflating the results have been identified (Anderson and van Wincoop (2003), Head and Mayer (2002b)). Obstfeld and Rogoff (2000) demonstrate that border-specific trade costs can explain this surprising result, as well as other five major puzzles in international macroeconomics. Certainly, an expansion of the range of considered trade costs is required. Other attempts to explain the mystery of missing trade have focused on informal trade barriers, especially on weak enforcement of international contracts (Anderson and Marcouiiler (2002)), and on inadequate information about trading opportunities (Portes and Rey (2005)) supplied by markets.

Hence, there is probably little left to gain from the elimination of traditional trade costs, and certainly much more from the removal of less traditional costs. But besides the identification of specific non-traditional trade costs, one still needs to quantify them, in order to evaluate the trade creation associated with their reduction, and elaborate pertinent policy recommendations. Moreover, interactions between the two types of trade costs need also be considered. For instance, the decline in information and search costs may be reinforced by more liberal trade policies, or occur independently from them. Similarly, trade liberalization measures are easier to implement when good institutions are at work.

A central place in this line of research is attributed to *institutions* and *networks*. Reforms, leading to better functioning of domestic institutions, and higher similarity between institutions of different trading countries, permit a direct estimation of the gain in trade attributed to the reduction of institutional costs. Similarly, the extra trade brought by strong cross-border networks reflects the advantage of the removal of information, search,

and contract enforcement costs. The use of institutions is not new to a number of economic areas, such as the new institutional economics (Coase (1937), North (1990), Williamson ()), and the growth and development economics (Acemogolu et alii (2001), Rodrik (), Kaufman and Kraay (1999)). Networks have been imported into the trade literature mainly from sociology and labour economics. But certainly, in the context of international trade, both factors are conceptualized slightly differently than in the field of origin.

In the international trade literature *institutions* are defined as formal and informal rules of behavior, means for ensuring their application, mediation procedures in case of dispute, sanctions for violation of established rules, and organisations and bodies in charge with their enforcement. Institutions' quality is judged as more or less good by the more or less good functioning of their different elements. Exemples include constitutions, judicial systems, banks, corporate, collateral, and bankruptcy laws, tax collection and competition agencies. Effective institutions are those ensuring that the incentives that they create actually lead to the desired behavior.

Trade theory does not underestimate the importance of institutions. Rather, the problem is that it takes the ubiquitous existence of well-functioning institutions for granted. However, only developed countries in recent times come anywhere near this ideal picture. In most countries of the world the institutional apparatus is very costly, slow, unreliable, weak, or corrupt. Under these conditions, international trade contracts are more time-demanding, uncertain, harder and costlier to accomplish. Still, economic activity does not grind to a halt because the government cannot provide adequate institutional underpinnings. Economic agents manage to find solutions even in such an imperfect world. The description of a larger number of possible contingencies and solutions to them in the contract, and international arbitration are only two examples commonly used by trade partners. However, they will unquestionably generate an upsurge in transaction costs, and lead to lower cross-border trade. The fragmentation of institutions at country level is an additional source of larger international trade costs. Even in the case of well-functioning institutions, national specificity introduces confusion and supplementary costs. Therefore, similarity between institutional frameworks of the exporting and importing countries, along

with the development of high-quality national institutions, has a trade creating effect.

Differently from previous works, recent developments in this field consider national, i.e. country-specific, institutions. The idea itself has been borrowed from the literature on economic growth and foreign direct investment, where institutional aspects were already an established factor. Recent research on trade and institutions coincides with the development of a range of indexes characterizing the quality of domestic institutions by different international agencies, and organizations (WB - Kaufman et alii (1999), (2003), Fraser Institute, Freedom House, EBRD, etc.). Despite the increased popularity, this field remains little investigated: there is only a handful of studies, and very reduced theoretical modelling. Anderson and Young (2002), Anderson and Marcouiller (2002), Dixit (2003a), and (2003b) constructed theoretical frameworks for specific institutional aspects. Institutional deficiencies are more acute in less developed countries and in transition economies. A more thorough investigation of these cases is hence demanded.

For all its importance, there is unfortunately no clear definition of *networks* in the literature. The trade literature considers networks as groups of individuals or firms, connected with each other with ties stronger than the ones found on the market. Rauch (1999) considers networks as an alternative to market interactions. In some contexts the key feature of networks is that their members are engaged in repeated exchange that helps sustain cooperation. In other contexts the key feature is that network members possess thorough knowledge on each other that helps them match each other or refer each other to outside business opportunities. These features correspond to two definitions of networks used in sociological literature. However, when considering the role of networks in overcoming trade barriers, a narrower definition is required. Rauch (2001) considers that only networks that were formed domestically and became transnational through migration or foreign direct investment, even if this internationalization has taken place generations ago, are suitable to this end. Networks are also referred to in the literature as informal institutions: they often operate outside the formal legal system, and reflect unwritten codes of social conduct. In this line of thought, national institutions presented and discussed above are called formal.

The recognition that networks promote trade existed long before the issue has been

questioned by economists. A poem published in June 1922 states:

"If I knew you and you knew me
'Tis seldom we would disagree;
But never having yet clapsed hands
Both often fail to understand
That each intends to do what's right
And treat each other "honor bright"
How little to complain there'd be
If I knew you and you knew me..."

Source: *Who's Who in the Grain Trade 35*, cited in the World Development Report 2002.

Recent research by Greif (1993), Gould (1994), Rauch (1999), Feenstra et alii (1997), Cassela and Rauch (2003) and other authors establish both theoretically and empirically that networks play an important role in international trade. Economists have identified two broad types of network ties, social and business, and three functions or channels through which they shape trade (Rauch (2001), Combes et alii (2005)). Networks promote trade due to (i) the increased information about foreign partners, and business contacts they provide to their members, (ii) contract enforcement mechanisms they establish, that discourage or limit the opportunistic behaviour, and (iii) shifts in consumer preferences and tastes they generate. Social networks are based on common ethnic, religious, linguistic, and other common ties. Business networks, as suggested by their name, rely on contacts between firms or other organized entities. A main function of networks is to exchange detailed information between members at zero or low cost. Transnational networks can help members to match to profitable trade opportunities through providing market information, letting suppliers know whether consumers in a particular country would be receptive to their products and/or on how to adapt their products to consumer preferences in a given country. Networks can also facilitate trade by building or substituting for trust when contract enforcement is weak or inexistent. Repeated mutual contacts and punishment schemes developed by networks discourage members from violating an agreement, reduce

opportunistic behavior, and lower costs of implementing contract's clauses. This second function is specific to cross-border business networks. The preference effect, on the contrary, is present only in the case of social ties. Individuals with common ethnic or religious origins situated in different countries have generally increased preference for each other's home country products. However, certain researchers aggregate the first two functions under a single one. The reason is straightforward: perfect information about members of the network can become a powerful device persuading firms to fulfill their contractual liabilities. Business and social networks operating across national borders can help overcome informal trade barriers, and at the same time help document and even quantify the existence of these barriers. Research on the identification of network types and channels of their action remains limited.

The literature on trade and transnational networks is closely linked to international migration. The adoption of the network view of international trade contributed to a recent upsurge of the literature on trade and migration. Increased empirical research of ethnic networks benefited from the easiness of identifying their membres. Immigrants can promote bilateral trade by providing market information and supplying matching and referral services. Members of coethnic groups share a set of common characteristics and ties defining social networks. In a different line of work, the ability to communicate in a common language has been considered as the main feature delimiting social networks. Coethnic networks active in international trade often display features specific to business networks: they create the conditions for limiting opportunism and bridge direct contacts between partners in the host and home country. Many ethnic networks will blacklist a business owner violating an agreement and refrain from doing business with the guilty party. Employment of foreigners is often motivated by the desire of companies to develop business contacts with firms in the country of origin. Alternatively, business networks have been summarized to financial linkages developed through repeated interactions or foreign direct

investment (e.g. French economic groups, Japanese keiretsu).

Organization of the dissertation

The study of issues described above is interesting not only for the understanding of a series of today phenomena. It is especially useful for the formulation of relevant economic policies. This dissertation approaches this problematic throughout four chapters, assembled in two parts. The first part concerns the estimation of trade potentials, i.e. trade costs expressed in terms of actual trade volumes, and costs specific to the domestic and foreign institutional environment. Empirical applications consider the particular case of Central and East European countries. This choice was motivated by the recent reintegration of these countries into the world economy, the important shifts in the volume and structure of their trade patterns, and especially by the deep trade policy and institutional reforms they have suffered in the last fifteen years. Network ties linking the importing and exporting countries are tackled in the second part of the dissertation. This part evaluates the role of cultural exchange in defining trade-sustaining social networks, and regards the capacity of ethnic communities to organize into voluntary associations as a form of business networks. This time the geographical span of the sample used is very different from the sample used in part one, and was dictated by the availability of data. The order in which different aspects have been addressed in the dissertation follows the chronological evolution of the literature during the last years.

*T*he first chapter estimates total border-related costs, and addresses the issue of trade potential. To asses the contribution of institutions and networks in overcoming formal and informal trade barriers one needs first to quantify the barriers. The discussion is restricted here to border-specific costs: all trade costs except the ones related to the physical transportation of merchandize are particularly large or arise exclusively in international

transactions. The literature on border effects permits an evaluation of costs in terms of trade volumes. For example, McCallum (1995) finds that the Canada-U.S. border corresponds on average to a reduction of trade between states and provinces by twenty times. However, for multiple reasons, all this missing international trade is unlikely to be reached as long as two countries remain separated by a political frontier. In the literature trade potentials have been traditionally estimated with respect to international trade patterns of a control or reference group of countries. However, a country's trade with itself is a much more reliable benchmark. We use advances in the literature on border effects and trade potentials to construct a measure based on this principle. It is assumed that integration translates first into a reduction of bilateral trade costs, and only afterwards an upsurge of trade is obtained. This coincides with the logical evolution of events: firms increase demands from suppliers when the reduction of costs has already been achieved. In our specific case, East-West European trade costs are assumed to converge in the long run to the lower level observed for trade between Western countries. Following the traditional literature, trade potentials are computed with respect to a reference group of countries, but it is computed in terms of differences in transaction costs rather than in terms of volumes of trade. Taking domestic trade as a benchmark, one needs to compare total border-related trade costs for the two groups of countries. Border effect techniques are applied to that end. As a result, trade potentials are computed as second differences in trade volumes: as the difference between the predicted and the actual volume of trade for the control group, minus the difference between the predicted and the actual trade for the inquired group. For the considered set of European countries, large possible trade creation is predicted. Our results greatly surpass findings in the traditional trade potential literature, and warn governments about the higher-than-expected effect of regional integration.

The new method introduced in the first chapter also permits to integrate the rich theoretical progress in deriving gravity-type trade specifications. In this case, the identification

of the trade model that is best supported by the empirical data represents an additional challenge. We construct a test for the compatibility of national product differentiation *à la* Anderson (1979), and monopolistic competition *à la* Dixit and Stiglitz (1977) and Krugman (1980) trade models with the observed data. Bilateral regional trade flows are estimated with each model and predicted values are compared with the actual trade. The exercise is repeated for different values of the elasticity of substitution, and the model with a monopolistic competition market structure is identified as a better replica of European trade. The corresponding elasticity of substitution estimated by the test to have a value equal to three, which lies within the range of values found by previous works.

The size of estimated border effects and border-specific trade costs depends on a variety of factors, among which is the way in which distances are calculated. We address this question in more detail in the last appendix to the chapter. This is not a debate on how to compute internal distances, which will undoubtedly affect border effects, but rather a discussion proposing the use of compatible computation techniques. All theoretical trade models are based on a nonlinear relationship between distance and trade, confirmed by a multitude of empirical works. However, this aspect is ignored in the calculation of distances employed in trade estimations that pay attention to countries' internal geography. Instead of simply summing weighted bilateral distances separating the different regions of importing and exporting countries, we develop and apply a nonlinear procedure for computing distances between and within countries as a function of the estimated distance elasticity of trade. An iterated procedure, consisting at each step of an estimation of the distance elasticity and its employment in the computation of distances, permits to estimate the true value elasticity that verifies the nonlinear correlation suggested by trade theory. Our results confirm previous findings about the general overestimation of border effects in the literature. Our results suggest that defective computation of distances inflates border-specific trade costs by a factor of two. Nevertheless, this effect is constant over time and does not

affect the conclusions formulated in the first chapter.

In the *second chapter* we consider in more depth the role of institutions in international trade. The idea of well-functioning institutions encouraging economic activity is not new to economists, but it had few applications to international trade. We complement this literature in several ways. First, inspired by the works on economic development, we study the endogeneity between trade and institutions. It is not only that better institutions at home and abroad increase the security of international exchange, reduce uncertainty and contract enforcement costs, and thereby persuade firms to trade more, but also that increased participation in international transactions generates more demand for institutional reforms, and higher pressure on governments to finance and implement them. Trade, is also a channel through which a country's economic agents can learn of the ways to ameliorate existing institutions and design new, more similar to those of its trading partners. Secondly, we consider two aspects of the institutional framework: the quality and the similarity of national institutions. International fragmentation represents an additional barrier to trade. Even firms from advanced countries with strong institutions might find difficult to conclude mutual agreements with one another if institutions in their home country differ a lot from those in the partner country. Unlike previous works, we construct a real measure of institutional heterogeneity, the institutional distance, and find that it is a significant determinant of trade, comparable in importance to the quality of domestic and foreign institutions. Next, we compare the effect on trade of institutional reforms to that of the foreign trade policy, and compute the share of each factor in total border-specific trade costs. As in the first chapter, we consider the trade of transition economies with West European partners. This choice is motivated by the fact that institutions in transition countries have undergone profound reforms in the recent years, while their trade with EU members benefited from increased liberalization. Similarly to other authors, we find strong national institutions to be at least as important for international trade as the removal of

policy barriers to trade. A further increase of regional trade is likely to occur even after all tariff and non-tariff barriers are eliminated. Moreover, we distinguish between general institutions promoting economic development, and those specific to transition economies. As expected, the latter are of greater importance for our group of countries. Finally, we employ both index and quantitative measures to evaluate institutions. The second type of measures permit to formulate specific recommendations to governments in terms of economic policy. Increasing the share of the private sector in the economy by one percentage point, for example, would lead on average to a 1.6% raise in trade of a transition country with an average EU partner.

The *third chapter* focuses on cross-border social network ties. They benefited from an increased attention in the empirical literature due to the fact that they are relatively easy to quantify. Previous research relied mainly on the use of stocks of immigrants or shares of different ethnic groups in a country's population, and share of the population speaking a common language. A new aspect of social networks is studied in this chapter on a large sample of countries. International trade itself can contribute to the development of transnational social ties. Differently from the repeated interactions definition of networks, exchange of cultural goods can increase the awareness of and/or preference for products from the origin country in the same time period. Cultural goods, more than any other products embody information of the origin market. Trade in motion pictures, books, other printed matter, newspapers, or recorded audio media is much more sensitive to the presence of common ties between countries engaged in the exchange. The presence of cultural and social links increases the utility associated with the consumption of these products, and in certain cases is even an indispensable premise for their consumption. We show that firms and individuals can acquire increased information about foreign markets and in general develop a higher preference for foreign products, by consuming cultural goods from those countries. The amount of extra trade in cultural goods between two countries with respect

to the predictions of the general gravity model is used to express the intensity of social ties linking them. However, one needs to adjust for the presence of culture-free bilateral linkages, such as the general preference of Americans for Canadian products. We control for this element by including non-cultural ties, estimated as the residual trade in similar goods without a cultural component: as an independent variable in the trade model. But even then, the consumption of foreign cultural goods is found to contribute to the accumulation of information about partners situated and goods produced abroad.

The main way proposed in the literature of separating the information from the preference effect of social networks consists in comparing the size of effects on exports and imports. According to it, a larger network effect on imports testifies to the adoption of foreign consumption habits. Nonetheless this approach is quite imperfect, as foreign-born individuals can not only preserve their preference for products produced in their country of origin, but also, given their increased knowledge of the host country acquired after migration, encourage family and friends at home to purchase more goods produced in their country of residence. Indeed, community-specific studies confirm the presence of both phenomena. Differently from this literature, we compare the effect of cultural ties estimating it for seven types of cultural goods. By their very nature newspapers and periodicals, booklets, and other printed advertising material have mainly an informative role, while motion picture, books, recorded media, and agricultural goods are more likely to produce shifts in consumer preference structure. We find strong evidence of both effects in the data. Rauch (1999) states that networks are of particular importance when markets fail to provide necessary information or enforcement mechanisms, i.e. in the case of differentiated products. Applying his classification of goods into homogeneous, reference priced, and differentiated, only partial support for this statement is found.

Fourth and last *chapter* addresses the role of business networks *per se*, and relative to social networks. A possible way to quantify trade costs reduced by cross-border networks

is to consider international migration. There is a recent and expanding literature showing that international transaction costs are generally lower in the presence of large flows or stocks of immigrants. The intuition behind it is straightforward: immigrants carry their increased knowledge of the country of origin to the host country. From this point of view, international migration can be viewed as a transfer of information. Countries which receive immigrants also import their knowledge of opportunities, practices and tastes in their respective countries of origin. However, this literature does not consider the organized activity of immigrants in the host country. Rauch and Trindade (2002) observe that many ethnic groups living outside their countries of origin create formal and informal associations to which coethnic businesspeople both from the host country and from the native country have access. In this line of thought, the last chapter proposes a different view on international migration. The classification of networks into business and social can be transposed to migration as follows: overseas ethnic populations represent social networks referring to common linguistic, ethnic, religious, and historical ties, while home country associations established by immigrants in the host country depict business networks formed by interlinked firms and organizations. A central issue in the literature on business networks is the presence of organized structures. The capacity of immigrants to associate, to define common goals, to raise funds, and to undertake joint actions in the benefit of their home country is, therefore, used as a measure of the intensity of business networks.

We employ a new, unexplored dataset on migrant associations established in France, along with data on flows of immigrants to France in order to quantify the impact of social and business networks on its trade with seventeen selected developing countries. A significant effect is found only for trade in differentiated goods, but this result is most likely due to the asymmetric composition of considered trade flows. Similar to Combes et alii (2005), we find a larger impact on trade of business compared to social networks. Information and business contacts supplied by unorganized immigrant communities, however, are irrelevant

for French imports from developing countries. Home country associations generally become convenient for trade immediately, or with a delay of two to four years, the time needed for the establishment of local business contacts in France and abroad. Similar effects of networks are identified in the case of foreign direct investment of French firms. Interestingly, results are stronger and more robust than in the case of trade. Still, the procurement of information on the foreign market via migrant associations is more efficient than by the word-of-mouth.

This dissertation shows that there is a large place for non traditional trade costs in explaining missing international trade. Trade potentials may actually have been underestimated in the literature, and trade creation associated with regional economic integration might be much larger than expected. This finding is illustrated in the particular case of trade between East and West European countries. Results presented in different chapters confirm the pro-trade effect of both institutions and transnational networks. The well-functioning of domestic and foreign institutions is a factor comparable in importance to foreign trade policies. Even after all tariff and non-tariff barriers are removed, institutional reforms may generate a large increase in international trade. Social networks promote trade not only via common ethnic, linguistic and other ties that connect their members, but also via information and tastes acquired from the consumption of foreign cultural goods. A particular form of business networks studied in this dissertation are home country associations established by immigrants in their host country. Migrant associations have a stronger effect on trade than social network ties, they shape foreign trade and affect as well decisions to invest abroad.

Part I

Economic integration, trade policies, and institutional reforms

Chapter 1

Border Effects and East-West Integration

1.1 Introduction

Economic relationships between Central and Eastern European (CEE) countries and their Western partners during the last decade or so have been marked by the premises of EU enlargement. In the early 1990s most CEE countries have formulated officially their desire to integrate the Union, and have received an affirmative response conditional on the fulfillment of several economic criteria. A decade latter, eight of them have acquired the membership status and benefit from all insider's advantages. The evolution of their economic exchanges between these two dates reflected a gradual elimination of trade costs, and a concentration of trade with 'old' EU partners. Regional integration between Eastern and Western European nations has been accompanied by important trade creation effects, that may continue even after CEE countries have joined the European Union. It takes time for firms to grasp trading opportunities offered by the modified economic environment. The economic literature employs the term *trade potential* to designate these effects.

The additional trade arising from an economic integration initiative is traditionally

estimated in the literature by trade potential models that rely on the empirical success of the gravity equation. The essence of these models consists in comparing actual trade to the gravity predicted so-called "normal" level of trade, with the difference between the two capturing the trade potential. Wang and Winters (1991), Hamilton and Winters (1992), Baldwin (1993), Gross and Gonciarz (1996), Fontagné et al. (1999), and Nilsson (2000) use this approach to estimate European trade potential during the 1990s.

One drawback of this method is the mis-specification of the gravity equation used in these models with respect to trade theory, and the sensitiveness of results upon the gravity specification used. Another weakness of trade potential models is that they disregard the large amount of trade taking place inside national borders and base their predictions on an analysis carried exclusively on international trade.

The present chapter attempts to quantify the size of future increase in trade among European countries, and introduces a new method for this purpose. Contrary to traditional trade potential models, we compute trade potential directly from cross border trade costs. For that, each country's domestic trade is used as benchmark for its trade with partner countries. In other words, trade costs other than those induced by the distance are assumed nil for transactions taking place within the same country. The rationale for this the following: A country is a highly integrated and homogeneous economic space, where full economic integration is achieved. Indeed, in the light of some recent studies (e.g. Brunetti et alii (1997), Rauch (2001)) the presence of a single legislative system, central administration, currency, communication network, and set of economic policies contributes to an important reduction of transaction costs and fosters exchange. Under this perspective, international trade costs are reflected by border effects. The ratio between border effects estimated for East-West European and intra-EU flows produces the CEE-EU trade potential. This method eliminates the two drawbacks characterizing the traditional trade potential models mentioned above. The use of border specific costs permits to account for

the fact that a lot of trade is already "missing" at the international level, and the estimation of border effects with theoretically derived trade equations corrects for specification problems.

Trade both among CEE and between CEE and EU countries improved remarkably during the last decade of the twentieth century, both in terms of border effects and trade potentials. Our results predict much higher trade potential values for both CEE-EU and intra-CEE trade than usually found in the literature with traditional trade potential models. Results are very robust and are obtained with border effect estimates of all theoretically sound specifications. Thus, at the beginning of the XXIst century trade between CEE and EU countries represented about half of its attainable level, suggesting a possible 100% increase with further EU integration. The possible upsurge of regional CEE trade in the following years, despite the impressive reduction of bilateral border effects reached by the beginning of the twenty-first century, is even higher.

While strengthening trade between 'old' and new members, EU enlargement is very likely to have a non-negligible impact on trade between new joiners (e.g. between Hungary and Poland). As revealed by the literature,[1] the reintegration of CEE countries into the world economy in the early 1990s marched side-by-side with their disengagement in regional integration. The decline of trade with other CEE partners was beyond its normal level, pointing out the strong competition between former socialist economies for obtaining a higher share of the much larger EU market, and which is more important, for a positive evaluation from the EU and augmented chances for accession. These tendencies have been reduced and even reversed occasionally with the implementation of regional free trade initiatives. With most of CEE countries joining the union and becoming members of the same economic block, this rivalry will be significantly reduced, and intra-CEE trade will most probably return to its 'normal' level. Moreover, it may even expand beyond that level, as part of the new intra-EU trade. In this chapter we assume that trade among

[1]Maurel (1998), Gros and Gonciarz (1996), Baldwin (1993), Nilson (2000).

CEE countries joining the union will reach in the long run the intra-EU level. CEE trade potential is then obtained by taking the ratio between intra-CEE and intra-EU border effects before enlargement.

The chapter is divided as follows: The next section describes the new trade potential measure introduced by this chapter. Section 1.3 describes the theoretical trade model and three different specifications used to estimate border effects. Border effect estimates within and between country groups are presented and discussed in the next section. Main results are displayed in section 1.5. Trade potentials for European trade flows produced by the different approaches and their evolution in time are compared. In section 1.6 we build a test for monopolistic and perfect competition models of trade, and the last section concludes.

1.2 Border Effects and Trade Potential

Recent empirical work in international trade reveals an interesting phenomenon: A higher volume of trade takes place inside countries, within national borders, than between them, i.e. across borders. It's rather the size than the very presence of this phenomenon that is surprising. Even highly integrated countries as Canada and US trade about twenty times less with each other than with themselves (McCallum (1995)). The lower intensity of international transactions than what could be potentially justified on the basis of transportation costs alone pointed out by Trefler (1995) and Rauch (2001) is another indicator of this 'mystery of missing trade'. 'Under-trading' across national borders is usually referred to in the literature as the *border effet*. [2]

To McCallum (1995) the border effect reflects how much more on average a region trades with another region of the same country than with a region of equal size and situated at equal distance but abroad. He uses a dummy variable for the border along with country GDPs and bilateral distance in a standard gravity equation to capture this effect. A nega-

[2] Obstfeld and Rogoff (2000) call this phenomenon the home bias in trade.

tive and significant estimate of the coefficient on the border dummy reveals a large border effect: a large amount of 'missing' international trade. Helliwell (1996) and Wei (1996) confirm McCallum's finding of large border effects between some highly integrated economies using identical or very similar equations on different data sets. Unlike McCallum and Helliwell who use region level data, Wei (1996) estimates the value of missing trade from country data. He computes unavailable internal trade as the difference between a country's production and its exports,[3] and introduces a remoteness variable (multilateral distance) in the trade equation to control for the relative isolation of a country from its trading partners.[4] Under this specification border effects equal to the ratio of internal to international trade after controlling for economic size and distance.

We use these empirical findings to build our trade potential measure. Differently from traditional trade potential models, our method resides in a direct comparison of international trade costs for the integrating and reference groups of countries. We define the level of trade integration of two or more countries by referring to the intensity of trade inside these very countries. The more the volume of trade across national borders approaches that of internal trade when controlling for standard variables such as size and distance, the more integrated the trading countries are. The integration of two groups of countries is assumed to lead to a drop in bilateral trade costs to the level of the lowest intra-group trade costs. Under these conditions, the estimation of trade potentials is reduced to the estimation and comparison of within and cross group border effects, with a lower border effect signaling a higher trade integration. We call this kind of integration *integration in terms of border effects*. By its very construction this approach partially incorporates 'missing' international trade and produces higher trade potentials.

In the precise case of European integration, trade between 'old' EU members is subject

[3]This permitted the estimation of border effects for a large number of trade flows removing the limits set by the unavailability of regional trade data, and therefore the expansion of this literature.

[4]This correction of the gravity was embraced by further works such as Wolf (2000), Nitsch (2000), and Evans (2003).

to the lowest distortions and used as reference for other European flows, just like in the related trade potential literature. The part of intra-EU trade in total EU trade remaining at a steady level during the last decade suggests that the latter might well correspond to the long term equilibrium. The East-West European trade creation effect may or not be accompanied by trade diversion in the detriment of regional CEE integration. After the EU enlargement to the East, trade between new members becomes intra-EU trade. Therefore, trade costs associated with it will also reduce at least in the long run to the level of intra-EU costs prior to enlargement.

Specifically, our approach implies two steps. First, the amount of missing international trade relative to trade within national borders is estimated for each group of countries. Put differently, these amounts to estimating intra-EU and CEE-EU border effects. Secondly, the two border effects are compared and their ratio gives the potential of trade between CEE countries and the European Union. This corresponds to the actual trade creation that will occur once East-West European trade integration reaches the level observed among 'old' EU members, or the trade potential induced by full integration of these countries in terms of border effects.

As shown above, a large part of the literature on border effects relies on the use of an augmented gravity model. The gravity equation is a basic tool in international economics usually used to express the volume of trade between two countries. It relates trade volume positively to the size of the two countries and negatively to the distance between them. Its wide use comes from its simplicity and good fit of empirical data. There is a large and growing international trade literature based on the empirical use of the gravity. However, its compatibility with the predictions of international trade theory remained questionable for a long time. Until recently the neoclassical trade theory seamed unable to predict a gravity-type relationship, and gravity-based works were considered therefore as lacking theoretical foundation.

Important progress has been made lately in deriving gravity-like equations from different trade models, showing that gravity is compatible with trade in both differentiated and homogeneous products.[5] Trade models with differentiated goods account by far for the largest part of this literature. Product differentiation can be defined in many ways, yielding different but rather complementary explanations for why gravity works. Helpman and Krugman (1985) and Bergstrand (1989) reach a gravity equation in a monopolistically competitive setting with goods differentiated at firm level. Anderson (1979) and Anderson and van Wincoop (2003) use differentiation by country of origin to derive the gravity in a perfect competition setup. Deardorff (1998) obtains a gravity equation in a neoclassical framework with different factor intensities. Eaton and Kortum (2002) enrich the theoretical underpinning of gravity with a Ricardian model of trade with homogeneous goods and differences in technologies.

The last two results dissipate the tacit belief that the success of gravity should be attributed to the presence of increasing returns to scale to the detriment of traditional trade theories. In the same context, Hummels and Levinshon (1995)'s empirical study reveals that gravity works for a wide range of countries, suggesting that it is consistent with different trade models, and, as Deardorff (1998) states, "is therefore not evidence of anything, but just a fact of life". Evenett and Keller (2002) as well find support for both theories.

Although gravity is shown to be compatible with both traditional and new trade theories, each theoretical model produces a different final trade specification. This aspect ignored by trade potential models is incorporated in our approach through the use of theoretically derived trade equations in the estimation of border effects. One can estimate border effects from a national product differentiation setting as Anderson and van Wincoop (2003), with monopolistic competition and firm-specific varieties like Wei (1996) and

[5]For a detailed review of literature on gravity see Deardorff (1998), Feenstra, Markusen and Rose (2001), Feenstra (2003), and Harrigan (2003).

Head and Mayer (2000), or yet estimate an average bilateral border effect as Head and Ries (2001a). Three alternative specifications for domestic and foreign trade flows are used in this chapter. The first consists in using country-specific effects to capture importer and exporter groups of variables, allowing the estimation of coefficients on bilateral variables alone. The second approach involves the incorporation the production side of a DSK monopolistic trade model, and the last approach implies the computation of average trade 'freeness'.

The choice of the trade model, however, may have a direct impact on the magnitude of trade potentials. It is important therefore to identify and use the model that best replicates trade flows for considered countries. We address this question in more detail in section 1.6 by constructing a test for the national product differentiation with perfect competition, and monopolistic competition with endogenously determined number of firms and varieties trade models. According to it, European trade is better replicated by a monopolistic competition setting with endogenous firms and varieties, and an average elasticity of substitution between internationally traded European varieties equal to 3 is obtained.

1.3 Theoretical Discussions

In this section we develop three specifications of trade flows, basing our theoretical modelling on two trade models used in the literature: the national product differentiation model *à la* Armington (1969), and the monopolistic competition model of Dixit and Stiglitz (1977) and Krugman (1980).

We start by describing an underlying preference structure with differentiated goods, common to all trade specifications. The trade equation obtained includes variables that are unobserved or inaccurately measured. This makes the trade equation unsuitable for direct estimations. The issue of reaching an estimable equation is solved in three particular ways, generating the same number of trade flows specifications. Each specification is further

considered into details in a separate subsection.

1.3.1 A differentiated-good trade structure

We consider a trade structure with a differentiated good and n_i varieties produced in each country i. The model has a slightly different interpretation depending on the used data. Each industry (when using industry-level data) or the entire manufactured sector (when using aggregate data) is considered to be composed of a single differentiated product of which multiple varieties are available. Product differentiation can be at country or firm level. National product differentiation was introduced by Armington (1969) who proposed an utility function in which consumers distinguish products by their origin. It can also arise from a Heckscher-Ohlin model with no factor price equalization as in Deardoff (1998). An alternative approach is that of Dixit-Stiglitz-Krugman (DSK) type monopolistic competition models. In the latter, each variety is produced by a distinct firm, and the number of varieties n_i (identical to the number of firms) is endogenously determined by the model.

Consumer preferences are homothetic and represented by a CES utility function. Importing country j's representative consumer utility is given by:

$$u_j = \left[\sum_i \sum_{r=1}^{n_i} \left(a_{ij} x_{ij} \right)^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}} \tag{1.1}$$

with a_{ij} representing country j consumers' preference for country i products, x_{ij} the volume of goods produced in i and consumed in j, and σ the substitution elasticity between any two varieties. Coefficients a_{ij} are introduced in order to allow for different preferences across countries.[6]

We assume that consumers of each product are charged with the same price augmented

[6]Two forms of preferences are usually found in the literature: identical for all countries, $a_{ij} = a_i \ \forall j$, yielding symmetric utility functions (e.g. Anderson and van Wincoop (2003)), and more pronounced for domestic products, $a_{ij} = \exp(e_{ij})$ if $i \neq j$ and $a_{jj} = \exp(e_{jj} + \beta)$, producing asymmetric demand functions (e.g. Bergstrand (1989), Head and Mayer (2000)).

by trade costs. The difference in the price of the same good in two different locations is therefore entirely explained by the difference in trade costs to these locations. For simplicity, an 'iceberg' trade costs function is used. The price to country j consumers of a good produced in i, p_{ij}, is the product of its mill price p_i and the corresponding trade cost t_{ij}. Two elements of bilateral trade costs are considered: transport costs proportional to the shipping distance d_{ij}, and costs due to the presence of trade barriers such as tariffs, non-tariff barriers, information costs, partner search costs, institutional costs, etc:

$$t_{ij} = \underbrace{{d_{ij}}^{\rho}}_{\substack{\text{transport} \\ \text{costs}}} \underbrace{\exp\left[\left(1 - home_{ij}\right) b_{ij}\right]}_{\substack{\text{border-specific} \\ \text{costs}}}. \tag{1.2}$$

The second type of costs arise exclusively for trade across national borders. $home_{ij}$ is a dummy variable equal to one for internal trade and to zero for trade between countries. $[\exp(b_{ij}) - 1] \times 100$ gives the tariff equivalent of border-specific trade barriers on country i exports to j. In section 1.4 we introduce a more complex trade costs function by decomposing the second left hand side term of equation (1.2) in order to account for the presence of a common land border or language, and different trade flows types.

Consumers of each country j spend a total sum E_j on domestic and foreign products:

$$\sum_i n_i x_{ij} p_{ij} = E_j, \tag{1.3}$$

and choose quantities that maximize their utility function (1.1) under the budget constraint (1.3). Country j's total demand for country i products is given by:

$$m_{ij} \equiv x_{ij} p_{ij} = a_{ij}^{\sigma-1} \left(\frac{p_i t_{ij}}{P_j}\right)^{1-\sigma} n_i E_j, \tag{1.4}$$

$$\text{where} \qquad P_j \equiv \left[\sum_k a_{kj}^{\sigma-1} \left(p_k t_{kj} \right)^{1-\sigma} n_k \right]^{\frac{1}{1-\sigma}} \tag{1.5}$$

is a price index of the importing country j nonlinear with respect to the unknown parameter σ. The estimation of trade equation (1.4) is possible only for particular values of the substitution elasticity σ. But even then the presence of a nonlinear price index P_j, and the difficulty of measuring the number of varieties produced in each country limit the accuracy of results. Slightly different specifications are reached with national and firm level product differentiation.

We adopt the following notation $\phi_{ij} \equiv (t_{ij}/a_{ij})^{1-\sigma}$, imported from the economic geography literature, and representing trade freeness (or ϕ-ness). Consumer preferences can also be expressed as a function of bilateral variables, similar to trade costs. However, we have no means to disentangle the impact of the same variable on preferences from its impact on trade costs. Estimated coefficients on the latter will actually reflect the global effect on both trade costs and consumer preferences. We assume throughout the rest of the chapter unitary preferences for all products and consumers, and discuss the release of this restriction at the end of the section.

The rest of this section is reserved to the presentation and discussion of three alternative strategies to address these issues. The first consists in using country-specific effects to capture importer and exporter variables, allowing the estimation of coefficients on bilateral variables alone. We shall refer to it as the *fixed-effects* approach. The second procedure involves a deeper use of the theoretical framework, in particular the production side of a DSK monopolistic model, and the last approach refers to the computation of an average trade 'freeness'. We call those the *odds* and *friction* specifications respectively, following Combes et alii (2005).

1.3.2 The fixed-effects specification

The method presented below relies uniquely on the differentiated-goods structure presented above. As a result, it holds independently of the specific market structure and the production side assumptions, and is equally compatible with both perfect and imperfect competition, national and firm level differentiation of products. As implied by the name, it resides in using importer and exporter specific dummies to account for market and supply capacities, as in Hummels (1998), Harrigan (1995), Rose and van Wincoop (2001), and Redding and Venables(2004).

An estimable trade specification can be derived directly from (1.4) by grouping i and j terms of the equation, using the definition of trade freeness, and taking logarithms on both sides:

$$\ln m_{ij} = FE_i + \ln \phi_{ij} + FM_j. \tag{1.6}$$

Country fixed effects are used as proxies for supply and demand terms of the equation with:

$$FE_i \equiv \ln(n_i p_i^{1-\sigma}), \quad \text{and} \tag{1.7}$$

$$FM_j \equiv \ln(E_j P_j^{\sigma-1}). \tag{1.8}$$

Under this approach only bilateral variables are left in the equation, and all structural parameters, in particular the elasticity of substitution between varieties σ, cannot be estimated. This represents the major drawback of this approach.

Differently from the cited authors, we are interested in the estimation of border specific effects, and consequently estimate equation (1.6) for international and domestic trade. Trade costs in ϕ_{ij} are decomposed according to (1.2) to reach the final trade specification:

$$\ln m_{ij} = FE_i + FM_j + \rho(1-\sigma)\ln d_{ij} + (1-\sigma)b_{ij} + (\sigma-1)b_{ij}home_{ij}. \tag{1.9}$$

Accordingly, a higher coefficient on the last variable designates higher cross-border barriers for country i's exports to j. As suggested by (1.9) higher barriers can arise not only from larger trade costs (larger b_{ij}), but also from a higher elasticity of substitution. The trade loss due to country-specific trade barriers (e.g. high overall tariffs, or poor domestic institutions) is disregarded by this measure of border effects and seized by country specific effects.

Differently, one can first derive a gravity-type trade equation following Anderson and van Wincoop (2003)'s approach for national product differentiation, and only afterwards group supply and demand variables separately into country specific effects. This will produce identical estimation equations and results; the difference lays in the interpretation of country and partner effects FE_i and FM_j.

Summing bilateral imports (1.4) across destinations gives the production level at origin $y_i = \sum_j x_{ij} p_{ij}$. Then the obtained identity can be further used to express the unknown variable ${p_i}^{1-\sigma}$ ($n_i = 1$, $\forall i$ in this particular case), which is then re-introduced in the trade equation (1.4). Differently from Anderson and van Wincoop (2003), this can be accomplished without imposing market clearance ($y_i = E_i$) using data on importer's expenditure, i.e. without assuming factor price equalization and balanced trade.[7] A nice gravity equation is thus obtained:[8]

$$m_{ij} = \frac{y_i E_j \phi_{ij}}{\bar{P}_i^{1-\sigma} \tilde{P}_j^{1-\sigma}} \tag{1.10}$$

$$\text{with} \qquad \bar{P}_i^{1-\sigma} \equiv \sum_k \phi_{ik} {P_k}^{\sigma-1} E_k, \quad \text{and} \qquad \tilde{P}_j^{1-\sigma} = \sum_k p_k^{1-\sigma} \phi_{kj}. \tag{1.11}$$

[7] Market clearance is a quite restrictive assumption for it implies balanced international trade (see Appendix A.1), which occurs only at national level and in the long run. This assumption is not completely inconsistent with the CEE-EU industry level pattern of trade. In 2000 net trade amounted to 20 percent of total industry level trade between EU and Central and Eastern Europe, leaving four fifths of CEE-EU trade to intraindustry trade. Trade imbalances are less important for the entire manufactured sector, but not sufficiently low to suggest that realistic predictions shall be obtained by assuming market clearance at aggregate level. Therefore we choose to use expenditure data, computed as the sum of domestic production and foreign imports.

[8] Deardorff (1998) reaches a similar trade equation from a Heckscher-Ohlin trade model with differences in factor prices across countries and complete specialization.

$\tilde{P}_j$ is the importer specific price index, reflecting the average price of country j's imports. The higher the average price paid by consumers of an importing country, the higher is the value of exports to that market. $\tilde{P}_j^{1-\sigma}$, on the contrary, corresponds to the relative isolation of a country in terms of trade costs and/or consumer preferences, and reduces bilateral flows. $\bar{P}_i$ is an exporter specific weighted average of price indexes of all its trading partners including itself. Note that the expression of $\bar{P}_i^{1-\sigma}$ in (1.11) is very similar to the supplier market access used in economic geography models (2004). Consequently, we can associate it to the access of country i's products to all markets, including the domestic one. The average partners' price index reflects their purchasing power and is positively related to trade. An improved global market access enjoyed by a country's products translates into higher total shipments to its partners. The impact on a bilateral basis depends on partner's market capacity.

Symmetric trade costs ($t_{ij} = t_{ji},\ \forall\, i, j$), and identical preferences across countries ($a_{ij} = a_i,\ \forall\, i, j$) yield the symmetric solution $\bar{P}_i = \tilde{P}_i$ used by Anderson and van Wincoop (2003) to reach a more elegant version of (1.10). In our specific case of East-West European trade this assumption is irrelevant because the two groups of countries followed uneven trade liberalization timetables, a difference that we attempt to measure in the following sections.

As before, country and partner binary variables are used to capture demand and supply terms in equation (1.10) in logarithmic form, and equation (1.6) is reached:

$$FE_i \equiv \ln\left(y_i \bar{P}_i^{\sigma-1}\right), \tag{1.12}$$

$$FM_j \equiv \ln\left(E_j \sum_k p_k^{1-\sigma 1} \phi_{kj}\right). \tag{1.13}$$

However the two fixed effects denote different things in this case, compared to equations (1.7) and (1.8). Supply capacity, expressed by the exporter specific effect FE_i in equation (1.6), is equal to the logarithm of country's production divided by the average market

access for its products. Market capacity, reflected by the importer specific effect FM_j, is actually the logarithm of the ratio between the partner's expenditure and their relative isolation from other countries.

1.3.3 The odds specification

This subsection presents an alternative trade model with monopolistic competition as in Dixit and Stiglitz (1977) and Krugman (1980), increasing returns to scale and firm-level differentiated products. Similar trade models have been developed by Head and Ries (2001a) and Head and Mayer (2000).

In a DSK setting firms set prices as if they face a constant price elasticity of demand, equal to the elasticity of substitution between two varieties σ. Their prices, free of trade costs, are expressed as a constant markup over the marginal cost of production c_i:

$$p_i = c_i \frac{\sigma}{\sigma - 1} \tag{1.14}$$

We consider labor as the unique factor of production and a single equilibrium wage level within any given country. Then a unique mill price is charged for all varieties produced in the same country. Production technologies are assumed identical across countries and wages are the only source of difference in production costs. Identical cost functions $TC_i = Fw_i + \mu q w_i$ are considered, with F denoting fixed costs and μ marginal costs, both expressed in units of labor. Firms enter the market until all profits vanish away $\pi = 0$, and $qp_i = CT_i$, and the equilibrium price equals the average cost. This implies equal outputs q for all firms and varieties:

$$q = \frac{F(\sigma - 1)}{\mu}. \tag{1.15}$$

The number of varieties produced, and of firms in each country, n_i, is endogenous to the model. Combining equations (1.14) and (1.15), and using the fact that a country's revenue

is the sum of its firms' revenues, we can express the number of varieties produced by a country as follows:

$$n_i = \frac{y_i}{w_i \sigma F}. \tag{1.16}$$

With full employment, the production y_i is equal to the product of country's endowment with labour L_i and the average wage w_i. By dividing the numerator and the denominator of the right hand side expression in (1.16) by the wage we obtain the expression of n_i usually employed in the literature: $n_i = \frac{L_i}{\sigma F}$. Given the expression of the number of locally produced varieties, equation (1.4) rewrites to:

$$m_{ij} = p_i^{1-\sigma} \frac{\phi_{ij}}{P_j^{1-\sigma}} \frac{y_i E_j}{\sigma w_i F}, \tag{1.17}$$

$$\text{with} \qquad P_j^{1-\sigma} = \sum_k p_k^{1-\sigma} \phi_{kj} \frac{y_k}{\sigma w_i F}. \tag{1.18}$$

Using relative demands as explained variables, i.e. the ratio of trade flows to the same destination, considerably simplifies the specification by eliminating destination specific right hand side terms. Applied to our trade equation (1.17) this means the elimination of non-linear importer's price index and expenditure. Thus the set of explained variables shrinks to the characteristics of the two origins. Particularly interesting for us is the case when the destination country is taken as reference. With bilateral flows given by equation (1.17), the foreign-to-internal trade ratio becomes:

$$\frac{m_{ij}}{m_{jj}} = \frac{y_i}{y_j} \left(\frac{p_i}{p_j} \right)^{1-\sigma} \frac{w_j}{w_i} \frac{\phi_{ij}}{\phi_{jj}}. \tag{1.19}$$

Note that assumptions on the production side imply that mill prices are equal to $p_i = \mu w_i(\sigma/(\sigma-1))$. The price ratio in (1.19), which can also be written as the ratio of marginal costs, becomes equal to the wage ratio. Unknown technological F and μ coefficients simplify when using relative demands.

Border specific costs can be estimated from equation (1.19) with destination country as reference and the sample restricted to foreign-relative-to-domestic shipments (exclude observations of the m_{jj}/m_{jj} type). Use the decomposition of trade costs (1.2) in (1.19) and take logarithms to obtain what we call the *odds* specification:

$$\ln \frac{m_{ij}}{m_{jj}} = \ln \frac{y_i}{y_j} - \sigma \ln \frac{w_i}{w_j} + \rho(1-\sigma) \ln \frac{d_{ij}}{d_{jj}} + (1-\sigma) b_{ij} \tag{1.20}$$

The opposite of the constant term in the above equation reflects border-specific trade barriers. 'Missing' international trade is measured in terms of actual domestic trade, i.e. as the ratio of domestic-to-cross-border trade deflated by relative production, wage and distance. More specifically, the border effect for imports of j from i is obtained from (1.20) by taking the exponential of the negative free term: $\exp[(\sigma - 1)b_{ij}]$.

If consumer preferences were to vary with the goods' origin, any disproportionate preference for domestic varieties would be captured by the border effect. With a generally accepted perception of positive domestic biases in preferences, one should expect larger border effects estimates with the *odds* specification.

1.3.4 The friction specification

The last approach regards the use of a transformation of the explained variable introduced by Head and Ries (2001a). They use as left hand side variable the inverse index of 'friction' to trade, defined as:

$$\Phi_{ij} = \left(\frac{m_{ij}}{m_{jj}} \frac{m_{ji}}{m_{ii}} \right)^{1/2} \tag{1.21}$$

It reflects the geometric mean of foreign firms' success relative to domestic firms' success in each home market. Head and Ries (2001a) assimilate the inverse of this index to the actual border effect between Canada and the United States.

To stay consistent with the theoretical setup described in the beginning of this section,

trade flows in the expression of Φ_{ij} are replaced using equation (1.4). Take logarithms on both sides to obtain:

$$\ln \Phi_{ij} = \ln \left(\frac{\phi_{ij}}{\phi_{jj}} \frac{\phi_{ji}}{\phi_{ii}} \right)^{1/2} \tag{1.22}$$

Equation (1.22) can also be obtained following the same steps directly from (1.10) or even (1.19). Its application is not therefore restricted to a specific market structure. According to the above specification, index Φ_{ij} actually represent the average trade freeness between countries i and j relative to their internal freeness. In the light of economic geography literature which assumes unitary internal freeness (null internal trade costs) and symmetric trade costs, the inverse friction index Φ_{ij} becomes precisely the trade freeness ϕ_{ij}.

Note that equation (1.22) imposes equal coefficients on production variables. However, it allows only for the estimation of the average border effect for any two trading partners, rather than for two distinct effects, one for each trade directions. Use the expression of trade costs (1.2) in the above equation to get:

$$\ln \Phi_{ij} = \rho(1-\sigma) \ln \frac{d_{ij}}{(d_{jj} d_{ii})^{1/2}} + (1-\sigma) \left(\frac{b_{ij} + b_{ji}}{2} \right) \tag{1.23}$$

An advantage of the *friction* specification is that it removes the need of using even origin specific variables, which is an important gain when accurate production, price and/or wage data is not available. As previously, the constant term refers to the magnitude of border effects when unitary trade friction observations are excluded. It captures as well any bias in consumer preferences of both importing and exporting markets when preferences are allowed to vary across countries.

1.3.5 Differences in consumer preferences

The unitary consumer preferences assumption in the beginning of this section will not affect the validity of results, but only requires a slightly different interpretation. Differences in

tastes and preferences can be introduced by decomposing the preference term as follows:

$$\ln a_{ij} = \chi home_{ij} + \sum_r \zeta^r C_{ij}^r + e_{ij}. \tag{1.24}$$

χ reflect the home bias in preferences, and C_{ij} is a set of bilateral variables that may induce additional differences in consumer preferences, and e_{ij} is a residual term. The second element in (1.24) is usually associated with preferential bilateral relationships such as between neighbor countries or countries with a common official language.

With non-unitary preferences a_{ij}, estimated coefficients in the above trade specifications need be interpreted differently. Under all specifications the border effect reflects the sum of bilateral trade costs and the larger-than-average preference for domestic products. Note that sharing a land border or the same language with a partner can increase the preference for its products, but also reduce reciprocal transaction costs and offer an improved access to its market. The latter effect is ignored by the simplified trade costs function (1.2), but will be considered in the next section through the use of a more complex function. While unable to differentiate the two effects, coefficients on bilateral variables present in the structure of both trade costs and consumer preferences will actually reflect their sum.

Border effects under all specifications have two components: one reflecting the true level of border specific trade costs (b_{ij} for the first two approaches and $(b_{ji} + b_{ij})/2$ for *friction*), and another coming from the elasticity of substitution between variables ($\sigma - 1$). This means that even tiny trade barriers may generate important deviations of trade towards the domestic market when the substitution elasticity is sufficiently high. None of the specifications presented in this section permits the estimation of all structural parameters. Therefore we can only estimate entire border effects with each approach, without being able to distinguish the part ascribed to each of the two elements. We proceed in the next section to estimations of European border effects.

1.4 Estimating Border Effects Across Europe

The method proposed in section 1.2 computes trade potentials from border effects within and between country groups. To analyse trade creation effects of European integration trade between European countries is divided into four types: EU imports from CEE, CEE imports from EU, intra-EU trade, and trade among CEE countries. The European Union enlargement to the East will drive CEE-EU trade integration in the long run to the level of integration between the fifteen 'old' EU members. To picture further (post integration) increase in reciprocal trade the intra-EU integration level is compared to the CEE-EU level. The deepening of East-West European integration was repeatedly argued and feared by politicians to harm regional integration in Central and Eastern Europe. With CEE countries joining the EU, trade between them becomes intra-union trade and will probably regain attraction. The above mentioned partition of European trade permits to evaluate each of these aspects. The data employed in estimations is described in section A.2.

1.4.1 Estimated trade equations

We estimate border effects for each type of trade from a single estimation on the entire sample of countries. This method is preferred to estimating border effects separately for each type of trade since it has the advantage of imposing the same coefficients of independent variables for all trade types and yields more comparable results. Border effects are estimated with the *fixed-effects*, *odds*, and *friction* specifications presented in section 1.3. For comparison reasons simple gravity estimations of international trade, and domestic and foreign flows are also presented. Estimations are carried separately for total manufactured imports and for industry level imports.

Trade costs specific to each type of flows identified by the corresponding dummy variables, as well as reduced costs for preferential bilateral relationships (neighbor countries, and countries with a common official language) are introduced by decomposing the border-

specific term b_{ij} in (1.2) as follows:

$$\begin{aligned} \ln t_{ij} &= \rho \ln d_{ij} + b_1 homeEU_{ij} + b_2 homeCEE_{ij} + b_3 CEEtowardsEU_{ij} \\ &\quad + b_4 EUtowardsCEE_{ij} + b_5 intraEU_{ij} + b_6 intraCEE_{ij} \\ &\quad + c_1 contig_{ij} + c_2 comlang_{ij} + u_{ij} \end{aligned} \tag{1.25}$$

Six dummies for domestic trade of 'old' EU members and Eastern European countries, Central and East European exports to and imports from Western European countries, and regional Western and Eastern European trade are used. The first two account for lower than average domestic trade costs (negative coefficients b_1 and b_2), while the latter four dummy variables allow for different trade costs across trade types. Similar to most empirical studies on international trade, we control for a common land border between countries i and j, and a common language for both countries by including the binary variables $contig_{ij}$ and $comlang_{ij}$ respectively in the structure of trade costs. As both linguistic and neighbor relations are likely to reduce trade costs, negative coefficients c_1 and c_2 are expected.

Observe that the first six dichotomic variables in the above trade costs specification sum to unity. The use of (1.25) along with a constant term in a trade equation does not permit therefore the estimation of all parameters b_1 to b_6. We choose to drop the intra-EU trade dummy from all estimated equations. Cross-border trade between EU countries is reflected then by the constant of the model, and all other flows are expressed as deviations from the intra-EU level. Accordingly, a positive coefficient on *homeEU* reflects the difference between international and domestic EU trade. In the *odds* and *friction* equations lower trade costs for domestic shipments are directly accounted for by the specific form of the left hand side variable, and *home* dummies become irrelevant.

A gravity equation very similar to the one used by McCallum (1995) is used for baseline

estimations:

$$\begin{aligned} \ln m_{ij} &= \alpha_1 prod_i + \alpha_2 cons_j + \alpha_3 d_{ij} + \beta_0 + \beta_1 homeEU_{ij} + \beta_2 homeCEE_{ij} \\ &+\beta_3 CEEtowardsEU_{ij} + \beta_4 EUtowardsCEE_{ij} + \beta_5 intraCEE_{ij} \\ &+\gamma_1 contig_{ij} + \gamma_2 comlang_{ij} + \epsilon_{ij} \end{aligned} \quad (1.26)$$

Exporter's production $prod_i$ and importer's consumption $cons_j$ are used as proxies for national revenues. Variables $CEEtowardsEU_{ij}$, $EUtowardsCEE_{ij}$, $intraCEE_{ij}$, $homeEU_{ij}$, and $homeCEE_{ij}$ are dummies indicating the affiliation of each observation to a particular trade type. The constant term captures the specificity of intra-EU trade. And a positive and significant estimate of β_1 shows how much more does in average a EU member buy from itself than from other EU member countries.

The border effect for EU imports from CEE reflects how much less do EU countries import from CEE partners than from domestic ones. It is obtained from comparing EU imports from CEE countries to domestic EU trade while controlling for size, distance, and other trade costs, and equals to the exponential of the difference between the coefficients of the corresponding dummy variables: $\exp(\beta_1 - \beta_3)$. Similarly, the border effect for CEE imports from EU is given by $\exp(\beta_2 - \beta_4)$. The intra-EU trade being the reference in trade equation (1.26), the intra-EU border effect is simply equal to the exponential of the coefficient on $homeEU_{ij}$: $\exp(\beta_1)$. The intra-CEE border effects is obtained by taking the exponential of the difference between the home and intra-group dummies: $\exp(\beta_2 - \beta_5)$.

The gravity equation (1.26) can also be used for international trade alone, in which case the two variables for group specific domestic trade are to be excluded. Naturally, no border effects can be estimated when this option is used. One can only appreciate how much more or less CEE countries trade with each other or with 'old' EU members compared to intra-EU trade. Similar specifications are used in traditional trade potential models.

The equation estimated with the *fixed-effects* procedure is obtained by integrating the

more detailed trade costs function (1.25) in equation (1.6). However, the use of all group dummies, country and partner specific effects is impossible due to collinearity problems. The inclusion of all country specific effects is imperative for the estimation of average effects for the entire sample, not relative to an excluded country pair. When we include fixed effects for all importing and exporting countries, together with dummies for the six types of trade in equation (1.25), a threefold span of the sample is obtained: Each of these three sets of variables sum to unity. Under these conditions the estimation of coefficients on all group dummies is possible only with reference to a given pair of countries. Three of the six group variables in (1.25) become a linear combination of other group, country, and partner dummies. Therefore, we choose to impose similar differences between foreign and domestic trade costs for all European countries, and the estimation of the average CEE-EU effect. For this purpose, a unique variable $home_{ij} = homeEU_{ij} + homeCEE_{ij}$ is used, and variables $CEEtowardsEU_{ij}$ and $EUtowardsCEE_{ij}$ are replace by their sum:

$$\begin{aligned} \ln m_{ij} &= FE_i + FM_j + \alpha \ln d_{ij} + \beta_0 + \beta_{12} home_{ij} + \beta_{34} CEEandEU_{ij} \\ &\quad + \beta_5 intraCEE_{ij} + \gamma_1 contig_{ij} + \gamma_2 comlang_{ij} + \varepsilon_{ij} \end{aligned} \tag{1.27}$$

As domestic trade for each group of countries cannot be identified, one can actually estimate only average East-West trade and border effects. Moreover, in this case alone the intra-group border effect estimates rely considerably on the equal foreign-relative-to-domestic trade costs assumption for the two groups of countries: $b_1 = b_2$ in (1.25). The relative difference between domestic and shipments to other EU countries is given by the exponential value of β_{12}. Accordingly, the intra-CEE border effect is equal to $\exp(\beta_{12} - \beta_5)$. With lower relative trade costs for EU countries ($b_1 < b_2$), this method underestimates the border effect within the EU, and overestimates the effect for trade between CEE countries. The border effect between Eastern and Western European countries, computed as $\exp(\beta_{12} - \beta_{34})$, reflects how much less on average EU countries import from CEE partners and CEE countries

import from EU partners than from domestic ones.

The *odds* estimation equation is reached by combining (1.20) and (1.25):

$$\begin{aligned}\ln\frac{m_{ij}}{m_{jj}} &= \alpha_1 \ln\frac{y_i}{y_j} + \alpha_2 \ln\frac{w_i}{w_j} + \alpha_3 \ln\frac{d_{ij}}{d_{jj}} + \beta_0 intraEU_{ij} + \beta_3 CEEtowardsEU_{ij} \\ &+\beta_4 EUtowardsCEE_{ij} + \beta_5 intraCEE_{ij} + \gamma_1 contig_{ij} + \gamma_2 comlang_{ij} + \upsilon_{ij}\end{aligned} \quad (1.28)$$

Differently from the *fixed-effects* specification, in this case we can introduce all group dummies. However, variables *home* are inappropriate when the explained variable is relative trade, and are excluded from equation (1.28). Relative production values are used for output or revenue ratios. Of all specifications exposed in section 1.3, this is the only one that estimates distinct border effects for each of the four European trade types. The amount of 'missing' international trade is given by the exponential of the opposite value of the coefficient of the corresponding dummy: $\exp(-\beta_0)$ for trade between 'old' EU members, $\exp(-\beta_3)$ for Central and East European exports to EU countries, $\exp(-\beta_4)$ for opposite flows, and $\exp(-\beta_5)$ for intra-CEE trade.

The *friction* approach estimates average two-way trade within and between the two groups of countries. Differently from the *fixed-effects* method, dummies for both CEE exports to and imports from EU are included. By construction, the coefficients on these variables are identical and reflect the average CEE-EU border effect. The equation estimated with this approach is the following:

$$\begin{aligned}\ln\Phi_{ij} &= \alpha \ln\frac{d_{ij}}{\sqrt{d_{jj}d_{ii}}} + \beta_0 intraEU_{ij} + \beta_3 CEEtowardsEU_{ij} \\ &+\beta_4 EUtowardsCEE_{ij} + \beta_5 intraCEE_{ij} + \gamma_1 contig_{ij} + \gamma_2 comlang_{ij} + \upsilon_{ij}\end{aligned} \quad (1.29)$$

As in the previous case, intra-EU trade is introduced on the right hand side of the trade equation, and regional border effects are computed exactly in the same way. The amount $\exp(-\beta_3)$ shows how much more domestic products prevail over products originating from

Central and Eastern Europe in EU consumers' purchases. Coefficients β_3, β_4, and β_5 may also capture the part of consumer preferences common to all countries of each group, including any particular preference for domestic products, common to EU, and respectively CEE countries.

The use of relative demands in the last two specifications introduces spatial autocorrelation in the error term. This is corrected through a robust clustering procedure, which allows residuals of the same importing country to be correlated. In the *fixed-effects* specification unilateral origin and destination trade costs and preferences are reflected in the country and partner fixed effects. The last two trade equations, therefore, might produce higher estimates of border effects.

1.4.2 Estimations for the manufactured sector

Border effects are estimated for total manufactured bilateral imports of fifteen EU countries and ten Central and East European countries with pooled ordinary least squares and results are reported in table 1.1.[9] Reference border effects are estimated with the gravity equation (1.26) used on all international and domestic flows and production of the origin and consumption of the destination markets (in column 2). Setting all dummy variables equal to zero yields an estimation of intra-EU level of trade. All variables have coefficients of the expected sign and are statistically significant. Production and consumption coefficients are close to unity, and the distance elasticity of trade is not significantly different from -1, similar to most empirical studies in the literature. The parameters of interest are the coefficients on the home variables and the dummies corresponding to different trade types.

The estimate of β_3 in column 1 is equal to -0.61 and is significant at the one percent

[9]The Hausman specification test rejects the fixed effects model, and the F test for the presence of individual effects is not significant. The Breusch and Pagan Lagrangian multiplier test for random effects states that the random effect model is not appropriate for the used data set. Therefore we choose to estimate pooled OLS.

Table 1.1: European trade integration: total manufactured imports

Model :	(1) gravity	(2) gravity	(3) FE	(4) odds	(5) odds IV†	(6) friction
Dependent variable:	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$	$\ln \frac{m_{ij}}{m_{jj}}$	$\ln \frac{m_{ij}}{m_{jj}} - \ln \frac{y_i}{y_j}$	Φ_{ij}
intercept	-8.00^a	-8.31^a	24.46^a			
	(0.51)	(0.47)	(0.32)			
ln production exporter	0.83^a	0.82^a				
	(0.01)	(0.01)				
ln consumption importer	0.76^a	0.75^a				
	(0.01)	(0.01)				
ln distance	-1.08^a	-1.01^a	-0.99^a			
	(0.04)	(0.04)	(0.03)			
ln relative production				0.71^a		
				(0.06)		
ln relative wage				-0.15^a	-0.38^a	
				(0.12)	(0.03)	
ln relative distance				-0.53^a	-0.84^a	
				(0.15)	(0.03)	
ln average relative distance						-0.69^a
						(0.08)
CEE exports to EU	-0.61^a	-0.62^a		-4.40^a	-3.58^a	-4.10^a
	(0.06)	(0.06)		(0.41)	(0.09)	(0.25)
EU exports to CEE	-0.59^a	-0.62^a		-4.42^a	-3.93^a	-4.10^a
	(0.06)	(0.06)		(0.39)	(0.12)	(0.21)
CEE-EU			-1.14^a			
			(0.07)			
intra CEE	-0.85^a	-0.85^a	-1.89^a	-5.12^a	-4.52^a	-4.77^a
	(0.08)	(0.07)	(0.13)	(0.31)	(0.08)	(0.22)
intra EU				-3.20^a	-2.62^a	-2.90^a
				(0.22)	(0.07)	(0.14)
home EU		2.30^a				
		(0.12)				
home CEE		3.39^a				
		(0.15)				
home			2.33^a			
			(0.10)			
common land frontier	0.87^a	0.95^a	0.92^a	1.44^a	1.10^a	1.17^a
	(0.07)	(0.07)	(0.05)	(0.17)	(0.08)	(0.15)
common official language	-0.09	-0.09	-0.25	0.14	0.21	0.28^b
	(0.12)	(0.12)	(0.18)	(0.16)	(0.16)	(0.14)
N	3387	3554	4261	3143	3143	3988
R^2	0.835	0.862	0.899	0.692	0.570	0.509
RMSE	.980	.970	.829	1.149	1.200	1.027
F tests for individual effects *p-value*	0.653	0.427	0.698	0.690	0.531	0.985
Breusch and Pagan test *p-value*	0.128	0.165	0.185	0.591		0.948
Durbin-Wu-Hausman test *p-value*					0.000	

Note: Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels. † Instrumental Variables (IV) estimates are used in column 4 to correct for endogeneity problems due to the simultaneous use of production and wage variables.

level. This suggests that a EU member country buys in average about 46% [$= (1 - \exp(-0.61)) \times 100$] less from a Eastern European country that from another EU country, when holding sizes and trade costs constant. Similarly, CEE imports from EU countries represent only 55% [$= \exp(-0.59) \times 100$] of intra-EU trade. EU countries trade about 134% [$= (1/\exp(-0.85) - 1) \times 100$] more with each other than equally large and distant Eastern European countries. Hence, both East-West and regional East European trade integration lies below the level reached by the fifteen 'old' EU members. EU imports from CEE lie slightly below the intra-EU trade level while products are not significantly different from intra-EU trade. The positive and very significant coefficient on the common land border variable confirms the intuition that neighborhood increases trade. This comes not only from lower trade costs with partners just on the other side of the border, but also from more similar preferences among consumers. The negative non-significant coefficients on common language is due to its high correlation with the common border variable, the low number of dyads sharing both characteristics in the sample, and their uneven distribution across country groups.[10]

Including internal trade in the regression (column 2) keeps the coefficients on all variables almost unchanged, and sets forward the fact that both EU and CEE countries rely much more on domestic than foreign partners. A EU member country buys in average about 10 [$= \exp(2.30)$] times more from itself than from another EU country, while a similar country from Eastern Europe buys about 38 times more. For similar countries, East-West European trade and regional CEE trade is slightly above half of trade between EU members.

Correspondingly, border effects for the four trade types can be computed from these estimations and results are displayed in the upper part of table 1.2. The first column shows estimates *à la* McCallum (1995) with standard gravity, and country and partner

[10]Indeed, in Europe most countries that speak the same language share also a land border: e.g. Austria and Germany, Belgium with its neighbors. Out of the 552 distinct country-partner relationships in the panel only 14 speak a common language, and all of them are EU countries.

GDPs. Using country GDPs to control for size, suggests that EU imports from CEE lie slightly below the intra-EU trade level while CEE imports of EU products are not significantly different from intra-EU trade. Amounts in the second column correspond to gravity estimations in table 1.1. A EU member imports about 19 $[= \exp(2.30 - (-0.62))]$ times more from itself than from a Central or East European partner with which it does not share a common land frontier or language. Likewise, CEE countries' imports from EU are about 55 $[= \exp(3.39 - (-0.62))]$ times less than domestic ones, all other things equal. Trade integration between EU countries is significantly deeper than between Eastern and Western European countries for flows in either direction. The gap is even larger with respect to trade between CEE countries. The latter trade 69 $[= \exp(3.39 - (-0.85))]$ times less with each other than with themselves.

Column 3 in both tables 1.1 and 1.2 shows estimates of the *fixed-effects* model for the entire manufacturing sector. The positive coefficient on the *home* variable confirms the existence of border effects, which are larger between Eastern countries and lower for Western countries. Trans-European trade is about 32 $[= \exp(2.33 - (-1.14))]$ times higher than either domestic trade.

In the next two columns we present results from the *odds* approach. In column 4 we simply estimate equation (1.28) with generalized least squares. We correct for endogeneity problems due to the simultaneous use of production and wage variables, reflected by a significant Durbin-Wu-Hausman statistic, in column 5. A unitary coefficient on relative production, as predicted by the theoretical model, is imposed and per capita GDPs and employment levels (size of labour force) are used as instruments for wages. Standard errors take into account the correlation of the error terms for a given importer. This is required because the dependent variable is domestic imports divided by bilateral imports of the same country j. All estimates except the common language coefficient are statistically significant at the 1% level. The low coefficient on wages comes from the fact that the latter

reflect quite poorly product prices. A 'better' estimate is not obtained even when wages are replaced by price indices.[11]

Larger border effects than in all previous cases in columns 4 and 5 come at least partially from the use of a functional form which attributes home biased consumer preferences to group coefficients (see corresponding columns in table 1.2). Higher in absolute value coefficients on wage and distance are obtained when endogeneity is controlled for. This also induces a drop in European border effects which approach the estimates of the *fixed-effects* model. Intra-EU trade being the reference, Western countries with no common border or language trade with each other 14 times more than with themselves. The relationship between CEE-EU border effects in both directions established in with gravity is also maintained: EU domestic purchases overcome their imports from CEE partners by $36 = [\exp(-(-3.58))]$ times, 42% below the extent to which CEE domestic purchases overcome EU-originating imports. The larger border effect for CEE imports from the EU market has two possible explanations: large and similar preferences for domestic goods of CEE consumers, and higher access costs to the EU market. Both similar tastes and large transaction costs cas also justify the larger border effect for regional Eastern European trade.

The last column in tables 1.1 and 1.2 sets out point estimates and border effects of the *friction* specification. Bilateral variables used to express trade costs are the only explanatory variables of the model. By construction, error terms are not independent across observations, but are assumed independent across importer-exporter couples. A lower distance elasticity of trade in absolute terms is obtained, but inside the range of values replicated in the literature. A larger effect of sharing a land border and a positive significant effect of common language are also found.

[11] In reality the labor is not the unique factor of production and there are many additional distortions in the price structure not captured by the model.

Table 1.2: Border effects for European total manufactured trade

Model :	gravity*	gravity	FE	odds	odds IV	friction
	countries with no common border or language					
CEE to EU	11.7	18.7	32.2	81.7	35.8	60.6
EU to CEE	73.2	54.9	32.2	83.5	51.0	60.6
Intra EU	9.6	10.0	10.3	24.4	13.7	18.2
Intra CEE	62.5	69.4	68.3	167.3	92.1	118.3
	countries sharing a common border and language					
CEE to EU	4.9	7.9	19.0	16.7	9.6	14.2
EU to CEE	30.6	23.3	19.0	17.1	13.7	14.2
Intra EU	4.0	4.3	6.0	5.0	3.7	4.3
Intra CEE	26.1	29.5	40.2	34.3	24.7	27.8
	Average border effects, all EU					
CEE to EU	6.8	10.0	17.1	45.3	25.5	30.1
EU to CEE	43.8	29.0	17.1	34.1	27.4	30.1
Intra EU	5.8	5.6	5.8	11.7	8.4	9.1
Intra CEE	35.5	35.2	34.8	71.1	51.5	54.7
	Average border effects, 'core' EU					
CEE to EU	1.0	1.4	4.1	5.9		13.0
EU to CEE	11.2	5.9	4.1	24.5		13.0
Intra EU	2.3	2.0	2.5	4.2		4.4
Intra CEE	18.8	17.8	21.3	55.1		53.0

Note: * country GDPs rather than true production and consumption values are used in the estimation.

The model estimates that CEE-EU trade is on average 60 = [exp(−(−4.10))] times inferior to domestic trade when keeping size and trade costs constant. This ratio is three times larger than the similar foreign-to-domestic trade ratio for flows within the EU, but only half of the one for regional CEE trade. The *friction* specification generates the highest border effects, almost double compared to the *fixed-effects* approach. As both models rely on the same hypothesis of identical relative differences in domestic and foreign trade costs for Eastern and Western European countries, the difference in border effects can be explained only by the variance in consumer preferences captured by fixed effects in the last specification and attributed to border effects in the former one. If one is to ignore 'missing' foreign trade due to biases in consumer preference, estimates in column 3 should be used.

The first set of results in table 1.2 shows border effects with all specifications for countries without a common land border or language. These refer to most countries in the sample. The next set displays to which extent countries that are direct neighbors and speak the same language engage into trade relations with foreign relative to domestic partners. These are obtained by subtracting the impact of common border and language on trade from border effect estimates above, and refer to country-pairs like Austria-Germany, Great Britain -Ireland, France-Belgium, etc. Obviously, in this case all border effects are considerably lower. Interesting, the relationship between border effects under different specifications is reversed, and larger results are obtained with the gravity and *fixed-effects* approach. This reveals that consumers from these countries have also more similar preferences. The original relation is restored when gains in trade costs due to contiguity and common language are disregarded and border effects for average European countries are computed (the next set of results). Finally, border effects for each trade type when EU is resumed to its six founding members are presented. Trade integration between the so-called 'core' EU is twice as strong in terms of border effects than average integration within all fifteen member countries, confirming the core-periphery structure of the European econ-

omy. As for CEE countries, they have stronger commercial links with the 'core' EU, as suggested by lower border effects. Lower border effects for CEE-EU trade than within the 'core' EU comes from non-significant positive coefficients on CEE-EU trade and should be disregarded.

1.4.3 Estimations with industry level data

Results of estimations with industry data are set forth in table 1.3, and corresponding border effects in table 1.4. When trade is broken down by industries, an important number of zero value trade flows is observed. The problem with null trade flows is that they do not occur randomly, but are the outcome of a selection procedure (e.g. a low supply or demand for a particular group of products). We correct for this sample self-selection bias by giving a positive weight to the zero trade mass by employing a two-stage Heckman estimator: a first-stage probit model, and a second-stage OLS model. Significant coefficients on Mills' ratio in the second stage displayed in the bottom of table 1.3 indicate the necessity of this adjustment. When non significant coefficients are obtained (not shown in the table), the Heckman procedure is not justified and we use simple OLS.

Estimates of the three trade specifications in line with the theoretical model correspond to the last three columns in tables 1.1 and 1.2. As above, the first two columns give estimates of comparable gravity specifications. Coefficients on standard variables are very close to values obtained for aggregate manufactured sector, with the difference that slightly lower coefficients are obtained on supply and demand variables, and larger in absolute value coefficients on distance. The positive and significant effect on trade of a common language spoken by the exporter and the importer is more pronounced and appears in all five specifications. Note that border effects are always smaller when industry level data is employed. This finding testifies that most European trade liberalization was concentrated in a large number of small size industries. The use of aggregate manufacturing data overestimates the

Table 1.3: European trade integration: bilateral imports at industry level

Model :	(1) gravity	(2) gravity	(3) FE	(4) odds	(5)) friction
Dependent variable:	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$	$\ln \frac{m_{ij}}{m_{jj}}$	Φ_{ij}
intercept	-1.51^a	-1.82^a	14.94^a	-	
	(0.18)	(0.16)	(0.13)		
ln production exporter	0.74^a	0.72^a			
	(0.01)	(0.01)			
ln consumption importer	0.61^a	0.60^a			
	(0.01)	(0.01)			
ln distance	-1.28^a	-1.18^a	-0.89^a		
	(0.02)	(0.02)	(0.02)		
ln relative production				0.83^a	
				(0.04)	
ln relative wage				-0.34^b	
				(0.14)	
ln relative distance				-0.81^a	
				(0.14)	
ln average relative distance					-1.54^a
					(0.19)
CEE exports to EU	-1.25^a	-1.25^a		-4.71^a	-3.86^a
	(0.02)	(0.02)		(0.40)	(0.22)
EU exports to CEE	-0.87^a	-0.89^a		-4.12^a	-3.86^a
	(0.03)	(0.02)		(0.41)	(0.21)
CEE-EU			-0.97^a		
			(0.04)		
intra CEE	-1.75^a	-1.71^a	-0.94^a	-4.89^a	-4.21^a
	(0.04)	(0.03)	(0.07)	(0.29)	(0.24)
intra EU				-3.24^a	-2.69^a
				(0.23)	(0.19)
home EU		2.76^a			
		(0.05)			
home CEE		3.46^a			
		(0.08)			
home			3.12^a		
			(0.05)		
common land frontier	1.04^a	1.11^a	0.88^a	1.24^a	1.00^a
	(0.03)	(0.03)	(0.03)	(0.13)	(0.10)
common official language	0.30^a	0.31^a	0.21^a	0.46^a	0.54^a
	(0.05)	(0.05)	(0.05)	(0.15)	(0.15)
Mills' ratio	1.65^a	1.26^a	-2.51^a		2.49^a
	(0.12)	(0.12)	(0.06)		(0.80)
N	59215	62180	103785	58308	65238
R^2	0.621	0.673	0.608	0.486	0.280
RMSE	1.876	1.844	1.971	2.057	1.743
Durbin-Wu-Hausman *p-value*				0.976	

Note: Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

amount of 'missing' international trade because it disproportionately reflects large sectors with high barriers to trade.

With industry data the gap between East-West European and intra-EU trade is very prominent under both gravity and *odds* specifications, the only ones that separate the two types of trade. However, the gravity produces erroneous results even when industry level demand and supply data are used because it ignores remote resistance terms implied by the theory, particular strong at the industry level. A *p-value* of 0.962 of the Durbin-Wu-Hausman test shows the absence of endogeneity in the data. Consequently, we have no equivalent for instrumental variables estimates with aggregate flows in tables 1.3 and 1.4. Different from the aggregate case, with industry data the theoretically consistent *odds* specification shows that CEE exports to EU face higher trade barriers than flows in the opposite direction. This counterintuitive result is robust to changes in the estimation procedure or country panel. The apparent paradox can be explained by the fact that EU countries liberalized first their domestic markets for small and medium size industries, and kept until late 1990s relatively important barriers in several key CEE industries such as textiles, while CEE countries have adopted a distinct policy towards EU partners.

The logical relationships between border effects for different country groups identified above for aggregate trade hold also when industry level data is used. According to table 1.4, CEE-EU trade for non-neighbor countries is between 48 and 111 times lower that domestic trade of European countries, and only 10 to 20 times lower for neighbors speaking the same language. As previously, cross European integration is stronger with the six founding members of the European Union.

The next section addresses the estimation and computation of trade potentials, the central issue of this chapter.

Table 1.4: Border effects for European industry level trade

Model :	gravity*	gravity	FE	odds	friction
	countries with no common border or language				
CEE to EU	18.4	55.4	59.8	110.7	47.5
EU to CEE	156.0	77.3	59.8	61.5	47.5
Intra EU	18.4	15.9	22.6	25.4	14.7
Intra CEE	74.3	175.8	58.1	132.9	67.4
	countries sharing a common border and language				
CEE to EU	5.0	13.4	20.1	20.2	10.2
EU to CEE	42.7	18.7	20.1	11.2	10.2
Intra EU	5.0	3.8	7.6	4.6	3.2
Intra CEE	20.3	42.6	19.5	24.2	14.5
	Average border effects, all EU				
CEE to EU	18.4	27.7	30.7	50.9	14.4
EU to CEE	156.0	38.4	30.7	21.9	14.4
Intra EU	18.4	7.6	11.8	10.0	4.3
Intra CEE	74.3	85.4	28.8	48.4	19.5
	Average border effects, 'core' EU				
CEE to EU	6.8	9.7	15.1	25.9	12.2
EU to CEE	33.3	5.4	15.1	19.9	12.2
Intra EU	7.0	3.4	5.6	5.8	3.7
Intra CEE	47.8	48.4	29.0	66.7	28.7

Note:* country GDPs rather than true production and consumption values are used in the estimation.

1.5 Trade Potential and East-West European Integration

The important steps undertaken by Eastern and Western European countries for the removal of politically imposed distortions on bilateral exchanges at the beginning of 1990s, as well as efforts engaged with the scheduled EU enlargement translated into a continuous increase in trade between these countries. The reintegration to the world economy of Central and Eastern European countries after the collapse of the communist system was accompanied by reorientation of their foreign trade towards the European Union. Not only did these countries increase the share of their imports from the EU, but they also improved their positions on Western markets. As shown in table 1.5, the share of CEE exports towards the European internal market in region's total exports increased during the period between 1993 and 2000 with thirteen percentage points, reaching the share observed for imports and which remained at the same level throughout the considered period. The evolution was the most remarkable for the Baltic countries which were the least integrated of the CEE group at the beginning of 1990's.

The steady share of EU products in CEE imports is an aggregation artefact, and due to a different trade diversification path undertaken by Hungary, Poland, and Slovenia. Already in 1993 these countries imported a large part of products form the European Union, which attests that main changes in the geographic structure of their imports occurred very rapidly during the first years following the breakdown of the state centralized political system. During the last years of the twentieth century all three countries expanded the number of foreign supply markets which led to an inevitable fall in the share of imports originating from the EU. Given the large size of their economies, these shifts outweighted the positive effects recorded for other CEE countries. Indeed, the average effect obtained with equal country weights is positive and displayed in the last line of table 1.5. A similar pattern

Table 1.5: Geographical structure of CEE foreign trade in 2000 and change relative to 1993

Country	Imports				Exports			
	from EU		from core EU		to EU		to core EU	
	2000, %	change, p.p.	2000, %	change, p.p.	2000, %	change, p.p.	2000, %	change, p.p.
Bulgaria	70.4	(3.7)	47.4	(4.5)	84.1	(39.1)	60.4	(30.7)
Czech Republic	76.2	(6.4)	60.6	(6.8)	67.5	(21.8)	52.7	(17.3)
Estonia	61.9	(29.8)	21.0	(12.2)	66.5	(44.5)	11.9	(5.7)
Hungary	67.7	(-17.9)	52.5	(-7.4)	72.8	(-3.7)	57.6	(-0.1)
Lithuania	69.8	(31.0)	45.9	(16.3)	57.7	(30.0)	32.9	(15.1)
Latvia	78.7	(17.4)	46.5	(9.4)	66.9	(36.7)	35.8	(17.8)
Poland	74.2	(-6.6)	57.8	(-5.3)	70.8	(-8.4)	55.0	(-8.7)
Romania	75.5	(3.5)	61.2	(0.5)	81.7	(31.4)	65.2	(23.8)
Slovakia	60.0	(17.9)	46.6	(15.6)	63.0	(32.2)	51.0	(25.7)
Slovenia	86.6	(-0.8)	65.9	(-5.2)	63.0	(-3.4)	50.0	(-6.9)
All CEE	72.5	(0.0)	55.3	(0.7)	70.0	(13.3)	53.5	(9.1)
Country average	72.1	(8.4)	50.5	(4.7)	69.4	(22.0)	47.3	(12.0)

Source: WTO Trade Statistics. Calculations by the author.

is observed for CEE exports, but the Hungarian, Polish, and Slovenian diversification of supplied foreign markets had a lower scale effect of total region's exports. Both exports to and imports from the EU of the other seven countries grew during the 1990s at a higher pace than their trade with other geographical regions. Consequently, the European Union became not only their main foreign supplier of manufactured products, but also by far the most attractive dispatch market for CEE countries' products. In 2000 more than 70% of CEE foreign trade was with EU partners, three-fourths of which was with the six founding members of the Union.

In the view of EU enlargement to the East, the convergence of countries from Central and Easter Europe towards the EU market is expected to arise in all economic areas, including the manner to trade. It is thus not unreasonable to assume that in the perspective the proportion of purchases of domestic relative to foreign products of CEE countries will

Table 1.6: Trade Potential According to the Traditional and New Methodology

Trade potential	Traditional models	New method
General formulas	$\frac{X_{ij,REF}}{X_{ij,INV}}$	$\frac{X_{ij,REF}/X_{jj,REF}}{X_{ij,INV}/X_{jj,INV}}$
Example: France-Poland	$\frac{X_{FRA-DEU}}{X_{FRA-POL}}$	$\frac{X_{FRA-DEU}/X_{DEU-DEU}}{X_{FRA-POL}/X_{POL-POL}}$

approach that of the fifteen 'old' EU members. We define therefore the potential of trade between CEE and the EU as the ratio of the appropriate border effects:

$$\text{Trade potential CEE-EU} = \frac{\text{CEE-EU border effect}}{\text{intra-EU border effect}}, \tag{1.30}$$

and the regional CEE trade potential as the ratio between intra-group border effects:

$$\text{Trade potential intra-CEE} = \frac{\text{intra-CEE border effect}}{\text{intra-EU border effect}}. \tag{1.31}$$

In the traditional models, trade potential is estimated by dividing the trade of a reference group of countries by that of the investigated group, both corrected for size, distance, and other standard gravity variables. In our case the reference group is the EU. Thus, according to these models, the potential of trade between France and Poland is obtained by taking the ratio between the gravity adjusted trade of France with another EU country, say Germany, and its trade with Poland. Differently, our method introduces national trade as an additional benchmark for both reference and investigated trade flows. Following the previous example, French-Polish trade potential is computed by dividing the numerator of the previous ratio by German domestic trade, and the denominator by the trade between Polish partners. In the end, this resumes to dividing the traditional trade potential by the ratio of domestic trade of the two countries. This difference in methodology is exposed in table 1.6.

Trade potentials obtained with the new method reflects a trade integration in terms of border effects (or international trade costs). This kind of integration reaches its peak when the two groups of countries have identical cross-border trade costs and preferences. Computations of (1.30) and (1.31) for each year, and border effect estimates of the four trade specifications employed in section 1.4 are laid out in tables 1.7 and 1.8. Separate border effects for each year from 1993 to 2000 and type of trade (CEE exports to and imports from the EU, and between CEE countries) are obtained with equations (1.26) to (1.29). Average East-West European trade potential for flows in both directions are estimated using a single dummy for CEE-EU trade.

European trade potentials are computed according to both methods presented in table 1.6. First, we use a traditional trade potential model that relies exclusively on international trade data. In line with the literature on trade potential,[12] simple gravity is estimated for trade of the reference group, intra-EU trade in our case. Specifically, equation (1.26) is estimated for trade between EU countries. Obtained parameter estimates are used along with GDP levels, distance and other bilateral variables to predict the 'normal' level of trade for the rest of flows using an identical gravity equation. The difference between actual and predicted (or 'normal') trade levels gives the potential of trade, displayed in table 1.7 as a percentage of actual trade. The upper part of table 1.7 presents the results by year. This method claims relatively low trade potentials for all four types of European trade: By the year 2000, CEE-EU trade potential is appreciated around 30% of actual trade values. Moreover, it advocates a slow East-West trade integration: During seven years its deviation from potential trade remained almost unchanged. As for intra-CEE trade, the model does not predict an increased regional integration, but rather a growing reticence of CEE countries for mutual exchange. Nilsson (2000) estimates find even stronger results, according to which a large part of these flows have already reached their potential by 1996

[12]Wang and Winters (1991), Hamilton and Winters (1992), Baldwin (1993), Gross and Gonciarz (1996), Fontagné et al. (1999), and Nilsson (2000).

Table 1.7: European Trade Potential (in % of actual trade)

Trade flows	CEE → EU	EU → CEE	CEE-EU	Intra CEE
	Traditional trade potential models†			
1993	27.5	28.3	28.2	16.4
1994	27.0	30.3	28.8	27.2
1995	26.5	29.9	28.5	29.1
1996	29.1	32.8	31.4	32.1
1997	25.3	29.6	27.5	29.3
1998	25.2	28.2	27.1	28.5
1999	25.8	30.3	28.5	30.4
2000	25.8	29.1	27.6	31.2
	Nilson (2000)†			
1995-1996	-10.0	10.0		-40.0
	Border effects with augmented gravity (McCallum (1995))‡			
1993	31.3	1709.0	186.8	714.3
1994	29.1	987.3	184.3	398.5
1995	12.1	884.4	160.7	400.5
1996	2.5	908.3	141.7	432.6
1997	2.2	663.6	114.7	299.8
1998	-5.7	600.7	98.2	259.5
1999	-15.8	531.5	71.3	181.6
2000	-25.5	435.2	41.8	154.6

Note: Trade potentials are computed with industry level data: * as exponential values of estimated group dummies; † as the difference between actual and normal trade, obtained with intra-EU coefficients; ‡ as a border effects ratio.

and did not cease to grow.

Secondly, Next, border effects are estimated with standard gravity, and trade potentials are computed using (1.30) and (1.31). Much larger values are obtained with this specification: see the last set of results in table 1.7. Coefficients on CEE exports to and imports from EU, however, are rarely significant. This explains the very uneven East-West trade potentials. The average CEE-EU trade potential, obtained from an estimated gravity equation with a unique home dummy, has a higher statistical significance and is therefore more

credible. Although trade potential was high at the beginning of the period, it dropped considerably to reach only 42% in 2000 for CEE-EU trade and 155% for intra-CEE trade.

Border effect estimates of the three trade specifications derived in the section 1.3 are employed to find East-West and regional East European trade potentials according to the method introduced above. Results are displayed in table 1.8. The three specifications produce close results for East-West trade and situate its potential between 106 and 125% in 2000, much higher than any of the previous models. Depending on the approach, during the considered period CEE-EU trade regained between 25 and 33% of its 1993 potential. The *odds* specification is the only to produce differentiated results by flows' direction. Except for one year, the model exhibits CEE exports to EU more distant from their potential than opposite flows. This matches the lower access of Eastern products to Western markets finding in the last section.

According to all three approaches CEE countries traded very few with each other in the first half of 1990s. In 1993 regional East-European trade amounted to one fifteenth - one sixteenth of its potential. Regardless of the border effects estimates used to compute trade potentials in table 1.8, all signal an important increase of regional CEE integration. This reflects the drastic reorientation of foreign trade of these countries in the first years following the collapse of the socialist system. Advances in the process of transition and the development of regional economic agreements (CEFTA, the Free Trade Agreement of Baltic states) encouraged regional trade, which augmented enormously in terms of its potential. *Odds* and *friction* specifications yield a trade potential inside the Central and Eastern European region slightly above actual trade flows for the year 2000. For the same type of trade, the *fixed-effects* specification produces values more than twice as low and similar to those with gravity estimated border effects. This difference in results is caused by important country specific trade costs encountered when trading with CEE partners (e.g. poor institutions or transport systems).

Table 1.8: European Trade Potential (in % of actual trade)

Trade flows	CEE → EU	EU → CEE	CEE-EU	Intra CEE
	Border effects with the fixed-effects specification			
1993			378.9	625.4
1994			274.0	353.4
1995			212.0	247.0
1996			179.1	213.8
1997			137.1	121.5
1998			136.8	119.8
1999			96.5	59.5
2000			76.6	62.6
	Border effects with the odds specification			
1993	355.5	447.9	399.8	1519.8
1994	516.5	178.3	317.2	748.0
1995	535.9	103.0	263.0	960.4
1996	310.7	191.7	247.2	552.0
1997	342.8	135.4	224.6	335.0
1998	319.2	95.1	187.9	316.8
1999	240.9	87.8	154.7	268.5
2000	166.6	65.4	111.2	113.2
	Border effects with the friction specification			
1993			425.4	1380.8
1994			304.3	517.6
1995			257.9	488.8
1996			234.1	399.6
1997			204.2	288.2
1998			168.8	282.5
1999			163.4	222.6
2000			125.2	143.3

Note: Trade potentials are obtained with industry level data by taking the ratio between the border effect for a particular trade flow and the intra-EU border effect.

In contrast to trade integration in terms of border effects estimated with standard gravity and the theoretically compatible specifications presented in section 1.3, models based exclusively on foreign trade predict much lower potentials. The huge difference comes from the use of different criteria for evaluating trade integration. Traditional trade potential models ignore domestic trade and assign 'normal' trade to the prediction of the gravity equation. The method introduced in this chapter compares directly trade costs arising in East-West European and CEE transactions to costs existing between EU trade partners. Trade within the domestic market is used as benchmark for the very estimation of these costs. Thus, our method accounts for the discrepancy between domestic and cross-border trade integration. It is important to signal that not all 'missing' international trade is attributed to the trade potential, but only the proportion which corresponds to the difference in trade impediments for specific types of flows. Regional integration is evaluated here in terms of trade costs, expected to converge to their lower intra-EU level. This uniformisation of costs will result in increased trade with more distant partners and weaker concentration of trade in the immediate neighborhood.

Larger potentials obtained with the new method we have introduced here with respect to traditional trade potential models confirm the necessity to account for domestic trade in predicting the trade creation effects of regional integration. The disregard of internal trade opportunities is likely to largely underestimate trade potentials. Our method has the advantage of accounting for total international barriers to trade and therefore produces results more in compliance with integration efforts made by countries. Globally, the access of CEE goods to the EU markets improved considerably during the 1990s, and a large part of the potential European trade creation was already accomplished. Nevertheless, by the year 2000 the left CEE-EU trade potential was significantly larger than actual trade, implying an almost twofold possible increase of trade in the years to follow.

We show industry level effects on trade of European integration with the *fixed-effects*

and *friction* specifications in table 1.9.[13] The first four columns refer to trade potentials in 1993, and the last four for the year 2000. The first thing to notice is that with a few exceptions trade creation effects are observed for all industries, both CEE-EU and intra-EU trade, and under both specifications. As previously trade creation potentials are generally larger with the *fixed-effects* approach. Trade creation effects (the relative change in trade potential between 1993 and 2000) for CEE-EU trade are also more pronounced under this specification. The largest trade creation for both two-way East-West and East European trade was observed in the wood industry, followed by fabricated metal products, the rubber, and footwear industries. For the former two trade has literally reached its potential by 2000. Paper, leather, and non-metallic mineral products industries also enjoyed important trade creation, but mainly for regional East European trade. The lowest trade integration is found in the tobacco industry, subject to specific domestic regulations especially in EU countries. In the case of intra-CEE trade, however, this comes from the fact that trade in tobacco production between East European countries was below its potential level even in 1993. Moderate effects on trade are obtained for the rest of industries. By the year 2000 CEE-EU trade remains largely inferior to its potential (less than one fourth) only in seven industries: food, beverages, tobacco, chemicals, and basic metal industries(iron and steel, and non-ferrous metals). As expected, their number is larger for intra-CEE trade.

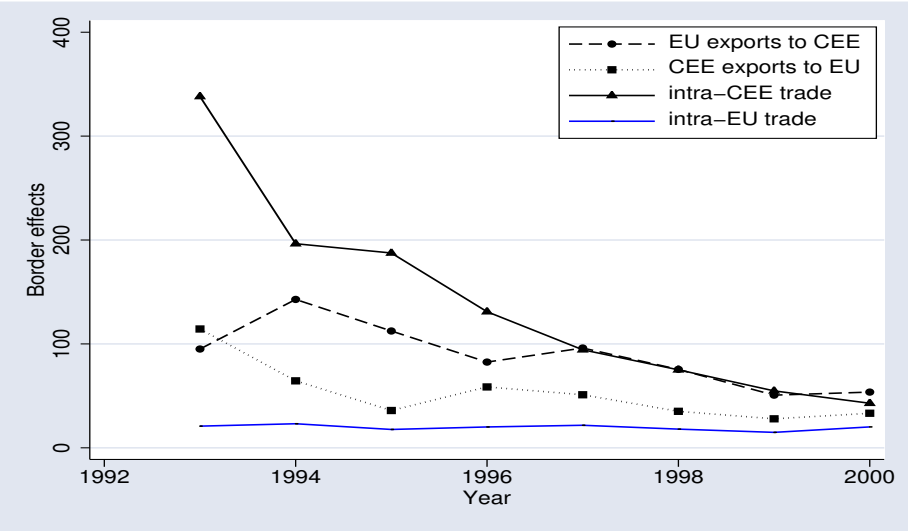
[13]The term European integration is used for all 24 European countries considered in this chapter. This is different from its wide but inaccurate employment in the literature to designate integration within the European Union.

Table 1.9: Trade potential with respect to intra-EU trade (in %of actual trade)

Trade flows	CEE-EU	CEE-EU	Intra CEE	Intra CEE	CEE-EU	CEE-EU	Intra CEE	Intra CEE
Model	FE	friction	FE	friction	FE	friction	FE	friction
Industry	1993	1993	1993	1993	2000	2000	2000	2000
Food	496	423	962	975	350	331	243	277
Beverage	944	814	2005	1099	655	695	473	230
Tobacco	367	254	-16	-60	361	355	-39	0
Textiles	768	727	4004	4270	36	66	236	170
Wearing apparel	434	276	3674	920	196	378	2269	0
Leather	237	167	3551	4407	47	78	205	330
Footwear	147	138	1574	2655	231	145	923	1595
Wood Products	163	147	1293	622	-3	3	2	5
Furniture	179	150	4236	2555	78	123	676	555
Paper products	876	643	1181	883	128	107	44	17
Printing, publishing	608	429	765	885	160	109	157	108
Industrial chemicals	559	516	713	795	355	316	799	353
Other chemical products	1218	829	2030	1840	365	342	230	228
Products of petroleum and coal	326	295	995	532	152	212	164	144
Rubber products	747	616	1316	2083	59	27	121	117
Plastic products	650	626	1211	1344	68	83	184	93
Pottery, china and earthenware	597	531	6813	19651	164	168	415	979
Glass and glass products	315	244	798	727	73	44	74	11
Other non-metallic mineral products	289	216	412	324	79	82	48	-14
Iron and steel	1239	1057	3158	2180	351	367	1050	291
Non-ferrous metals	632	477	767	549	463	302	989	416
Fabricated metal products	301	288	618	721	15	2	20	-7
Machinery	1294	869	5311	1811	154	256	474	539
Electrical apparatus	608	569	1656	1980	97	111	343	225
Transport equipment	1557	1287	2902	4774	199	137	353	558
Professional, scientific, etc. goods	783	958	1255	2934	143	179	334	239
Other manufacturing	932	667	7744	5848	171	160	603	503

Note: The trade potential is obtained by taking the ratio between the border effect for a particular trade flow and the intra-EU border effect.

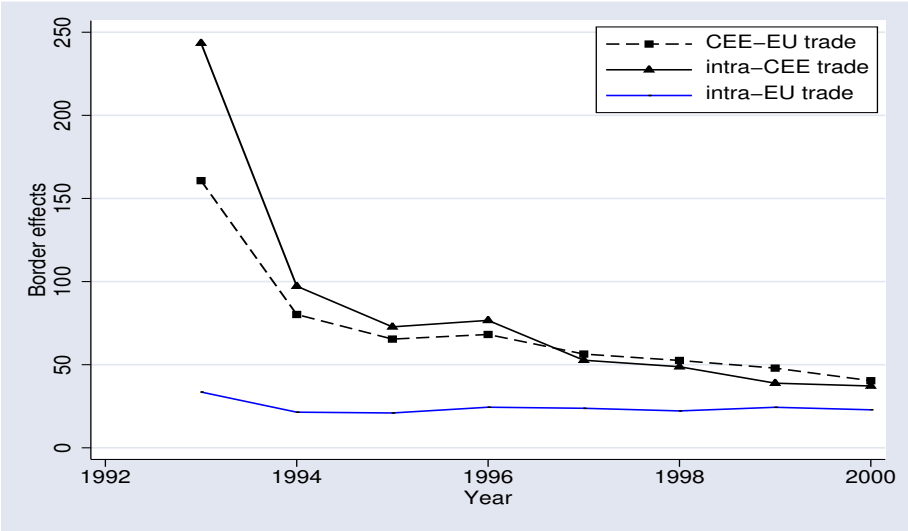
Figure 1.1: European trade integration: odds specification



Note: Border effects are computed using estimated coefficients of equation (1.28) for each year with industry level data. Effects for countries with no common land border or language are represented.

Changes in trade potentials described above can be also inferred from the evolution of regional border effects. Figures 1.1 and 1.2 picture a similar evolution of CEE-EU and intra-CEE border effects relative to intra-EU border effects generated with the *odds* and *fixed-effects* approaches respectively. The most pronounced regional trade integration was the one among Central and Eastern European countries. By the year 2000 trade integration in terms of border effects within this group has reached, or even surpassed the level of CEE-EU trade. Less spectacular, the drop in CEE-EU border effects is still very important and reflects at once the reintegration of CEE countries in the world economy and the reinforcement of regional integration across Europe. Meanwhile, intra-EU trade integration remained unchanged, advocating its use as reference for other regional trade flows in order to compute trade potentials. Similar evolutions can be seen with respect to the level of integration within the 'core' EU (figures A.1 and A.2 in the Appendix A.4). As expected, trade integration is considerably more pronounced when only the six founding EU members are retained.

Figure 1.2: European trade integration: fixed-effects specification

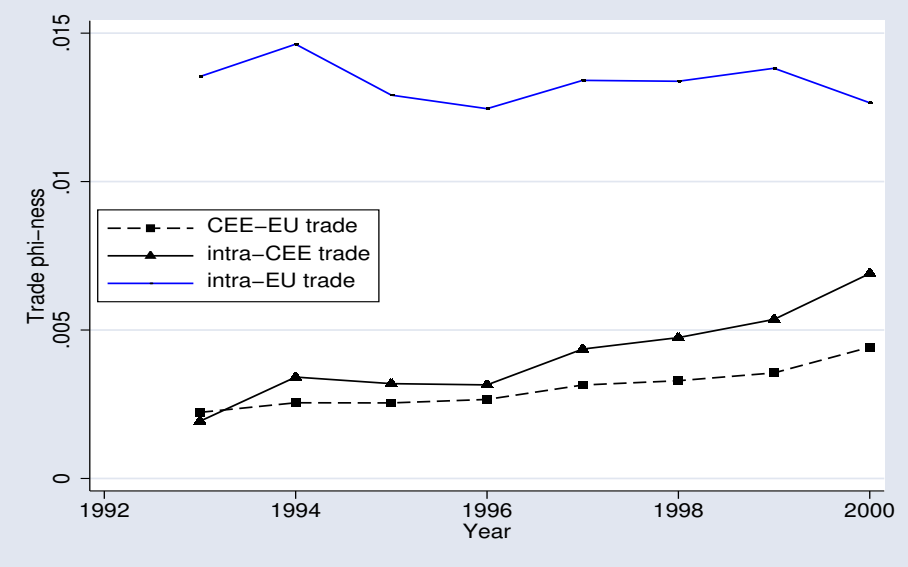


Note: Border effects are computed using estimated coefficients of equation (1.29) for each year with industry level data. Effects for countries with no common land border or language are represented.

The reduction of both trade barriers and trade potentials for CEE-EU trade coincided with an even more impressive evolution for trade within Central and Eastern Europe. These results disseminate the fears formulated by politicians and some authors that that CEE-EU trade integration will be accompanied by a lower commitment of CEE countries to regional integration, reflected here by very larger intra-CEE border effects and trade potentials at the beginning of the period. Still, trade potential figures in table 1.8 show that manufactured trade between CEE countries may expand to as much as twice its actual value.

Finally, the evolution of regional trade freeness is replicated in figure 1.3. The figure shows the evolution of median industry trade freeness of manufactured trade between CEE and EU countries, and separately for EU and CEE intra-group trade. Trade freeness ϕ_{ij}, as defined in section 1.3, reflects the easiness with which two countries participate to reciprocal trade, and is an alternative measure of trade integration, usually employed in new economic geography (e.g. Baldwin et alii 2003). Note that CEE-EU trade freeness

Figure 1.3: European trade ϕ-ness (free-ness)



Note: Trade ϕ-ness for each year and type of trade are given by respective median values of Φ_{ij} computed with industry level data.

increases under all previously presented specifications. With frictionless internal trade (null trade costs within countries) and symmetric trade costs ($\phi_{ij} = \phi_{ji}$), trade freeness is equal to the inverse 'friction' index Φ_{ij} used by the *friction* trade specification. Since true trade costs are unknown but only estimated, this can represent an additional benchmarks of our results. Nevertheless, this method ignores internal trade costs, that usually increase with the size of the country,[14] and produces lower levels of trade integration. When trade costs arise only for cross-border transactions, foreign partners are more distant from domestic ones.

As can be seen in figure 1.3, trade freeness for among 'old' EU countries varies slightly throughout the period, but without a clear tendency. Other European trade flows benefited from an increase in trade freeness, larger for Eastern European regional trade. Other European trade flows benefited from an increase in trade freeness, larger for Eastern European regional trade. Trade freeness for between 'core' EU is significantly higher than for all

[14]Larger shipping distances generate higher average transport costs.

fifteen EU countries. CEE countries' trade with 'core' countries is characterized by lower trade costs (higher freeness), but convergence in this case is much less evident (figure A.3 of Appendix A.4). One can conclude that trade integration enjoyed by 'core' EU countries reflects an integration level too high to be reached by CEE-EU trade.

The size of estimated border effects and border-specific trade costs depends on a variety of factors, among which the way in which distances are calculated. We address this question in more detail in the annex B.3.

1.6 National Product Differentiation vs. Monopolistic Competition

The *odds* specification derived from the theoretical model in section 1.3 is based on hypothesis characteristic to the Krugman (1980) monopolistic model of trade. Its predictions in terms of border effects and trade potentials, are quite close to those obtained with the other theoretically consistent approaches. Is this a sufficient indicator of the fact that a monopolistic structure replicates fairly well trade between European nations? Does such a model produce better results than a perfect competition approach? We address and attempt to answer these questions in this section.

In a monopolistic model of Dixit-Stiglitz-Krugman type, traded varieties and the number of firms that produce them at the equilibrium are endogenously generated by market forces, and are proportional to a country's output. Alternatively, trade can arise in a perfect competition setting with identical locally produced varieties. National product differentiation fits the perfect competition structure because it imposes a much higher competition among the firms of a country. We take a step further and assume marginal cost pricing in this model, similar to Head and Ries (2001a). Market power and scale economies are features specific to imperfect competition structures and nonexistent in this type of models.

We shall thus refer to the models based on monopolistic and perfect competition also as the DSK and national product differentiation (NPD) models respectively.

We use the *fixed-effects* approach from section 1.3 to construct a test for monopolistic versus perfect competition trade models. Independently from the form of competition and the market structure, trade between two countries can be expressed using equation (1.6). The difference induced by the two trade models refers to the particular structure of country and partner fixed effects. The theoretical structure shared by both NPD and DSK models, gives also the expression of exporter and importer fixed effects. Since equation (1.6) explains trade flows in logarithmic form, true supply and demand capacities are given by the exponential value of country-specific effects represented by (1.7) and (1.8):

$$\exp(FE_i) = n_i p_i^{1-\sigma}, \tag{1.32}$$

$$\exp(FM_j) = E_j \left[\sum_k n_k p_k^{1-\sigma} \phi_{kj} \right]^{-1}. \tag{1.33}$$

Since total imports of a country, plus the purchase by domestic consumers of nationally produced goods gives the expenditure level of that country, the following identities hold:

$$\begin{aligned} E_j &= x_{jj} + \sum_{k \neq j} x_{kj} \\ &= n_j p_j^{1-\sigma} \phi_{jj} \frac{E_j}{P_j} + \sum_{k \neq j} n_k p_k^{1-\sigma} \phi_{kj} \frac{E_j}{P_j} \\ &= \frac{E_j}{P_j} \sum_k n_k p_k^{1-\sigma} \phi_{kj} \\ &= \exp(FM_j) \sum_k \phi_{kj} \exp(FE_k). \end{aligned} \tag{1.34}$$

Summing the exports of a country and its internal shipments yields the country's level of output. Using the above expressions of country fixed effects and trade equation (1.4), this

generates a second identity:

$$\begin{aligned} y_i &= x_{ii} + \sum_{k \neq i} x_{ik} \\ &= n_i p_i^{1-\sigma} \phi_{ii} \frac{E_i}{P_i} + \sum_{k \neq i} n_k p_k^{1-\sigma} \phi_{ik} \frac{E_i}{P_i} \\ &= \frac{E_i}{P_i} \sum_k n_k p_k^{1-\sigma} \phi_{ik} \\ &= \exp(FE_i) \sum_k \phi_{ik} \exp(FM_k). \end{aligned} \tag{1.35}$$

Trade friction is obtained by assuming unitary preferences and the decomposition of trade costs presented in equation (1.25):

$$\begin{aligned} \phi_{ij} &= \alpha \ln d_{ij} + \beta_0 + \beta_1 2home_{ij} + \beta_3 4CEEandEU_{ij} + \beta_5 intraCEE_{ij} \\ &\quad + \gamma_1 contig_{ij} + \gamma_2 comlang_{ij}, \end{aligned} \tag{1.36}$$

where parameters b are the coefficients estimated with the *fixed-effects* method.

We test the expenditure and output identities above first with directly estimated country specific effects. Results for different countries are exposed in table 1.10. Although a perfect fit of equation (1.34 and (1.35)) is reached only with CEE countries' output values, coefficients reasonably close to unity are obtained by regressing respectively expenditure and output on the right hand side expression. Except for the case of CEE economies, computations of countries' expenditure and output values with importer and exporter effects overestimate true amounts. The right hand side expression of (1.34) and (1.35) are in the average 10% larger than actual countries' expenditure and output values.

The relationships between country and partner fixed effects, output and expenditure levels set by equations (1.34) and (1.35) are equally verified under monopolistic and perfect competition. We apply features specific to each model to construct the two sets of effects with NPD and DSK respectively. Testing the two models resumes then to compar-

Table 1.10: Testing expenditure and output identities with the *fixed-effects* trade specification

Countries	All European	EU countries	CEE countries
expenditure	1.10	1.13	0.96
	(0.003)	(0.003)	(0.004)
output	1.10	1.14	1.00
	(0.003)	(0.003)	(0.004)

Note: Figures are inverse values of coefficients estimated by regressing country output y_i and expenditure E_j on values predicted by each model model and expressed by the right hand side of (1.34) and (1.35) respectively, in logarithmic form and with no constant term. Standard errors are shown in parentheses. More accurate results could be obtain by applying bootstrapping techniques.

ing computed country and partner specific effects to estimated effects obtained with the *fixed-effects* specification (1.27), and testing the expenditure and output identities for each theoretical model.

A number of simplification hypotheses are necessary to make possible the accomplishment of the test. Labor is the only production factor in both monopolistic and perfect competition trade models. This greatly simplifies the computation of country fixed effects because marginal production costs become a linear function of wages. As previously, invariant consumption preferences are imposed and trade freeness resumes to a function of trade costs.

The DSK trade model used here is the one presented in section 1.3.3. The number of locally produced varieties can not be measured directly from the data, but is known to proportional to domestic production: $n_i = \frac{y_i}{w_i \sigma F}$. Local prices are constant markups over marginal costs: $p_i = \mu w_i(\sigma/(\sigma-1))$. Substitute these in trade equation (1.4) to obtain expression of bilateral demand in the monopolistic competition setting:

$$m_{ij} = \frac{\frac{y_i}{w_i \sigma F} \mu^{1-\sigma} w_i^{1-\sigma} \left(\frac{\sigma}{\sigma-1}\right)^{1-\sigma} \phi_{ij} E_j}{\sum_k \frac{y_k}{w_k \sigma F} \mu^{1-\sigma} w_k^{1-\sigma} \left(\frac{\sigma}{\sigma-1}\right)^{1-\sigma} \phi_{kj}}. \tag{1.37}$$

The amount $\frac{\mu^{1-\sigma}}{F} \frac{\sigma^{-\sigma}}{(\sigma-1)^{1-\sigma}}$ appears both at the numerator and the denominator in (1.37), and

simplifies. Grouping importer and exporter variables separately one obtains the expression of importer and exporter fixed effects under DSK:

$$FE_{DSKi} = \ln y_i {w_i}^{-\sigma}, \text{ and} \tag{1.38}$$

$$FM_{DSKj} = \ln E_j / \sum_k y_k {w_k}^{-\sigma} \phi_{kj}. \tag{1.39}$$

Next, plug production, wage, expenditure, and trade data into (1.38) and (1.39) to compute theory equivalents of country specific effects.

We use a national product differentiation *à la* Armington (1969) to introduce perfect competition in trade. Differently from Dixit and Stiglitz (1977) and Krugman (1980), in this model product varieties are defined with respect to their origin. In this case a single variety is produced in each country, $n_i = 1, \forall i$, firms face a much higher level of competition, and returns to scale are constant. Marginal cost pricing produces as in Head and Ries (2001a) a producer prices as a linear function of wages: $p_i = \mu w_i$. Under these conditions trade equation (1.4) rewrites as:

$$m_{ij} = \frac{\mu^{1-\sigma} w_i^{1-\sigma} \phi_{ij} E_j}{\sum_k \mu^{1-\sigma} w_k^{1-\sigma} \phi_{kj}}. \tag{1.40}$$

The amount $\mu^{1-\sigma}$, invariant for all countries and partners simplifies, and the expression of fixed effects is straightforward:

$$FE_{NPDi} = \ln w_i^{1-\sigma}, \tag{1.41}$$

$$FM_{NPDj} = \ln E_j / \sum_k w_k^{1-\sigma} \phi_{kj}. \tag{1.42}$$

Using actual wages, expenditures and trade costs one can easily compute country and partner specific effects for NPD.

For comparability, trade costs in both theoretical models is decomposed as in the *fixed-effects* estimation equation (1.27) into distance-induced costs, gains from common border

and language, and specific regional costs. The latter refer to costs specific to trade between EU members, among Central and Eastern European countries, or between the two groups of countries. This choice is motivated by the use of the *fixed-effects* specification in the construction of the test. Estimates of coefficients on distance, language, border and regional dummies from (1.27) are used to compute trade freeness in the expression of country and partner effects:

$$\begin{aligned}\hat{\phi}_{ij} &= d_{ij}^{\hat{\alpha}} \exp(\hat{\beta}_0)^{1-\sigma} \exp(\hat{\beta}_{12} \times home_{ij})^{1-\sigma} \exp\left(\hat{\beta}_{34} \times CEEandEU_{ij}\right)^{1-\sigma} \\ &\quad \times \exp(\hat{\beta}_5 \times intraCEE_{ij})^{1-\sigma} \exp(\hat{\gamma}_1 \times contig_{ij})^{1-\sigma} \exp(\hat{\gamma}_2 \times comlang_{ij})^{1-\sigma}. \end{aligned} \tag{1.43}$$

Coefficients used in (1.43) are parameter estimates presented in column 3 of table 1.3.

The last difficulty regarding the computation of expenditure and output levels with the two models comes from the presence of the unknown parameter σ. Estimates of the substitution elasticity σ in the literature suggest that it takes values comprised between 2 and 10. We compute expenditure and output levels with DSK and NPD models for different values of σ, and search for those which yield the lowest deviation from estimated country and partner effects.

Coefficients of a simple regression of computed effects on corresponding estimated effects in logarithmic form for the two models and different σ are displayed in table 1.11. The national product differentiation model produces negative coefficient values on exporter specific effects, and very large coefficients on importer effects for all reasonable substitution elasticities. This model proves to be inappropriate for trade between European nations. On the contrary, the monopolistic model yields much more precise country effects. Values close to unity are obtained for ratios $\widehat{FE_{DSKi}}/FE_i$ and $\widehat{FM_{DSKj}}/FM_j$ and an elasticity σ approaching 3. In figure 1.4 we plot the difference between the the exporter fixed effects estimated with the *fixed-effects* trade specification and similar effects predicted by the DSK and NPD trade models, against the value of the elasticity of substitution σ. The horizontal

Table 1.11: Testing fixed effects computed with NPD and DSK versus estimated effects

σ	FE_{NPD}	FM_{NPD}	FE_{DSK}	FM_{DSK}
$\sigma = 1$	0.00	1.91	1.39	0.41
$\sigma = 2$	-0.24	2.19	1.15	0.72
$\sigma = 3$	-0.48	2.41	0.91	1.00
$\sigma = 4$	-0.72	2.52	0.67	1.22
$\sigma = 5$	-0.96	2.56	0.43	1.34
$\sigma = 6$	-1.21	2.58	0.18	1.40
$\sigma = 7$	-1.45	2.60	-0.06	1.43
$\sigma = 8$	-1.69	2.61	-0.30	1.45
$\sigma = 9$	-1.93	2.61	-0.54	1.47
$\sigma = 10$	-2.17	2.62	-0.78	1.48

Note: Figures are estimated coefficients from regressing computed country and partner effects with the NPD and DSK models respectively on effects estimated with the fixed-effects specification (1.27) with no constant term. All coefficients are significant at 1% level.

line corresponds to estimated exporter-specific effects, and its intersection by the DSK or NPD curve shows the verification of that particular model by the data.

In table 1.12 we test how well do NPD and DSK models verify expenditure and output identities:

$$E_j = \exp(\widehat{FM_{DSKj}}) \sum_k \phi_{kj} \exp(\widehat{FE_{DSKk}}), E_j = \exp(\widehat{FM_{NPDj}}) \sum_k \phi_{kj} \exp(\widehat{FE_{NPDk}});$$

$$y_i = \exp(\widehat{FE_{DSKi}}) \sum_k \phi_{ik} \exp(\widehat{FM_{DSKk}}), y_i = \exp(\widehat{FE_{NPDi}}) \sum_k \phi_{ik} \exp(\widehat{FM_{NPDk}});$$

tested above using estimated country effects. Again, the DSK monopolistic trade model reveals as more suitable for European industry trade data. The national product differentiation model underestimates importing country's expenditure and inflates exporter's output for all reasonable substitution elasticities. Values very close to countries' true expenditure and output levels are obtained with the monopolistic competition for precisely the same substitution elasticity as for country effects. This finding confirms once more the presence of important markups in the European market, and the necessity of using models

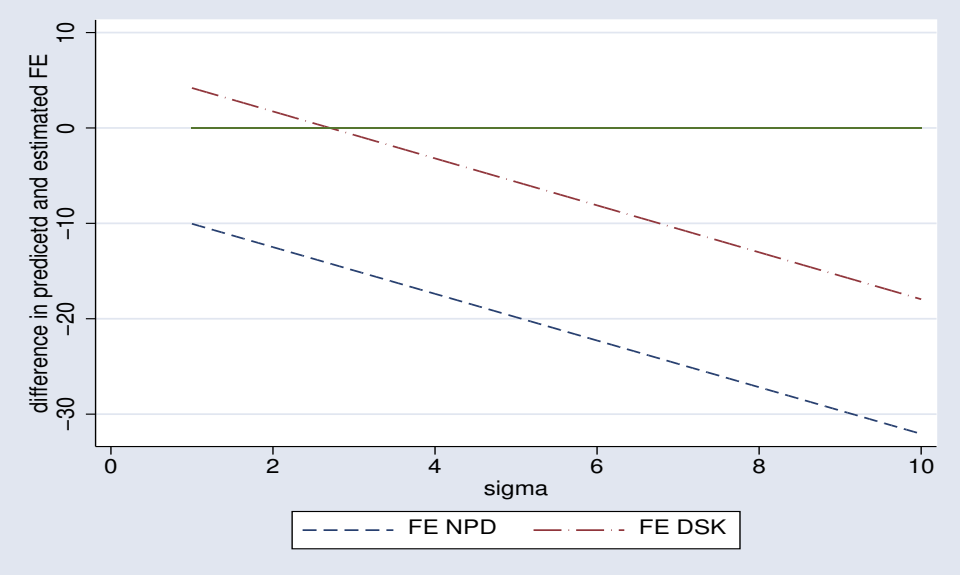


Figure 1.4: Testing the DSK and the NPD trade models

integrating imperfect competition to account for them.

Combined, our results argument in favor of the monopolistic competition trade model. This outcome is contrary to Head and Ries (2001a)'s findings for North-American trade on the basis of a discrimination test based on the relationship between output shares and demand share in a national product differentiation and an increasing returns model. It complements the exiting literature, which relies deeply on the share of intra-industry trade and the presence/absence of the home market effect to assess the empirical success of perfect and imperfect competition trade models (Head and Ries (2001a), Evenett and Keller (2002), Brülhart and Trionfetti (2005)).

However, our results rely deeply on the elasticity of substitution used, although it is indirectly predicted from the data. Note that for high values of σ both trade models overestimate outputs and undervalue true expenditures. This signals possible mismeasurement of expenditure and output values by equations (1.34) and (1.35). Nevertheless, an elasticity of substitution equal to 3 is very realistic if one considers that it is obtained for both domestic and foreign varieties. We are therefore confident when affirming that trade between

Table 1.12: Testing NPD versus DSK models: verification of expenditure and output identities

σ	E_{NPDj}/E_j	y_{NPDi}/y_i	E_{DSKj}/E_j	y_{DSKi}/y_i
$\sigma = 1$	0.36	1.72	1.40	0.62
$\sigma = 2$	0.16	1.93	1.18	0.84
$\sigma = 3$	0.01	2.10	0.99	1.05
$\sigma = 4$	-0.07	2.19	0.84	1.23
$\sigma = 5$	-0.10	2.23	0.74	1.34
$\sigma = 6$	-0.12	2.24	0.70	1.39
$\sigma = 7$	-0.13	2.25	0.68	1.42
$\sigma = 8$	-0.13	2.26	0.67	1.43
$\sigma = 9$	-0.14	2.26	0.66	1.44
$\sigma = 10$	-0.14	2.27	0.65	1.45

Note: Figures are estimated coefficients from regressing computed country and partner effects with the NPD and DSK models respectively on effects estimated with the fixed-effects specification (1.27) with no constant term. All coefficients are significant at 1% level.

European countries during the 1990s is best replicated by monopolistic trade models.

1.7 Conclusions

Trade both between CEE and between CEE and EU countries improved remarkably during the last decade of the twentieth century, both when measured in terms of border effects and trade potentials. The present chapter shows that there is still place for important growth in bilateral CEE-EU transactions. This result contradicts with most trade potential gravity models who claim that East-West European trade has already reached its highest integration level. Much higher trade potentials for both CEE-EU and intra-CEE trade are obtained when one controls for the amount of trade within national borders. Results are very robust and are confirmed by three different theoretically compatible trade specifications used. Thus, at the beginning of the twenty-first century trade between CEE and EU countries represented about half of its attainable level, suggesting a 100% increase with further EU integration. As for regional CEE trade, its potential ranges depending on the

model between 112 and 175%. And this is regardless of the strong reduction of bilateral border effects between these countries achieved during the 1990s. A discrimination test for monopolistic against perfect competition trade models, based on the estimation of bilateral trade flows with country and partner specific effects, is developed. According to it, European trade is better replicated with monopolistic competition trade models *à la* DSK, and an elasticity of substitution of traded varieties close to 3 is obtained.

Chapter 2

Trade Liberalization and Institutional Reforms

2.1 Introduction

East-West European trade integration started with the reduction of tariffs on bilateral imports, and generated an important increase of regional trade. However, as shown in chapter one, even after most policy barriers have been eliminated, trade potentials remained very large. This suggests that the reduction of other types of impediments to European trade is possible. It confirms at the same time the existence of complementary trade determinants, less explored in the literature, but not less important in shaping trade patterns. Another aspect which suffered important changes during the same time period concerns institutions in transition countries. The abandon of the centralized system by these countries, and their increasing willingness to join the EU motivated their governments to undertake large reforms in this area. Institutional reforms were a chief condition imposed by the EU to new candidate countries. In order to permit the well-functioning of the enlarged Union, candidate states have been demanded to adopt changes in their legislation, increase the efficiency of the judicial system, reduce corruption, etc. However, unlike in the case of

trade policy, progress made by different countries in this direction was more moderate, and varied significantly across countries. The present chapter explores the institutional heterogeneity, and regional trade liberalization in Europe, and develops specific recommendations in terms of economic policy for further trade integration.

The use of institutions is not new to a number of economic areas, such as new institutional economics (Coase (1937), North (1990), Williamson ()), and growth and development economics (Acemogolu (2001) et alii, Rodrik (2002), Kaufman and Kraay (2003) etc.). However, only very recently they captured the interest of international trade economists. Institutions are generally defined as formal and informal rules of behavior, means for ensuring their application, mediation procedures in case of dispute, sanctions for violation of established rules, and organisations and bodies in charge with their enforcement. Institutions's quality is judged as more or less good upon the more or less good functioning of its different elements. Examples include constitutions, judicial systems, banks, corporate, and bankruptcy laws, tax collection and competition agencies. Effective institutions are those ensuring that the incentives that they create actually lead to desired behavior.

Recent work by Anderson and Marcouiller (2002), Groot et alii (2004), Jansen and Nordas (2004), Koukhartchouk and Maurel (2003), Duc et alii (2005) illustrate the pro-trade effect of institutions. However, this literature disregards the possibility of institutions to be affected by a country's participation in international trade. Inspired from works on economic development, the present chapter studies the endogeneity between trade and institutions. In conformity with the result of the differentiation test developed in section 1.6, we use a monopolistic competition model of trade to analyse the relationship between trade and the quality of domestic and foreign institutions for 25 European countries. It is not only that better institutions at home and abroad increase the security of international exchange, reduce uncertainty and contract enforcement costs, and thereby persuade firms to trade more. Increased participation in international transactions generates more demand

for institutional reforms, and higher pressure on the government to finance and execute them. Trade is, thus, a channel through which a country's economic agents can learn of ways to ameliorate existing institutions. Although the existing literature establishes that fragmentation of institutions at country level is an additional source of larger international trade costs, there is not a specific variable measuring the institutional heterogeneity. In this chapter we introduce the concept of *institutional distance* to fill this gap. Even in the case of well-functioning institutions, the existence of country-specific procedures and practices introduces confusion and supplementary costs. Therefore, similarity between institutional frameworks in the exporting and importing countries, along with the development of high-quality national institutions, has a trade creating effect.

The effect of institutional reforms on trade is compared to that of foreign trade policy. We compute the share of each factor in total border-specific trade costs, and find strong national institutions to be no less important for promoting European trade than the removal of policy barriers. A further increase of regional trade is, therefore, likely to occur even after all tariff and non-tariff barriers have been eliminated. The separation of institutions into general, and specific to transition countries, and the employment of quantitative variables permit to formulate specific recommendations to governments in terms of economic policy.

2.2 European Trade Liberalization and Institutional Changes

In the early 1990s all transition countries have engaged into a firm process of trade liberalization with the European Union. Despite the fact that time tables and specific measures differed across countries, at the beginning of the 21st century trade with EU of each of them is qualified as almost entirely free. Still, annual growth rates of CEE-EU bilateral trade are far from being uniform. One can easily see from Fig.2.1 that the major increase in CEE-EU bilateral trade occurred in the mid 1990's. Meanwhile, most regional trade liberalization measures became effective since 1995, and can be held responsable only for the

later growth of bilateral trade. In the light of works on trade potential, the important early boom in foreign trade of transition countries can be associated with their re-integration into the world economic system.[1]

Still, the growth of transition countries' trade with EU even after 1995 may not be entirely imputed to regional trade liberalization. For instance, highest growth rates of transition countries' exports to EU partners do not always correspond to lowest values of the average EU import tariff (table 2.1). It is straightforward that other factors are at work. The present chapter focuses on the importance of one such determinant *per se* and relative to foreign trade policy: national institutions. Institutions have been shown to be strong determinants of economic growth.[2] The economic development literature stresses also on the reversed causality between per capita GDP growth and the quality of institutions. Strong domestic institutions are an important premise for economic growth, but are simultaneously shaped by the level of economic development of the country.

The examination of nation-level institutions in connection with international trade is very recent in the literature. The pioneer paper on this subject is Anderson and Marcouiller (2002), and investigates the impact of corruption and imperfect contract enforcement on international trade patterns. They conclude that inadequate institutions constrain trade as much as tariffs do. Latter work of Koukartchouk and Maurel (2003), Groot et alii (2004), and Jansen and Nordas (2004) confirm this finding. Despite the different institutional aspects considered in these papers, they all rely on index measures for the quality of institutions. Groot et alii (2004), Turrini and Ypersele (2002), and Duc et alii (2005) analyse the effect of similarity in governance quality but without constructing a proper variable for institutional homogeneity. The possible endogeneity between trade and institutions is ignored in all of the above studies.

The present chapter complements this literature in several ways. First, we consider two

[1] See Wang and Winters (1991), Baldwin (1993), Hamilton and Winters (1992), Harrigan (2003), Gross and Gonciarz (1996), Fontagné, Freudenberg and Pajot (1999) for a further discussion.

[2] See Rodrik, Subramanian, Trebbi (2002), Frankel and Romer (1999), Sachs and Warner (1995).

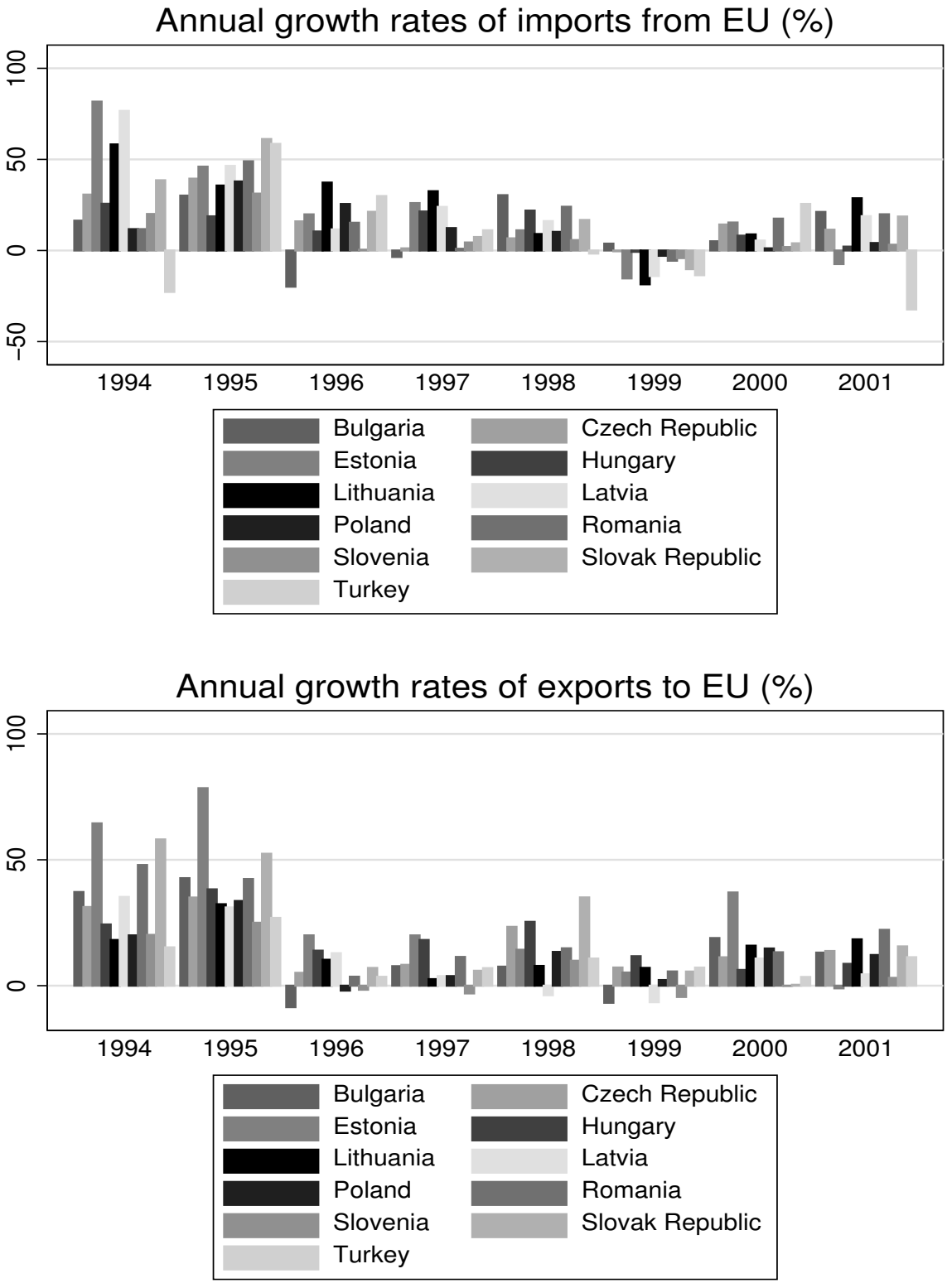


Figure 2.1: Annual growth rates of CEE-EU trade

Table 2.1: Exports' growth, trade liberalization, and the quality of institutions in CEE

Country	**Manufactured exports to EU,** 1993-2000 growth rate (%)	**Change in average EU tariff,** 1993-2000[a]	**IEF score,** 2000 [b]	**EBRD score,** 2000 [b]	**KKM score,** 2000 [b]	**Fraser score,** 2000 [b]
Estonia	647	-2.75	0.67	0.62	0.68	0.68
Lithuania	364	-2.75	0.47	0.54	0.59	0.61
Slovakia	323	-4.25	0.50	0.55	0.59	0.54
Hungary	288	-6.17	0.63	0.68	0.68	0.63
Romania	242	-2.58	0.39	0.46	0.46	0.43
Czech Republic	230	-6.17	0.67	0.61	0.64	0.67
Latvia	199	-2.75	0.57	0.52	0.58	0.65
Bulgaria	153	-2.58	0.42	0.50	0.52	0.50
Poland	149	-6.14	0.53	0.62	0.64	0.52
Slovenia	51	-4.42	0.50	0.56	0.68	0.57

Note: [a]Change in percentage points between first and the last year within the period for which data is available.
[b]A value closer to unity corresponds to an increased level of a country's economic freedom, a better functioning of market institutions, or good governance.

types of institutions: general development-specific ones, and institutions specific to CEE transition economies. We call the latter also market institutions, as they are mainly concerned with the development of functional market economies in these countries. Secondly, two distinct ways in which institutions affect trade are identified. Trade increases not only when it is supported by strong institutions in the importing and exporting countries, but also when the differences between the two are small. From this point of view, countries with poor but similar institutions exchange more because they have already acquired an experience by trading locally in overcoming difficulties induced by the ill institutional environment. Other things equal, engaging in transactions with partners from countries with similar institutional deficiencies implies a lower burden for them.

Next, through the use of appropriate instrumental variables we examine the reversed causality between trade and institutions. The quality of institutions can be influenced by the extent to which the country participates in international trade. A high openness to foreign trade intensifies the demand for better institutions, which can increase government's

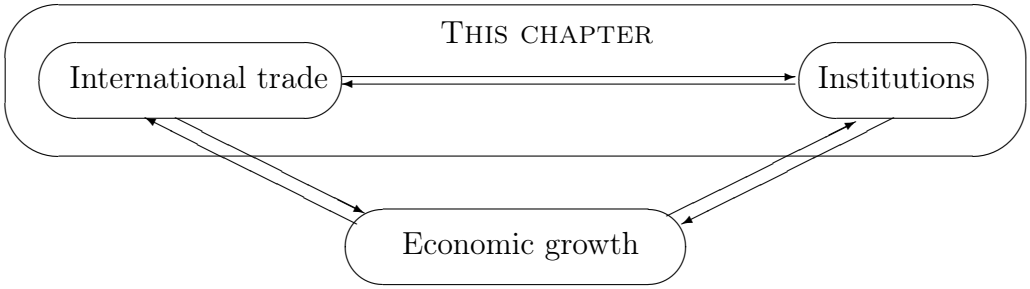


Figure 2.2: The 'magic' triangle: Growth, Trade and Institutions
The sense of causality is given by the sense of the arrows.

willingness to improve existent institutions. Alternatively, trade *per se* can have positive externalities, among which a learning effect about better institutions existing abroad. Combining these arguments with findings in the literature on economic growth, we conclude that institutions shape both international trade and per capita GDP growth, while remaining sensitive to changes in either of the two. The interaction between trade, growth and institutions can be represented by a triangle (Fig.2.2). The present chapter discusses only causality shown in the upper part of the figure. The other double sided effects are explored in depth in the economic growth literature.

Central and Eastern Europe represents a region with significant institutional changes during the 1990s. The passage from planned to market-oriented economy induced major reforms in domestic institutions, although they were uneven across countries. Hence, the impact of institutional changes on trade is even more significant for transition countries. Table 2.1 displays the scores of four institutional measures for CEE countries in the year 2000. The Index of Economic Freedom (IEF) of the Heritage Foundation shows the level of economic freedom within a country, and can be viewed as a measure of the quality of development-specific institutions. The composite index of the European Bank for Reconstruction and Development (EBRD) reflects the advance of the transition process, i.e. of reforms meant to ensure the passage to the market economy. For comparability the last two columns show the corresponding institutional scores computed by Kaufmann et

al. (2003) and by the Fraser Institute. Original scores have been rescaled in order to take values on the $[0; 1]$ segment. A score closer to 1 corresponds to an increased level of a country's economic freedom, a better functioning of market institutions, and an improved governance. Countries are ranked according to the growth rate of their exports to EU partners during the 1990s. The change in the average EU tariff on imports from each CEE country is roughly equal to the average EU import tariff of CEE goods in 1993. Table 2.1 shows that countries with high institutional scores performed well on exports to the EU. The largest increase in exports to EU are found for countries that obtained the best score for the index of economic freedom. It can be therefore concluded that at least some part of the uneven CEE-EU trade growth displayed in figure 2.1 comes from differences in national institutions. We consider this to be a sufficient motivation for a more serious investigation of causality between trade, institutions and trade policy, to which we proceed in the following sections.

2.3 The Trade Model

We build a trade model in which bilateral trade is affected by countries' economic environments. We apply Anderson and Marcouiller (2002)'s hypothesis that insecurity constrains trade by raising the price of goods, in a monopolistic competition setting, with firm level product differentiation *à la* DSK. As in Anderson and Young (2002) and Anderson and Marcouiller (2002), imperfect contract enforcement is reflected in a price markup equivalent to a hidden tax on trade. But differently from them, in our case hidden transaction costs associated with the insecurity of international trade arise from poor institutions in both importer's and exporter's country. Moreover, the national character of these institutions is an additional source of fragmentation of the economic space, and constitutes by itself a barrier to cross-border exchange. Hence, we account for the role of both domestic and foreign institutions, as well as for their similarity.

Consumers in each country solve a two-step budgeting function. First, consumers determine the proportion of total expenditure E_j to allocate to internationally traded goods, both foreign and domestic:

$$E_j = \sum_i x_{ij} p_{ij} = \sum_i m_{ij}, \tag{2.1}$$

where x_{ij} is the amount of goods that country j buys from country i producers, p_{ij} is the price of these goods, and the product $m_{ij} = x_{ij} p_{ij}$, gives the value of country j's imports from i. Secondly, the value of E_j is distributed across consumed varieties. We assume that products are differentiated at firm level, that consumer preferences are homothetic, of CES form, and identical across countries and varieties. The utility of the representative consumer of an importing country j is then given by

$$u_j = \left[\sum_i \sum_{r=1}^{n_i} x_{ijr}^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}} \tag{2.2}$$

where n_i represents the number of varieties r produced and exported by country i, and at the same time the number of firms in country i, because each variety is produced by a separate firm.

The demand in country j for goods produced in i is obtained by solving the optimization program in which importing country consumers maximize their utility (2.2) subject to the budget constraint (2.1):

$$m_{ij} = n_i \left(\frac{p_{ij}}{P_j} \right)^{1-\sigma} E_j \tag{2.3}$$

The denominator in equation (2.3) is a importer-specific nonlinear price index, representing the average price of internationally traded varieties to consumers in country j:

$$P_j = \left[\sum_k n_k {p_{kj}}^{1-\sigma} \right]^{1/(1-\sigma)}. \tag{2.4}$$

A tractable trade equation is obtained by dividing bilateral imports m_{ij} expressed by

(2.3) by imports of the same country from a different partner. We choose a country's trade with itself as reference for purchases from all foreign partners in order to relate our model to the literature on border effects. Nonlinear price indices P_j and importer's expenditure on internationally traded goods E_j simplify to give the following equation of relative demands:

$$\frac{m_{ij}}{m_{jj}} = \frac{n_i}{n_j}\left(\frac{p_{ij}}{p_{jj}}\right)^{1-\sigma}. \tag{2.5}$$

A confirmed finding in the recent literature is that countries trade significantly less with each other than the theory predicts (e.g. Trefler (1995), McCallum (1995)). The difference is particularly strong when compared to trade within national borders, revealing a so-called *border effect*. Trade policy barriers and the quality of institutions are stated among the various explanations of this result. One way to evaluate the role these two factors play in economic integration is to compare their contribution to explain the lower than expected volume of imports. Working with foreign-to-domestic trade ratios as in equation (2.5) is very convenient for the estimation of border effects.

A single production factor, labour, is used to produce all varieties, and identical fixed and variable costs in terms of labour units, F and μ respectively, for all countries are assumed. In a monopolistic competition setup producers face a constant price elasticity of demand equal to the elasticity of substitution between varieties σ, and maximize profits by setting marginal cost equal to marginal revenue:

$$\mu w_i = p_i(\frac{\sigma - 1}{\sigma}). \tag{2.6}$$

Consequently, the unitary price of each variety can be expressed as a function of the number of labour units μ used to produce it, the unitary remuneration of labour force w_i, and the elasticity of demand σ.

The market equilibrium with free entry of firms arises with average cost pricing since

new firms enter the market until all profits vanish away:

$$\mu p_i = \frac{F w_i}{q_i} + \mu w_i = w_i \left(\frac{F}{q_i} + \mu \right). \tag{2.7}$$

One can express the mill price p_i from equation (2.6) and substitute it in the left hand side of equation (2.7). Note, that the price of any variety produced in country i is a linear function of country's wage w_i. Wage on both sides of equation simplify and the number of units of variety i produced at equilibrium becomes a function of invariable amounts F, μ, and σ:

$$q_i = \frac{F(\sigma - 1)}{\mu}. \tag{2.8}$$

With symmetric varieties, equal quantities $q \equiv \frac{F(\sigma-1)}{\mu}$ of each variety are produced. A country's output y_i equals the sum of outputs of its firms, evaluated at producer prices p_i:

$$y_i = n_i q p_i. \tag{2.9}$$

We allow prices at destination to differ across countries proportionally to bilateral trade costs τ_{ij}:

$$p_{ij} = p_i \ \tau_{ij}. \tag{2.10}$$

It is thus implicitly assumed that all partners are charged the same mill price.

Expressing n_i from (2.9), and p_i from (2.6) and substituting using the expression (2.10) into the trade equation (2.5) one gets the following expression of relative demands:

$$\frac{m_{ij}}{m_{jj}} = \frac{y_i}{y_j} \left(\frac{p_i}{p_j} \right)^{-\sigma} \left(\frac{\tau_{ij}}{\tau_{jj}} \right)^{1-\sigma}. \tag{2.11}$$

Next, we consider the structure of trade costs τ_{ij}. The price of a good consumed in the importing country j exceeds the producer price by the transport cost, the import tariff, the tariff equivalent of non-tariff barriers, and an "insecurity" markup. The latter represents

hidden transaction costs associated with the non-existence or the poor functioning of national institutions (as defined in section 2.2). Anderson and Marcouiller (2002) show that the magnitude of this insecurity markup depends on the quality of national institutions.[3]

The fulfillment of a cross-border transaction involves a set of procedures to be accomplished in the exporting and importing country. The search of a foreign partner, the negotiation of the trade contract, the shipment of goods across the border, customs' clearance, and the international payment imply a direct interaction with institutions of both countries. Therefore the complexity of these operations, associated costs and delays, as well as the success of the entire transaction will be affected by the quality of domestic and foreign institutions.

Three sources of trade costs are identified here: transport costs, trade policy costs (both tariffs and non-tariff barriers), and institutional costs:

$$\begin{aligned} \tau_{ij} &= d_{ij}{}^{\rho}(1+t_{ij})(\exp[ntb_{ij}])^{\eta}(\exp[S_i])^{\gamma_1}(\exp[S_j])^{\gamma_2}(\exp|S_i-S_j|)^{\gamma_3} \\ &\quad \exp[(1-home_{ij})b_{ij}]. \end{aligned} \tag{2.12}$$

Transport costs are instrumented by the distance. The ad-valorem import tariff t_{ij} generates a linear increase of total trade costs, and raises the price precisely in proportion to the tariff. Non-tariff barriers (NTB) have a similar effect, but are considerably more difficult to measure. We use the NTB trade coverage and frequency ratios to quantify the level of these barriers, denoted by ntb_{ij} in equation (2.12).

Variables S_i and S_j reflect the quality of institutions in countries i and j respectively. As better institutions facilitate trade and reduce additional transaction costs we expect coefficients γ_1 and γ_2 to be negative. [4] As shown by de Groot et alii (2004) it is not only

[3] Institutions for the defense of trade and factors that allow traders to use those institutions successfully are considered by Anderson and Marcouiller (2002).

[4] Notice that S_i and S_j need not necessarily contain the same elements. It is possible and even very likely that different things promote (impede) trade in the origin and the destination country. However, this aspect can not be investigated with the trade specification developed by this model.

the quality of institutions in the trading countries that matters for bilateral trade, but also the institutional similarity or homogeneity. We account for this aspect by introducing the institutional distance, i.e. the opposite of institutional similarity, in the structure of trade costs (2.12). Partners from countries with similar institutions are more familiar with each other's formal procedures and conventions, norms of behavior and even business practices. They also face reduced adjustment costs and lower insecurity from the natural unfamiliarity of the international environment when engaging in bilateral trade transactions. Similarity of informal business procedures may increase bilateral trust, and institutional similarity increases the compatibility of trading partners, which could explain a fair share of the border effect. In our specific case this suggests a positive coefficient γ_3 of the absolute difference between the quality of countries' institutions.

There may be complementary cross-border costs b_{ij}, other than the ones described above. While we are unable to identify their source, we can still quantify them by introducing a factor that takes values greater than 1 in equation (2.12) for international transactions. Variable $home_{ij}$ is a dummy that denotes whether trading partners are from the same country, and $[\exp(b_{ij}) - 1] \times 100$ is the tariff equivalent of border-specific trade barriers on country i exports to j different from tariffs, NTB, and institutions.

Differently from the trade costs specification given by (2.12), the literature on border effects dissociates trade costs into two broad categories: one corresponding to costs common to all flows, continuous across space, and another standing for border-specific costs that occur only when traded goods cross an international border, i.e. specific to flows between partners from different countries. Representative for the first category are transport costs which arise for both international and domestic transactions. The presence of border-specific costs, such as tariffs and different institutional environments, generate discontinuous shifts in trade costs and flows. Therefore, tariff and non-tariff barriers, and the non-uniformity of national institutions account at least for a partial explanation of

border effects. The quality of institutions, however, matters for all trade flows, foreign and domestic, and refer to the first type of trade costs. For internal shipments, the second, the third and the last two terms of the right hand side of equation (2.12) disappear. Domestic trade costs are given by:

$$\tau_{jj} = {d_{jj}}^{\rho} \exp\left[\gamma_4 S_j\right]. \tag{2.13}$$

Note that if institutions matter for domestic trade as much as they do for foreign trade flows, the following identity should hold: $\gamma_4 = \gamma_1 + \gamma_2$. Different functional forms for internal and cross-border trade costs with respect to institutions' quality can be an additional source of lower than expected international trade. Although this may be true, in the absence of supporting evidence this aspect is disregarded in the present chapter.

Substituting equations (2.12) and (2.13) into the relative demand equation (2.11) and taking logs, we get:

$$\begin{aligned} \ln \frac{m_{ij}}{m_{jj}} &= \ln \frac{y_i}{y_j} - \sigma \ln \frac{w_i}{w_j} + \rho(1-\sigma) \ln \frac{d_{ij}}{d_{jj}} + (1-\sigma) \ln\left(1 + t_{ij}\right) \\ &\quad + \eta(1-\sigma) ntb_{ij} + \gamma_1(1-\sigma)(S_i - S_j) + \gamma_3(1-\sigma)|S_i - S_j| + (1-\sigma) b_{ij}. \end{aligned} \tag{2.14}$$

There are two institutional terms on the right hand side of equation (2.14). The difference in the quality of national institutions in the exporting and importing country $(S_i - S_j)$ reflects the impact of exporting country's institutions on cross-border relative to domestic trade, while the absolute difference $|S_i - S - j|$ shows how the dissimilarity between trading countries' institutional environments affects trade between them. A positive coefficient of the first variable testifies that improved national institutions increase trade, while an estimated negative coefficient on institutional difference reveals the positive role of institutional homogeneity. Note that the two measures can be highly correlated, which may produce biased and non-significant estimates of the corresponding coefficients. If the estimation of true effects on trade of each of the two institutional measures is not possible in the presence

of multicolinearity, one can still judge which of the two measures is more important. In this case dropping one of the two variables from equation (2.14) allows to identify the main channel through which institutions shape trade flows. The sign of the estimated coefficient on the left institutional variable will indicate the prevalence of institutions' quality or of institutional similarity.

To compare the explanatory power of changes in foreign trade policy and relative to that of the institutional environment, we need to estimate the total border effect between trading countries i and j, the residual border effects unexplained by tariffs and NTB, and by institutional variables separately. The total effect reflects the loss in trade caused by all cross-border barriers, and is estimated by the exponential value of the constant of the model when all border-specific costs in (2.12) are replaced by a single term $\exp\left[(1 - home_{ij})B_{ij}\right]$:

$$\ln \frac{m_{ij}}{m_{jj}} = \ln \frac{y_i}{y_j} - \sigma \ln \frac{w_i}{w_j} + \rho(1-\sigma) \ln \frac{d_{ij}}{d_{jj}} + \gamma_1(1-\sigma)(S_i - S_j) + (1-\sigma)B_{ij}. \quad (2.15)$$

Now we can introduce trade policy variables $\ln(1 + t_{ij})$ and bnt_{ij} in equation (2.15). The exponential of the resulting constant term gives the corresponding residual border effect, i.e. the drop in trade produced by all border-specific trade barriers except tariffs and NTB. Similarly, one can estimate the residual border effect with institutional variables. The computation of the incremental in trade induced by trade liberalization and by institutional reforms separately is then straightforward.

In the empirical part of the chapter we focus on coefficients of the tariffs and NTB, and institutional variables as features of trading countries' economic environment. In our model both factors have an impact on trade through trade costs. Trade liberalization and an improved functioning of national institutions reduce transaction costs, and yield lower prices of exchanged goods being charged to consumers. Institutional reforms may have an even stronger effect on trade as they also increase the homogeneity of the institutional environment: better institutions are at work in all countries. Full similarity is always

ensured when trading partners are from the same country.

However, working with relative demands, m_{ij}/m_{jj}, implies the knowledge of both foreign and internal trade values. Unlike international trade, only very few countries provide data on true trade flows taking place inside national borders. To overcome this limitation, one can follow Wei (1996) and compute internal trade as the difference between a country's production and its exports to all partners. This approach, however, yields biased results for at least two reasons. First, it does not permit to control for non-tradable goods and thus inflates internal trade and border effects. Secondly, it can produce negative values of internal trade for high levels of re-exports.

A possible way to tackle this problem is to use a different dependent variable. Rather than taking the foreign-to-domestic trade ratio we can divide country i exports to j by exports of a reference country k to the same importing country j.

$$\begin{aligned} \ln \frac{m_{ij}}{m_{kj}} &= \ln \frac{y_i}{y_k} - \sigma \ln \frac{w_i}{w_k} + \rho(1-\sigma) \ln \frac{d_{ij}}{d_{kj}} + (1-\sigma) \ln \frac{(1+t_{ij})}{(1+t_{kj})} \\ &\quad + \eta(1-\sigma)(ntb_{ij} - ntb_{kj}) + \gamma_1(1-\sigma)(S_i - S_k) \\ &\quad + \gamma_3(1-\sigma)\left(|S_i - S_j| - |S_k - S_j|\right) + (1-\sigma)(b_{ij} - b_{kj}). \end{aligned} \tag{2.16}$$

In this way only international trade data are employed. Due to the specific form of the dependent variable, the quality of institutions of the importing country j drops out from equation (2.16). The difference between the quality of national institutions in the exporting and reference country accounts for the role of well- or miss-functioning national institutions in stimulating trade, while institutional heterogeneity is displayed thus by a more complex term than in (2.14). The two considered institutional dimensions are better separated under trade specification (2.16), reducing the risk of multicollinearity. Although in this case one can no longer estimate the border effects, the importance of institutions' reforms relative to trade liberalization, as factors stimulating trade, can be judged by comparing the trade creating effects of total trade liberalization and of completed institutional re-

forms. Respectively, comparing absolute values of coefficients of the relevant variables is misleading, as they are directly dependent on the units used.

Thus, we employ trade specification (2.14) to quantify the relative importance of trade liberalization and institutional reforms, the two strategies that countries can adopt to intensify mutual trade, and (2.16) to differentiate the impact of institutions' quality and of institutional diversity.

2.4 The Data

Bilateral data on trade between ten CEE countries (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, and Slovenia) and the fifteen EU members prior to Union's enlargement of May 2004, from 1993 to 2000, is used in this chapter.[5] Throughout the chapter we shall call the old EU members *EU countries*, and Central and East European countries, including the eight which received EU membership status, *CEE* or *transition countries*.

During the considered time period, these countries undertook important trade liberalization measures and reforms of national institutions. The almost complete liberalization of trade between EU and CEE countries by the end of the period was concomitant with an intensification of regional CEE trade. The passage of transition countries from the former centrally planned economic system to the market economy called for a radical transformation of existing institutions, the elimination of certain structures, and the establishment of new ones. Although vital for the transition process, institutional reforms faced and still face major political opposition in many CEE countries, and are more difficult to implement than the eradication of tariffs and NTB. National institutions of EU countries remained mainly unchanged. Thus the selected panel of observations is characterized by important variance in both trade policy and institutional variables (see the Appendix C) which we

[5]Belgium and Luxembourg are aggregated into a single observation.

explore in the empirical part of the chapter.

Bilateral manufactured trade data has been collected form the the COMTRADE (World Bank) database. Internal trade m_{jj}, i.e. imports of a country from itself, have been computed following Wei (1996) as the difference between domestic production and the sum of exports to all foreign partners. Production and wage data are from the World Bank - UNIDO joint database "Trade and Production". Missing data have been completed using the "STAN" database of OCDE for production, and "NewCronos" database of Eurostat for wages.

To avoid the identification of a country with its capital (or largest) city, international distances are computed as the population-weighed average of interregional distances. Each country is divided into comparable territorial units corresponding to European Union's NUTS II regions.[6] The distance between two regions is simply the distance between largest cities. Internal distances d_{jj} are computed following the same principle in order to ensure comparability of the two measures: the population-weighed average distance from each region to all regions of the country, including itself.[7] For small countries consisting of a single NUTS II region, NUTS III regions have been used. A region's distance from itself, which we call intra-regional distance, is computed as by Head and Mayer (2000): two-thirds of the radius of a circle of an area equal to that of the region. This is equivalent to the average distance between local producers and consumers when each region is identified with a circle of an equal area, where producers are concentrated in the center, and consumers are equally spread in the entire region.

Tariffs and NTB measures have been calculated using Haveman's database constructed from TRAINS database of UNCTAD.[8] Data on tariffs is obtained from declaring countries. Bulgaria and Slovakia do not appear as declaring (importing) countries in this database,

[6]NUTS regions are defined for EU members, as well as for countries having expressed officially their will to join the Union.

[7]Helliwell and Verdier (2001) and Head and Mayer (2000) insist on the consideration of countries' internal geography and a similar computation of cross-border and internal distances.

[8]I am indebted to Soledad Zignago (CEPII) for her help with the extraction and processing of this data.

and not even in the original UNCTAD's TRAINS database. Slovakia does not appear as partner (exporting) country. Tariffs are supplied in Haveman's database at a very detailed level (tariff lines, using the Harmonized System six digits classification HS6). Since data on production, wages, and trade use significantly less detailed classifications, tariff data needed to be aggregated to corresponding levels. The only possible weight one can use (from the point of view of the availability of data) is the value of imports for each HS6 position (tariff line). But it is straightforward that there is a strong and negative correlation between the value of tariffs and the value of imports. To minimize the endogeneity bias and still account for the different importance of each product in international trade, we follow A.Bouët, L.Fontagné, M.Mimouni and X.Pichot (2001) and weigh the tariff protection of each importing country by world imports.

The two bilateral measures of NTB employed are computed using the same database. The NTB coverage ratio is equal to the volume of trade subject to at least one non-tariff measure, expressed as a percentage of the total bilateral trade. NTB frequency is obtained by dividing the number of bilateral non-tariff measures by the total number of tariff lines. By construction, both NTB coverage and frequency range between 0 and 1. Lower values are evidence of the fact that non-tariff restrictions apply either to a lower part of bilateral imports, or to a smaller number of traded products, while a value equal to 0 shows the absence of any NTB for the particular pair of countries.

We consider five sources of institutional variables: European Bank for Reconstruction and Development (EBRD), Heritage Foundation, Fraser Institute, Kaufmann et alii (1999), (2003) data, and World Development Indicators (WDI). The first four use index measures of the quality of national institutions, while the latter is used to draw quantitative institutional variables.

In this chapter we rely mainly on institutional measures provided by the first two sources. The EBRD evaluates the status quo of the institutional environment in CEE

countries and the progresses achieved in the transition process. We employ nine distinct measures of the quality of countries' institutions published by the EBRD on an annual basis, separately and aggregated into a single summary index equal to their arithmetic mean. These indices take values from 1 to 4 with a higher score indicating fuller or better implemented reforms. EBRD's transition indicators assess the quality of institutions specific for the transition process, and have been computed for CEE countries alone. To fully explore the information incorporated in these measures, we assume that all EU members have well-functioning market economies, graded with the highest mark in the given range. Specifically, this implies setting the EBRD indicators equal to 4 for European Union countries. Accordingly, CEE institutions are classified as fully compatible with the market economy when they become alike national institutions of EU countries, which is a logical constraint since to most international bodies Western European economies are the main guideline for CEE countries' transition process. This adjustment is compatible with observed scores for other institutional variables of the two groups of countries. As can be seen from table 2.2, while all three indices exhibit a variability of scores across EU countries, lower values are obtained for CEE countries. Moreover, the maximal score among the latter group of countries never exceeds the average value of the same indicator for EU members.

The Heritage Foundation offers a measure of the quality of a country's institutions in the form of an index of economic freedom (IEF) published since 1995 for a large number of countries. The IEF is computed as the simple average of ten component indices corresponding to an equal number of institutional dimensions, and takes values running from 5 to 1. A score of 1 denotes an institutional framework and a set of policies that are most conductive to economic freedom. The IEF is measured only since 1995, its use implying a reduction of the time range of the data set, but unlike the EBRD composite index it is available for all countries in the sample. To reduce multicollinearity problems between institutional and trade liberalization measures, the IEF index is redefined as the average

Table 2.2: Institutional scores for EU and CEE countries

Variable	No. obs.	Mean	Std. Dev.	Min	Max
IEF for EU	80	0.67	0.08	0.47	0.81
IEF for CEE	55	0.50	0.10	0.28	0.67
KKM for EU	42	0.79	0.07	0.62	0.89
KKM for CEE	30	0.59	0.07	0.46	0.69
Fraser for EU	28	0.71	0.06	0.58	0.82
Fraser for CEE	20	0.52	0.10	0.31	0.68
EBRD for EU	112	1.00	0.00	1.00	1.00
EBRD for CEE	80	0.59	0.12	0.24	0.83

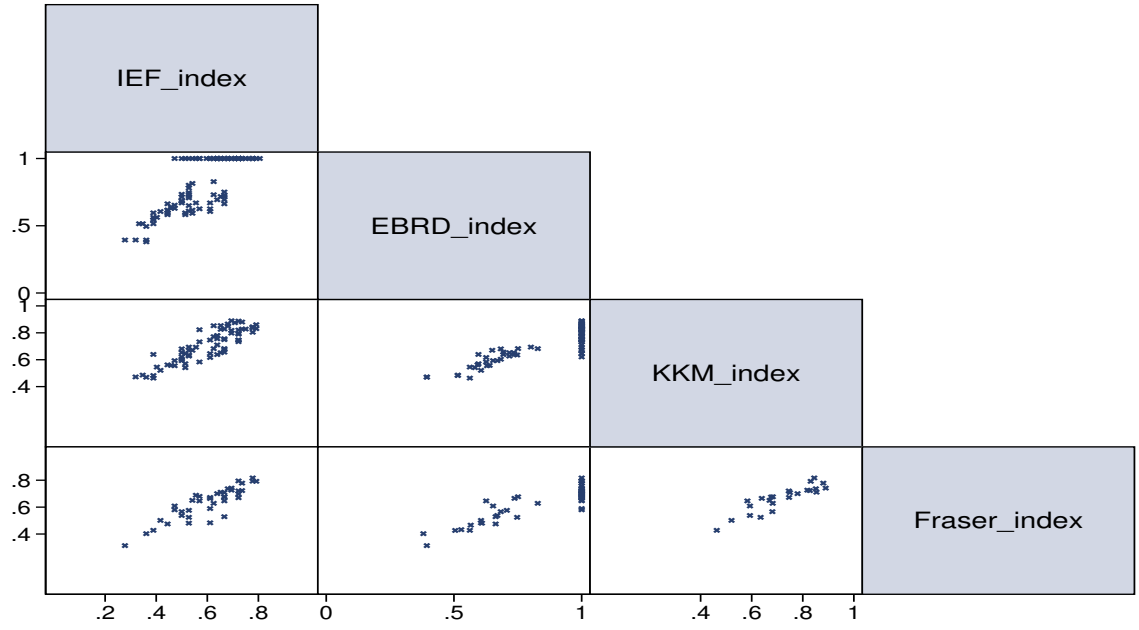
Note: Re-scaled scores running from 0 to 1 for all indicators are shown in the table.

of nine component indices, trade policy being dropped out.

The Fraser Institute has developed an index of economic freedom of the world (EFW) that measures the consistency of a nation's policies and institutions with economic freedom. It is published in the institute's annual report "The economic freedom of the world" and is currently available for 123 countries. The index measures the degree of economic freedom present in five major areas: 1) size of government, expenditures, taxes, and enterprises; 2) legal structure and security of property rights; 3) access to sound money; 4) freedom to trade internationally; and 5) regulation of credit, labor and business. Unlike the previous measures, the EFW index is computed only for two out of the eight years considered in the empirical part of the chapter.

Kaufmann et alii (2003) estimate six dimensions of governance covering 209 countries and territories for four distinct years: 1996, 1998, 2000, and 2002. Their indicators are based on several hundred individual variables measuring perceptions of governance, drawn from 37 separate data sources constructed by 31 different organizations. We construct a global indicator for the quality of a country's institutions as the simple average the six aggregate governance indicators.

Figure 2.3: The Correlation of Institutional Variables



We rescale all indicators to run between 0 and 1, with a score close to 0 representing a poor institutional framework, absence of reforms and low economic freedom. There is a high correlation between the four institutional measures, shown in figure 2.3, suggesting that they should be used separately. A more detailed discussion of component measures of the EBRD and IEF indices is presented in the Appendix C. Additional continuous institutional measures, obtained from the World Development Indicators database of the World Bank and from the EBRD Transition Report, are used in the next section to infer more specific results and to instrument the qualitative institutional variables.

2.5 Baseline Estimations and Results

In the empirical part of this chapter we estimate first the impact of institutions and trade policy instruments on cross-European trade using global measures of a country's institutions. Then, we test the presence of a two-way relationship between trade and institutions,

and use instrumental variables techniques to correct for endogeneity. Next, the contribution of each factor to promote trade is judged from the perspective of the explained part of the bilateral border effect and the supplementary trade flows generated by institutional reforms and trade liberalization. Last, we investigate the different institutional aspects and employ quantitative institutional variables in order to draw specific policy recommendations.

We turn now to the estimation of the impact of trade liberalization, represented here by tariffs and non-tariff barriers, and by countries' institutional framework, on trade between European nations. A first problem that we face is finding good measures for the quality of national institutions. There are multiple measures one can use to asses diverse institutional aspects. Besides the measures discussed in section 2.4, empirical studies have also employed Freedom House country ratings, Euromoney country risk index, ICRG risk ratings, BERI index of contract enforceability, etc.

In a first place useful insights are drawn by considering the quality and functioning of a country's entire institutional framework. For that, a single overall institutional measure incorporating different institutional aspects is used. It simplifies the comparison of the importance for trade of national institutions versus that of foreign trade policy. We restrict ourselves to the use of IEF and EBRD indices separately in order to quantify the quality of nationwide institutions, but for comparability reasons report also results obtained with Kaufmann et alii (1999), and Fraser institutional indices. The *Index of Economic Freedom* is employed to picture the general (development-specific) institutions, while the *European Bank for Reconstruction and Development*'s composite index to show the state and advancement of transition-specific institutions.

We estimate the demand for foreign products relative to the domestic demand using equation (2.14). As we consider bilateral trade between countries of the same geographic region, with common historical and linguistic backgrounds, the estimated trade equation

is reached from (2.14) by accounting for these aspects:

$$\begin{aligned} \ln \frac{m_{ij}}{m_{jj}} &= \beta_0 + \beta_1 \ln \frac{y_i}{y_j} + \beta_2 \ln \frac{w_i}{w_j} + \beta_3 \ln \frac{d_{ij}}{d_{jj}} + \beta_4 border_{ij} + \beta_5 lang_{ij} \\ &\quad + \beta_6 country_{ij} + \beta_7 \ln(1 + \text{tariff}_{ij}) + \beta_8 ntb_{ij} + \beta_9 InstitDif_{ij} \\ &\quad + \beta_{10} InstitDist_{ij} + \epsilon_{ij} \end{aligned} \tag{2.17}$$

$border_{ij}$, $lang_{ij}$, and $country_{ij}$ are discotomic variables corresponding respectively to the existence of a common land border between countries i and j, the same language spoken by the majority of individuals in both countries, and the fact that both countries formed in the past a single country. The last two variables in (2.17) reflect the nominal and absolute difference in the quality of institutions in the importing and exporting countries. Note, that equation (2.17) resembles to a certain extent the standard gravity, suggesting that similar values and signs of coefficients should be found.

Table 2.3 displays results of estimating equation (2.17) with ordinary least squares with year dummies (columns 1 to 4), and with generalized least squares (columns 5 to 8). The different columns correspond to the four distinct institutional measures employed. Estimates with the re-scaled Index of Economic Freedom are shown in column 1. The choice of the relative demand as the explained variable introduces spatial autocorrelation in the error term. This is corrected through a robust clustering procedure, which allows residuals of the same importing country to be correlated. All variables have coefficients of the expected sign and most of them are statistically significant. The coefficients on production ratio are close to unity and on distance within the range of values generally found in the literature. The small and non-signifiant estimate of the elasticity of substitution σ, the opposite of the coefficient of wage ratio, sheds doubt on the appropriateness of wages as proxies for mill prices. Evidently, the labour is not the unique primary production input. Nevertheless, poor results may be also due to endogeneity issues: large exports can motivate firms to increase wages, imports can boost or dissuade domestic production

depending on the share of intermediate relative to final products. Positive coefficients on binary variables controlling for a common land border, common language, and historical path show the importance of non-economic factors in reducing international trade costs. Countries sharing a common land border or language trade 2 [= exp(0.73) ≅ exp(0.74)] times more than two countries that do not, while being part of the same country at a certain point in time increases trade by five 5 [= exp(1.64)] times even after disintegration.

The key parameters of interest are the coefficients on trade policy and institutional variables. The import tariff enters the equation with a large and strongly significant negative coefficient of -19.38, while the coefficient on non-tariff barriers coverage ratio is not significantly different from zero. The difference between the coefficients on tariffs and on wages is much larger than unity, as predicted by the theory, and confirms the poor suitability of a single production factor assumption. The very large coefficient on tariffs comes from the choice of countries and years for which estimations are carried. Thus, the late 1990s were characterized by a general liberalization of European trade and a simultaneous re-orientation of CEE countries' towards West-European partners. The coefficients on both institutional variables are of expected signs but non-significant. The coefficient on the difference in the quality of institutions reflects the effect of an equal simultaneous improvement of institutions in both countries, while the coefficient on the other variable shows the impact of convergence/divergence of these institutions. Low statistical significance may be explained by the use of unappropriate econometric techniques, and ignorance of the two-way causality between trade and institutions, described in section 2.2.

Table 2.3: Relative demand for foreign products, trade liberalization and institutions: importing country as reference

	Dependent variable: m_{ij}/m_{jj}			
Model :	(1)	(2)	(3)	(4)
Institutions index:	IEF	EBRD	KKM	Fraser
Estimator	OLS	OLS	OLS	OLS
intercept	-2.83^a	-2.72^a	-2.71^a	-2.75^a
	(0.20)	(0.17)	(0.22)	(0.22)
ln production ratio	0.73^a	0.75^a	0.72^a	0.71^a
	(0.04)	(0.04)	(0.05)	(0.05)
ln wage ratio	-0.20	-0.27	-0.42	-0.27
	(0.16)	(0.18)	(0.27)	(0.25)
ln distance ratio	-0.57^a	-0.66^a	-0.52^a	-0.60^a
	(0.13)	(0.10)	(0.12)	(0.13)
common border	0.73^a	0.73^a	0.73^a	0.70^a
	(0.15)	(0.11)	(0.16)	(0.14)
common language	0.74^a	0.68^a	0.65^a	0.69^a
	(0.16)	(0.15)	(0.18)	(0.17)
same country	1.62^a	1.49^a		
	(0.20)	(0.14)		
ln (1+tariff/100)	-19.38^a	-14.27^a		
	(3.19)	(3.55)		
NTB coverage	0.06	-0.16		
	(1.04)	(0.31)		
institutions, quality	0.18	1.46	1.85	0.46
	(1.01)	(1.12)	(1.40)	(1.48)
institutions, distance	-0.53	-1.32^b	-2.97^a	-1.19
	(0.85)	(0.64)	(0.82)	(1.59)
year dummies	yes	yes	yes	yes
N	1073	1356	546	314
R^2	0.723	0.74	0.736	0.702
RMSE	.802	.786	.73	.772

Note: Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

Table 2.3: Relative demand for foreign products, trade liberalization and institutions: importing country as reference (continued)

	Dependent variable: m_{ij}/m_{jj}			
Model :	(5)	(6)	(7)	(8)
Institutions index:	IEF	EBRD	KKM	Fraser
Estimator	GLS	GLS	GLS	GLS
intercept	-2.99^a	-2.86^a	-3.47^a	-3.32^a
	(0.03)	(0.02)	(0.03)	(0.03)
ln production ratio	0.72^a	0.75^a	0.75^a	0.73^a
	(0.01)	(0.00)	(0.01)	(0.01)
ln wage ratio	-0.21^a	-0.32^a	-0.30^a	-0.24^a
	(0.01)	(0.02)	(0.02)	(0.01)
ln distance ratio	-0.55^a	-0.67^a	-0.66^a	-0.62^a
	(0.02)	(0.01)	(0.02)	(0.01)
common border	0.75^a	0.72^a	0.98^a	0.87^a
	(0.03)	(0.02)	(0.03)	(0.02)
common language	0.65^a	0.68^a	1.04^a	0.96^a
	(0.04)	(0.03)	(0.06)	(0.09)
same country	1.53^a	1.56^a		
	(0.36)	(0.08)		
ln (1+tariff/100)	-19.05^a	-14.02^a		
	(0.42)	(0.30)		
NTB coverage	0.05	-0.43^a		
	(0.07)	(0.07)		
institutions, distance	0.19^c	1.94^a	1.25^a	0.29^a
	(0.10)	(0.11)	(0.15)	(0.11)
institutions, distancee	-0.68^a	-1.43^a	-1.21^a	-3.23^a
	(0.12)	(0.10)	(0.12)	(0.10)
N	1073	1356	546	314
Hausman specification test	4.56	19.51	28.60	5.49
p - value	0.34	0.03	0.00	0.24
Breusch and Pagan test	1418.91	1641.38	430.49	90.53
p - value	0.00	0.00	0.30	0.00
Correlation of institutional variables	0.17	0.32	-0.00	0.00

Note: Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

The negative and significant constant term indicates that there are important border specific trade costs unexplained by tariffs, NTB, and the institutional environment. These additional trade costs generate a domestic trade of about 17 [= exp(2.83)] times higher than with a similar foreign partner.

In column 2 we estimate equation (2.17) with the EBRD composite index. Results are very similar to the previous ones, and all coefficients have expected signs. Moreover, a statistically significant coefficient is obtained on institutional distance, confirming that similarity between national institutions generates more trade.

To produce results more comparable to other findings in the literature we use institutional indices developed by Kaufmann et al. (1999) (column 3), and Fraser Institute (column 4), measures more frequently found in empirical studies. Unlike the previous two indices, KKM and Fraser institutional measures are available for a smaller number of years. This restriction of the data set removes all variability in tariff and non-tariff data, and the common historical path captured by the *country* dummy. Therefore one cannot estimate the corresponding coefficients. However, even in this case we find evidence of the positive impact of institutions' quality (although not statistically significant) and similarity on trade. Point estimates for institutional variables with all four indices are of comparable magnitude. One can thus be pretty confident of obtaining credible results when restricting the choice to the IEF and EBRD indices.[9]

In the second part of table 2.3 we display results with panel estimation techniques. Cross-section times series generalized least squares estimates of (2.17) with the same institutional variables are displayed in columns 5 to 8. We have to choose between a fixed-effect and a random-effect estimator. The presence of explanatory variables invariant in time in equation (2.17) induces the impossibility to estimate their coefficients with a fixed-effects procedure. However, in order to use random effects one needs to test the independence

[9]The high correlation of the IEF and EBRD index with the KKM and Fraser indices shown in figure 2.3 also supports our choice of institutional variables.

of the individual (in our case country-pair) error term with respect to the right hand side variables. The Breusch and Pagan Lagrangian multiplier test for random effects is very significant for IEF, EBRD and Fraser institutional indices. This indicates that individual effects are not constant across time, violating the primary random-effects assumption. However, the Hausman test of fixed versus random effects specification indicates that very similar coefficients are obtained with both models: For all three indices the χ^2 statistic is not significant at the 1% level. In the case of KKM institutional index, although the difference in coefficients is systematic ($\chi^2_4 = 28.60$, $p = 0.00$), the independence assumption of the individual term is validated. As a result we prefer the random to the fixed effects specification with all institutional measures. We also control for panel specific heteroscedasticity, since the error term can be correlated.

Interestingly, in this case coefficients of both institutional variables become significant regardless of the index employed. We find evidence in support of both institutional channels identified in section 2.3: Both better and similar institutions promote bilateral international trade. Still, the effect is significantly larger if transition-specific institutions are targeted. Despite the fact that the variability of the level of economic freedom across European countries is comparable to that in terms of market institutions, countries need to concentrate their efforts on the latter in order to increase regional trade integration.

Thus, a 1% drop in the average bilateral tariff causes between 14% and 19% increase in mutual relative to domestic trade, and a 5% drop can persuade firms in the importing country to buy twice as many products from foreign partners. The significant estimated value of the coefficient on NTB in column 6 permits to quantify the impact of these measures: One percentage less of trade subject to a NTB yields a $54 = [\exp((-1) * (-0.43) - 1]$ percentage increase in relative trade. Similarly, one standard deviation increase in the level of economic freedom of a foreign partner will lead to a $3.4\% = [\exp(0.175 * 0.19) - 1]$ increase in imports from that country relative to domestic trade, and a comparable reduction

of the institutional distance to that country to a $6.6\% = [\exp(0.10 * (-0.68)) - 1]$ increase in the foreign-to-domestic trade ratio. Meanwhile, one standard deviation increase in the quality of a partner's market institutions and the corresponding institutional distance generate $79\% = [\exp(0.30 * 1.94) - 1]$, and respectively $26\% = [\exp(0.21 * (-1.43)) - 1]$, more trade with that particular country compared to internal trade. One can easily conclude that despite the large effect of trade liberalization, institutional reforms remain an important trade-creating factor, and European trade will mostly benefit from improved market institutions in CEE countries.[10]

Almost unchanged estimates both in terms of magnitude and statistical significance are obtained be replacing the NTB coverage ratio in equation (2.17) with the NTB frequency ratio,. In the bottom of table we display the correlation coefficient between the two institutional variables, i.e. the nominal and the absolute difference in the quality of institutions. The latter coefficients are sufficiently low for one to worry about multicollinearity. Therefore, we do not emphasize results obtained for the demand for foreign goods relative to the demand for a reference country's products.

The impact of trade policy and institutions on foreign trade with imports from a third country used as reference is obtained by estimating equation (2.16) augmented by three dummy variables for contiguity, linguistic and past political ties:

$$\begin{aligned} \ln \frac{m_{ij}}{m_{kj}} &= \gamma_0 + \gamma_1 \ln \frac{y_i}{y_k} + \gamma_2 \ln \frac{w_i}{w_k} + \gamma_3 \ln \frac{d_{ij}}{d_{kj}} + \gamma_4 (border_{ij} - border_{kj}) \\ &+ \gamma_5 (lang_{ij} - lang_{kj}) + \gamma_6 (country_{ij} - country_{kj}) \\ &+ \gamma_7 \ln \frac{(1 + \text{tariff}_{ij})}{(1 + \text{tariff}_{kj})} + \gamma_8 \frac{ntb_{ij}}{ntb_{kj}} + \gamma_9 InstitDif_{kj} \\ &+ \gamma_{10} (InstitDist_{ij} - InstitDist_{kj}) + \varepsilon_{ij}. \end{aligned} \tag{2.18}$$

Germany, the main trading partner of most European countries, is chosen as the reference

[10] According to the transformation of institutional variables, EU countries already possess well-functioning market institutions.

country k. The last two variables stand for the difference in the quality of institutions in the exporting country and the reference country, Germany, and the difference between the institutional distance separating the importing from the exporting country and from Germany. Regardless of the more complicated content of institutional variables in (2.18), the interpretation of coefficients is similar. Moreover, according to the theoretical model, coefficients in (2.18) should be identical to those obtained from estimating (2.17). The constant of the model in this case is the difference in unexplained border effects between the importing and exporting country, and the importing country and Germany, and does not have any particular economic meaning.

Estimated coefficients of trade equation (2.18) with the four institutional indices as above are displayed in table 2.4. Indeed, they differ quite little from estimates of (2.17) in table 2.3. However, dividing imports from foreign European countries by imports of German products suffers from several inconveniences. First of all, even if low prices attract foreign customers, they can also signal the poor quality of traded goods. For small differences in price, consumers may prefer more expensive similar German goods to other foreign goods simply because high prices are perceived to compensate the difference in quality. Secondly, because of the fact that Germany shares a land border with seven countries from the sample, a common language with Austria alone, and was not a part of the same country with any other European nation, equation (2.18) underestimates the impact of contiguity, and amplifies the effect of linguistic and historical ties on trade. Finally, trade specification (2.18) reduces the variability of institutional variables, which obviously leads to less significant estimates.

2.6 Endogeneity Issues

Another issue we want to discuss in detail in this chapter concerns endogeneity in estimated trade equation (2.17). The presence of a two-way causality between trade and the

Table 2.4: Relative demand for foreign products, trade liberalization and institutions: Germany as reference

	Dependent Variable: m_{ij}/m_{kj}			
Model :	(1)	(2)	(3)	(4)
Institutions index:	IEF	EBRD	KKM	Fraser
Estimator	OLS	OLS	OLS	OLS
intercept	35.12^{c}	-2.87	30.04	50.52^{a}
	(18.76)	(18.41)	(19.56)	(15.76)
ln production ratio	0.87^{a}	0.86^{a}	0.88^{a}	0.86^{a}
	(0.03)	(0.03)	(0.03)	(0.04)
ln wage ratio	0.22^{a}	0.47^{a}	0.14	0.28^{c}
	(0.07)	(0.09)	(0.15)	(0.16)
ln distance ratio	-0.56^{a}	-0.58^{a}	-0.46^{a}	-0.46^{a}
	(0.14)	(0.13)	(0.11)	(0.14)
common border	0.28^{b}	0.28^{b}	0.28^{b}	0.26^{b}
	(0.12)	(0.11)	(0.12)	(0.11)
common language	0.93^{a}	0.88^{a}	0.91^{a}	0.92^{a}
	(0.10)	(0.10)	(0.11)	(0.09)
same country	3.20^{a}	2.97^{a}		
	(0.25)	(0.20)		
ln (1+tariff/100) ratio	-15.14^{a}	-1.85		
	(4.03)	(7.20)		
NTB coverage	-1.84^{a}	-1.08^{b}		
	(0.35)	(0.46)		
institutions, quality	0.96^{b}	0.88^{c}	2.60^{a}	2.26^{a}
	(0.42)	(0.46)	(0.65)	(0.60)
institutions, distance	0.16	-0.50	-1.23^{c}	-2.77^{a}
	(0.53)	(0.52)	(0.65)	(0.54)
N	1017	1306	507	314
R^2	0.862	0.868	0.884	0.877
RMSE	.562	.558	.466	.48

Note: Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

independent variables can produce biased coefficients in OLS and GLS estimations. As already stated in section 2.5, production and wage variables are one possible source of endogeneity. Larger imports can favor domestic production when the latter relies heavily on foreign intermediate inputs, but can also have a harmful effect if imported products crowd out local producers through increased competition on the domestic market. Wages too are affected by a country's performance on foreign markets. This can be visualized within a country through the gap between employees' remuneration by exporting companies and by local market oriented firms. Last but not least, the quality of institutions can change with respect to country's participation in international trade. The exchange of large amounts of goods with foreign partners brings the firms more often in contact with deficiencies in the institutional framework, and can determine them to lobby for reforms in the system.

Consequently, one calls for appropriate econometric proceedures when estimating the relative demand for foreign goods. The solution is given by instrumental variable (IV) and generalized method of moments (GMM) estimations. However, these approaches rely heavily on the availability of good instruments for each endogenous variable, i.e. variables that are important determinants of a particular endogenous variable but have no direct impact on the others. The literature acknowledges the difficulty of finding good instruments for all three variables mentioned above.

In econometric terms, what counts is good instruments for right hand side endogenous variables in order to find exogenous variations in production, wages and institutions, and explain relative trade. From a theoretical point of view, truly exogenous variations are unlikely to exist; it is necessary therefore to find sources of variation that are orthogonal to other determinants of trade. The theoretical model predicts a unitary coefficient on production. One can thus easily correct for endogeneity between trade and production in (2.17) by imposing $\beta_1 = 1$. Wages in a country are determined by demand and offer conditions on the labor market: the size of the labor force, the number of employers (firms)

operating on the market, unions' bargaining power, and the productivity of labor. Of all these variables, only the last one passes the Sargan over-identification test and is used to instrument variation in wage ratio in first-stage estimations.

Endogenous institutions have been treated in the literature almost exclusively in development related issues, such as to demonstrate their strong causality on per-capita income (Acemoglu, Johnson and Robinson (2001)). They use mortality rates of colonial settlers as an instrument for institutional quality and find that the adopted instrument is strong. From this paper it is possible to say that the characteristic of the environment found by the colonialists is one of the most important reasons for the decision to establish themselves in a determined area rather than in another. Moving from the idea that geography can explain institutions' variations, Easterly and Levine (2003) and others instrumented institutions with different geographic variables. They include different sets of instruments for endowments like latitude, landlocked and ten different dummy variables representing minerals and crops.

However, all theses studies adopt an approach specific to the breakdown of the world into industrialized and developing countries, with past colonial ties. Therefore, instruments they found are irrelevant for institutions of European countries. In our case instrumental variables need to account for specific differences between East and West-European economies. None of the countries in our sample has been colonialized in the last centuries. Purely geographic aspects cannot explain differences in the functioning of institutions across the continent either. Although countries from the North tend to have better institutions, moving to the South, the passage to poorer institutions is far from being smooth. Moreover, one should be able to provide an economic justification of the causality between the chosen instruments and the endogenous explanatory variable.

We have considered a entire set of possible instruments for institutions, starting from the mortality rate, and the share of non-tax revenue, passing through patents deposed by

residents and foreigners, the share of rural population, market capitalization, the percentage of listed domestic companies, the share of traded stocks in the national product, and finishing with the per capita central government's consumption. Plausible stories about the effect on institutions' quality can be told for any of these variables, but only three qualify as good instruments according to Sargan test.

The first one is the mortality rate. The intuition behind is that a high probability of dying tomorrow diminishes people's valuation of future benefits, including the ones in terms of well-functioning institutions. Therefore, there is less incentive for institutional reforms in countries with high death rates. Building better institutions is a long-term investment, and those who make the main effort may simply not be able to enjoy its future advantages. High mortality has the same effects as political instability for government officials, who continue to accept bribery and corruption as ordinary things.

Market capitalization, expressed as a share of domestic product, is the second instrument employed. It reflects simultaneously the share of listed companies and the market value of their stock. A high level of market capitalisation illustrates a large participation of firms on the stock exchange, a high value of firms' assets, or both. All three situations correspond to increased needs (and pressure) for strong institutions. The stock exchange alone can be viewed as an institution, and its condition can shed light on the state of other institutions in the country.

The last eligible instrument for institutions is the government's tax revenue. It is generally accepted that a country's institutions can change notably only with sufficient support from the government. Support can come in two forms: political and financial. The ability of the government to collect taxes determines the amount of its funds, and as a consequence its capacity to finance institutional reforms. A severe limitation in funds on which the government can draw to finance its actions reduces not only the scale of these actions, but also their popularity among the electorate.

Endogeneity compatible estimates of (2.17) are displayed in table 2.5. To control for the panel structure of our data, country pair effects have been included in all second-stage estimations. Wu-Hausman and Durbin-Wu-Hausman test statistics for endogeneity are constructed and reported in the lower part of the table. The null hypothesis associated with this tests recognizes all the variables on the right hand side of (2.17) to be exogenous. The alternative hypothesis requires wages and institutions to be endogenous. As the results of these tests rely on the instruments selected, the Sargan validity of instruments test is conducted to determine whether the instruments selected are appropriate.

The IEF is used in column 1 as a measure of institutions' quality. Note, that limited availability of data on selected instruments reduces the number of observations and the variablility in other exogenous variables. Thus, insufficient variation in import tariffs makes impossible the estimation of β_7. The gain in statistical significance of coefficients on institutional variables is very small, but zero on wages. And the large p-value for both Wu-Hausman ($F = 8.67$, $p = 0.00$) and Durbin-Wu-Hausman ($\chi^2 = 29.99$, $p = 0.00$) tests reveals that controlling for endogeneity is unnecessary. The absence of endogeneity also suggests that OLS and GLS estimations are reliable in this case.

Column 2 shows results with the EBRD composite institutional index. Both large partial R^2 in first-stage regressions and low Sargan statistic (0.01, $p = 0.91$) testify the relevance of chosen instruments. The two endogeneity tests justify the use of instrumental variables estimator. All coefficients are significant at the 1% level. The coefficient on wage ratio is equal to -1.03, yielding a more credible value of the elasticity of substitution σ. Compared to OLS and GLS estimations presented in table 2.3, the effect of NTB and the quality of institutions on cross border trade obtained with IV is much larger. The impact of import tariffs and institutional quality, on the contrary, is lower with a IV estimator. The elimination of tariffs for European trade, amounting at the beginning of the period to a 5% average, generates according to estimates in column 2 a 43%$= [5 * (-8.62)]$ increase in

Table 2.5: Relative demand for foreign products, trade liberalization and institutions: endogeneity issues

	Dependent Variable: m_{ij}/m_{jj}					
Model:	(1)	(2)	(3a)	(3b)	(4a)	(4b)
Institutional index:	IEF	EBRD	KKM	KKM	Fraser	Fraser
Estimator:	IV	IV	IV	GMM	IV	GMM
intercept	-3.58^a	-3.03^a	-2.33^a	-2.31^a	-2.37^a	-2.28^a
	(0.41)	(0.15)	(0.13)	(0.26)	(0.20)	(0.26)
ln production ratio	1.00	1.00	1.00	1.00	1.00	1.00
ln wage ratio	-0.25	-1.03^a	-1.44^a	-1.43^a	-1.35^a	-1.23^a
	(0.22)	(0.13)	(0.15)	(0.30)	(0.22)	(0.36)
ln distance ratio	-0.57^a	-1.11^a	-0.85^a	-0.83^a	-0.84^a	-0.93^a
	(0.13)	(0.05)	(0.07)	(0.13)	(0.10)	(0.17)
common border	-0.39	0.49^a	0.39^b	0.38^c	0.31^a	0.13
	(0.25)	(0.09)	(0.16)	(0.22)	(0.26)	(0.16)
common language	2.03^a	0.96^a	0.79^a	0.81^a	0.92^a	1.02^a
	(0.17)	(0.18)	(0.23)	(0.19)	(0.33)	(0.19)
same country	2.45^a	2.62^a				
	(0.20)	(0.43)				
ln (1+tariff/100)		-8.62^a				
		(1.46)				
NTB coverage	-0.63	-1.50^a				
	(0.53)	(0.16)				
institutions, quality	0.50	4.34^a	3.02^a	2.18	4.34^b	2.81
	(0.53)	(0.73)	(0.86)	(2.35)	(1.80)	(4.19)
institutions, distance	-0.39^c	-0.79^a	-2.24^a	-2.39^a	-1.18	-0.22
	(0.22)	(0.28)	(0.71)	(1.15)	(1.18)	(1.79)
First-stage regressions						
Wage: partial R^2	0.088	0.765	0.414	0.414	0.536	0.536
Institutions: partial R^2	0.169	0.758	0.398	0.398	0.332	0.332
Second-stage regression						
Centered R^2	0.990	0.950	0.427	0.406	0.382	0.414
RMSE	.139	.299	.898	.91	.93	.91
Sargan test	1.49	0.01	3.42	0.63	4.25	1.25
p - value	0.22	0.91	0.06	0.43	0.04	0.26
Wu-Hausman F test	0.54	8.67	32.09		8.81	
p - value	0.58	0.00	0.00		0.00	
Durbin-Wu-Hausman χ^2 test	1.92	29.99	57.73		17.10	
p - value	0.38	0.00	0.00		0.00	
Pagan-Hall test		396.01	22.73		16.06	
p - value		0.29	0.00		0.01	
N	607	867	494	494	288	288

Note: Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

trade. Different from OLS and GLS results, the effect of the quality of institutions on trade is 5.5 times larger than the effect of institutional distance separating the trading countries. Still, in the case of the EBRD, the two measures are not orthogonal: Any improvement in the functioning of CEE countries' institutions reduces the institutional distance separating them from EU members. Results are very similar if the NTB coverage ratio is substituted by the NTB frequency ratio.

Columns 3a and 3b, use the KKM general index to construct the two institutional variables, and the last two columns employ the Fraser index. The χ^2 score of the Sargan test (equal to 3.42 with the KKM index, and to 4.25 with the Fraser index) is below the 1 percent critical value, suggesting that the null hypothesis, stating that the selected instruments are appropriate, should be accepted in both cases. The value of the Wu-Hausman test statistic shown in table 2.5 (32.09, and respectively 8.81) is well above the 1 percent critical value of the χ^2 distribution, indicating that wage and institutions are truly endogenous variables in (2.17). IV estimations reveal institutions as stronger determinants of trade. However, for both KKM and Fraser indices, the IV estimator does not correct for heteroscedasticity in the system of equations estimated in the first and second stage. This is reflected by the significant Pagan-Hall statistic shown in the bottom of table 2.5. The generalized method of moments (GMM) estimator is used to fix this problem. Again, the GMM equivalent of the Sargan test, also called the J statistic of Hansen or Jansen, confirms that selected instruments are appropriate. Switching to the GMM estimator reduces the statistical significance of institutional effects. However, we do not consider this loss to be important as we base our main conclusions on IEF and EBRD index. Results in column 3a, the only one yielding significant estimates for both institutional variables, show that the contraction of institutional distance separating two countries generates about as much trade as an equal upward shift in the quality of both countries' institutions.

Whenever endogeneity is present, IV and GMM estimates of the wage ratio coefficient

are larger than 1 in absolute value, complying with predictions of the theoretical model. It can thus be concluded that wages can be employed as proxies for mill prices only if one corrects for the introduced endogeneity. Using either of the four institutional measures described above yields similar results: International trade increases when national institutions work better, and are more alike. Trade liberalization, translated by lower import tariffs and share of trade exposed to NTB, has a strong trade-boosting effect. Nevertheless, the amelioration of institutions is expected to increase trade between European partners, suggesting that trade integration can continue even when complete trade liberalization is reached.

2.7 Trade Policy vs. Institutional Reforms

There are two possible ways in which one can judge about the relative importance of trade policy instruments and reforms of national institutions for regional trade integration. The first method consists in determining the share of the overall border effect explained by each determinant. The second regards the volume of additional bilateral trade generated by complete trade liberalization and fully accomplished institutional reforms. For both approaches estimates of imports relative to domestic trade m_{ij}/m_{jj} are used.

The contribution of each factor to the total border effect is actually equivalent to the share of trade policy and institutional costs in the total border-specific trade costs. The overall border effect between two countries i and j is an expression of total trade costs between i and j in terms of lost trade volume. It reflects the loss in trade caused by all border-related barriers, and is obtained by taking the exponential of the opposite of the constant terms of equation (2.15). We denote it by $BE \equiv \exp(B_{ij})$. Equation (2.15) is reached by dropping all border-specific trade cost terms from trade specification (2.17), assuming a uniform effect of the quality of national institutions on trade within and across

national borders. Shall institutions be assumed to matter for cross-border trade alone, the institutional term should be dropped from (2.15) in order to estimate total border-related costs.

As we are unaware of all elements determining trade costs, we adopt an indirect method in order to find the share of trade costs corresponding to tariff and non-tariff barriers to trade, and to the worldwide institutional diversity.[11] We compute residual border effects left unexplained by each factor separately. Introducing trade policy and institutional distance separately in equation (2.15), the resulting free term gives the corresponding residual effect:

$$\ln \frac{m_{ij}}{m_{jj}} = b_0 + b_1 \ln \frac{y_i}{y_j} + b_2 \ln \frac{w_i}{w_j} + b_3 \ln \frac{d_{ij}}{d_{jj}} + b_4 \ln (1 + t_{ij}) + b_5 ntb_{ij} + u_{ij} \tag{2.19}$$

$$\ln \frac{m_{ij}}{m_{jj}} = c_0 + c_1 \ln \frac{y_i}{y_j} + c_2 \ln \frac{w_i}{w_j} + c_3 \ln \frac{d_{ij}}{d_{jj}} + c_4 InstitDist_{ij} + v_{ij} \tag{2.20}$$

Again, if the quality of institutions is considered to be a border-specific cost, the term $InstitDif_{ij}$ is added on the right hand side of equation (2.20). The amount of border-specific costs explained by trade liberalization, and institutions in terms of trade volume is then obtained by subtracting the residual border effects estimated by equation (2.19), and respectively (2.20), from the overall border effect BE. The computation of the share of trade costs explained by each factor is straightforward:

$$\begin{aligned} \text{Trade policy:} \quad & B_{TL} = \frac{BE - \exp(b_0)}{\exp(b_0)} \\ \text{Institutions:} \quad & B_{IR} = \frac{BE - \exp(c_0)}{\exp(c_0)}. \end{aligned} \tag{2.21}$$

Estimates of B_{TL} and B_{IR} with the IEF and EBRD index as measures of institutions' quality for four years of our sample are displayed in table 2.6. Similar results when both institutional quality and distance are assumed as costs specific to international trade flows,

[11] In deed, important border effects are obtained when we include trade policy and institutional variables: tables 2.3 and 2.5.

for the same years are provided in table 2.7. The contribution to overall trade costs is calculated according to the formulas (2.21) with estimates of b_0 and c_0 obtained with OLS and year fixed effects. By construction, results should range between 0 and 1. This condition is verified except for IEF institutions in 1995 in table 2.7, corresponding to a non-significant estimated coefficient on the dummy variable for the year 1995. Figures in italic show the average European border effect for different years.

Table 2.6: The contribution of trade policy and institutional factors in promoting international trade

	1993	1995	1998	2000
Institutional measure: IEF				
Total border effect		*45.8*	*35.2*	*23.4*
Import tariff and NTB coverage		0.62	0.45	0.26
Institutional distance		0.14	0.10	0.08
Institutional measure: EBRD index				
Total border effect	*55.5*	*50.8*	*35.1*	*24.8*
Import tariff and NTB coverage	0.62	0.67	0.52	0.39
Institutional distance	0.31	0.23	0.13	0.06

Note: Figures in italic exhibit European border effect. The rest of the figures in the table show the part of total border effect explained by each set of variables. The quality of institutions is considered equally important for both foreign and domestic trade, and can not be held responsible for a lower level of international trade relative to internal shipments.

A first conclusion to be drawn from tables 2.6 and 2.7 is the important trade integration that marked the region during the 1990s. International trade costs expressed in volumes of trade were reduced by more than a half. By the year 2000 Europeans bought about twice as much from regional foreign partners than they did in 1993 relative to domestic partners. Secondly, trade policy instruments seem to impose larger costs on bilateral trade. In the early 1990s around 60% of these costs came from tariffs and NTB to trade. A proportion of 14% was generated by the diversity of general (development-specific) institutions and 32% by transition or market institutions. Obviously, there are aspects captured by both types of institutions. Still, one can not ignore the greater burden of market institutions.

Table 2.7: The role of foreign trade policy and institutions in trade integration

	1993	1995	1998	2000
Total border effect	*57.7*	*52.6*	*36.4*	*25.7*
Import tariff and NTB coverage	0.58	0.65	0.50	0.37
IEF score and distance		-0.07	0.13	0.16
EBRD score and distance	0.34	0.26	0.16	0.09
KKM score and distance			0.04	0.03
Fraser score and distance		0.16		0.06

Note: Figures in the table show the contribution of trade policy and institutional factors in explaining the total border effect displayed in italic. The quality of institutions is considered to matter for foreign trade exclusively and is a source of border effects.

Finally, the weight of trade policy instruments and institutional heterogeneity decreased in time. Summing up the contribution of different factors, we conclude that tariffs, NTB and institutions explained the quasi-totality of border-specific trade costs in the beginning of the period, but their cumulative share decreased to 45%-53% of total border-related trade costs by the year 2000. This indicates the increasing importance of other(auxiliary) trade costs.[12]

Alternatively, the role of foreign trade policy and domestic institutions in promoting regional trade can be compared through the trade volume each of them can generate. As both trade liberalization and reforms of domestic institutions concern first of all CEE countries of the sample, we focus on trade between CEE and EU countries. We compute the trade creation effect of total trade liberalization between East and West European nations using equation (2.17) and show results in table 2.8. Trade liberalization is said to be completed when all tariff and non-tariff barriers are eliminated. Because of the low number of observations for which NTB are available in the data, we use two samples: a

[12]When the share of trade policy and institutions in total border-specific costs is estimated from a single trade equation, the joint effect of the two factors is only obtained. In terms of size, it is slightly superior to the share of tariffs and NTB in table 2.6, but inferior to the summed share of the two factors.

Table 2.8: The CEE-EU trade creation effect of trade liberalization and institutional reforms

	small sample		*large sample*	
Trade creation source	IEF	EBRD	IEF	EBRD
Trade liberalization	15.2	16.4	76.7	53.3
Institutional reforms	7.1	4.1	3.9	135.7
Trade liberalization and institutional reforms	23.4	21.2	79.8	261.4

Note: Figures in the table show the trade creation in percentage of observed international trade produced by complete trade liberalization and institutional reforms. Trade liberalization translates by the elimination of existing import tariffs and NTB in the case of the small sample, and by the elimination of tariffs alone in the case of the larger sample. Institutional reforms consist in improving the quality of national institutions in CEE countries to reach the average level observed across EU countries.

small sample corresponding to observations for which both tariff and non-tariff data exists, and a large one combining observations for which only tariff data is available. Similarly, the trade creation produced by institutional reforms is computed. The reforms of domestic CEE institutions are assumed to increase the quality of the latter to the average level observed for corresponding institutions in EU countries (as shown in table 2.2). Effects are shown in table 2.8 for both general and transition specific institutions. All figures are expressed in percentage of actual trade.

Trade creation associated with the two factors separately and jointly is very low when small sample estimates are employed. However, these values explode when estimations are carried on the large sample. Thus, the removal of import tariffs and NTB results in a trade creation comprised between 53% and 77% of actual CEE-EU trade. The increase in bilateral trade produced by reforms of development specific institutions is barely noticeable (less than 4%), but is very large for reforms in transition specific institutions, and is exceeding the effect of trade liberalization. Thus, even after CEE-EU trade has been completely liberalized, the improvement of market institutions in CEE countries can have a comparable trade creation effect. It may bring as much as $54\%[= (1 + 135.7/100)/(1 + 53.3/100) - 1]$

of additional CEE-EU trade, post-liberalization trade used as base. Moreover, the data reveals a large amplification effect when the two measures are conducted simultaneously. Once more, evidence of a large positive role of reforms in market institutions is found.

2.8 Distinguishing among Institutions

A country's institutional framework is, however, too diverse and broad to be properly evaluated by a single variable. Therefore, as a next step, it is useful to distinguish the different features of the institutional framework and to set forth the ones that matter the most for cross-border trade flows.

Firstly, the institutional dimensions corresponding to each component indices used in the computation of the Index of Economic Freedom average and the EBRD composite measure are considered. The high correlation of individual institutional measures shown in figure 2.3 and tables C.3 and C.4 of the Appendix C demands a separate use of each index in trade specification (2.17).

Table 2.9 presents coefficients on the variables of interest and the summary regression statistics for IEF component indices. In the first part of the table we show OLS results when both institutional channels (quality and distance) are included on the right hand side of equation (2.17). Coefficient values close to those with the average IEF index are obtained for import tariffs and NTB. As for institutional variables, coefficients are rarely significantly different from zero. A high inflation rate (corresponding to a low value of the monetary policy factor) and a large black market cause the highest trade friction. Statistically non-significant coefficients for other IEF factors are the outcome of the absence of a corresponding effect on trade or of a high correlation of the institutional quality and distance variables. Estimations with a single explanatory institutional variable are reproduced in the lower part of table 2.9. Unlike previously, the Hausman specification test falls short of the 5% percent critical value, justifying the use of the random-effects

Table 2.9: The role of different institutional dimensions: IEF

Model: OLS with year FE Institutional dimension	tariff	NTB coverage	instit'l quality	instit'l distance	R^2	No. obs.
Fiscal burden of	-19.68^a	0.03	0.39	0.39	0.724	1073
government	(3.13)	(1.07)	(0.77)	(0.59)		
Government	-18.81^a	0.04	-0.26	0.23	0.726	1073
intervention	(3.23)	(1.07)	(0.24)	(0.22)		
Monetary policy	-17.98^a	0.05	0.54^a	-0.82^a	0.736	1073
	(3.85)	(1.01)	(0.25)	(0.27)		
Capital flows and	-19.76^a	0.11	0.26	0.26	0.723	1073
foreign investment	(3.21)	(1.07)	(0.36)	(0.41)		
Banking and finance	-19.74^a	0.07	-0.09	-0.03	0.723	1073
	(3.36)	(1.06)	(0.35)	(0.33)		
Wages and prices	-19.58^a	0.06	0.09	-0.01	0.723	1073
	(3.37)	(1.06)	(0.36)	(0.42)		
Property rights	-19.61^a	0.10	-0.08	-0.07	0.723	1073
	(3.32)	(1.04)	(0.58)	(0.37)		
Regulation	-19.79^a	0.15	-0.31	0.52	0.726	1073
	(3.33)	(1.13)	(0.47)	(0.42)		
Black market	-19.49^a	0.09	0.37	-0.68^a	0.733	1073
	(3.24)	(1.09)	(0.32)	(0.25)		
Model: GLS Institutional dimension	tariff	NTB coverage	instit		Hausman test	No. obs.
	(0.61)	(0.18)	(0.04)		(0.005)	
Fiscal burden of	-19.61^a	0.12	0.23^a		5.14	1073
government	(0.30)	(0.07)	(0.07)		(0.162)	
Government	-19.06^a	0.12	-0.17^a		6.47	1073
intervention	(0.23)	(0.11)	(0.03)		(0.091)	
Monetary policy	-19.93^a	0.05	0.35^a		0.14	1073
	(0.52)	(0.11)	(0.04)		(0.986)	
Capital flow and	-19.44^a	0.09^a	0.52^a		4.37	1073
foreign investment	(0.20)	(0.04)	(0.09)		(0.112)	
Banking and finance	-19.54^a	0.19^a	-0.05^c		5.03	1073
	(0.21)	(0.08)	(0.03)		(0.170)	
Wages and prices	-19.43^a	0.10^c	0.06		6.73	1073
	(0.24)	(0.06)	(0.04)		(0.081)	
Property rights	-19.54^a	0.24^a	-0.12^a		1.97	1073
	(0.16)	(0.07)	(0.04)		(0.373)	
Regulation	-18.92^a	0.14^a	-0.39^a		4.78	1073
	(0.25)	(0.04)	(0.04)		(0.189)	
Black market	-19.02^a	0.03	0.27^a		7.49	1073
	(0.37)	(0.08)	(0.03)		(0.058)	

Note: Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

estimator. The coefficient on institutions reflects in this case the average effect of the two channels. A positive value, such as in the case of fiscal burden of government, of capital flows and foreign investment, and of black market, speaks of a larger effect of the quality of institutions. A reduction of tax rates, of restrictions on foreign ownership and of other specific restrictions imposed on foreign companies, and of the size of black market economy by any of the two trading partners will increase their mutual trade. Negative estimates, on the contrary, show the prevalence of the similarity in instituions channel. This is the case of government intervention in the economy, property rights, and regulation factors. For these aspects, extra trade occurs only for a joint effort in the importing and exporting countries. Countries with poor but similar levels of property rights protection, high corruption, and/or restrictions to create new businesses exchange more with each other than with partners characterized by better functioning institutions.

The effect of transition specific institutions is displayed in table 2.10. Reported coefficients and regression statistics correspond to the separate introduction of each of the nine factors used in the computation of the single EBRD index in equation (2.17). Fixed-effects estimations are preferred in this case: the Hausman test of fixed versus random effects specifications is always significant at the 10% level, and in seven out of nine cases also at the 5% level. The variation in EBRD indices not only explains a larger share of the variation in the dependent variable than IEF factors (larger R^2 values), but also produces coefficient estimates closer to findings in the literature. Moreover, coefficients on all variables in this case have expected signs and are significant at the 1% level. One percent fall in the average import tariff produces an increase in bilateral trade averaging between 7% and 11%. The NTB coefficient is negative and highly significant for all nine EBRD factors. The restriction of NTB by one per cent of bilateral trade flows produces a 1% rise in trade. European trade integration will benefit from both better performing and more similar market institutions, a statement verified by each dimension comprised in the EBRD

Table 2.10: The role of different institutional dimensions: EBRD index

Model : FE Institutional dimension	tariff	NTB coverage	instit'l quality	instit'l distance	R^2	Hausman test	No. obs.
Price liberalization	-10.81^a	-1.12^a	2.72^a	-1.98^a	0.785	25.073	1356
	(1.33)	(0.17)	(0.43)	(0.30)		(0.005)	
Foreign exchange and	-7.08^a	-0.85^a	2.44^a	-3.89^a	0.792	28.450	1356
trade liberalization	(1.32)	(0.17)	(0.97)	(0.92)		(0.002)	
Small-scale	-9.47^a	-1.27^a	2.11^a	-0.96^a	0.788	21.179	1356
privatisation	(1.26)	(0.20)	(0.35)	(0.34)		(0.020)	
Large-scale	-8.62^a	-0.99^a	2.28^a	-1.49^a	0.795	17.119	1356
privatisation	(1.51)	(0.16)	(0.27)	(0.29)		(0.072)	
Enterprise reform	-9.49^a	-0.97^a	1.28^a	-1.14^a	0.785	21.057	1356
	(1.48)	(0.17)	(0.24)	(0.21)		(0.021)	
Competition policy	-11.92^a	-1.21^a	2.20^a	-0.75^a	0.794	24.506	1356
	(1.36)	(0.16)	(0.24)	(0.17)		(0.006)	
Infrastructure reform	-8.94^a	-1.00^a	1.61^a	-1.12^a	0.790	19.018	1356
	(1.33)	(0.16)	(0.24)	(0.18)		(0.040)	
Banking sector	-7.85^a	-1.10^a	1.84^a	-1.37^a	0.793	18.777	1356
	(1.40)	(0.16)	(0.30)	(0.26)		(0.043)	
Non-banking financial	-9.81^a	-1.13^a	1.69^a	-0.93^a	0.793	17.464	1356
institutions	(1.35)	(0.16)	(0.22)	(0.17)		(0.065)	

Note: Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

index. Still, the effect is more prominent for increased markets' liberalization, privatisation and domestic competition.

Despite of the improved knowledge of the role of specific institutions brought by results presented in tables 2.9 and 2.10, one can difficultly formulate rigorous economic policy recommendations on the basis of qualitative (index) variables. What does exactly mean a rescaled score of 0.5 of the IEF or the EBRD index, or of any of their component factors? To what corresponds a tenth point increase in this value and how specifically can it be achieved by an economy? Questions like this are left unanswered by the previous discussion. Government officials operate with very precise measures, and a more quantified view of institutions is necessary to satisfy their inquiries.

In the remaining part of this subsection we concentrate on CEE exports to EU, trade flows with the highest growth potential within the region. Conclusions formulated below can serve as guidelines for CEE countries' governments for undertaking reforms that will have the strongest positive impact on their countries' export performance on West European markets.

All results obtained with index measures of institutions' quality claim the principal role of transition-specific institutions for trade among the selected group of European countries. Therefore we focus on quantitative variables characterizing this type of institutions. Compared to CEE countries, all EU members have well-functioning market institutions, and their amelioration is ruled out. This restriction is consistent with the economic policy approach: CEE governments can at most produce changes in their domestic institutions. Hence, one can ignore the quality of institutions in EU countries and derive an adequate trade specification for CEE exports to EU:

$$\begin{aligned} \ln \frac{m_{ij}}{m_{jj}} &= \alpha_0 + \alpha_1 \ln \frac{y_i}{y_j} + \alpha_2 \ln \frac{w_i}{w_j} + \alpha_3 \ln \frac{d_{ij}}{d_{jj}} + \alpha_4 border_{ij} + \alpha_5 lang_{ij} \\ &\quad + \alpha_6 country_{ij} + \alpha_7 \ln(1 + \text{tariff}_{ij}) + \alpha_8 ntb_{ij} + \alpha_9 Instit_i + \omega_{ij} \end{aligned} \tag{2.22}$$

A single institutional variable reflecting the quality of market institutions in the exporting CEE country i, $Instit_i$, is included. Institutional distance is dropped because of colinearity with variable $Instit_i$. Indeed, any change in the functioning of institutions in i translates immediately by a corresponding shift in the institutional distance with respect any importing EU country j.

Eleven different continuous variables are used to portray CEE's market institutions, and the coefficients estimated with (2.22) are presented in the first column of table 2.11. Coefficients are highly significant except for the average bribe tax. Average values of institutional variables across CEE countries are also reported. The impact of each aspect of CEE countries' institutional framework on their exports to EU is computed for one unit

and one standard deviation unit change in institutional variables and is displayed in the last two columns of table 2.11.

The private sector accounts for about 62% of CEE economies. One percent point increase of that share will generate a 1.57% growth of CEE exports to EU. The largest effect is observed for budget subsidies and bribes. An equal change in the share of budgetary subsidies and firms giving bribes reduces CEE exports by 2.89% and respectively 2.18%. In

Table 2.11: The role of transition specific institutions for CEE exports to EU

Model : OLS Institutional dimension	instit coeff	R^2	No. obs.	Mean (SD)	Effect on trade† $\Delta = SD$	 $\Delta = 1$
Private sector in GDP	0.04[a]	0.826	64	62.13	4.55	1.57
	(0.01)			(11.93)		
Private sector in	0.02[a]	0.777	42	59.83	1.67	0.58
employment	(0.01)			(13.01)		
Budgetary subsidies	-0.08[a]	0.805	62	4.15	-8.03	-2.89
	(0.02)			(4.48)		
Investment rate	0.05[a]	0.806	64	24.28	5.33	1.84
	(0.02)			(6.44)		
Number of banks	0.01[a]	0.791	64	36.58	0.64	0.22
	(0.01)			(19.18)		
Foreign owned banks	0.03[a]	0.799	63	13.54	3.29	1.14
	(0.01)			(10.35)		
Non-performing loans	-0.02[a]	0.832	53	17.88	-1.81	-0.64
	(0.01)			(13.47)		
Domestic credit to	0.05[a]	0.852	63	22.02	5.24	1.81
private sector	(0.01)			(12.68)		
Broad money M2	0.02[a]	0.826	64	42.55	2.41	0.84
	(0.01)			(18.05)		
Firms giving bribes	-0.06[a]	0.826	24	26.48	-6.10	-2.18
frequently (%)	(0.01)			(11.45)		
Average bribe tax	1.07	0.834	24	1.24	ns	ns
	(1.28)			(0.35)		

Note: Standard errors in parentheses: [a], [b] and [c] represent respectively statistical significance at the 1%, 5% and 10% levels;
† Effects on trade are per cent changes in relative imports caused by one unit and one standard deviation increase in the value of the institutional variable respectively.

a similar way, an increased number of non-performing loans reduces a country's exporting performance. On the contrary, the presence of foreign owned banks, as well as the increased competition in the banking sector (associated with the fragmentation of the sector), gives a larger access of well-performing exporting firms to funds and increases the trust of EU partners in the respect of contract stipulations. Unsurprisingly, the private sector is a leading factor of exports. Its expansion, both in terms of production and employed labor force, together with an improved access to credit for private firms are an important premise for CEE exports' growth. Another important determinant is the investment rate in the economy. During the 1990s it amounted to 24% of CEE domestic product. Raising this figure by 1% will produce a 1.84% growth of exports to EU.

Hence, a CEE country preoccupied with the increase of its exports to the EU market should start by reducing budgetary subsidies and corruption, and should privilege the development of private sector and domestic investment. Banking sector and monetary policy issues, although important, lead to less important gains.

2.9 Conclusion

Trade policy and national institutions are two important determinants of cross-border trade flows. We use a simple monopolistic trade model with a trade costs structure with tariff and non-tariff barriers, and institutions to investigate the role of these two factors. National institutions measured both in terms of quality and similarity, along with instruments of foreign trade policy, have a strong and significant impact on trade between European countries. The result is confirmed by the use of both index and continuous variables as measures for the quality of institutions. Still, the size of the effect on trade is smaller for general development specific institutions, and larger for institutions specific to transition economies. The reverse causality between trade and institutions is also considered, and evidence is found that larger trade volumes stimulate reforms of the institutional framework.

The role of trade liberalization in promoting regional trade integration is compared to that of institutional reforms according to two methods. In each case, the part of total border-specific trade costs explained by each factor, and the size of the trade creation effect of complete CEE-EU trade liberalization and reforms of domestic institutions are computed. Also, both approaches ascribe a non-negligible contribution to institutional reforms. A further increase in CEE-EU trade, comparable to the that due to trade liberalization, is possible even after all policy barriers to trade have been removed. Finally, the use of quantitative institutional measures allows us to formulate specific policy recommendations for increasing CEE exports to the EU market.

Part II

The role of social and business networks in international trade patterns

Chapter 3

Trade in Cultural Goods and Social Networks

3.1 Introduction

Recent empirical work by Rauch (1999), (2001), Combes et alii (2005) shows that cross-border networks, both social and business, stimulate trade in general. They complement the traditional determinants of international trade, such as transport costs, tariffs and non-tariff barriers, the quality and the proximity of the national institutions. According to this literature, networks emerge when the market fails to bring the necessary information to partners or to impose reliable enforcement mechanisms.[1]

The literature advances three channels via which networks increase trade. First of all networks permit a better information of members on potential partners, unavailable on the market, or available at a higher cost. In this way networks contribute to the reduction of information and partner search costs for its members, and a corresponding increase of their profits on the foreign markets (Casella and Rauch (1997), Rauch and Trindade (2002), Gould (1994)). Secondly, networks facilitate the punishment of opportunistic behavior via

[1]Thompson (1991), and Powell (1990) support this idea.

well-established enforcement mechanisms, but also implicitly through a full and costless spread of information between members. The non respect of contractual stipulations by a member is quickly known by other members of the network, which strongly reduces the chances of the former to find a partner inside the network (Greif (1993), Hsing (1999), Anderson and Young (2002)). Finally, networks can induce modifications in the structure of consumers' preferences (Dunlevy and Hutchinson (1999)). This latter channel is assigned in the literature exclusively to social networks. For historical reasons, consumers of a particular country can have a higher preference for domestic products, and it can be altered by important flow of immigrants with different preferences.

Social networks are usually defined by common ethnic, linguistic, cultural, etc. ties of consumers and/or producers, and are traditionally accounted for by the flows or stocks of immigrants. The use of migration variables has the advantage of measuring not only the presence or absence of a social or cultural tie, but also its intensity. Limiting social networks to migration, however, reduces our understanding of the role of social and cultural ties for trade. Other cultural and social aspects are less treated in the literature although most empirical studies include dummy variables for common land border, language or past colonial relationship. Helliwell (1999) and Melitz (2002) use data on the shares of countries population speaking the same language, and highlight the positive role of linguistic ties on trade. Guiso, Sapienza and Zingales (2004) show that the trust of European citizens towards foreigners depends on cultural aspects (religion, history, wars, etc.), and exerts a considerable impact on trade and investments.

This chapter highlights the presence of an additional dimension of social networks than those considered in the literature and constructs a measure that permits to quantify the intensity of cross-border social and cultural ties from international trade in cultural goods. Cultural goods (books, music, films, newspapers, etc.) more than any other goods embody information on the market of origin. Their international exchange implies at the same time

an exchange of information and a reduction of the costs of access to the foreign market for firms in each country. It will be assumed here that the intensity of the cultural trade, compared to non-cultural trade, is proportional to the strength of transnational social networks, expressed otherwise by linguistic, historical, or ethnic links. The surplus of trade in cultural goods compared to the predictions of the trade model is associated to reinforced social and cultural ties. The bilateral measure of the intensity of social networks built in this way allows for variations in time and the direction of trade flows.

There is little empirical work allowing the separation of the three channels of action of networks. The present chapter enriches this literature by introducing another way of separating the information effect of social networks from the preference effect. Limited support in favor of the preference effect on trade of social networks is found in the literature: immigrants have a similar effect on exports and imports (e.g. Head et alii (2002)). Beyond the reduction of transaction costs, imports of foreign cultural goods generate a shift in local consumer's preferences. The visualization of American films and TV channels, might encourage the consumption of American products, the adoption of American values and life style by the young population. The specific measure developed in this chapter proposes a different way to separate the two channels of action. Used on a large sample of countries, it suggests that the preference effect of social networks on trade prevails without ignoring the role of information channelled through social networks. According to Rauch (1999), networks are particularly important for trade in differentiated goods, and for repetitive long term relationships. Using Rauch's classification of goods into homogeneous, reference priced and differentiated, only partial support for this thesis is found.

The chapter is structured as follows. A general discussion of cultural goods and social and cultural ties is presented in the next section. Section 3.3 exposes the trade model and section 3.4 some general results. The strength of social networks, their impact on international trade, and information and preference effects are quantified in the following

two sections, and section 3.7 concludes.

3.2 Cultural Goods and Social Networks

Cultural goods are defined as products carrying an important cultural component, such as information on consumer preferences, on business practices and opportunities in the origin market. This cultural content is assimilated by consumers at destination in two possibles ways: (a) by increasing their knowledge about the origin market, or (b) by transforming their preferences for foreign products. One main feature of cultural goods is that the utility associated with their consumption is usually higher in the presence of social and cultural links between the origin and destination countries.

According to the World Customs Organization, cultural goods comprise cinematographic films, newspapers and periodicals, books, leaflets and other printed matter, and recorded tapes and media. Each of these product groups is treated below separately and when possible with reference to similar non-cultural goods. Additional to the above list, most agricultural goods have some cultural components, and can therefore be qualified as cultural. Of the latter, only alcoholic beverages are retained in the present analysis, a category for which it is easy to find similar goods without the cultural charge. Trade in cultural products is obtained from disaggregated data according to the SITC (Standard International Trade Classification) Rev.2 and 3 at the 4-digit level. Table 3.1 lists cultural products considered in this paper and their non-cultural equivalents whenever the latter can be identified.

Imports of cultural products imply a simultaneous import of information on preference of consumers in the country of origin, its market and public institutions, business practices, trade opportunities, etc. Reading foreign newspapers regularly, for example, can help firms to seize the best trade opportunities, find suppliers or outlets for domestic production. This superior 'market intelligence' reduces transaction costs for firms in the importing country,

Table 3.1: Cultural and non-cultural goods

	CULTURAL GOODS		NON-CULTURAL EQUIVALENTS
	SITC Rev.2 classification		
112	alcoholic beverages	5121	acyclic monohydric alcohols (both food and industrial use)
8830	cinematographic films		
8921	books, pamphlets, maps, etc.		
8928	other printed matter		
8922	newspapers, periodicals	6411	newsprint rolls and sheets
	SITC Rev.3 classification		
8985	magnetic tapes recorded	8984	magnetic tapes unrecorded
8987	other recorded media	8986	other blank recording media

and increases their access to the origin market. Moreover, consumption of foreign goods with an important cultural component may develop a preference for similar foreign goods, i.e. generate a shift in consumer preferences. Reading foreign magazines, or watching foreign movies often encourages the young population to adopt foreign values and life styles, reflected by a changed consumption structure. It is therefore not unreasonable to associate large volumes of trade in cultural goods to the intensity of social networks.

But these are exactly the ways in which cross-border social networks stimulate trade. Rauch and Trindade (2002), Girma and Yu (2002), and Gould (1994) use gravity type models of trade with migration and find that ethnic networks have essentially an informational role for international trade. Similarly, Nicita and Olarreaga (2000) find evidence of a significant positive effect of information flows on global trade. Still, social networks can alter as well consumer preferences for goods produced abroad. Head and Ries (1998) and Dunlevy and Hutchinson (1999) estimate strong effects of migration on imports, highlighting the importance of the 'taste linkage' established via social networks. Using imports of different cultural goods from abroad, we also introduce a new way for separating the two

effects. This ideas are developed in more detail in the following sections.

3.3 The Gravity Model and Data

The gravity model is a basic tool in international economics usually employed to express the volume of trade between two countries. It relates bilateral imports positively to the product of the two countries' sizes, and negatively to the distance between them. Its wide use comes from its simplicity and good fit of empirical data. There is a large and growing international trade literature based on the empirical use of the gravity. However, its compatibility with the predictions of international trade theory remained questionable for a long time. Still, important recent progress in deriving gravity-like equations from different theoretical structures confirms its compatibility with trade in both differentiated and homogeneous products, and in presence of both constant and increasing returns.

A gravity specification integrating social networks is developed in this section. we use an augmented gravity equation to include both information and preference effects of networks on trade. Countries connected by strong social and cultural links face lower transaction costs and/or have similar preference structures. Five dummies and one quantitative variable most frequently found in gravity specifications in the literature are added to the standard gravity variables to control for these aspects. Thus, country j's imports from i in time period t in logarithmic form are expressed by the following equation:

$$\begin{aligned} \ln x_{ijt} &= \alpha_0 + \alpha_1 \ln GDP_{it} + \alpha_2 \ln GDP_{jt} + \alpha_3 \ln d_{ij} + \beta_1 \text{contiguity}_{ij} \\ &\quad + \beta_2 \text{language}_{ij} + \beta_3 \text{colony}_{ij} + \beta_4 \text{country}_{ij} + \beta_5 \text{conflict}_{ijt} \\ &\quad + \beta_6 \ln \text{immigrants}_{ijt} + f_t + \epsilon_{ijt} \end{aligned} \tag{3.1}$$

Country products GDP_{it} and GDP_{jt} are used to control for economic size, and shipping distance d_{ij} is the commonly used proxy for transport costs. The next six variables describe

the intensity of cultural and social linkages between countries i and j, f_t stand for the year fixed effects, and ϵ_{ijt} is the residual term.

Countries that share a land border, reflected by a dummy variable $contiguity_{ij}$ equal to one, are usually better informed each on the other's trading opportunities and consumer preferences, making mutual trade less costly. A common history, either as members of the same country or same colonial empire, increases the knowledge of partner's institutions and business practices, and reduces international trade costs. These aspects are captured by the binary variables $country_{ij}$, and $colony_{ij}$ respectively. Improved communication skills are achieved when both trading parties speak the same language. The dichotomic variable $language_{ij}$ is employed to control for this feature.

On the contrary, countries confronted in a militarized dispute trade much less at least for two reasons. Armed conflicts are usually accompanied by various trade barriers imposed by governments on imports from, and exports to the enemy country. The embargos on Iraq and Yougoslavia during the 1990s are two examples of such trade-deterring measures. Secondly, a country's involvement in an international conflict causes modifications of its consumers' preferences and utility function: lower or nil consumption of goods produced by the enemy. The presence of an armed dispute between two countries is considered in the model through the introduction of the dummy variable $\mathrm{conflict}_{ijt}$.

Finally, bilateral migration has both a trade costs, and a preference effect. Immigrants bring with them an increased preference for goods from their country of origin, have a superior knowledge of trading opportunities with partner from their countries of origin, and are in a better position to seize them. Migration flows in logarithmic form are represented by variable $\ln migration_{ijt}$.

Sharing a common border, language, history, harmonious political relations, and ethnic ties reveal strong cultural and social linkages. Hence, social networks have a favourable effect on international trade if positive point estimates for coefficients β_1, β_2, β_3, β_4, and

β_6, and a negative estimate for β_5 are obtained.

Two additional specifications of trade flows are used. One of them consists in adding importer and exporter fixed effects to equation (3.1):

$$\begin{aligned} \ln x_{ijt} &= \alpha_0 + \alpha_1 \ln GDP_{it} + \alpha_2 \ln GDP_{jt} + \alpha_3 \ln d_{ij} + \beta_1 \text{contiguity}_{ij} \\ &+\beta_2 \text{language}_{ij} + \beta_3 \text{colony}_{ij} + \beta_4 \text{country}_{ij} + \beta_5 \text{conflict}_{ijt} \\ &+\beta_6 \ln \text{immigrants}_{ijt} + FE_i + FM_j + f_t + \epsilon_{ijt}, \end{aligned} \tag{3.2}$$

Note, that trade equation (3.2) is a stylized version of Anderson and van Wincoop (2003)'s expression of bilateral trade flows. Indeed, Anderson and van Wincoop (2003) derive aggregate trade between countries i and j from a theoretical model of trade with nationally differentiated products as follows:

$$x_{ij} = \frac{Y_i Y_j T_{ij}^{1-\sigma}}{Y_w P_i P_j}, \tag{3.3}$$

where Y_i and Y_j are countries' internal products, Y_w is the world product, T_{ij} are bilateral trade costs, and P_i and P_j are exporter and importer price indices respectively. Using an appropriate trade costs function and country fixed effects for difficultly measured price indices, and taking logarithms, one reaches equation (3.2).

The other trade specification employed below consists in replacing country GDPs in (3.1) by country fixed effects:

$$\begin{aligned} \ln x_{ijt} &= \alpha_0 + FE_i + FM_j + \alpha_3 \ln d_{ij} + \beta_1 \text{contiguity}_{ij} + \beta_2 \text{language}_{ij} \\ &+\beta_3 \text{colony}_{ij} + \beta_4 \text{country}_{ij} + \beta_5 \text{conflict}_{ijt} + \beta_6 \ln \text{immigrants}_{ijt} + f_t + \epsilon_{ijt}. \end{aligned} \tag{3.4}$$

The data employed in this paper covers the period from 1988 to 2000 between 168 importing and exporting countries. Table 3.2 gives the source of the dependent and ex-

Table 3.2: Dependent and independent variables: data sources

Variable	Definition	Source
	DEPENDENT VARIABLES	
x_{ij}	aggregate bilateral trade	NBER-UN Trade Data (Feenstra and Lipsey html)
m_{ij}	bilateral trade of all non-cultural goods	NBER-UN Trade Data (Feenstra and Lipsey html)
m_{ij}^{l}	bilateral trade of selected non-cultural goods l	NBER-UN Trade Data (Feenstra and Lipsey html)
c_{ij}^{k}	bilateral trade of selected cultural goods k	NBER-UN Trade Data (Feenstra and Lipsey html)
g_{ij}	bilateral trade of non-cultural goods, except those with cultural equivalents	NBER-UN Trade Data (Feenstra and Lipsey html)
	INDEPENDENT VARIABLES	
GPD_i, GDP_j	domestic product	World Bank, WDI
d_{ij}	bilateral distance between capitals	CEPII
contiguity_{ij}	common land border	CEPII
language_{ij}	common official language	CEPII
colony_{ij}	past colonial relationship	CEPII
country_{ij}	parts of the same country in the past	CEPII
conflict_{ij}	bilateral militarized conflict	CORRELATES OF WAR
immigrants_{ij}	flows of immigrants	EUROSTAT

planatory variables in equations (3.1), (3.2), and (3.4). Eight independent variables are used along with year and country fixed effects to explain four distinct types of bilateral international trade: aggregate trade, aggregate trade of non-cultural products, trade of selected cultural, and non-cultural goods. Bilateral trade data, both aggregate and at product level, is obtained from (Feenstra and Lipsey html) database. Countries' domestic products are from World Bank Development Indicators, distance and various bilateral linkages are from CEPII's database, and cross-border flows of immigrants are from EUROSTAT. Coefficients on all independent variables, except distance and militarized conflicts which decrease trade, are expected to have a positive sign.

In the next sections we present estimation results for all trade specifications presented

above, and all four types of international trade.

3.4 International Trade and Social and Cultural Ties

The current section presents estimation results obtained with traditional measures of social and cultural ties employed in the literature. Bilateral linkages such as common language, past history, and international migration are used to capture the preferential ties existing between the trading countries. The difference of their importance for different types of goods is also emphasized.

The augmented gravity equations presented in section 3.3 are estimated first for aggregate international trade and results are shown in table 3.3. The first three columns give results for the entire sample of countries. Importer and exporter GDPs are used in the first column, countries' GDPs and fixed effects in column 2, and country fixed effects alone in column 3. The last three columns display results for a sub-sample of importing European countries for which migration data is available. Columns 4 to 6 correspond to the same specifications as in the first three columns. All specifications use year fixed effects. All estimated coefficients are statistically significant and of expected signs.

According to results displayed in table 3.3, social and cultural links have a positive effect on trade. Sharing a common land border augments bilateral imports by 84 to 139%, while speaking the same language expands trade by 57 to 79%. Countries engaged in a common colonial relationship in the past exchange up to three times more than similar countries that did not. Trade between political entities that formed a single country in the past is between 48 and 92% larger. A militarized dispute reduces international trade by at least 50%, and a 10% increase in the number of immigrants translates by a 1-1.7% increase in the value of imports from their home country.

Despite the fact that militarized conflicts are accompanied by a lower domestic product, and that countries that have a common official language are often neighbors or have shared

Table 3.3: Total bilateral imports

	large sample: all countries			*sub-sample: migration*		
Dependent variable:	$\ln x_{ijt}$	$\ln x_{ijt}$	$\ln x_{ijt}$	$\ln x_{ijt}$	$\ln x_{ijt}$	$\ln x_{ijt}$
Model:	(1)	(2)	(3)	(4)	(5)	(6)
intercept	-1.91^a	3.35^a	11.03^a	-4.45^a	3.25^a	13.07^a
	(0.07)	(0.18)	(0.12)	(0.18)	(0.91)	(0.71)
ln GDP importer	0.79^a	0.50^a		0.86^a	0.73^a	
	(0.00)	(0.01)		(0.01)	(0.06)	
ln GDP exporter	0.86^a	0.39^a		0.93^a	0.30^a	
	(0.00)	(0.01)		(0.01)	(0.03)	
ln distance	-0.77^a	-1.04^a	-1.04^a	-0.68^a	-0.88^a	-0.87^a
	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)	(0.03)
common border	0.87^a	0.61^a	0.61^a	0.68^a	0.12^b	0.14^b
	(0.03)	(0.03)	(0.03)	(0.07)	(0.06)	(0.06)
militarized dispute	-0.92^a	-0.68^a	-0.69^a	-0.99^a	0.08	0.04
	(0.09)	(0.08)	(0.08)	(0.30)	(0.24)	(0.24)
common official language	0.58^a	0.46^a	0.45^a	0.13^b	0.03	0.02
	(0.01)	(0.01)	(0.01)	(0.05)	(0.05)	(0.05)
colonial relationship	1.06^a	1.12^a	1.12^a	0.95^a	0.63^a	0.61^a
	(0.03)	(0.03)	(0.03)	(0.06)	(0.05)	(0.05)
same country	0.14^b	0.40^a	0.39^a	0.49^a	0.65^a	0.60^a
	(0.06)	(0.05)	(0.05)	(0.13)	(0.11)	(0.11)
ln immigrants				0.10^a	0.17^a	0.17^a
				(0.01)	(0.01)	(0.01)
year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
importer fixed effects		Yes	Yes		Yes	Yes
exporter fixed effects		Yes	Yes		Yes	Yes
N	128265	128265	128265	18319	18319	18319
R^2	0.597	0.722	0.716	0.732	0.847	0.844
RMSE	1.671	1.39	1.406	1.462	1.112	1.123

Note: Estimations with year fixed effects. Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

a colonial relationship, the correlation matrix suggests the absence of multicolinearity in the previous estimations. It can be argued that the variable *same country* is redundant in trade specifications above. Indeed, countries that formed a single political unit at some point in the past are often also linked by some other bilateral ties. However, results are

almost unchanged when this variable is dropped from the regression.

The impact of social and cultural variables on international trade in cultural goods can be evaluated by estimating a gravity trade equation for distinct types of cultural goods identified in table 3.1. Comparable production and consumption data at this level are virtually inexistant. Using country products as in equation (3.1) is not an ideal solution, as this permits to control for country size, but not for the size of the particular cultural industry.

An acceptable solution, increasingly employed in the literature, is the use of a fixed-effects specification. Using importer and exporter effects in the regression allows to account for large/small industry-level production capacities at the origin and different consumption preferences at destination. In this way one can control for a demand for, and supply in cultural goods non-proportional to country's economic size. Accordingly, the obtained residual term contains purely bilateral information on the intensity of cultural trade.

A specification without the migration variable is chosen in this case in order to encompass a larger sample of observations.[2] Bilateral trade is estimated for each cultural good k according to:

$$\begin{aligned} \ln c_{ijt}^{k} &= a_0 + FE_i + FM_j + a_3 \ln d_{ij} + b_1 \text{contiguity}_{ij} \\ &\quad + b_2 \text{language}_{ij} + b_3 \text{colony}_{ij} + b_4 \text{country}_{ij} + b_5 \text{conflict}_{ijt} + f_t + e_{ijt}^{k}. \end{aligned} \tag{3.5}$$

In the case of the cinematographic industry, for example, exporter fixed effects correct for the large American and Indian film productions, and importer effects adjust for larger amounts spent on watching foreign movies in developed contrary to developing countries. For German imports of American movies, the residual term indicates then how much German people prefer American movies to other movies unaffected by their general 'love' for

[2] Although the number of observations for aggregate trade between countries for which migration data is available is relatively large (18319), only a small portion of them exchange individual cultural goods (951, 4646, 2632, 4206, 5706, 2537, 4747 dyads).

theater movies and by the large number of exported American films. An alternative illustration can be given for British imports of French wine. Applying the fixed-effect technique, one adjusts for the large wine production in France and the relatively low consumption of wine in Great Britain. The estimated residual term shows how much British consumers prefer French wine to all other wines, given their overall preference for alcoholic beverages.

Because of the large number of observations with zero trade in individual products and/or product groups, the Heckman two-step estimation method is employed to estimate trade specification (3.5). First, the probability of a bilateral trade flow to be nil, denoted as mill's ratio, is estimated with a probit model. In the second step it is introduced as an explanatory variable in the gravity estimation, and a significant estimated coefficient for it points out that results are statistically different from those when nil trade observations are disregarded. The explanatory variables used in the first step regressions are level values of the right hand side variables in the gravity equation (in logarithmic form) used in the second step.

Table D.1 of the Appendix D shows estimates of gravity equation (3.1) for each cultural product group identified above. The unusually low in absolute value coefficients on standard gravity variables confirm that GDPs are poor proxies for the cultural industry size. Large countries are not necessarily large exporters and consumers of cultural goods. Therefore a fixed-effects specification is preferred in the case of specific products. The joint employment of country products and country effects does not represent an acceptable solution. The only reason for which the former are included in the regression is to control for the size of demand and supply. The use of both variables is justified in the trade model developed by Anderson and van Wincoop (2003) because it is specifically designed for aggregate flows.

Table 3.4 gives estimates of equation (3.5) with importer and exporter dummies. Results are in accordance with those obtained in the literature. However, both distance elasticity and cultural and social effects on trade vary significantly across products. Recorded mag-

Table 3.4: Imports of cultural goods: fixed-effects specification

Product group k:	cinemato-graphic films	books, pam-phlets, maps, etc.	other printed matter	newspapers, periodi-cals	magnetic tapes recorded	other recorded media	alcoholic beverages
Dependent variable:	$\ln c_{ijt}$	$\ln c_{ijt}$	$\ln c_{ijt}$	$\ln c_{ijt}$	$\ln c_{ijt}$	$\ln c_{ijt}$	$\ln c_{ijt}$
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
intercept	11.61^a	10.92^a	9.27^a	10.28^a	3.00^a	5.83^a	5.58^a
	(1.83)	(0.89)	(0.79)	(1.53)	(2.12)	(1.39)	(1.29)
ln distance	-0.66^a	-0.71^a	-0.87^a	-0.91^a	-1.11^a	-1.29^a	-0.73^a
	(0.05)	(0.02)	(0.02)	(0.03)	(0.05)	(0.04)	(0.02)
common border	0.15	0.55^a	0.89^a	0.74^a	0.19	0.46^a	0.94^a
	(0.12)	(0.05)	(0.04)	(0.05)	(0.19)	(0.14)	(0.05)
militarized dispute	-0.26	-0.15	-0.71^a	0.12	-0.80^a	-0.98^a	-0.21
	(0.31)	(0.13)	(0.15)	(0.21)	(0.34)	(0.23)	(0.16)
common official language	0.57^a	1.06^a	0.56^a	0.91^a	0.31^a	1.20^a	0.19^a
	(0.09)	(0.04)	(0.03)	(0.05)	(0.07)	(0.06)	(0.03)
colonial relationship	0.16	0.67^a	0.47^a	0.32^a	0.25^c	0.43^a	0.66^a
	(0.14)	(0.06)	(0.05)	(0.08)	(0.14)	(0.10)	(0.07)
mill's ratio	0.47^b	-0.15^c	0.21^a	-0.13^c	0.54	1.28^a	0.21^a
	(0.19)	(0.08)	(0.07)	(0.08)	(0.42)	(0.39)	(0.09)
importer fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
exporter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2548	18783	18139	8391	10666	19216	22744
R^2	0.482	0.608	0.593	0.604	0.518	0.621	0.560
RMSE	.952	1.053	1.025	1.064	1.777	1.709	1.221

Note: Heckman estimations with year fixed effects. Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

netic tapes and other media, newspapers, and periodicals are most sensitive to the distance, reflecting the important role of news and novelty for the consumption of these products.

Note that to compare the effect of social and cultural variables on cultural and non-cultural goods one needs to use comparable samples in both estimations. Table D.2 of the Appendix D shows reference estimates for aggregate non-cultural goods on samples identical to those used in table 3.4. Land neighbors exchange more cultural goods in general, but especially printed matter, newspapers and agricultural products. Increased communication skills, revealed by the same language spoken in the origin and destination countries, generate more trade in cultural goods than in non-cultural products. A certain

knowledge of the language employed is a necessary condition for the very act of consumption for books and newspapers, yielding much larger coefficient estimates. Results in column 6 show that this is also the case of other recorded media: Understanding the words of songs is probably a purchase criterion. Past colonial relationships, however, matter much less for cultural goods' trade. Depending on the product, the trade-inducing effect of a colonial relationship is between 22 and 60 % of its effect on product with no cultural component. International armed conflicts have in average a lower trade reducing effect for cultural than non-cultural goods. Still, the effect is significant only in the case of other printed matter and recorded sound media. The apparently positive effect for newspapers may come from an increased demand in information on the enemy.

Compared to results for non-cultural goods, one can conclude that non-significant coefficients in table 3.4 are not due to a minor importance of corresponding social or cultural attributes for trade in cultural goods, but rather to the low number of observations fulfilling this characteristic in the sample. Because of the particular features of cultural goods, social networks are more important for trade of this type of products: The presence of cultural links increases the utility associated with the consumption of goods, and in certain cases is a necessary condition for their very consumption (e.g. reading books and journals in a foreign language is conditioned by the knowledge of that language by the the reader). A volume of trade with cultural goods higher than the forecasts of the gravity model indicates the presence of more important cultural ties between countries engaged in the exchange. Hence, overall, international trade in cultural goods is much more sensitive to social and cultural characteristics that trade in goods without a cultural content. We employ this results in the next section in order to construct a new measure of the intensity of cross-border social networks.

3.5 A Measure of the Intensity of Social Networks

This section addresses the strength of social networks in more detail. A first precision should be made regarding the definition of social networks. In line with the existing literature, social networks are identified with social and cultural ties between countries. Thus, strong cross-border social networks are identified in this section with strong social and cultural ties linking trading countries, and a more complex measure of social networks is developed below.

A possible way to quantify the intensity of bilateral social and cultural linkages is to use trade in cultural goods between the concerned countries. As suggested in section 3.4, a larger volume of cultural trade than predicted by the model testifies of the existence of important social and cultural ties. The extra trade in cultural goods compared to the prediction of the gravity model is a direct indicator of the strength of these ties, and of international social networks as well. We produce a two stage estimation method to evaluate the impact on trade of bilateral social and cultural ties. First, trade in cultural goods is estimated according to the gravity model and the bilateral residual term is obtained. The residual in the first stage equation is used in the second stage as a supplementary explanatory variable for bilateral trade in non-cultural goods. The coefficient on this residual term indicates the role of social and cultural ties/networks in international trade.

The first stage consists in estimating international exchanges of cultural products according to the trade equation (3.5). The residual term $\hat{e}_{ijt}$ is introduced in the right hand side of the trade equation (3.1) for non-cultural goods:

$$\begin{aligned} \ln m_{ijt} &= \bar{\alpha}_0 + \bar{\alpha}_1 \ln GDP_{it} + \bar{\alpha}_2 \ln GDP_{jt} + \bar{\alpha}_3 \ln d_{ij} + \bar{\beta}_1 \text{contiguity}_{ij} \\ &\quad + \bar{\beta}_2 \text{language}_{ij} + \bar{\beta}_3 \text{colony}_{ij} + \bar{\beta}_4 \text{country}_{ij} + \bar{\beta}_5 \text{conflict}_{ijt} + \nu\, \hat{e}^k_{ijt} + f_t + \varepsilon_{ijt} \end{aligned} \tag{3.6}$$

We call non-cultural goods all other traded goods except the ones identified as carrying

a cultural component in table 3.1. The size of the error term of the trade equation estimated for the cultural goods reflects the importance of social and cultural ties between partners other than linguistic, historical, ethnic and geographical ties already considered in the model, and brings evidence of an additional dimension of social networks. A positive and significant coefficient ν confirms the assimilation of information and/or of foreign preferences via the consumption of foreign cultural goods.

Second stage estimates are obtained for each product group used in the first stage estimations (table 3.4) and are displayed in table 3.5 The residual e^k_{ijt} measures the strength of bilateral cultural links, other than can those displayed by the cultural and social variables of the augmented gravity, leading countries to exchange more cultural goods. By construction, links of different strength can be observed for the same pair of countries depending on the direction of flows. Thus, links between British producers and American consumers are not necessarily of equal strength as links between British consumers and American producers. Used as an explanatory variable for non-cultural products, they reveal a complementary dimension of social networks. The last line of table 3.5 displays coefficient ν estimates obtained with different cultural goods trade residual. The seven columns correspond to estimates using the residual terms obtained for each group of cultural goods displayed in the same columns of table 3.4.

Thus, a twofold value of imported newspapers unexplained by the trade model (3.5) generates an additional 13 percent increase of imports of non-cultural goods. An equal upsurge for foreign films raises non-cultural imports only by 6 percent. Although the supplied 'amount' of culture in the two cases is different at least because newspapers are cheaper than films, results are directly comparable because the residual term represents the logarithm of the trade volume the model cannot explain. The difference in unitary prices is thus captured by the constant term of the second stage estimation.

Using residual terms normed by the average annual bilateral trade flow for each cultural

Table 3.5: Imports of non-cultural products and cultural ties: cultural trade residual

Dependent variable:	$\ln m_{ijt}$	$\ln m_{ijt}$	$\ln m_{ijt}$	$\ln m_{ijt}$	$\ln m_{ijt}$	$\ln m_{ijt}$	$\ln m_{ijt}$
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cultural goods used in first stage estimations k:	cinematographic films	books, pamphlets, maps, etc.	other printed matter	newspapers, periodicals	recorded magnetic tapes	other recorded media	alcoholic beverages
intercept	1.39^a	0.13^a	0.59^a	0.42^a	-0.85^a	-1.89^a	-0.83^a
	(0.24)	(0.11)	(0.11)	(0.14)	(0.17)	(0.13)	(0.11)
ln GDP importer	0.66^a	0.74^a	0.75^a	0.69^a	0.88^a	0.84^a	0.78^a
	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)
ln GDP exporter	0.66^a	0.74^a	0.69^a	0.73^a	0.79^a	0.91^a	0.87^a
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)
ln distance	-0.51^a	-0.62^a	-0.60^a	-0.56^a	-0.80^a	-0.82^a	-0.79^a
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
common border	0.61^a	0.59^a	0.60^a	0.59^a	0.48^a	0.58^a	0.70^a
	(0.06)	(0.03)	(0.03)	(0.04)	(0.05)	(0.05)	(0.04)
militarized dispute	0.23	-0.83^a	0.15	0.11	-0.77^a	-0.59^a	0.00
	(0.24)	(0.12)	(0.13)	(0.17)	(0.20)	(0.16)	(0.14)
common official language	0.35^a	0.21^a	0.44^a	0.36^a	0.76^a	0.64^a	0.71^a
	(0.04)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.02)
colonial relationship	0.36^a	0.43^a	0.38^a	0.17^a	0.02	0.16^a	0.50^a
	(0.05)	(0.03)	(0.03)	(0.03)	(0.07)	(0.06)	(0.03)
same country	0.97^a	0.31^a	0.28^a	0.26^a	0.07	0.35^a	0.19^a
	(0.11)	(0.05)	(0.06)	(0.06)	(0.09)	(0.07)	(0.06)
cultural trade residual $\hat{e}_{ijt}$	0.06^a	0.21^a	0.18^a	0.13^a	0.07^a	0.10^a	0.19^a
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	2548	18698	18110	8379	10222	18289	22744
R^2	0.772	0.719	0.735	0.741	0.738	0.701	0.758
RMSE	.804	1.054	1.004	.929	1.132	1.21	1.172

Note: Estimations with year fixed effects. Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

good k:

$$\bar{e}^k_{ijt} = \frac{\hat{e}^k_{ijt}}{\ln(\sum_{ij} c^k_{ijt}/N^k_t)},$$

where N^k_t is the number of positive trade flows for each good k, yields very similar results. Employing this measure in the second stage equation permits to interpret results in terms of average trade flows in cultural goods.

At first view, lower coefficient estimates seem to be obtained on most variables when the cultural residual is added in the regression. However, one needs to keep in mind that different country samples are used in the second stage. In fact, regardless of the fact that we account for the proportion of nil trade observations in the panel, table 3.5 shows the role of information and preference compounds enclosed in cultural goods only for a selection of country pairs and year for which positive exchange in cultural good is observed. For comparison reasons the augmented gravity equation (3.1) is estimated separately on each of the samples used in the second stage regressions and results are shown in table D.2 of the Appendix D. Note that coefficients on most independent variables in tables 3.5 and D.2 are virtually identical, suggesting that the positive and highly significant coefficients of the residual term e^k_{ijt} signal a different dimension of social-cultural links between countries engaged in international trade not tackled by the other variables of the model. A statistically significant coefficient ν of the cultural residual term is obtained for all types of goods used in the first stage. This confirms the fact that the consumption of foreign cultural goods leads to an increased 'market intelligence' and/or a more similar preference structure in the destination country, both encouraging larger imports.

Estimates of similar size are obtained when the fixed-effects specification is used (see table D.3 of the Appendix D). As previously, the statistically non-significant or relatively low coefficients on social variables come from the fact that social dimensions count less for the particular observation panels used, and not because they count less when the cultural residual term is introduced in estimations.

A refinement of the previous measure is possible by substracting from the cultural residual e^k_{ijt} estimated in the first stage any non-cultural component. One way to do this is to include residual terms of similar goods without a cultural component in second stage estimations along with the cultural residual terms. The two methods developed in this section for measuring the strength and the impact on trade of cross-border social

networks are summarized in table 3.6. The use of the difference in residual terms for similar goods with and without a cultural component is another available option to correct the first measure of social networks discussed above. However, given the functional form of first stage estimation equations, obtained residual terms represent logarithms of the extra bilateral trade in specific cultural and non-cultural goods relative to the predictions of the gravity model. Their difference is thus equal to the ratio of additional trade volumes and is inconsistent for explaining the logarithm of import values in the second stage. However, it can still serve as an illustration of the strength of social networks linking the trading countries.

Table 3.6: Estimating the strength and impact on trade of social networks

	1^{st} stage estimation(s)	2^{nd} stage estimation(s)
	1. Rough measure of social networks	
Explained variable	Trade in specific cultural goods c^k_{ijt}	Trade in all non-cultural goods m_{ijt}
Estimated equation	Augmented gravity with country FE	Augmented gravity with cultural residual e^k_{ijt}
	2. Corrected measure of social networks	
Explained variable	Trade in specific cultural goods c^k_{ijt} and non-cultural goods m^l_{ijt}	Trade in other non-cultural goods g_{ijt}
Estimated equation	Augmented gravity with country FE	Augmented gravity with cultural residual e^k_{ijt} and non-cultural residual u^l_{ijt}

The matching of cultural goods with culture-free equivalents needs a thorough investigation, because the structure of international trade in reference non-cultural products is very different from that for cultural goods. Cross-border exchange of culture-free products depends on countries' dotation with factors and resources used in their production. Thus, countries abundantly endowed with wood (e.g. Norvegia, Canada, Russia) are large exporters of paper products. But this has nothing in common with their exports of books

and newspapers. To control for this aspect, we employ importer and exporter fixed effects in trade estimations. It is straightforward that non-cultural equivalents cannot be easily found for all goods used in the first stage. Similar culture-free goods l are identified for four out of seven product groups (see table 3.1). Non-cultural trade residual terms are estimated using a similar equation as for trade in cultural goods:

$$\begin{aligned} \ln m^l_{ijt} &= \tilde{a}_0 + FE_i + FM_j + \tilde{a}_3 \ln d_{ij} + \tilde{b}_1 \text{contiguity}_{ij} + \tilde{b}_2 \text{language}_{ij} \\ &\quad + \tilde{b}_3 \text{colony}_{ij} + \tilde{b}_4 \text{country}_{ij} + \tilde{b}_5 \text{conflict}_{ijt} + f_t + u^l_{ijt} \end{aligned} \tag{3.7}$$

Trade residual terms for each cultural good and its culture-free equivalent are used as explanatory variables for trade in all products but the ones used to obtain these residuals:

$$\begin{aligned} \ln g_{ijt} &= \tilde{\alpha}_0 + \tilde{\alpha}_1 \ln GDP_{it} + \tilde{\alpha}_2 \ln GDP_{jt} + \tilde{\alpha}_3 \ln d_{ij} + \tilde{\beta}_1 \text{contiguity}_{ij} \\ &\quad + \tilde{\beta}_2 \text{language}_{ij} + \tilde{\beta}_3 \text{colony}_{ij} + \tilde{\beta}_4 \text{country}_{ij} + \tilde{\beta}_5 \text{conflict}_{ijt} \\ &\quad + \tilde{\nu}\ \hat{e}^k_{ijt} + \mu\ \hat{u}^l_{ijt} + f_t + v_{ij} \end{aligned} \tag{3.8}$$

Accordingly, the residual term obtained for newsprint will be used together with the residual term for newspapers and periodicals, the one for recorded media with that for blank media, etc.

Thus, the new coefficient of the cultural residual term $\hat{\nu}$ shows the importance of 'pure' cultural ties for total non-cultural trade less the specific goods used in first stage estimations, i.e. corrected for any non-cultural ties. The use of cultural and non-cultural residual terms jointly in the same trade equation also permits to evaluate the role of cultural versus non cultural ties. Therefore, estimates obtained with equation (3.8) are to be preferred to previous ones.

Table 3.7 shows second stage gravity estimates with both cultural and non-cultural residual trade. Positive and highly significant estimates of similar magnitude are found

for both residual terms. In all cases except alcoholic beverages and equivalent industrial alcohols bilateral, cultural ties have a larger positive impact on trade than non-cultural ties. This finding confirms the important role of social networks for international trade and points out the presence of additional social and cultural ties unrevealed by the variables traditionally employed in the literature.

Importer-exporter relationships with strongest cultural ties are displayed in table 3.8 shows . The upper part of the table shows country pairs which have the largest cultural trade residual $\hat{e}^k_{ijt}$, and the lower part of the table shows country pairs for which the difference between the residual trade in cultural goods and in reference non-cultural products $\Delta^{kl}_{ijt} = \hat{e}^k_{ijt} - \hat{u}^l_{ijt}$ is the most prominent. Strong ties are revealed for countries enjoying or having enjoyed a preferential political relationship, such as Great Britain and Macao or Cyprus and Malta, but not exclusively. Countries sharing common linguistic, ethnic, or historical linkages are rare in the table because these aspects are controlled for in the first stage equation via corresponding dummy variables. About half of large cultural ties in the second part of the table come from negative values of residual non cultural trade (e.g. Italy, Portugal, and Spain are net importers of paper and newsprint, causing their exports to France and Germany to lie below the average bilateral trade flow).

Very similar results are obtained when the exercise is carried on the smaller migration sample and the logarithm of the number of immigrants is an explanatory variable in both first and second stage estimations. In this case the sample is reduced to imports of 28 European countries from 168 foreign partners over the same time period 1988-2000. Table D.4 in the Appendix D displays estimated coefficients for the cultural and non-cultural residual terms used alone or together in the second stage equation along with the number of immigrants. Despite the apparent connection between the decision to immigrate and the existing cultural and social ties between the origin and host countries, the correlation matrix does not reveal any multicollinearity problems. non-significant estimates on some

Table 3.7: Imports of non-cultural products and cultural ties: cultural and non-cultural residual terms

Dependent variable:	$\ln g_{ij}$	$\ln g_{ij}$	$\ln g_{ij}$	$\ln g_{ij}$
Model:	(1)	(2)	(3)	(4)
Cultural goods used in first stage estimations k:	newspapers, periodicals	recorded magnetic tapes	other recorded media	alcoholic beverages
Similar non-cultural goods used in first stage estimations l:	newsprint rolls and sheets	unrecorded magnetic tapes	other blank media	acyclic mono-hydric alcohols
intercept	1.78^a	0.72^a	-0.48^a	1.69^a
	(0.20)	(0.18)	(0.15)	(0.13)
ln GDP importer	0.62^a	0.83^a	0.80^a	0.69^a
	(0.01)	(0.01)	(0.01)	(0.00)
ln GDP exporter	0.63^a	0.69^a	0.81^a	0.67^a
	(0.01)	(0.01)	(0.01)	(0.01)
ln distance	-0.42^a	-0.76^a	-0.76^a	-0.61^a
	(0.02)	(0.01)	(0.01)	(0.01)
common border	0.53^a	0.33^a	0.49^a	0.49^a
	(0.04)	(0.05)	(0.05)	(0.03)
militarized dispute	-0.07	-0.80^a	-0.78^a	0.02
	(0.20)	(0.19)	(0.18)	(0.13)
common official language	0.21^a	0.79^a	0.53^a	0.52^a
	(0.03)	(0.04)	(0.03)	(0.03)
colonial relationship	0.09^a	-0.03	0.00	0.23^a
	(0.04)	(0.08)	(0.06)	(0.03)
same country	0.59^a	0.01^a	0.26^a	0.21^a
	(0.07)	(0.09)	(0.07)	(0.06)
cultural residual $\hat{e}_{ijt}$	0.16^a	0.08^a	0.11^a	0.10^a
	(0.01)	(0.01)	(0.01)	(0.01)
non-cultural residual $\hat{u}_{ijt}$	0.04^a	0.07^a	0.05^a	0.13^a
	(0.01)	(0.01)	(0.01)	(0.01)
N	2872	6868	11034	9234
R^2	0.789	0.758	0.708	0.757
RMSE	.728	.997	1.045	.867

Note: Estimations with year fixed effects. Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

Table 3.8: Strongest cultural ties

Type of cultural products			
newspapers, periodicals	magnetic tapes recored	other recorded media	alcoholic beverages
Largest cultural residual, $\hat{e}_{ijt}$			
Brazil-Chile	Indonesia-Norway	Ecuador-Brazil	Mongolia-Kazakhstan
Denmark-Sweden	Indonesia-Sweden	Armenia-Greece	Russia-Moldova
Great Britain-Macao	Hungary-Singapore	Cyprus-Malta	
Ireland-Slovakia		Poland-Urugay	
Largest difference in residual, Δ_{ijt}^{kl}			
France-Italy	Hungary-Singapore	Chile-Sweden	Germany-Greece
France-Portugal	Netherlands-India	India-Indonesia	France-Poland
Germany-Slovenia	Netherlands-Indonesia	Israel-Ireland	Germany-Romania
Germany-Spain	Philippines-Germany	Turkey-Sweden	Germany-South Africa

Note: Exporter and importer pairs corresponding to the upper quartile of each measure are displayed.

variables (not shown in table D.4) are due to the very low number of countries sharing a common language or having fought on opposite sides in an armed conflict in the employed samples.

Positive and highly significant coefficients of the cultural residual term are obtained regardless of the type of cultural goods' trade used in first stage estimations. We add the interaction term of immigrants with residual trade to test whether the impact of social networks is reinforced by the means of international migration. Interesting, this affects the sign and statistical significance of coefficients ν and μ. Except for the case of other recorded media and alcoholic beverages, the coefficient of the residual cultural trade becomes completely non significant when the interaction term is added into the regression. This is accompanied, still, by a positive and significant coefficient on the interaction term. This permits us to conclude that, apart the two exceptions stated above, social networks increase trade only when they are complemented by bilateral flows of humans. Differently,

since international migration is traditionally employed in the literature to account for the presence of these networks, one can interpret this result as most cross-border social and cultural ties being heavily dependent on the human factor.

Correcting for bilateral non-cultural ties through the use of corresponding residual trade values confirms the trade-boosting role of social and cultural ties only in two cases out of four. Significant and larger coefficients of the residual of non cultural trade are obtained for magnetic tapes and alcohols. The trade creating effect of social ties measured by extra trade in other recorded media and newspapers is robust to the introduction of interaction terms. Contrary to non-cultural ties, the impact of social networks on trade is unaffected by the flows of immigrants. The corrected method is preferred to the rough use of residual trade in cultural goods at least for products for which similar culture-free goods are identified. Therefore, we formulate our conclusion based on the last set of results. The positive role of social networks expressed by an increased exchange of cultural products established in this section is not conditioned by international migration between trading countries. Nor does this phenomenon reinforce their effect on trade. Consequently, the innovative method developed in this chapter permits to measure aspects of social networks totally different from those identified in the literature, and shed more light on the way they affect international trade.

3.6 Information and Preference Effects

Although all the seven product groups mentioned above qualify as cultural, they reflect different aspects of social and cultural ties. Newspapers and other printed matter (which includes various advertising materials) have essentially an informational function, while films, books, recorded media and beverages are more likely to generate shifts in the consumer preference structure. Thus, by comparing the impact on trade of the residual term for different cultural goods, corrected or not by the residual trade of equivalent products

without a cultural component, one can judge upon the importance of the information and preference effects on trade of social networks.

The positive effect on trade in non-cultural products is largest for books, suggesting the larger preference effect on trade (see table 3.5). The information effect, mainly attributed to other printed matter and newspapers are only the third and fourth largest in size. However, if one is to consider the pure cultural component of the measure presented above, by including the residual trade of similar non-cultural goods in second stage estimations, the information effect prevails. Note that not only the coefficient on the cultural residual term is largest for newspapers, but also the coefficient on the non-cultural residual term is smallest for newsprint rolls and sheets used to produce these newspapers (last two lines in table 3.7). Still, the corrected measure of social networks can be constructed only for a limited number of goods. Similar goods without a cultural content are very difficult to be found for cinematographic films and printed books, two large categories of cultural products affecting mainly consumers' preference structure. Eliminating them from the set of results compared undoubtedly will artificially magnify the role of the information channel. Therefore we use the first set of results shown in table 3.5 to draw our main conclusions. This analysis permits to distinguish the two channels through which social networks have an impact on trade and to reveal the overwhelming change-in-preference inducing role of social networks.

A different classification of goods can be applied to evaluate results obtained in this chapter. Rauch (1999) divides goods into three broad categories depending on the relevance and sufficiency of markets for international transactions. Homogeneous goods are those traded on organized exchanges and the market mechanism allows successful transactions to arise in most cases. There is an intermediate category of goods for which a reference price exists on the market, but supplementary information from other sources increases the odds of finding a good partner. Additional information about foreign consumers or partners as

well as enforcement mechanisms are even more valuable for trade in differentiated goods. According to Rauch, networks represent the alternative of markets and integrate social and cultural ties, and count the less for trade in homogeneous goods and the most for trade in differentiated products.

As can be easily seen from table 3.9, Rauch's affirmation is confirmed for cultural ties expressed by the residual trade in books, recorded media and food products. Results are confirmed when residual terms obtained for similar goods with no cultural component are used in second stage equations. The role of cultural ties in international trade of reference priced and differentiated products is larger than their role for homogeneous goods' trade.

The impact of cultural ties acquired via an extra trade of other printed matter, films, or recorded magnetic tapes is not statistically different for the three types of goods. Printed matter has a main informational component, while the other two types of cultural goods have strong preference effects. Estimates in columns 1, 3 and 5 show that the increased market intelligence of domestic firms and shifts in preferences are equally relevant for imports of homogeneous and differentiated goods. This represents a weakening of Rauch's results.

Finally, information from foreign newspapers seems to be more relevant for international transactions with homogeneous goods. This result does not contradict Rauch's statement regarding the importance of network ties because internationally traded newspapers often list market rates for organized exchanges. More puzzling is the unexpectedly low effect obtained for reference priced goods. The difference between the effect of cultural ties on trade across types of goods is reversed when residual trade in culture-free newsprint is added to the right hand side of the estimated equation (the lower part of table 3.9). Thus, in line with Rauch's prediction, information on foreign partners and markets included in foreign newspapers and periodicals is particularly important for suppliers and buyers of more differentiated products.

The preference channel prevails for trade in differentiated and cultural goods, while trade in homogeneous goods benefits rather from increased information brought through cross-border social networks. The largest coefficients of the cultural residual in the case of the first two types of goods are obtained when trade in books and alcoholic beverages is used in fist stage estimations. The information effect of cultural ties developed by the cross-border trade in newspapers, on the contrary, is larger for homogeneous goods. Homogeneous goods, as suggested by their name, are very similar regardless of their origin and there is no apparent reason for their international sale and purchase to be subject to uneven bilateral preferences. Correspondingly, trade in these goods increases with an improved knowledge of foreign partners, and very little due to altered preferences of consumers.

Thus, differently from most empirical works distinguishing the preference and information channels of action of networks, we find evidence of a large preference effect on international trade of cross-borders social networks, without neglecting the role of information exchanged through them. With some exceptions, our results confirm Rauch's statement that networks are of greater importance for sophisticated products. Similar effects of extra trade in films, printed matter and recorded magnetic tapes for different types of goods demands for an additional investigation of this thesis.

Table 3.9: The importance of cultural ties for different types of goods: Rauch's classification

Cultural goods in first stage estimations k:	cinematographic films	books, pamphlets, maps, etc.	other printed matter	newspapers, periodicals	recorded magnetic tapes	other recorded media	alcoholic beverages
Similar non-cultural goods in first stage estimations l:				newsprint rolls and sheets	unrecorded magnetic tapes	other blank media	acyclic monohydric alcohols
Cultural ties variable(s) in second stage estimations:	*Cultural trade residual*						
cultural residual, homogeneous goods	0.07^b	0.20^a	0.22^a	0.24^a	0.06^a	0.09^a	0.08^a
	(0.04)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
cultural residual, reference priced goods	0.04^a	0.21^a	0.19^a	0.08^a	0.05^a	0.09^a	0.31^a
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
cultural residual, differentiated products	0.05^a	0.24^a	0.21^a	0.14^a	0.07^a	0.14^a	0.17^a
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	Cultural and non-cultural trade residuals						
cultural residual, homogeneous goods				0.08^a	0.19^a	0.07^a	0.04^a
				(0.01)	(0.02)	(0.03)	(0.01)
non-cultural residual, homogeneous goods				0.04^a	0.05^a	0.04^a	0.15^a
				(0.01)	(0.02)	(0.02)	(0.02)
cultural residual, reference priced goods				0.10^a	0.06^a	0.12^a	0.16^a
				(0.01)	(0.01)	(0.01)	(0.01)
non-cultural residual, reference priced goods				0.04^a	0.05^a	0.11^a	0.18^a
				(0.01)	(0.01)	(0.01)	(0.01)
cultural residual, differentiated products				0.14^a	0.06^a	0.17^a	0.13^a
				(0.01)	(0.01)	(0.01)	(0.01)
non-cultural residual, differentiated products				0.07^a	0.09^a	0.03^a	0.09^a
				(0.01)	(0.01)	(0.01)	(0.01)

Note: Estimations with year fixed effects. Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

3.7 Conclusions

A measure of the intensity of the social networks from the trade with cultural goods is developed in this chapter. Results indicate the presence of bilateral social and/or cultural linkages other than those identified in the literature and which matter for international trade in general. Trade with cultural goods is an important interface for the assimilation of information about foreign markets and preferences. The measure developed here is preferable to dischotomic variables usually used in empirical studies, as it shows not only the presence or not cultural ties, but also quantifies their strength.

The simple consumption of the foreign goods with a cultural component generates shifts in the structure of the preferences, but also contributes to a superior information on foreign partners and markets. The preference effect of social networks on trade, expressed by a larger positive coefficient for the cultural and social ties measure obtained from the extra trade in books and agricultural products, exceeds the information effect.

The literature on trade and networks suggests that markets are least sufficient and networks are of greater importance for trade in sophisticated products. Using Rauch (1999)'s classification of goods into homogeneous, reference priced and differentiated goods, only partial support of this affirmation is found. Only for three out of seven groups of cultural products the role of social and cultural ties for trade in reference priced and differentiated products is larger than their role for homogeneous goods'trade. Similar effects for the three types of products are obtained in three out of seven cases, encouraging a further investigation of this affirmation.

Chapter 4

Migrant Associations, Trade, and FDI

4.1 Introduction

Regardless of the increased integration and globalization marking the present-day world economy, cross-border trade is achieved at non-negligible costs. According to Anderson and van Wincoop (2004) these amount to a 74% tax equivalent for North-North trade. This figure includes all directly observed and inferred border-related trade barriers, and breaks down as follows: 21% transportation costs (both in terms of freight and time), 8% policy barriers (tariff and non-tariff barriers), a 14% currency barrier, and 17% inferred trade costs, such as information costs, contract enforcement costs, legal and regulatory costs, etc. ($1.74 = 1.21 \times 1.08 \times 1.14 \times 1.17$). Despite the recent innovations in technology associated with lower transport costs, authors estimate that the latter represent the largest share of international trade costs. With today's global trade liberalization the friction induced by tariffs and NTB shrinks and the gain in trade associated from their elimination is reduced. Barriers relative to the use of different currencies in the importing and exporting country are large, but very difficult to reduce due to major associated macroeconomic costs.[1]

[1]Developing and transition countries have linked their domestic currency to a hard foreign currency and reduced exchange rate volatility almost exclusively in periods of harsh economic problems. The European monetary union was reached at a high cost and after a long history of economic integration.

The present chapter focuses on the last type of trade costs in the above decomposition and second in terms of importance. Rauch (2001) identifies them with information and partner search costs, and costs relative to the enforcement of contracts and agreements. Institutional costs, i.e. additional costs arising because of the poor quality of domestic importer and/or exporter institutions, and the resulting risk and uncertainty with regard to the outcome of international transactions also enter this category (Anderson and Marcouiller (2002)). As suggested by their name, hidden transaction costs are not easily quantified or even revealed, and make international trade contracts more time-demanding, harder and costlier to accomplish than domestic ones. Inferred or hidden trade costs have been less explored by the literature, but their contraction, if reachable, may represent a major (or even the main) trade enhancing factor.

A possible way to quantify these costs is to consider international migration. There is a recent and expanding literature showing that international transaction costs are generally lower in the presence of large flows or stocks of immigrants. The intuition behind is straightforward: Immigrants carry their increased knowledge on the country of origin to the host country. From this point of view, international migration can be viewed as a transfer of information. Countries who receive immigrants also import their knowledge of opportunities, practices and tastes in the origin countries. Migration *per se* is often used to control for cross-border social (and even business) networks. However, this literature does not consider the organized activity of immigrants in the host country.

We propose a different view of migration in this chapter. The classification of networks into business and social introduces by Rauch (2001) and a number of other authors can be transposed to international migration. Social networks refer to common linguistic, ethnic, religious, historical ties. But this is exactly the case of immigrants. Therefore, one can use immigrants as a proxy for the strength of social ties. Differently, business networks refer to links existing between firms. Rauch and Trindade (2002) consider the overseas

Chinese network, Belderbos and Sleuwaegen (1998), and Head and Ries (2001b) focus on the case of Japanese keiretsu operating across national borders, while Combes et al (2005) study the links between plants belonging to the same business group inside France. A central issue to all these literature is the presence of organized structures. The capacity of immigrants to organize in the host country, define common goals, raise funds, and undertake joint actions in the benefit of their home country is revealed by the creation of migrant associations in the host country. The latter can therefore be used as a measure of the intensity of business networks. The approach adopted in this chapter consists in the joint use of data on immigrants and migrant associations to quantify the impact of social and business networks on the foreign trade and foreign direct investment in the case of France.

4.2 Networks, Immigrants, and Migrant Associations

The existing literature (Rauch (2001), Combes et alii (2005)) suggests that hidden border-specific costs are greatly reduced in the presence of networks linking individuals or firms in the importing and the exporting country. Cross border networks can by divided into business and social. The former refer to preferential linkages between trading firms, while the latter designate similar characteristics of individuals (consumers and employees) in the two countries. The magnitude of information, contract enforcement and related costs can therefore also be inferred indirectly from the strength of social and business linkages.[2]

Members of a social network can acquire information about a firm or product in the origin or host country at a low [or zero] cost since they speak the local language, can learn about economic risks and opportunities from their family and friends, or rely on their own

[2]The term *strength* is preferred to the *presence* of networks or linkages in order to emphasize the fact that networks differ in intensity and their effect on trade. The presence or absence of networks therefore provides insufficient information to draw unbiased conclusion. Moreover, the absolute absence of networks is very rare and corresponds to a network of null strength; selected individuals form all countries share at list some kind of common characteristics (e.g. English speaking people exist virtually in all countries of the world).

past experience. Usually, they have a more pronounced preference for goods produced in their country of origin, but can also influence the consumption patterns of family members and friends in favor of either origin or host country. As an illustration, a Vietnamese immigrating to France will tend to consume more Vietnamese products than an average French person. But he may also initiate his French friends to the consumption of products specific to Vietnam, as well as persuade his friends and family members back in Vietnam to purchase French products. Consequently, strong social cross-border networks translate overall into increased bilateral trade flows between the countries of residence of individuals in the network.

Networks formed by firms perform two main functions. As in the case of social networks, they permit a better information of members on potential partners, unavailable on the market or available at a higher cost. In this way business networks contribute to the reduction of information and partner search costs for its members, and a corresponding increase of their profits on foreign markets (Casella and Rauch (2003)). A second function specific to business networks is to facilitate the punishment of opportunistic behavior usually accomplished via well-established enforcement mechanisms. However, the desired result can be achieved also implicitly through a full spread of information about members within the network. The non respect of contractual stipulations by a member is quickly learned by other members of the network, which strongly reduces the chances of the former to find a partner inside the network (Greif (1993), Hsing (1999), Anderson and Young (2002)). When networks comprise firms or organized structures from different countries, cross-border trade is affected. Following the previous example, a French resident of Vietnamese origin can persuade its French employer to engage into increased business contacts with Vietnamese partners, given the low cost at which he can supply relevant skills and information on those partners. Furthermore, Vietnamese immigrants settled in France can create an association in charge of the development and implementation of different

programs in Vietnam, the diffusion among the French business community of information on business opportunities in Vietnam, the matching of partners from the two countries etc. In either case the development of bilateral ties between organized countries will benefit mutual trade.

We have concentrated so far on the impact of cross-border networks on trade. The literature on foreign direct investment suggests that the above discussion can be safely extended to firms' investment decisions. Recently, Portes and Rey (2005) have shown, using data on bilateral telephone traffic, that informational barriers are important in determining cross-country capital flows. Information, search and contract enforcement costs are known to matter as well for decisions to invest abroad. Lower costs increase potential profits and attract investors. Possessing a cost advantage, members of a business network have a higher incentive (can obtain a higher profit) to invest in countries of origin of other firms from the network than outsiders. Alternatively, they can explore this opportunity by serving as intermediary for an interested outside firm. On both occasions networks generate additional FDI. The existence of a strong social network is favourable mainly for exports-substituting tariff-jumping foreign direct investments. The awareness of goods that are to be produced locally, the brand, or the company in the host country, as well as the similarity in consumer tastes and preferences between the host and origin country are a premise for the acquisition of a larger market share by the investor. It will reinforce the probability of the FDI operation to take place in the first place, but may also determine the firm to invest a larger amount.

Once the importance of networks for trade and foreign direct investment established, the question arises of how to quantify networks and evaluate their effects. The presence of historical, ethnic, religious, or linguistic links, all testify in favor of existing social networks. Most empirical trade studies account for these aspects by using relevant dummy variables. However even using quantitative variables, such as the percentage of population in each

country speaking a common language or with an identical ethnic background, one needs to make additional assumptions in order to construct a unique measure of the intensity of social networks. A particular case when all or most of these characteristics are reunited is that of migrants. Accordingly, bilateral flows and stocks of immigrants are a good instrument of the unobserved networks' strength. There is a growing recent literature illustrating the pro-trade effect of migration using a gravity type framework. Authors also disentangle between the preference and the information effect on trade. Combes et alii (2005) write:

> "Presumably, the preference effect takes place for networks created and maintained by individuals at the destination of the trade flow only (i.e. on imports). By contrast, migrant networks at the origin of the trade flow (i.e. on exports) and firm networks are both origin and destination should encompass information effects only."

Gould (1994) and Head and Ries (1998) find support for both information and preference channels. They attest the existence of a preference for home country products by showing that immigrants increase imports substantially more than exports. Dunlevy and Hutchinson (1999) find support for the pro-import effect alone, especially for down-stream and highly differentiated goods during the early periods of mass migration to the US. Their result confirms the importance of the preference channel or "taste linkage" for international trade.

More recent studies support the dominance of the information channel over the preference channel. Rauch and Trindade (2002) establish this conclusion in the case of the worldwide Chinese networks and find that this effect is particularly large for trade in differentiated products. They explain that for these goods networks provide information unavailable on the market place. They reject the preference channel because some countries with a large Chinese population don't have China as a trade partner at all. Girma and Yu (2002) support the idea that immigrants improve trade through their superior knowledge about foreign markets and different social institutions rather than their busi-

ness connections or personal contacts in their home countries. They use recent UK data and show that immigration from non Commonwealth countries to UK, contrary to immigration from Commonwealth countries, has a positive and significant export-enhancing effect. Authors attribute these results to the fact that knowledge brought by immigrants from former colonies do not bring with them any new information that can help substantially reduce the transaction cost of trade between their home countries and the host nation. Combes et alii (2005) consider trade between French regions and reach similar findings. Authors show that the preference effect has been overestimated by the earlier literature. Finally, Herander and Saavedra (2005) complement this literature by revealing the positive relationship between American states's populations of immigrant groups and the volume of state exports to the home country, and emphasizing the role of proximity of ethnic networks.

Business networks are much less revealed by the data. Rauch and Trindade (2002) use data on ethnic Chinese population shares to evaluate the trade-creating effect of the overseas Chinese network. Similarly, Gao (2003) and Bandelj (2002) employ population shares of ethnic groups in the investing country to examine the role networks in international investment. In fact, all these papers use population shares as proxy for both social and business networks without separating the two types of ties. Differently, Belderbos and Sleuwaegen (1998), and Head and Ries (2001b) consider the specific case of Japanese keiretsu operating across national borders, much resembling the relationship between the parent-company and its subsidiaries. Authors show that inter-firm relationships between Japanese firms in a vertical keiretsu play an important role in export behaviour. Belderbos and Sleuwaegen (1998) show that subcontractor firms were able to expand components exports by supplying the European manufacturing plants of their parent firms, while Head and Ries (2001b) show that firms who increased their manufacturing investment overseas also tended to increase exports. Other studies on international trade and business networks refer to domestic business groups such as keiretsu in Japan (Spencer and Qui (2001)), and

chaebol in Korea (Feenstra et alii (1997), (1999)). Combes et alii (2005) measure business networks by the number of financially-linked enterprises, and find that business networks are more important than social ones for trade between French regions.

A different measure for cross-border business networks consisting in the number of associations established by immigrants in the host country is proposed in the present chapter. Migrant or home country associations can be interpreted as the organized aspect of international migration. The establishment of such organisations indicates the ability of migrants to associate into organized bodies (juridical persons), as well as their will to participate in economic transactions involving their country of origin. Therefore, despite their ethnic character, migrant associations reflect the intensity of business rather than social networks.

Using flows of immigrants to control for social ties between countries along with migrant associations permits to separate the social and business aspect of cross-border ethnic networks. Correspondingly, one can adopt a different terminology and refer to business and social networks as *organized* and, respectively *unorganized*. From this point of view, international migration can be considered as a two-stage phenomenon. First, there is the arrival of immigrants in the host country associated with an inflow of information on origin countries. Secondly, organized structures (migrant associations) may be established to assure direct contacts, intermediation, and even direct participation in bilateral projects. The specific way in which networks distort trade and FDI is modelled in the next section.

4.3 The Model

In this section we model bilateral South-North trade and North direct investment in developing countries from the South in the presence of social and business cross-border networks. More precisely, in our case the North se represented by a single country: France.

4.3.1 A Trade Model with Social and Business Networks

We derive a model in which trade flows in general, and developing countries' exports to and imports from France in particular, are expressed as a function of bilateral social and business linkages connecting the exporting and importing countries. It is based on the stylized version of the standard new trade theory model introduced by Fujita et alii (1999), and extended by Redding and Venables (2004) takes into account networks effects.

The R countries of the world economy exchange locally produced goods with each other at some positive trade costs. There are two types of countries, one rich or industrialized country and $R-1$ developing countries, labelled accordingly North and South. There are two sectors, a manufactured sector with an aggregate good M and an agricultural sector with a numeraire good A, but only the former is exchanged internationally. Firms in the manufactured sector in both industrialized and developing countries operate under increasing returns and monopolistic competition.

On the demand side, manufactured products are differentiated across firms and used both in final consumption and as intermediary inputs. There is a constant elasticity of substitution σ for each pair of manufactured goods regardless of their origin. As a consequence products enter both utility and production through a CES aggregator taking the form:

$$U_j = M^{\mu} A^{1-\mu} = \left(\sum_{i=1}^{R} \sum_{r=1}^{n_i} x_{ijr}^{(\sigma-1)/\sigma} \right)^{\frac{\mu\sigma}{\sigma-1}} A^{1-\mu}, \quad \sigma > 1. \tag{4.1}$$

n_i is the number of manufactured varieties produced in country i, and x_{ijr} is country j's demand for each variety r of the manufactured good produced in i. At the equilibrium all manufactured varieties originating from i are demanded in country j in equal quantities.

Accordingly, for each importing country j we have a global price index G_j defined over the price of all varieties of the manufactured good produced anywhere on the globe and

sold in j:

$$G_j = \left(\sum_{i=1}^{R} n_i p_{ij}^{1-\sigma} \right)^{\frac{1}{1-\sigma}}. \tag{4.2}$$

Symmetry applies as well to the price of products: All manufactured varieties from the same origin country are sold at a unique price p_{ij} to importing country consumers.

All countries spend an equal share μ of their expenditure E on manufactured products, and the $1-\mu$ remainder on the agricultural good:

$$E_j = G_j M_j + p_{Aj} A_j, \tag{4.3}$$

where p_{Aj} is the price of the locally produced and consumed agricultural good A_j. The budget contraint for the manufactured sector alone faced by the importing country can then be expressed as follows:

$$\sum_{i=1}^{R} n_i x_{ij} p_{ij} = \mu E_j. \tag{4.4}$$

Country j's total expenditure on goods produced in i is the sum of its expenditure on each variety produced in that country weighed by a probability function θ_{ij} of firms from the two countries to contact each other, and sign a contract. Although consumers from the North may demand a large amount of a particular manufactured variety produced in the South country i, firms from the North may not be able to satisfy it entirely because of the difficulties in contacting relevant partners in i and/or reaching a mutual agreement. Thus, North's imports from and exports to a partner in the South are equal to:

$$m_{ij} = \theta_{ij} n_i p_{ij} x_{ij}. \tag{4.5}$$

The volume of manufactured sales of all firms in i to each location j are obtained by maximizing the first term of the utility function (4.1), corresponding to the utility level associated with the consumption of manufactured products, under the budget constraint

expressed by equation (4.4):

$$x_{ij} = p_{ij}^{-\sigma} \mu E_j G_j^{\sigma-1}. \tag{4.6}$$

We assume mill pricing for all varieties, and an identical structure of trade costs for each pair of countries. Under these conditions the price at destination is equal to the product of the mill price p_i and bilateral trade costs T_{ij}. Substitute equation (4.6) in trade equation (4.5) to reach the following expression of bilateral imports of country j from a partner country i:

$$m_{ij} = \theta_{ij} n_i p_i^{1-\sigma} (T_{ij}^{1-\sigma}) \mu E_j G_j^{\sigma-1}. \tag{4.7}$$

Note that equation (4.7) holds for all types or trade, including South exports to and imports from the North. Grouping importer and exporter specific terms of the right hand side expression of (4.7), and taking logarithms on both sides:

$$\ln m_{ij} = FE_i + \ln \theta_{ij} T_{ij}^{1-\sigma} + FM_j. \tag{4.8}$$

Adopting the terms introduced by Redding and Venables (2004), $FM_j = \mu E_j G_j^{\sigma-1}$ represents importing country's market capacity, and $FE_i = n_i p_i^{1-\sigma}$ exporting country's supply capacity. Without any additional knowledge on the elasticity of substitution σ one cannot directly measure supply and market capacities. The use of country and partner fixed effects as Rose and van Wincoop (2001) and Redding and Venables (2004) permits the empirical estimation of bilateral trade costs from equation (4.8).

We consider five elements of trade costs: transportation costs proportional to the physical distance d_{ij}, policy costs expressed by the ad-valorem import tariff t_{ij} in country j on products from i, costs relative to the overall domestic economic and political situation, instrumented by the foreign aid received by countries, $S_{i/j}$, and the participation in

a militarized conflict $W_{i/j}$, informational costs I_{ij}, and contract enforcement costs C_{ij}:

$$T_{ij} = d_{ij}^{\rho}(1+t_{ij}){S_{i/j}}^{\eta}\exp[W_{i/j}]^{\omega}(1+I_{ij})(1+C_{ij}). \tag{4.9}$$

Positive institutional and armed conflict costs are assumed only for South countries. Therefore, depending on the type of trade flows explained, these costs are specific to the importing or exporting country. For French exports to the South we have $S_{i/j} = S_j$ and $W_{i/j} = W_j$, while for French imports from developing countries $S_{i/j} = S_i$ and $W_{i/j} = W_i$. The last two types of costs in equation (4.9) are expressed in terms of tax equivalent and are therefore included in a form similar to tariffs. Information and contract enforcement costs, as well as the probability of firms from countries i and j to meet and sign a trade contract are log-linear functions of the strength of network ties. Unobservable cross-border trade costs decrease, while the probability value θ_{ij} augments in the presence of strong social and business networks:

$$\begin{aligned} 1+I_{ij} &= \exp(SN_{ij})^{\nu}\exp(BN_{ij})^{\delta}, \\ 1+C_{ij} &= \exp(BN_{ij})^{\zeta}, \\ \theta_{ij} &= \exp(SN_{ij})^{\xi}\exp(BN_{ij})^{\psi}. \end{aligned} \tag{4.10}$$

SN_{ij} and BN_{ij} measure the intensity or strength of social and respectively business networks between countries i and j. Network variables enter the trade costs equation with negative coefficients ν, δ, ζ, ξ, and ψ, but have a positive impact on trade. Plug equations (4.9) and (4.10) into (4.8) to reach the final trade specification:

$$\begin{aligned} \ln m_{ij} &= FE_i + FM_j + \rho(1-\sigma)\ln d_{ij} + (1-\sigma)\ln(1+t_{ij}) + \eta(1-\sigma)\ln S_{i/j} \\ &\quad +\omega(1-\sigma)W_{i/j} + [\xi+\nu(1-\sigma)]SN_{ij} + [\psi+\delta(1-\sigma)]BN_{ij}. \end{aligned} \tag{4.11}$$

Equation (4.11) applies to all types of bilateral trade, including North-South trade flows in either direction, and is a central identity tested in this chapter.

4.3.2 A Model of FDI with Network Effects

In this section we derive a simple location choice model with inspired from the large empirical FDI literature. The explained variable in our model is the number of French subsidiaries operating in a developing country j during a each period (year) t, N_{jt}. This number is the outcome of a cumulative investment process starting at some point t_0. French firms' decision to invest in any period $t > t_0$ is a discrete choice made among the $R-1$ alternative locations. There is a total number c_{jt} of alternative investment options that French firms can undertake in each country j in period t. We allow c_{jt} be greater than unity in order to reflect a more realistic investment behaviour. Firms can make a green-field investment or acquire an existent domestic capacity in one or more locations inside the same country operating in the same or different sectors. Each location j and project s offers a time-variant profit π_{sjt}:

$$\pi_{sjt} = U_{jt} + e_{sjt}, \tag{4.12}$$

which can be expressed as the sum of a function U_{jt} of some country specific observable characteristics X_{jt} and transaction costs τ_{jt}, $U_{jt} = bX_{jt} + \beta\tau_{jt}$, and an unobservable advantage of each project e_{sjt}. We drop the origin specific subscript i as there is a single investing country, the North, but one should keep in mind that transaction costs are truly bilateral. Firms invest when profits exceed some country specific threshold value π^*_{jt}, corresponding to the fixed cost of the investment. In the absence of project specific observables, the probability of a company from the North to invest in any project s in the South country j is constant across investment projects and given by:

$$Pr_{sjt} = \text{Prob}(bX_{jt} + \beta\tau_{ijt} + e_{sjt} > \pi^*_{jt}) = 1 - \text{Prob}(e_{sjt} \leq \pi^*_{jt} - bX_{jt} - \beta\tau_{ijt})) \equiv Pr_{jt}. \tag{4.13}$$

The number of distinct investments operations in that particular developing country is obtained by summing probabilities Pr_{sjt} across investment projects $s = 1, ..., c_{jt}$:

$$S_{jt} = \sum_{k=1}^{c_{jt}} Pr_{kjt} = c_{jt} Pr_{jt}, \tag{4.14}$$

and is equal to the country-level probability with which projects yield profits superior to the threshold value π^*_{jt}, times the number of individual projects. Cumulate S_{jt} across time to obtain the number of subsidiaries functioning in each Southern country and any time period:

$$N_{jt} = N_{j,t_0} + \sum_{l=t_0}^{t} S_{jl} = N_{j,t_0} + \sum_{l=t_0}^{t} c_{jl} Pr_{jl}. \tag{4.15}$$

The fixed cost π^*_{jt} as well as the number of a country's investment projects c_{jt} are linear functions of country specific characteristics, the same which shape profits π_{sjt}. Thus, the number of subsidiaries of firms from the North operating in the South country j during any period is simply a function of observables X_{jt}, transaction costs τ_{jt}, and the number of subsidiaries operating at t_0, N_{j,t_0}.

Location specific observable characteristics X_{jt} include standard variables employed in the FDI literature, as the size of the host market, and local operational costs, but also variables describing the general framework of host countries. Similar to the trade model presented in section 4.3.1, foreign aid is employed to portray the global economic environment, and the participation of countries in armed conflicts to appreciate the internal political stability. Network effects are introduced through bilateral transaction costs:

$$\tau_{jt} = \tau(d_{ij}, SN_{ijt}, BN_{ijt}). \tag{4.16}$$

Investment-related costs are less burdening when the origin and host country are connected by strong social and/or business ties. This comes through the same channels as in the case of cross-border trade, i.e. lowering information and contract enforcement costs associated

with investment projects in each South country. In line with the empirical literature, firms also tend to invest less in distant countries. One reason explaining this phenomenon is that many bilateral linkages such as similarity in institutions, practices, or tastes, and trust decrease with distance. In addition to that, direct supervision of subsidiary's activity by the parent country is achieved at higher costs when the former are situated in faraway countries. For these reasons we include distance proportional costs in the decomposition (4.16) of transaction costs.

The number of subsidiaries owned by enterprises in the North and functioning in the South country j in period t can be expressed by:

$$N_{jt} = N\left(N_{j,t_0}, X_{jt}, d_j, SN_{jt}, BN_{jt}\right) \equiv N\left(Z_{j,t}\right). \tag{4.17}$$

We denote by $Z_{j,t}$ the set of independent variables in (4.17). This is the second relationship studied in the empirical part of this chapter. However, a proper choice of the starting period t_0, such that N_{j,t_0}=0, induces the irrelevance of the first variable on the right hand side of equation (4.17). Note that the explained variable N_{jt} takes non-negative integer values, requiring an adequate functional form. Positive integer values of N_{jt} are obtained assuming a Poisson distribution function:

$$f^P(N_{jt}) = \frac{\exp[-\lambda(Z_{jt})][\lambda(Z_{jt})]^{N_{jt}}}{N_{jt}!}, \tag{4.18}$$

where λ represents the conditional mean of the distribution, and is log linearly dependent on the set of independent variables in (4.17). Alternatively, one can use a negative binomial distribution:

$$f^{NB}(N_{jt}) = \frac{\Gamma\left(N_{jt}+\frac{1}{\alpha}\right)}{N_{jt}!\Gamma\left(\frac{1}{\alpha}\right)}\left(\frac{\alpha\lambda(Z_{jt})}{1+\alpha\lambda(Z_{jt})}\right)^{N_{jt}}\left(\frac{1}{1+\alpha\lambda(Z_{jt})}\right)^{\frac{1}{\alpha}}, \tag{4.19}$$

where α is the overdispertion parameter. In section 4.5 we test which of the two models

offers a better fit of the employed data.

4.4 The Data and Stylized Facts on Migrant Associations

The data used for the empirical application comprises French exports to and imports from seventeen developing countries, as well as investments of French companies in these countries from 1980 to 2000. Trade data comes from Feenstra and Lipsey's (html), and covers trade flows at SITC 4-digit level. Data on French subsidiaries is from the 2002 version of the database constructed by the Direction of Foreign Economic Relations (DREE) of the French Ministry of Economics and Finances. For each French subsidiary, it provides the year of the beginning of activities abroad, the host country, and a number of additional attributes. We compute the number of average-size French affiliates in each country and year using the number of local employees in 2000 as weights. Annual flows of immigrants from the considered 17 developing countries to France is from EUROSTAT. We use an original and entirely new data base on home country (migrant) associations settled in France, which we present below. Data on GDP, per capita GDP, and foreign aid is obtained from the World Bank's Development Indicators. Unweighted average import tariff rates computed by the World Bank on the basis of data supplied by WTO and UNCTAD are used. Bilateral distances are the distances between Paris and the capital cities of the selected countries. Whether trading countries have been or not engaged at any time period into a militarized conflict is documented from the "Correlates of War" database (SOURCE).

The final version of the French data base on migrant associations (bsta), also known as organizations of international solidarity emerged from migration (OISM), used in this chapter has been released in 2005 and has not been previously employed in economic studies. OISM are non-profit associations created by immigrants settled in France or their

descendants, and whose activities are at least partially turned toward solidarity with nationals from their countries of origin. They are federated at national level under a common platform known as the Forum of Organizations of International solidarity emerged from Migration (FORIM), created in 2002 as an working group of the Co-operation and Development Commission at the initiative of the Ministry of Foreign Affairs, and charged with the collection of data on migrant associations functioning in France. The creation of OSIM can not be simply attributed to the reach by ethnic communities of a critical mass or their maturity. They reveal the true ability of immigrants to organize in their host country. Indeed, representatives of large and relatively old communities do not necessarily participate at the establish home country associations. A good illustration of that is the case of most North-African immigrants established in France (e.g. Tunisians, Algerians). Contrary to Morrocan natives, these communities are very little, if at all, involved in the OISM phenomenon.

The data base provides information on the following points: associations' address, area and country of intervention, creation date, affiliation to a national or international group, financing origins, types of activities carried in France and abroad, association's budget and its use in France and abroad. For a limited number of associations it also provides the number of employees, members, volunteers and sympathizers in France and abroad, and the precise budget. We have employed and complemented the data base elaborated by the FORIM, mainly with respect to the year of creation and address in France, by contacting directly the associations for which missing values have been reported in FORIM's data base.

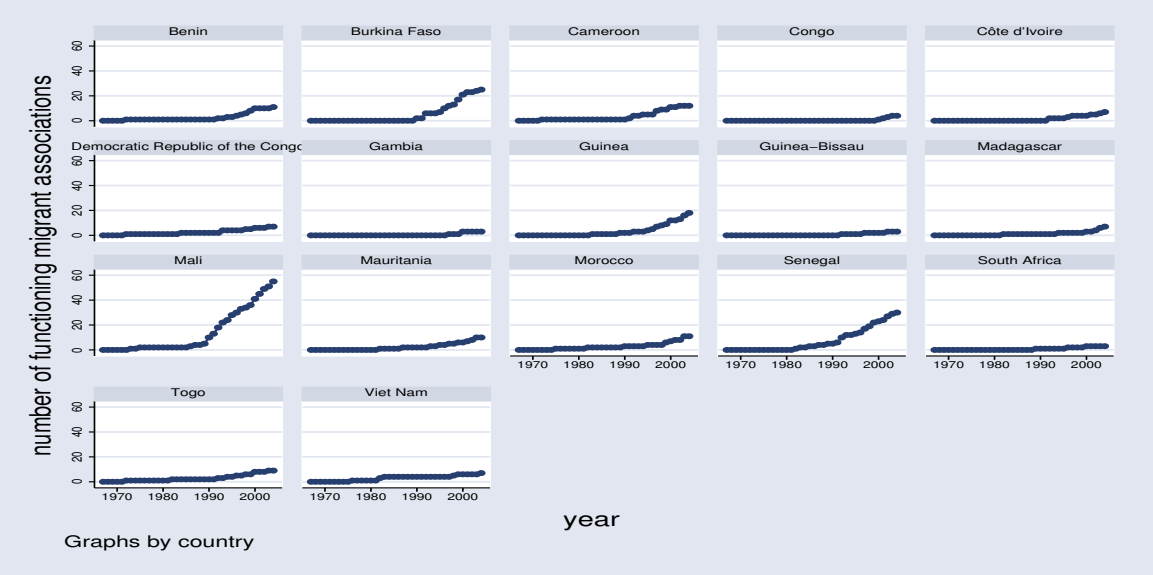
The entire data base on home country associations settled in France comprises 198 establishments carrying economic, social, and cultural actions in 48 countries. The oldest of them was created in the late 1960s. Even though the biggest part of migrant associations are situated in and around Paris, all country's largest towns (Marseille, Lyon, Toulouse,

etc.) host an important number of associations. Because of the non-exhaustive character of the data, we restrict the sample to associations acting in countries which benefited by the year 2004 from projects conducted by at least three OISM situated in France. In this way the sample is reduced to 161 migrant associations and 17 developing countries, most of them African. In terms of the number of associations, Mali and Senegal are in the front of the list with 54 and 31 OISM respectively. Largest associations with respect to the budget used get involved in countries where few OISM are present. Although a large part of the selected home country associations are quite recent: about half of them have been created during the last seven years, there are associations existing for more than three decades. 70% of the OISM function with very small budgets (less than 10000 USD per year), and use the largest part of their funds on programs and projects abroad. Regardless of the broad areas of intervention, three-fourths of associations carry at least some kind of economic actions. Their geographical spread inside France is very uneven, with two-thirds of OISM being concentrated in Paris and its suburbs. Figure 4.1 shows the evolution of home country associations by country of intervention. Migrants from former colonies established in France have developed more rapidly their capacity to organize in the host country. Detailed data on the explained and independent variables employed in the chapter, including the ones constructed in order to evaluate migrant associations, is displayed in table E.1 of the Appendix E.1.

4.5 Foreign Trade in the Presence of Ethnic Networks

The trade model presented in section 4.3.1 is applied to recent trade between France and seventeen foreign partners. The role of social and business networks for the international exchange of products is assessed via the use of information on international flows of immigrants and on the existing home country associations. Migration flows are preferred to stock values for explaining cross-border social ties from two considerations. New im-

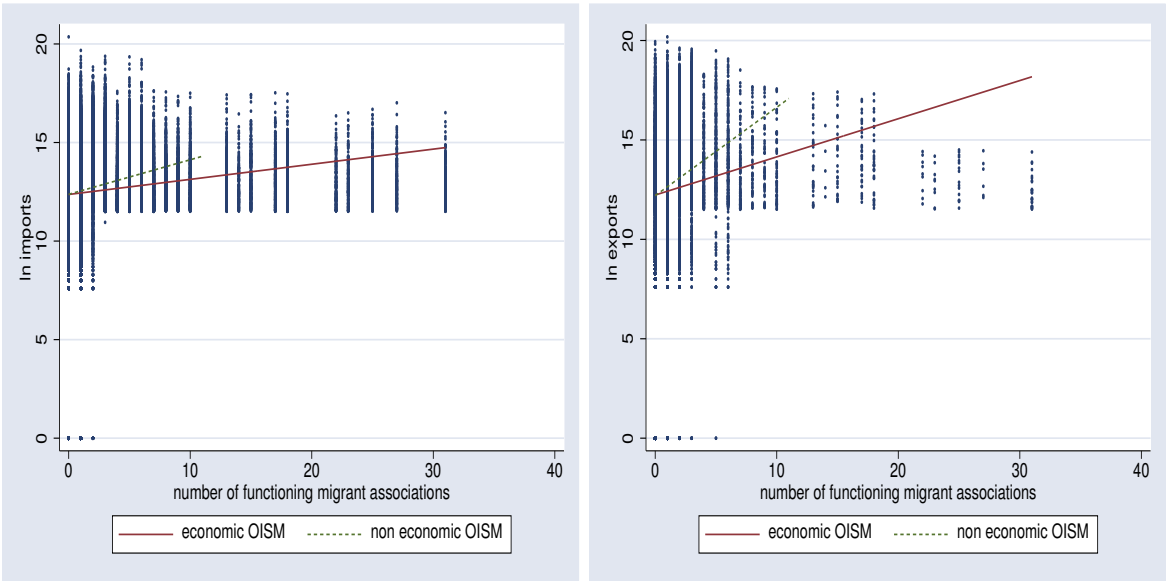
Figure 4.1: Migrant associations by country of intervention



migrants bring more recent and economically valuable information to the host country, preserve to higher degree their traditions and consumption habits, and keep tighter contacts with their place of origin than elder settlers. The establishment of home country associations, reflecting business networks in our case, is more likely to occur in large populations of immigrant groups, and the use of these variables on the same side of the equation will generate multicolinearity. We are able to avoid this problem by choosing immigrants flow data. One should also recall that migration arises mainly from countries with lower per capita GDP to countries with higher GDP per capita. Foreign nationals settled in France and associations created by them are thus a relevant proxy of the intensity of ties between France and origin countries, shaping reciprocal trade in either direction.

Before proceeding to the estimation of migrants' and home country associations' effect on trade, we start with a graphical representation of these phenomena. The positive correlation between trade and migrant associations is reflected in figure 4.2. We divide migrant associations in two broad groups: those conducting at least some sort of economic projects, and the ones with purely non-economic activities (social, cultural, etc.). Both types of orga-

Figure 4.2: Migrant associations and trade: economic and non-economic associations



nizations increase the intervention country's trade with France. Surprisingly, non-economic associations enhance trade at a greater extend, revealing the importance of cultural and social ties as a complement for strictly economic connections. The figure shows as well that cross-border linkages have a stronger exports promoting role. The positive correlation persists when product level bilateral trade corrected by countries' economic size and distance is used on the vertical axis. However, in this case similar size effects are observed for both exports and imports. This outcome is due to the fact that countries' products overestimate product level production to a larger extent than consumption values. Overall, regardless of the fact that migrant associations target with priority actions in the origin country of their founders, they contribute to the general development of foreign trade.

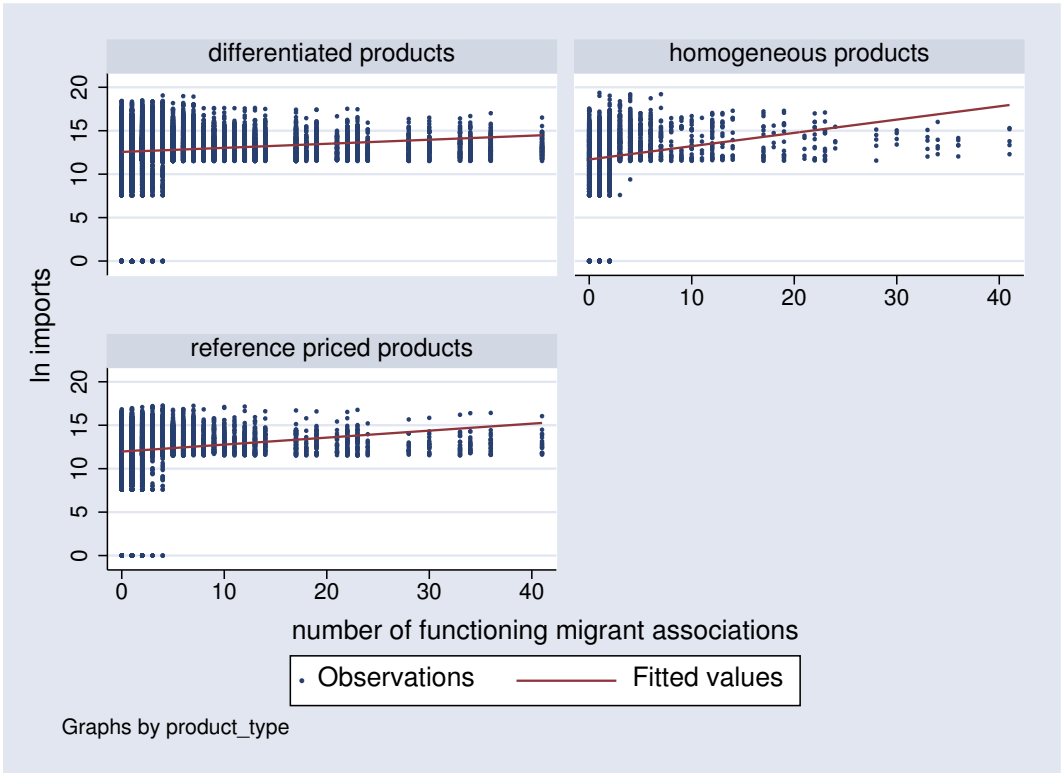
Next, we use Rauch (1999)'s classification of products into homogeneous, reference priced, and differentiated to visualize the previous relationship. Rauch (1999) demonstrates that markets provide sufficient information on relatively homogeneous goods, and any additional knowledge procured via network ties is unlikely to alter trade patterns. Differentiated products, on the contrary, increase their odds of being exchanged between

partners connected by social and business networks. According to figure 4.3, the effect of migrant associations, i.e. business ties, on trade varies with respect to products' level of differentiation. Cross-border business networks established via migrant associations in France have the largest positive impact on origin countries' imports of French homogeneous goods and exports of their differentiated products to France. Thus, for the selected sample of countries, Rauch (1999)'s statement is verified by exports alone. The opposite result for developing countries' imports from France can be the result of the concentration of business contacts in France developed by the means of home country associations in homogeneous goods' industries. We are unable to verify this affirmation because of lack of detailed data on the specific projects and partners of French OISM.

The overall impact of new immigrants from the selected developing countries on their trade with France is identical for imports and exports (figure 4.4). This exhibits the non-relevance of the preference channel of ethnic networks for trade, similar to findings by Rauch and Trindade (2002) and Combes et alii (2005). However, one needs to control for all possible sources of bias, such as superior trade costs charged on goods imported from the migrants' origin countries, which may reject the exclusively informational role of social networks. On average, immigrants have a small positive effect on trade. But the effect is different whether country-year pairs for which a migrant association was created or not are considered. Interestingly, new information brought by immigrants translates into larger trade of their origin countries with France when it is not provided by new home country associations. The effect of migrant associations on bilateral trade in either direction, however, is reinforced with every new association.

As in the case of migrant associations, the affirmation that networks are of greater importance for trade in differentiated goods is verified only for exports to France. Ethnic social networks have very similar effects on trade whether homogeneous, reference priced, or differentiated goods are considered. This reveals the asymmetry of networks formed by

Figure 4.3: Migrant associations and trade: Rauch's classification



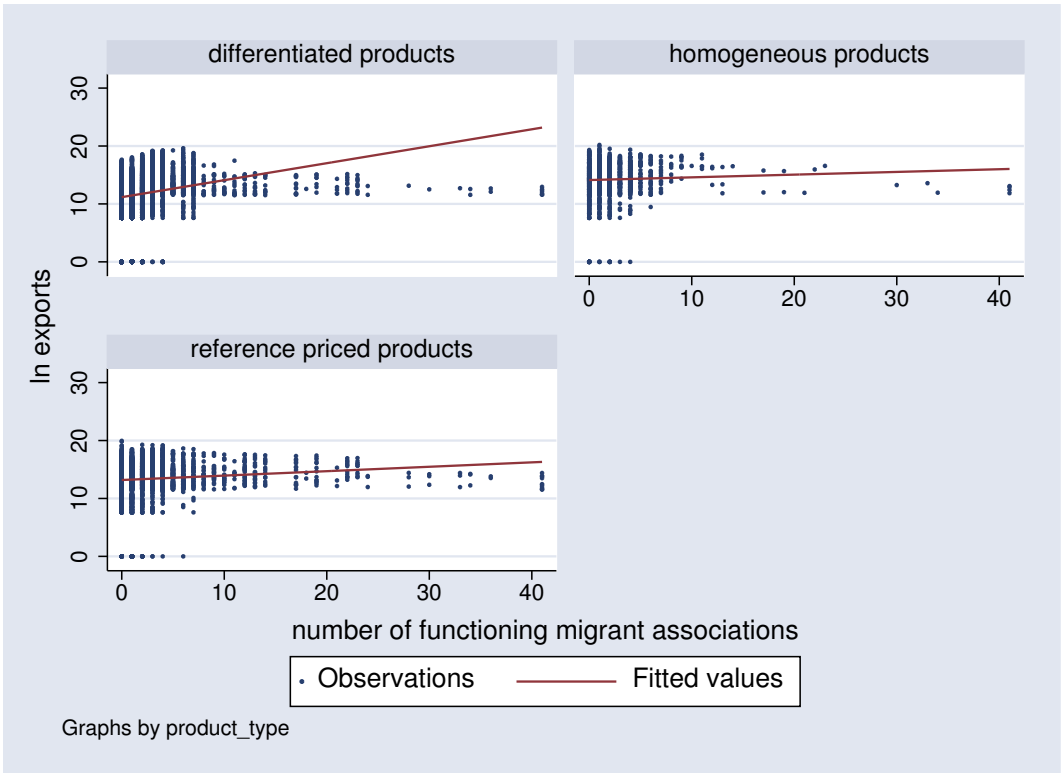
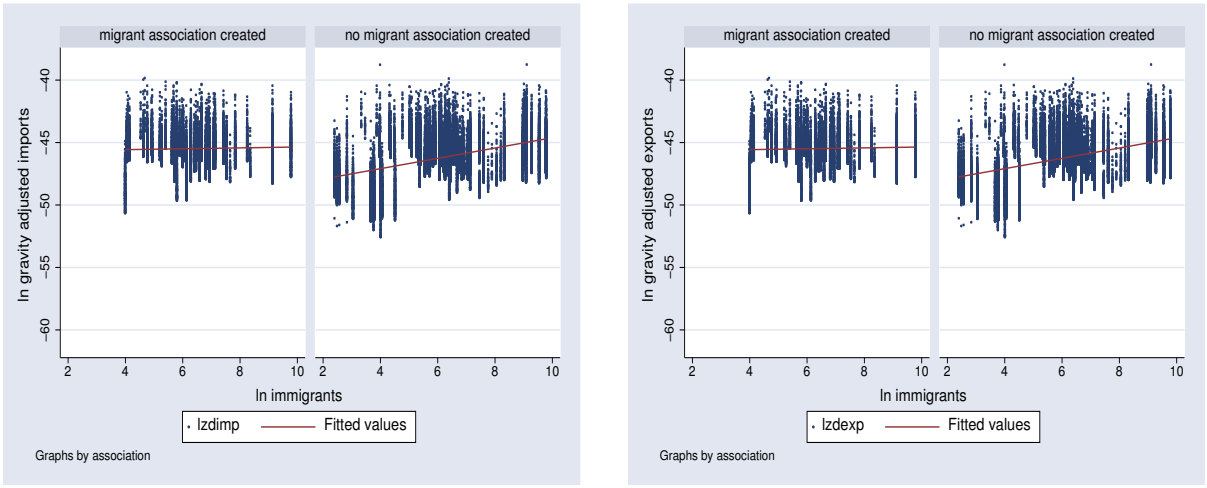


Figure 4.4: Immigrants and trade



Note: Gravity adjusted imports (exports) on the vertical axis are computed as the logarithm value of imports (exports) divided by countries's GDPs and bilateral distance separating them.

immigrants settled in France. They contribute to the diffusion of specialized information on potential French customers for products exported by their home country, but only of general information on the economic environment of the latter.

The estimated specifications of North-South trade are obtained from equation (4.11). Exports to France are estimated according to equation:

$$\begin{aligned} \ln EXP_{ijt} &= a_0 + a_1 \ln DIST_{ij} + a_2 COLONY_{ij} + a_3 \ln AID_{it} + a_4 WAR_{it} \\ &\quad + a_5 \ln MIGRFLOW_{ijt} + a_6 MIGRASSO_{ijt} + FE_i + FT_t + \epsilon_{it}. \end{aligned} \tag{4.20}$$

The constant term a_0 represents the market capacity of France. Variable $DIST_i$ represents the distance between Paris and the capital city of the exporting country i. Since thirteen out of the considered seventeen trade partners of France belonged to its colonial empire, we add a dummy variable $COLONY_i$ to control for this aspect in the data. AID_{it} and WAR_{it} are variables describing the global economic and political environment of country i in period t, and refer to the amount of total foreign aid received by the country, and its

implication in a militarized dispute respectively. Social and business networks are reflected by the next to variables in (4.20). $MIGRFLOW_{it}$ denotes annual flows of immigrants to France, and $MIGRASSO_{it}$ stands for home country associations created by immigrants from i or their descendants. Exporter and year fixed effects FE_i and FT_t are added to control for supply capacity and global shocks. Data on bilateral tariffs are very scarce for the developing countries, and we use instead the average import tariff. However, this informations cannot be used in equation (4.20) because of perfect collinearity with time effects.

Imports of developing countries from France are expressed by:

$$\begin{aligned} \ln IMP_{ijt} &= b_0 + b_1 \ln DIST_{ij} + b_2 \ln(1 + TARIFF_{jt}) + b_3 COLONY_{ij} \\ &\quad + b_4 \ln AID_{it} + b_5 WAR_{jt} + b_6 \ln MIGRFLOW_{ijt} \\ &\quad + b_7 MIGRASSO_{ijt} + FM_j + FT_t + \varepsilon_{ijt}. \end{aligned} \tag{4.21}$$

Right hand side variables are the same as previously, except for the average tariff rate $TARIFF_{jt}$ of the importing country j. The supply capacity of the French economy is constant across destinations and reflected by the intercept b_0. Country and time specific effects capture importer's market capacity and international shocks.

$MIGRASSO_{ijt}$ in equations (4.20) and (4.21) can denote different aspects of the home country associations. We construct the following variables referring to migrant associations:

- Dummy variables for the creation of a migrant association in the current and previous five years, varying across intervention countries.
- Number of associations created in the current and previous five years, by country of intervention.
- The number of associations acting in each foreign country in the current year.
- The average budget spent in each intervention country in the current year.

The second and third sets of variables take positive integer values. The last one is a qualitative variable because migrant associations in the database declare their budgets according to nine predefined value intervals. These variables are highly correlated with each other, and for that reason are used separately in trade and investment equations.

As suggested by figure 4.3, the effect of networks varies with the degree of homogeneity of traded goods. We divide bilateral trade with France using the classification of goods into homogeneous, reference priced, and differentiated introduced by Rauch (1999), and estimate coefficients for exports to and imports from France of a selection of seventeen developing countries separately for each product group.[3] The disaggregate level of employed trade data is characterized by a large number of zero values. Developing countries import most of internationally traded French products, while export only a very limited range of domestically produced goods, most of them labelled as homogeneous and reference priced. Equations (4.20) and (4.21) are estimated for exports to and imports from France over the last two decades of the twentieth century. We apply the Heckman two-step procedure to correct for the uneven distribution on the explained variable. Significant coefficients on independent variables other than bilateral distance are obtained only for differentiated products and are displayed in table 4.1. The data reveals that ethnic networks do not play a significative role for trade in non differentiated products. Partially this is due to the fact that about half of observations in the sample are differentiated products. Hence, we focus our discussion exclusively on this category of products.

The first five columns in table 4.1 refer to imports from France, while the last five exhibit estimates for exports of French products. Tariff data are available only for a limited number of observations: its consideration reduces the sample by half. Therefore, we disregard the tariff variable in the expression of imports. All estimations include country, year, and product specific effects. The first column shows estimates when immigrants alone are con-

[3]Estimating the model with country, year and product specific effects on a large set as in the present case becomes very cumbersome.

sidered. Coefficients on all independent variables are highly significant. Goods produced in France are shipped to its trading partners included in the sample almost exclusively by boat, yielding a coefficient on the distance variable larger than unity in absolute value. Colonial ties display a positive and significant coefficient, indicating that former French colonies consume almost $2[\approx \exp(0.63)]$ times more products from their former colonizer than the rest of the countries. Large financial aid from abroad can be simultaneously an indicator of poor domestic social and/or economic environment, and of on-going reforms consuming these resources. The positive elasticity of trade with respect to foreign aid signals their partial employment on the acquisition of products from industrialized countries including France. As expected, countries engaged into an armed conflict import less. Finally, the positive and significant coefficient on migration flows confirms that information bridged through social networks yields higher trade.

In columns 2 to 5 of table 4.1 we add different variables describing the migrant associations established in France. Coefficients on other variables deviate very little from their values in the first column. Dummy variables indicating whether an OISM was or not created in the studied and past five time periods are included in column 2. Significant coefficients are obtained for associations created in periods $t-1$, $t-3$, and $t-4$. This sets forth that home country associations become relevant for trade with a delay of two to four years, the time needed to develop local business contacts in France and the home country. In the following column we use the current and lagged number of newly created OISM. Results show that migrant associations start to generate additional trade four years after they have been founded. The total number of functioning associations at the considered time period t and their average budget are used in columns 4 and 5. Both measures confirm that immigrant-based business networks help French firms to increase their exports to origin countries. One supplementary association increases imports from France by 1.2%, but the effect is stronger for larger ones.

Table 4.1: Trade, immigrants, and home country associations: differentiated products

Dependent variable:	imports from France IMP_{ijt}					exports to France EXP_{ijt}				
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ln distance	-1.18^a	-1.28^a	-1.21^a	-1.28^a	-1.27^a	-1.16^c	-1.54^c	-1.32^c	-1.71^b	-1.57^a
	(0.13)	(0.14)	(0.14)	(0.14)	(0.14)	(0.70)	(0.73)	(0.72)	(0.71)	(0.71)
colonial relationship	0.63^a	0.79^a	0.69^a	0.71^a	0.73^a	1.10	1.17	1.13	1.10	1.16
	(0.12)	(0.13)	(0.13)	(0.12)	(0.12)	(1.65)	(1.66)	(1.65)	(1.65)	(1.65)
ln foreign aid	0.11^a	0.15^a	0.12^a	0.13^a	0.13^a	0.34^a	0.34^a	0.35^a	0.37^a	0.35^a
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.08)	(0.10)	(0.09)	(0.08)	(0.08)
armed conflict	-0.11^a	-0.13^a	-0.12^a	-0.10^a	-0.10^a	-0.04	-0.16	-0.12	-0.03	-0.02
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.09)	(0.10)	(0.09)	(0.09)	(0.09)
ln immigrants	0.07^a	0.07^b	0.07^b	0.06^c	0.05^c	-0.03	0.02	-0.01	-0.05	-0.06
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.07)	(0.08)	(0.08)	(0.07)	(0.07)
association created in t		0.033					0.172^c			
		(0.032)					(0.089)			
association created in $t-1$		0.058^c					0.222^b			
		(0.033)					(0.096)			
association created in $t-2$		-0.005					0.185^c			
		(0.031)					(0.096)			
association created in $t-3$		0.053^c					0.084			
		(0.032)					(0.089)			
association created in $t-4$		0.097^a					-0.011			
		(0.038)					(0.095)			
association created in $t-5$		0.059					0.199			
		(0.037)					(0.121)			

Table 4.1: Trade, immigrants, and home country associations: differentiated products (continued)

Dependent variable:	imports from France IMP_{ijt}					exports to France EXP_{ijt}				
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
number of new associations in t			0.022					0.068		
			(0.015)					(0.054)		
number of new associations in $t-1$			0.006					0.128^{c}		
			(0.017)					(0.068)		
number of new associations in $t-2$			-0.011					0.076		
			(0.017)					(0.066)		
number of new associations in $t-3$			0.024					0.001		
			(0.024)					(0.075)		
number of new associations in $t-4$			0.041^{c}					-0.083		
			(0.024)					(0.078)		
number of new associations in $t-5$			0.004					0.124^{c}		
			(0.014)					(0.074)		
total number of associations in t				0.012^{a}					0.068^{a}	
				(0.004)					(0.011)	
average associations' budget in t					0.004^{a}					0.014^{a}
					(0.001)					(0.004)
country, year, and product FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	14987	14987	14987	14987	14987	2678	2678	2678	2678	2678
R^2	0.489	0.490	0.490	0.489	0.490	0.520	0.523	0.522	0.523	0.522
RMSE	.795	.794	.795	.794	.794	1.433	1.431	1.431	1.428	1.430

Note: Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

The last five columns of table 4.1 displays estimates for exports to France. Bilateral distance, foreign aid, and migrant association variables are the only ones for which significant coefficients are obtained. Less significant results compared to import flows are due to the large gap in the the number of observations. Indeed, the imports sample is 5.6 times larger than the exports sample. Social networks do not improve the odds of firms from developing countries to export their products to the French market, but this outcome is very probably due to sample selection, and unaffected by the introduction of variables reflecting business ties. Again, all four types of variables employed present home country associations as a pro-trade factor. But the effect on exports is larger and faster. Migrant associations begin to provide assistance to firms in the home in country in the very year they were created. Any additional association generates in average 7% more of home country's exports to France.

When the tariff term in equation (4.20) is also considered, coefficient estimates for migrant associations drop in significance. Results are shown in table E.2 of the Appendix E.2 shows that OISM generate additional trade only in the next year after their creation. The pro-trade effect, however, decreases with the number of founded associations. It can thus be concluded that direct business contacts provided by organized structures are more relevant for commercial transactions than information acquired from other members of one's ethnic group.

4.6 French Subsidiaries and Cross-border Networks

Similar to the case of developing countries' trade with France, immigrant-based networks can influence the decision of French firms to invest abroad. The effect of business and social networks between the same countries considered in section 4.5, expressed by home country associations and flows of immigrants, is depicted in figure 4.5. Both types of ties are positively correlated with the number of French affiliates situated abroad. The

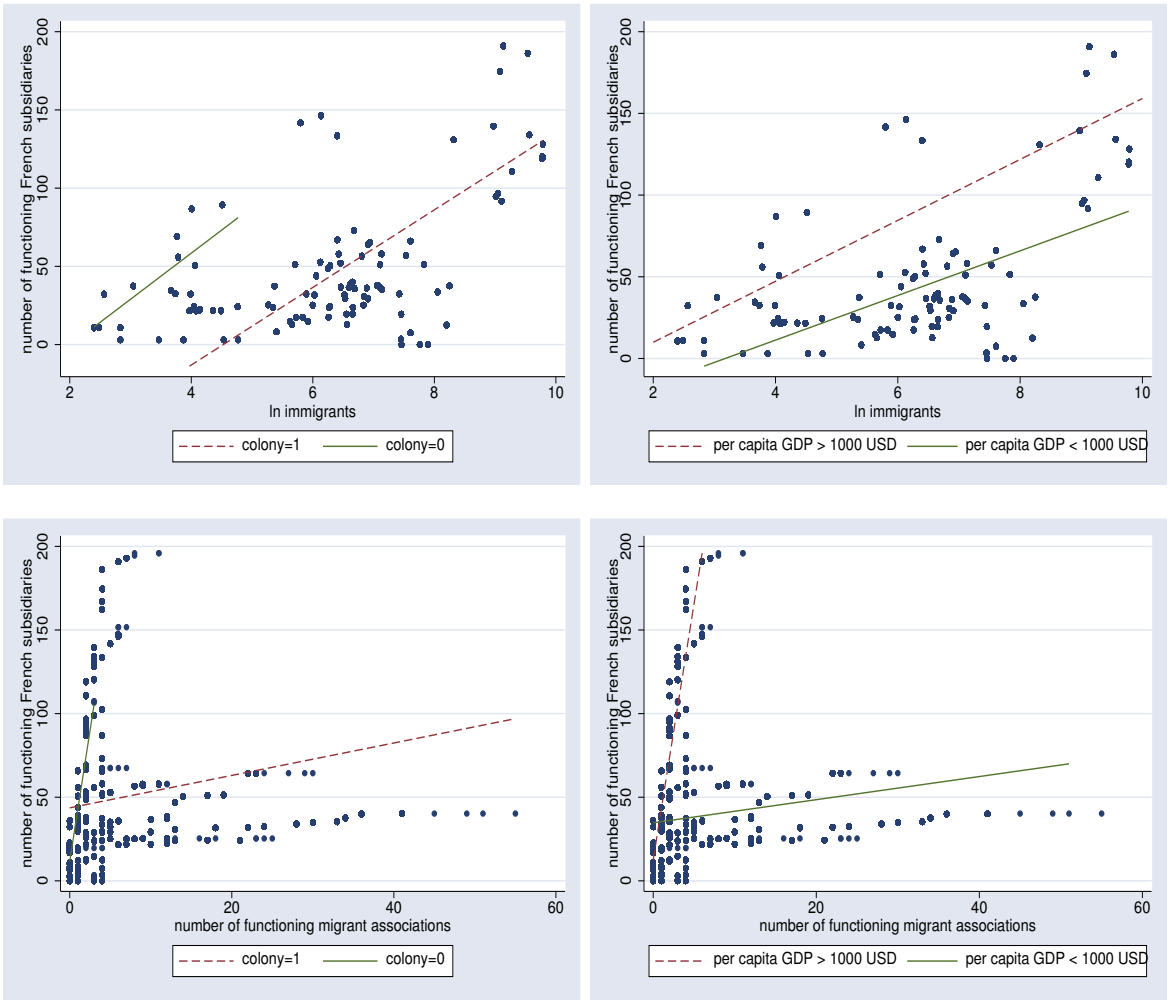
effect of migration is almost unchanged when host countries are divided into former French colonies and others, or according to their development level (upper part of the figure). New information brought by immigrants to France is equally pertinent for investment projects in ex-colonies and other countries, low and very-low income economies. The effect of migrant associations, on the contrary, changes a lot across country types. French enterprises possess increased knowledge and business contacts on countries colonized in the past. Therefore, services provided by OISM on projects hosted by these countries have little impact on the final decision to invest. For other countries less familiar to the French business community, however, this information is particularly valuable. As shown in figure 4.5, this is also the case of larger-income economies. A possible explanation is reduced number of profit-making investment opportunities in the less developed countries.

The number of French subsidiaries in country i in the time period t is explained by a number of country specific observables, distance, and immigrant-based social and business networks:

$$\begin{aligned} \ln N_{jt} &= \beta_0 + \beta_1 \ln GDP_{jt} + \beta_2 \ln PERCAPGDP_{jt} + \beta_3 \ln DIST_{ij} \\ &\quad + \beta_4 COLONY_{ij} + \beta_5 \ln AID_{jt} + \beta_6 \ln WAR_{jt} + \beta_7 MIGRFLOW_{ijt} \\ &\quad + \beta_8 MIGRASSO_{ijt} + \upsilon_{jt}. \end{aligned} \tag{4.22}$$

Host country's nominal and per capita GDP, GDP_{jt} and $PERCAPGDP_{jt}$ in equation (4.22), account for the economic size and unit costs at location j. The rest of independent variables are the same as in trade equations (4.20) and (4.21). We prefer to explain the number of French affiliates to a discrete choice variable stating whether French firms have invested in a particular South country or not. The dependent variable N_{jt} permits to account for the establishment of two or more French subsidiaries during the same year, and the shutting down of a subsidiary, both phenomena being present in our data. French affiliates abroad are very different in size: they range from simple representatives to large

Figure 4.5: FDI, immigrants and migrant associations: economic development and colonial ties



production capacities. To control for this heterogeneity, we consider the number of average-size French subsidiaries, using 2000 employees as weights, rather than the rough number of affiliates.

In a locational choice model with the number of subsidiaries as the dependent variable, taking non-negative integer values, we employ count model techniques.[4] Parameter estimates of (4.22) are obtained using maximum likelihood procedures. Table 4.2 displays

[4]The N_{jt} data are strongly skewed to the right, suggesting that OLS regression would be inappropriate. Panel specific techniques, however, could not be employed due to the low number of observations in the panel.

results obtained with the Poisson model. In column 1 we estimate equation (4.22) without network variables. All coefficients are statistically significant at the 1% level and are comparable to other findings in the literature. Large countries attract a higher number of French investments. Per capita GDP is an indicator of unit costs in the host country and enters equation (4.22) with a negative coefficient. Likewise, French firms invest more in near countries, former colonies, large foreign aid recipients, and peaceful economies. These results are very robust to the inclusion of ethnic social and business networks. In the second column we introduce the social networks variable and get a positive but statistically non-significant coefficient. Dummy and count variables on the creation of home country associations and their number are added in the next two columns. For the two sets of business networks variables, results confirm the positive role of both social and business networks established by immigrants settled in France on decisions to invest in their home countries. Still, information and contacts supplied via organized networks prevail in importance. This outcome is similar to the one found by Combes et alii (2005) for trade between French regions. Unlike trade flows, investment decisions benefit from new migrant associations starting with the year of their foundation. The last two columns of table 4.2 confirm previous results: strong business networks, revealed by more and larger associations, increase the investments of French multinationals in immigrants' home country.

The Poisson model imposes the restriction that the conditional mean of the dependent variable equals its variance. The poisson goodness-of-fit test displayed in the lower part of table 4.2, shows that the data rejects this hypothesis. The χ^2 statistics gives the deviance D, equal to twice the difference between the log-likelihood that would be achieved if the model offered a perfect fit and the log-likelihood of the model under consideration. If the value of deviance is greatly in excess of the number of degrees of freedom df, the model is overdispersed due to missing variables and/or non Poisson form. Thus, the ratio $\frac{D}{n-df}$ significantly larger than 1 in the last row of table 4.2 indicates over-dispersion. This can

Table 4.2: French subsidiaries, immigrants and migrant associations: Poisson model

Dependent variable: number of average-size French subsidiaries N_{jt}						
Model :	(1)	(2)	(3)	(4)	(5)	(6)
intercept	-12.17^a	-13.76^a	-13.91^a	-15.45^a	-15.67^a	-14.79^a
	(0.42)	(0.80)	(0.90)	(0.91)	(0.87)	(0.84)
ln GDP	0.97^a	1.03^a	1.02^a	1.06^a	1.07^a	1.03^a
	(0.02)	(0.03)	(0.04)	(0.04)	(0.03)	(0.03)
ln per capita GDP	-0.64^a	-0.72^a	-0.65^a	-0.65^a	-0.59^a	-0.58^a
	(0.03)	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)
ln distance	-0.45^a	-0.43^a	-0.42^a	-0.39^a	-0.42^a	-0.42^a
	(0.02)	(0.05)	(0.05)	(0.06)	(0.05)	(0.05)
colonial relationship	0.36^a	0.20^c	0.22^c	0.34^a	0.54^a	0.50^a
	(0.06)	(0.12)	(0.13)	(0.14)	(0.14)	(0.13)
ln foreign aid	0.36^a	0.52^a	0.44^a	0.49^a	0.49^a	0.49^a
	(0.02)	(0.03)	(0.04)	(0.04)	(0.03)	(0.03)
armed conflict	-0.19^a	-0.23^a	-0.29^a	-0.24^a	-0.21^a	-0.21^a
	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
ln immigrants		0.031	0.050^a	0.043^b	0.003	-0.014
		(0.021)	(0.022)	(0.022)	(0.022)	(0.022)
association created in t			0.234^a			
			(0.037)			
association created in $t-1$			0.073^c			
			(0.038)			
association created in $t-2$			0.064^c			
			(0.035)			
association created in $t-3$			0.019			
			(0.035)			
association created in $t-4$			-0.061			
			(0.039)			
association created in $t-5$			-0.015			
			(0.043)			
number of new associations in t				0.058^a		
				(0.015)		
number of new associations in $t-1$				0.026		
				(0.018)		
number of new associations in $t-2$				0.039^b		
				(0.018)		
number of new associations in $t-3$				0.003		
				(0.024)		
number of new associations in $t-4$				-0.012		
				(0.024)		
number of new associations in $t-5$				0.024		
				(0.020)		
total number of associations in t					0.022^a	
					(0.003)	
average associations' budget in t						0.008^a
						(0.001)
N	207	97	97	97	97	97
Pseudo R^2	0.737	0.715	0.728	0.724	0.731	0.734
χ^2 test: goodness-of-fit	1454.00	588.81	537.80	552.70	526.70	516.70
p-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$D/(N-df)$	6.21	6.54	6.40	6.58	5.92	5.81

Note: Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

be also identified by comparing the mean and variance of the the dependent variables N_{jt}. Indeed, the variance of N_{jt} is nearly 50 times larger than its mean (see table E.1 of the Appendix E.1). To deal with the over-dispersion we select a less restrictive distribution function, allowing for the variance to be greater than the mean: the negative binomial distribution represented by (4.19). The negative binomial distribution arises as a continuous mixture of Poisson distributions, where the mixing distribution of the Poisson rate is a gamma distribution. It is especially useful for discrete data over an unbounded positive range whose sample variance exceeds the sample mean. Since the negative binomial distribution has one more parameter, α, than the Poisson, it can be used to adjust the variance independently of the mean.

Parameter estimates of (4.22) with a negative binomial model are shown in table 4.3. When the over-dispersion parameter α is zero, the negative binomial distribution is equivalent to a poisson distribution. Under all specifications, α is significantly different from zero, confirming that the poisson distribution is not appropriate for our data. Although coefficient values are slightly different from those obtained with the Poisson model, conclusions formulated relative to the contribution of business and social networks remain unchanged. The elasticity of trade with respect to flows of immigrants increases in value, but not in statistical significance. Coefficient estimates on variables describing home country associations become less significant. Parameter estimates in column 3 show that migrant associations have a strong and positive immediate effect on foreign investment, but no lagged effect. Still, business networks are found to have a stronger impact on foreign direct investment than social ties. The model confirms as well the positive role of the total number of associations and their financial size.

Table E.3 of the Appendix E.2 reports estimated coefficients transformed to incidence-rate ratios. Incidence rate ratios are obtained by exponentiating β coefficients in the negative binomial regressions. The reported IRRs represent the percentage change in the

Table 4.3: French subsidiaries, immigrants and migrant associations: Negative binomial model

Dependent variable: number of average-size French subsidiaries N_{jt}						
Model :	(1)	(2)	(3)	(4)	(5)	(6)
intercept	-1.88^a	-1.79^a	-1.88^a	-1.84^a	-1.88^a	-1.91^a
	(0.12)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
ln GDP	0.93^a	0.94^a	0.90^a	0.92^a	0.91^a	0.89^a
	(0.04)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
ln per capita GDP	-0.58^a	-0.62^a	-0.54^a	-0.53^a	-0.48^a	-0.46^a
	(0.07)	(0.13)	(0.14)	(0.14)	(0.14)	(0.14)
ln distance	-0.46^a	-0.37^b	-0.37^b	-0.32^b	-0.36^b	-0.37^a
	(0.07)	(0.15)	(0.14)	(0.15)	(0.14)	(0.14)
colonial relationship	0.37^a	0.03	0.00	0.06	0.18	0.22
	(0.12)	(0.29)	(0.29)	(0.30)	(0.29)	(0.29)
ln foreign aid	0.37^a	0.59^a	0.51^a	0.53^a	0.51^a	0.51^a
	(0.06)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
armed conflict	-0.09	-0.21^c	-0.26^b	-0.21^c	-0.19^c	-0.19^c
	(0.08)	(0.12)	(0.11)	(0.11)	(0.11)	(0.11)
ln immigrants		0.074	0.093^c	0.091^c	0.055	0.037
		(0.054)	(0.054)	(0.056)	(0.053)	(0.054)
association in t			0.253^b			
			(0.116)			
association in $t-1$			0.065			
			(0.115)			
association in $t-2$			0.048			
			(0.108)			
association in $t-3$			-0.056			
			(0.106)			
association in $t-4$			-0.131			
			(0.117)			
association in $t-5$			-0.078			
			(0.115)			
number of new associations in t				0.048		
				(0.046)		
number of new associations in $t-1$				0.015		
				(0.049)		
number of new associations in $t-2$				0.051		
				(0.053)		
number of new associations in $t-3$				-0.020		
				(0.066)		
number of new associations in $t-4$				-0.019		
				(0.067)		
number of new associations in $t-5$				0.006		
				(0.053)		
total number of associations in t					0.016^b	
					(0.007)	
average associations' budget in t						0.006^b
						(0.002)
N	207	97	97	97	97	97
Pseudo R^2	0.180	0.140	0.146	0.144	0.146	0.147
over-dispersion parameter α	0.152	0.167	0.153	0.159	0.153	0.149
p-value	(0.018)	(0.033)	(0.031)	(0.032)	(0.031)	(0.030)

Note: Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

dependent variable (the number of average-size French subsidiaries) for a change of one standard deviation in the independent variable under consideration. Thus, one standard deviation change in the logarithm value of the immigrants brings a 1.1% increase of the number of French affiliates in their origin country. Origin specific information carried by 12 [$\approx$ $[(1/35.87 * 100)/1.10] * \exp(1.58)$] new immigrants settled in France generates on the average one additional French affiliation in their home country. Likewise, it takes 1[$\approx$ $[(1/35.87 * 100)/1.29] * 0.44$] new home country association, or 15[$\approx$ $[(1/35.87 * 100)/1.02] *$ 5.58] functioning associations to raise the number of French affiliates in their home country by one.

4.7 Conclusion

The recent literature sets forward the positive role of business and social networks on international trade. Empirically, most studies rely at least partially on the use of migration data to account for these phenomena. However, very few of them succeed in separating the two types of networks. The present chapter introduces an innovative way to evaluate the effect of cross-border networks, and shows that similar effects are observed for foreign direct investment. Data on the flows of immigrants and their capacity to organize into associations in the host country are used to differentiate the social and, respectively, business aspect of ethnic networks. Accordingly, cross-border networks can be labelled as unorganized and organized. We employ an entirely new data set on French migrant associations, and study the effect of organized and unorganized ethnic ties on French foreign trade with, and investment in seventeen selected developing countries over a twenty year period.

A statistically significant effect of network ties if found only for trade in differentiated goods. Both organized and unorganized immigrant-based networks have a pro-trade effect on French exports to the selected developing countries. Trade in the opposite direction, however, benefits only from the knowledge channelled by home country associations, but to

a greater extend than conjugate flows. The data sets forth that home country associations become relevant for trade with a delay of two to four years, the time needed to develop local business contacts in France and abroad. Ethnic networks also provide valuable information and contacts for French firms' decisions to invest abroad. Still, as in the case of trade, the procurement or the relevant knowledge on host countries via organized structures, migrant associations in particular, is more efficient.

General Conclusion

The present thesis studies the burden of international trade costs on trade between countries, and the contribution of two new factors, institutions and networks, in lowering it. It evaluates the size of overall border-related trade costs, and the extent to which their reduction can be achieved via regional economic integration. A central place in this discussion is attributed to non-traditional trade determinants, represented by country-specific institutions and transnational social and business networks. The latter increase the security and contract enforcement in international transactions, and furnish foreign contacts and information on potential partners, which all translate in reduced costs and uncertainty of cross-border exchange. This study is important not only for a more thorough understanding of a series of phenomena observed in international economics, but also for the development of specific economic policies assisting countries in the achievement of their long term objectives.

The work presented in this thesis consists mainly in an empirical analysis of evoked issues. Still, it takes advantage of recent theoretical advances in international trade literature. Thus, results and conclusions formulated in the thesis are supported by predictions of theoretical trade models. For each chapter, we choose a group of countries for which the set of questions treated in it find particular resonance. Accordingly, regional integration, trade liberalization and institutional reforms are studies for the case of transition countries and their West European partners. Cultural aspects of social networks are considered for a very large geographical span of trading countries. Finally, the role of migrant as-

sociations, as a form of business networks, in shaping cross-border trade and investment decisions is investigated for a limited number of French partners from the developing world.

We started our analysis by estimating the magnitude of total border-related costs, and how economic integration reduces them. Trade both between transition countries, and with EU members improved remarkably during the last decade of the twentieth century. The former become more and more similar to their Western partners in many aspects, including the way to trade. Continuous economic integration in Europe led to an important drop in regional trade costs, reflected first by the removal of import tariffs. However, as additional impediments or trade are reduced, important trade creation effects may be observed even after CEE countries have joined the European Union. A possible quantification of these effects is to compute East-West trade potentials, i.e. in terms of actual trade volumes. Differently from traditional research in this field, we use trade within national borders as reference for international trade, but similar to it estimate trade potentials with respect to a control group of countries. The underlying idea of this innovative method, presented in chapter one, is that extra trade arises as a result of lower transaction costs. Convergence of CEE-EU trade costs to the lower intra-EU level is a primary result of European integration, and should be exploited in the computation of the associated increase in trade.

Results obtained according to this technique show that there is still place for important growth in bilateral CEE-EU transactions. They are very robust and confirmed by three different theoretically compatible trade specifications employed. At the beginning of the twenty-first century trade between CEE and EU countries represented about half of its attainable level, suggesting a 100% increase with further EU integration. As for regional CEE trade, its potential ranges depending on the model between 112 and 175%. And this is regardless of the strong reduction of bilateral border effects between these countries achieved during the 1990s. These findings contradict with those of traditional trade po-

tential models, who claim that East-West European trade has already reached its highest level. A discrimination test for monopolistic against perfect competition trade models, based on the estimation of bilateral trade flows with country and partner specific effects, is also developed in the chapter. According to it, European trade is better replicated with monopolistic competition trade models *à la* DSK, and exhibits an elasticity of substitution of traded varieties equal to three. This outcome complements the exiting literature, which relies deeply on the share of intra-industrial trade and the presence/absence of the home market effect to assess the empirical success of perfect and imperfect competition trade models.

The size of estimated border effects and border-specific trade costs depends on a variety of factors, among which the way in which distances are calculated. We address this question in more detail in the last annex to chapter one. It discusses the necessity of using compatible techniques for the computation of distances and the estimation of trade flows. Trade theory predicts a nonlinear relationship between distance and trade, confirmed by a multitude of empirical works. This aspect is ignored in the calculation of distances in trade models that take into account the internal geography of trading countries. Instead of simply summing weighted bilateral distances separating the different regions of importing and exporting countries, we develop and apply a nonlinear procedure for computing distances between and within countries as a function of the estimated distance elasticity of trade. An iterated process of estimation of the distance elasticity of trade, and computation of distances, permits to estimate the true elasticity value that verifies the nonlinear correlation suggested by the theory. Our results confirm previous findings on the general overestimation of border effects in the literature. Defective computation of distances inflates border-specific trade costs by a factor of two. Nevertheless, the effect is constant in time and does not affect conclusions formulated in the first chapter.

The second chapter treats into more detail the role of national institutions and trade liberalization in international trade. Recent European integration was initiated by the conclusion of regional trade agreement and the progressive reduction of tariff and non-tariff trade barriers. It is brought to an upper level with the decision of transition countries' governments to improve their domestic institutions. These actions have been largely motivated by their willingness to join the European Union. Besides the compulsory character of EU's recommendations regarding institutional reforms in these countries, included in bilateral pre-accession agreements, institutional cohesion is required for the good functioning of a Union with a large number of member countries. Accordingly, changes in the institutional framework can generate a non-negligible increase of regional trade. We explore this idea by estimating the impact of the quality of institutions in the origin and destination country on trade between 25 European countries. A monopolistic model of trade is employed, which, according to the trade theory test developed in the first chapter, reproduces with greater exactitude observed trade flows. National institutions, evaluated by different index measures, are found to be a strong determinant of trans-European trade. The result is confirmed when we control for endogeneity between trade and several right-hand variables. Differently from the existing literature, we study as well the two-way causality between trade and institutions. The pro-trade effect of well-functioning institutions is only a part of the story. The participation in international trade helps countries improve their domestic institutions. Like a small number of authors, we show that similarity in home country institutions increases the extent to which firms engage in mutual transactions. However, we reach this conclusion by employing a separate variable reflecting institutional heterogeneity. Given the specific composition of the sample, we divide institutions in two classes according to their contribution to the general development of the country, and support of market activities. To judge on the importance of institutional reforms on trade relative to that of foreign trade policy, we include data on tariffs and non-tariff barriers in the

analysis. Estimation results show that the two factors have effects of comparable size. A large part of the trade potential predicted in the first chapter can be reached by raising the quality of institutions in transition countries in general, and of those supporting the market economy in particular. Finally, using continuous variables for the quality of institutions, such as the size of private sector or the investment rate, we formulate a number of explicit recommendations in terms of economic policy.

In the second part of the thesis we investigate the role of a different trade determinant, transnational networks. Social and business networks increase trade by lowering mainly information, search, and contract enforcement costs. Social networks benefited from increased attention in the empirical literature due to the fact that they are relatively easy to quantify. The literature relied mainly on ethnic ties, and the ability to communicate in a common language. The third chapter of the thesis analyses a new aspect of social networks. International trade itself can contribute to the development of transnational social ties. Exchange of cultural goods can increase the awareness on and/or preference for products from the origin country. Cultural goods (books, music, films, newspapers, etc.) more than any other products emboby information on the origin market. Trade in these products is much more sensitive to common ties between countries engaged in the exchange. The presence of strong cultural and social links is a major factor in the purchase decision, and increases the utility associated with the consumption of cultural goods. We employ a simple gravity model to construct a measure of the intensity of the social networks from trade with cultural goods. Results indicate that trade with cultural goods is an important interface for the assimilation of information about foreign markets and preferences. The simple consumption of the foreign goods with a cultural component generates shifts in the structure of the preferences, but also contributes to a superior information on foreign partners and markets. This outcome is confirmed even we adjust for the presence

of culture-free bilateral linkages, such as the general preference of Americans for British products. To separate the information from the preference effect of social networks, we compare the effect of cultural ties estimated for seven types of cultural goods. By their very nature newpapers and periodicals, booklets, and other printed advertising material have mainly an informative role, while cinematographic films, books, recorded media, and agricultural goods are more likely to produce shifts in the preference structure of consumers. Estimation results confirm the importance of both channels in international trade. The analysis is then carried separately for homogeneous, reference priced, and differentiated goods, and partial support is found for the statement that networks are of particular importance when markets fail to provide necessary information or enforcement mechanisms.

The recent literature sets forward the positive role on trade of both business and social networks. Although the two types of ties may alter trade in similar ways, business networks suggest the existence of organized structures. This difference is employed in the last chapter to differentiate social from business networks. Transnational business networks help members to find profitable trade opportunities through provision of market information, and increase trust between network members and reduce opportunism by applying contract enforcement and punishment schemes. A special dimension of business networks is considered in the chapter. It relies on a recent and expanding literature showing that international transaction costs are generally lower in the presence of large flows or stocks of immigrants. Immigrants increase trade by providing superior knowledge on their market of origin, and business contacts between firms situated in the home and host country. Moreover, many ethnic groups living outside their countries of origin create formal and informal associations that facilitate the contact among businesses situated in the two countries. The capacity of immigrants to organize in the host country is used to measure the intensity of cross-border business networks. We employ an entirely new and previously unexplored data set on mi-

grant associations established in France, and find that their presence affects positively the decisions of French companies to trade with and invest in their home countries. Compared to social ties, represented in the chapter by international flows of immigrants, business networks have a stronger and more robust effect. Information and business contacts supplied by unorganized immigrant communities are less important or even irrelevant when these can be procured via migrant associations.

This thesis elucidates certain aspects in which trade is affected by institutions and international networks. These two non traditional determinants of international trade patterns received until recently limited attention from economists. It has been shown in the thesis that both factors permit to explain a large part of hidden border-specific trade costs, and thus explain a part of the mystery of missing international trade. The presence of sound and similar institutions in the home and partner country are comparable in importance to foreign trade policies, and suggest that trade creation is still possible after tariffs and non-tariff barriers are removed. Social networks promote trade not only via common ethnic, linguistic and other ties, but also via information and tastes assimilated with the consumption of foreign cultural goods. The strength of business networks can be judged upon the capacity of immigrants to form home country associations in their country of residence, and their suitability for promoting international transactions upon the information and contacts they provide to interested parties.

The trade literature considers networks as established phenomena which can vary in intensity. In microeconomics networks are the outcome of choices made by individuals of a community, and their emergence is a central issue in their analysis. According to the definition of social networks in the trade literature, individuals are unlikely to have the option of forming a network or not, as well as to choose the strength of ties that connects them. Business networks, on the contrary, are much more close to the definition employed in

other parts of economics. Actually, firms possess the liberty to enter an existing network or create one. Enforcement and punishment mechanisms functioning inside business networks are an evidence of that. The effect on trade might be more complex and even different than shown in the literature, if this aspect of networks is to be considered. Therefore, a logical continuation of the literature and of questions treated in this thesis is to develop a trade model where trading firms decide themselves to participate in a network or not. An interesting issue that can be investigated by such a model is the reverse causality between trade and networks. Past foreign trade experiences may be of great importance when enterprises are free to chose the type of interaction, market or network. But if both institutions and networks are regarded as the result of some optimization program solved by economic agents, their interaction demands a thorough study. Attempts to treat this subject exist in the literature, but they are scarce and detached from the international trade context. Well-functioning institutions and strong network ties can be substitutes as well as complements. The outcome depends on several things, among which the incentives of firms and individuals to improve institutions and form networks (augment profits and/or utility, preserve or improve the bargaining power parity, etc.) Finally, as shown in the last chapter of the thesis, a large part of the analysis carried for international trade flows apply as well to foreign direct investment.

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Appendix A

Appendices to Chapter 1

A.1 Perfect Competition and Balanced Trade

A country's income is the sum of revenues from the sales of its products to domestic and foreign partners. Using notations introduced in section 1.3, and the assumption of symmetric varieties, the income of country i can be written as:

$$y_i = n_i x_{ii} p_{ii} + \sum_{k \neq i} n_k x_{ik} p_{ik}. \tag{A.1}$$

The first term of the equation gives the value of domestic shipments, and the second term is the expression on its exports to all foreign partners. Shipping costs are supported by the importer.

Similarly, a country's expenditure is equal to the sum spent by domestic consumers for purchasing national and foreign varieties:

$$E_i = n_i x_{ii} p_{ii} + \sum_{k \neq i} n_k x_{ki} p_{ki}. \tag{A.2}$$

The right hand side of equation (A.2) is precisely the monetary value of the demand for domestic products plus and total imports.

Market clearance implies equality between revenues and expenditures:

$$y_i = E_i. \tag{A.3}$$

Replacing amounts on each side with expressions (A.1) and (A.2), yields equal exports and imports for a given country i:

$$\sum_{k \neq i} n_k x_{ik} p_{ik} = \sum_{k \neq i} n_k x_{ki} p_{ki}, \tag{A.4}$$

an identity also called in the literature as balanced trade. The market clearing assumption excludes any trade imbalances. The latter are particularly high at industry level even for very similar countries, and their ignorance may significantly distort results. One should therefore be cautious about imposing balanced trade especially with disaggregate data.

A.2 Data

The empirical application of theoretically derived trade equations encounters both data availability and comparability problems. The use of different classifications, definitions and registration criteria even for such standard economic variables as production and trade may represent an additional source of errors and biases in results. The latter are yet more pronounced in the estimation of border effects when internal trade volumes are computed as the difference between national production and total exports in absence of regional data.

The present study carries over a sample of 25 countries: fifteen 'old' EU members with Belgium and Luxembourg aggregated under a single observation, and ten Central and East European countries, and a eight-year period from 1993 to 2000. Of the ten CEE countries of the panel eight have joined the EU in May 2004 and two are candidate countries scheduled to join the Union as early as in 2007. Two levels of aggregation are considered: total manufacturing industry, and 27 product industries according to the ISIC Rev.2 classification.

Data on total manufactured bilateral imports is obtained from the COMEXT (Euro-

stat) database for trade flows engaging at least one EU partner, and from the COMTRADE (World Bank) database for intra-CEE trade. GDP in current US dollars are from the World Development Indicators (World Bank) database. Total manufacturing production and wages, and expenditure are obtained from the New Cronos (Eurostat) database. Industry level trade, production, and wage data are from the Trade and Production (UNIDO, World Bank) database, with missing data on production and wage being complemented with New Cronos (Eurostat) and OCDE data. Trade, production, and expenditure are expressed in thousand of US dollars, and wages are in thousands of US dollars per year and employee.

In order to ensure compatibility of different data sources, data has been adjusted by applying a conversion rate equal to the average ratio of the value from the base source and the value from the secondary source, and estimated separately for each country on observations present in both databases.

For every year and country missing production data has been replaced by total production multiplied by the average weight of the particular industry in the two preceding and following years for which data were available.

Industry level expenditures are computed as the sum of demand for domestic goods and imports from all trading partners, as in equation (A.2).

A.3 Distance Calculation

As simple as it can seem, measuring the distance is not always obvious. This is because we seek the distance between two territorial units with positive area and non-uniformly distributed economic activity, rather than between two points. There is some constancy in the literature regarding bilateral distances: In most empirical studies the distance between two countries is simply the distance between capitals or largest cities. As for distance between partners situated within the same country, economists' views are divided. The necessity to compute intra-national distances, d_{jj} arises from the use of domestic trade, which includes all commercial transactions between any two agents of the same country.

The first to introduce internal distance in the estimation of border effects was Wei (1996). Pioneer work on border effects by McCallum (1995) and Helliwell (1996), (1997) identify trade within national borders with trade between Canadian provinces or American states, ignoring transactions that take place within each sub national unit. Wei himself computes internal distance as one fourth of the distance between a country's capital city and that of its closest neighbor. Wolf (2000) uses the distance between a country's largest two cities. Nitsch (2000) takes the radius R of a circle of an area equal to that of the country. Head and Mayer (2000) develop a similar measure for a particular country geography with producers located in the origin and consumers uniformly distributed on the area of the circle:

$$d_{jj} = \int_0^R \frac{2\pi r}{\pi R^2} r = \frac{2}{3} R. \tag{A.5}$$

Following Helliwell and Verdier (2001), and Head and Mayer (2000), (2002a) we compute both international and internal distances as the weighted average of inter-regional distances, with regions population as weights:

$$d_{ij} = \sum_{l \in j} \left(\sum_{k \in i} d_{kl} \frac{y_k}{y_i} \right) \frac{y_l}{y_j}, \tag{A.6}$$

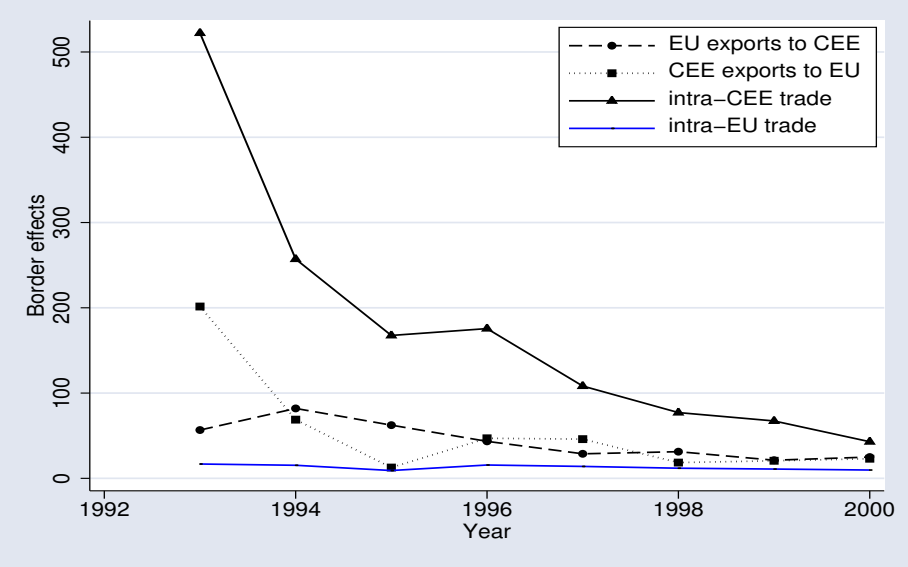
and distance inside each region d_{kk} computed according to equation (A.5) by replacing countries with regions. Inter-regional distances are geodesic distances between the largest central cities of any two regions. Table A.1 gives internal distances for the countries in the study computed with (A.5), with 1995 population as weights.

Table A.1: Internal distances d_{jj} in km

Country	internal distance
Spain	522
Italy	487
France	413
Sweden	387
Germany	376
Poland	359
Romania	319
Portugal	295
United Kingdom	290
Finland	264
Czech Republic	256
Greece	252
Bulgaria	234
Austria	232
Hungary	194
Slovakia	192
Netherlands	130
Belgium and Luxembourg	113
Ireland	99
Lithuania	96
Latvia	96
Estonia	78
Denmark	78
Slovenia	54

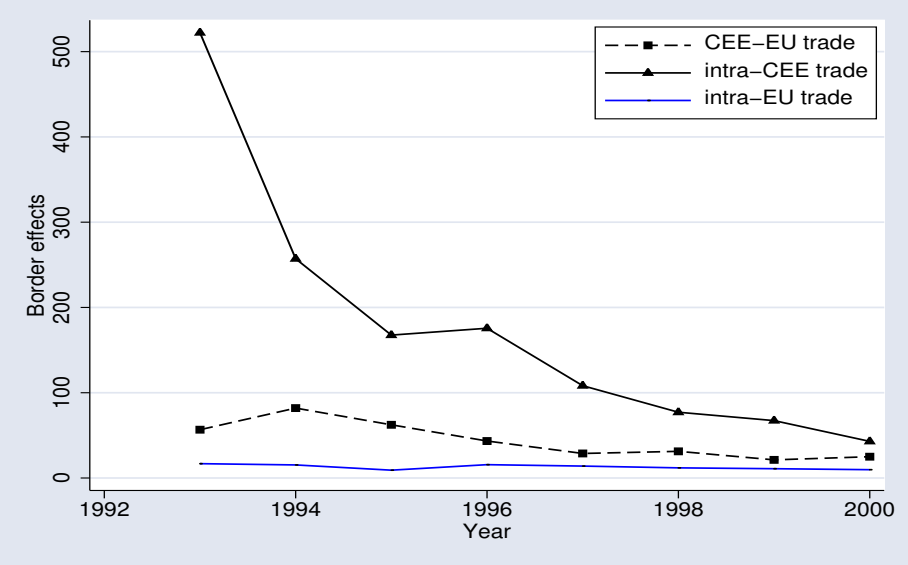
A.4 European Integration with the EU 'core'

Figure A.1: European trade integration: 'core' EU and odds specification



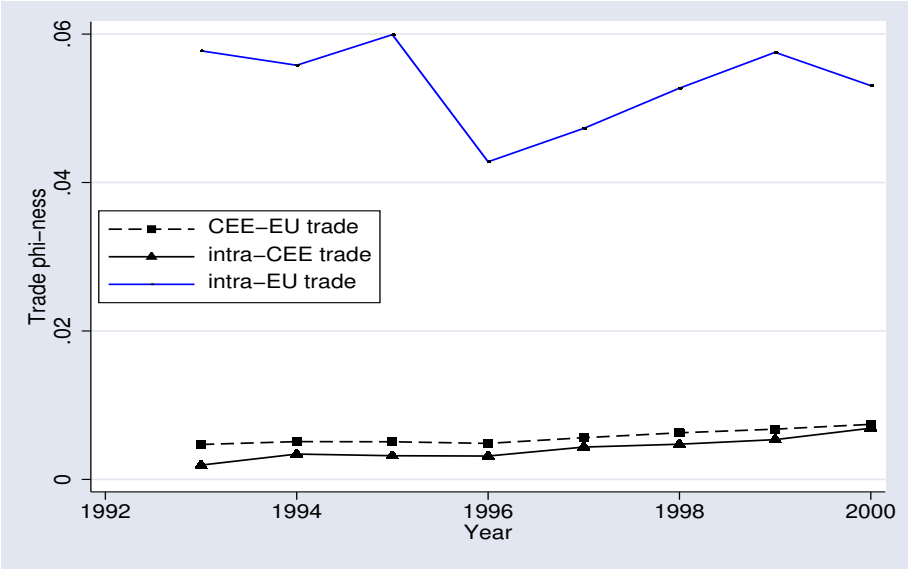
Note: Border effects are computed using estimated coefficients of equation (1.28) for each year with industry level data. Effects for countries with no common land border or language are represented.

Figure A.2: European trade integration: 'core' EU and fixed-effects specification



Note: Border effects are computed using estimated coefficients of equation (1.27) for each year with industry level data. Effects for countries with no common land border or language are represented.

Figure A.3: European trade ϕ-ness (free-ness): 'core' EU



Note: Trade ϕ-ness for each year and type of trade are given by respective median values of Φ_{ij} computed with industry level data.

Appendix B

Distance elasticity of trade and border effects

Recent studies on subnational trade patters and border effects drove supplementary attention to the use of distance in trade equations. The expression of trade flows at both national and international level using the same gravity model asks for a compatible measurement of distances. Rather than taking the distance between two points (capitals, largest cities or closest harbours) as in most empirical papers, Head and Mayer (2000) posit that international and internal distance should be computed as the weighted sum of interregional distances. The computation of distances as arithmetic means, however, is not compatible with the negative estimates of the distance elasticity of trade of most empirical works. A first attempt to correct the measurement of distances was formulated by Head and Mayer (2002b) who use a weighted harmonic mean.

The present annex makes an additional step by endogenizing the distance elasticity of trade. Rather than imposing the distance elasticity of trade to be equal to unity, negative one or some other amount, it is found through a nonlinear estimation procedure combining the gravity model with nonlinear distance computations. This method is derived directly from the fact that international (internal) trade is simply the sum of trade flows for all pairwise combinations between the regions of the two countries (same country). This annex treats jointly the concern for countries' internal geography formulated by Helliwell

and Verdier (2001) and the consistency with empirical findings.

The literature on border effects shows that the magnitude of the latter is very sensitive to distances used (e.g. Head and Mayer (2000), (2002b)). The overestimation of international distances artificially inflates border effects. Besides, distance proves to be an important determinant for other bilateral economic linkages that follow a gravity model like price covariations and migration flows (Engel and Rogers (1996), Parsley and Wei (2001)). For all these reasons distance measurement calls for a thorough attention in empirical studies.

B.1 Gravity and distance

One of the most solid empirical results in international economics is that trade decreases with distance and increases with the product of the two countries' sizes. This relationship known as the *gravity* equation is the 'horsework' model of many empirical studies on international trade and used as starting point in this annex. Trade between any two countries i and j in logarithmic form can be expressed as follows:

$$\ln m_{ij} = \alpha_0 + \alpha_1 y_i + \alpha_2 y_j + \theta distance_{ij} + \epsilon_{ij}. \tag{B.1}$$

Exporter and importer sizes y_i and y_j are generally reflected by the corresponding GDPs. According to the literature coefficients on countries' GDPs should be positive and close to unity. The coefficient of the distance variable gives the distance elasticity of trade and is the one on which this annex focuses.

As there are no reasons to accept the gravity model only for international data, it can be used also for trade between regions or cities. Indeed, empirical work confirm its suitability at either level. Moreover, theoretical derivations of the gravity can also be carried on a subnational basis. Hence, equation (B.1) can also be used to express trade flows between two regions. Different (larger) trade costs for international transactions are reflected similar to McCalumm (1995) by including a *home* dummy in (B.1) and using the resulting equation

for both types of trade flows, international and internal:

$$\ln m_{ij} = \alpha_0 + \alpha_1 y_i + \alpha_2 y_j + \theta distance_{ij} + \alpha_3 home_{ij} + \varepsilon_{ij}. \tag{B.2}$$

As simple as it can seem, measuring the distance is not always obvious. This is due to the fact that we deal with distance between territorial units with positive area and unequally distributed economic activity, and not simply between two points. There is some uniformity in the literature as to measuring international distances, the distance between capitals or the largest cities being mostly used, but there is an entire debate about intra-national distances. Wei (1996) is the first to introduce internal distances in the estimation of border effects, after developing a very easy way of computing unobserved internal trade as the difference between domestic production and exports to all partners. His work constitutes the basis of a genuine refinement of intra-national distance calculation. Wei himself computes internal distance as one fourth of the distance between the considered country and its closest neighbor. Wolf (2000) takes the distance between the largest two cities, while Leamer (1997) and Nitsch (2000) use the radius of the circle of area identical to the country area. Head and Mayer (2000) develop a similar measure for the particular case when all producers are located in the center and consumers are equally distributed on the area of the country (region), and which is equal to two-thirds of Nitsch's measure. Helliwell and Verdier (2001) and Helliwell (2002) come with a more sophisticated formula for computing internal distances as an average of the distances between urban areas, intra-city distances, distances from cities to rural areas and rural-area-to-rural-area distances.[1] Despite the different approach used, all these methods produce very similar estimates of the trade equation and border effects.[2]

A much greater difference is obtained when computing both international and internal distances as weighted average of inter and intra-regional distances, as formulated by Head

[1] For a more detailed discussion see Head and Mayer (2002b) (pages 10-11).
[2] See Head and Mayer (2002a).

and Mayer (2000):

$$d_{ij} = \sum_{l \in j} \left(\sum_{k \in i} d_{kl} \frac{y_k}{y_i} \right) \frac{y_l}{y_j}. \tag{B.3}$$

y_k, y_l, y_i, and y_j stand for regional and respectively country specific products or populations. Helliwell and Verdier (2001) use a similar principle for internal distances of Canadian provinces. The main advantage of equation (B.3) is that it permits to take into account the heterogeneous spatial distribution of economic activity within regions and countries. However, depending on the sample used, one needs to ensure that it is compatible with trade equations (B.1) and (B.2). We consider this question into detail in the next section.

B.2 The distance elasticity of trade

During the last decade empirical studies found a distance elasticity of trade close to negative one, although slightly lower in absolute terms in most cases (e.g. Frankel (1997), Hummels and Levinshon (1995), Feenstra, Markusen and Rose (2001)).[3] Recent work involving domestic or both domestic and foreign trade flows produced higher estimates in absolute terms. In his pioneer work on border effects McCallum obtains a distance elasticity of Canadian provinces' trade with the U.S. states of -1.5. He attributes this gap in with respect to earlier elasticity estimates to the different means of transport used in the U.S.-Canada and global trade. These results need to be considered when computing international and national distances.

We consider a sample of 25 European countries: fifteen old members, eight new member countries (Malta and Cyprus are ignored), and two candidate countries, aggregated into 24 observations for our estimations. Table B.1 gives results obtained directly from estimating trade equation (B.1) for manufactured trade across 27 industries between European countries for the year 2000. Different columns stand for different distance measures used in the literature. The first column shows estimates when distance between largest cities in each country is used, and the second one with distance between capitals. For most European countries the latter two coincide, which explains the almost identical results. In

[3]For a fuller survey see Head and Disdier (2005).

Table B.1: Gravity estimations with different distance variables: linear relationship with respect to the distance assumed (international trade flows)

Model :	(1)	(2)	(3)	(4)
Dependent variable:	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$
intercept	-1.18^a	-1.13^a	0.49^c	0.49^c
	(0.25)	(0.24)	(0.26)	(0.26)
ln GDP exporter	0.88^a	0.89^a	0.89^a	0.90^a
	(0.01)	(0.01)	(0.01)	(0.01)
ln GDP importer	0.77^a	0.78^a	0.78^a	0.79^a
	(0.01)	(0.01)	(0.01)	(0.01)
ln distance	-1.39^a	-1.44^a	-1.67^a	-1.68^a
	(0.03)	(0.03)	(0.03)	(0.15)
N	13388	13388	13388	13388
R^2	0.506	0.51	0.52	0.519
RMSE	1.958	1.951	1.932	1.932

Note: Standard errors in parentheses. ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

columns 3 and 4 bilateral distances are computing according to the expression (B.3) with regions' weights in national GDP and country's population respectively. From table B.1 it is straightforward that controlling for the internal geography produces larger in absolute value distance elasticities.

Head and Mayer (2002b) derive an expression for distance computation which conciliates the consideration of countries' internal geography with the use of a unique gravity equation for both internal and external trade.

Notice that trade between any two countries is given by the sum of trade between their subnational units:

$$m_{ij} = \sum_{l \in j} \sum_{k \in i} m_{kl}. \tag{B.4}$$

Expressing trade flows from (B.2) and substituting in equation (B.4), while assuming uni-

tary α_1 and α_2 coefficients, yields:

$$y_i y_j d_{ij}^{\theta} \exp(home_{ij})^{\alpha_3} = \sum_{l \in j} \sum_{k \in i} y_k y_l d_{kl}^{\theta} \exp(home_{kl})^{\alpha_3}. \tag{B.5}$$

By definition the home dummy is equal to one only for $i = j$ and null otherwise. Consequently, it takes the same value for a given pair of countries and can be simplified in equation (B.5). Divide both left and right hand side expressions by the product of country's sizes to get:

$$d_{ij}^{\theta} = \sum_{l \in j} \sum_{k \in i} \left(\frac{y_k}{y_i} \right) \left(\frac{y_l}{y_j} \right) d_{kl}^{\theta}, \tag{B.6}$$

and obtain the following relationship between international and interregional distances:

$$d_{ij} = \left[\sum_{l \in j} \left(\sum_{k \in i} {d_{kl}}^{\theta} \frac{y_k}{y_i} \right) \frac{y_l}{y_j} \right]^{\frac{1}{\theta}}. \tag{B.7}$$

Equation (B.7) is also suitable for the computation of internal distances d_{jj}. Interregional distances d_{kl} are geodesic distances between the largest cities of the two regions. The distance form a region to itself d_{kk} is calculated according to Head and Mayer (2000)'s procedure, i.e. assuming that each region is represented by a cercle of equal area, all producers are located in the center and consumers equally distributed on the area:

$$d_{kk} = \left(\int_0^R \frac{2\pi r}{\pi R^2} r^{\theta} \right)^{1/\theta} = \left(\frac{2}{2+\theta} \right)^{1/\theta} R. \tag{B.8}$$

Any other measure described in section B.1 would do the job. Head and Mayer (2002b) make the realistic assumption of $\theta = -1$ simply because it is compatible with empirical findings, and calculate internal and international distances as harmonic rather than arithmetic mean (as in equation (B.3)). It would be preferable, although, to use an estimated value of θ, the very one obtained when estimating trade equation (B.1) or (B.2).

A nonlinear estimation procedure is developed here in order to find the true distance elasticity of trade that should be used for distance computations. It consists of two repeatedly executed steps. First, distances are computed for a particular value of θ according to

(B.7) and (B.8). Secondly, obtained distances are used to estimate trade equation (B.1) or (B.2). The estimated distance elasticity of trade θ is then introduced in equations (B.7) and (B.8) and the procedure is repeated until the new estimate of θ is not statistically different from the old one. The process is performed starting with a distance elasticity of trade $\theta = -1$ close to values obtained by most empirical works. Results are very robust and do not change when different starting elasticity values are used (e.g. $\theta_0 = 1$).

For the same set of observations as previously, table B.2 displays estimates obtained with the nonlinear procedure described above. Estimations are run twice: using (a) regions' weights in national GDP and (b) regions' weights in national population for calculating distances and country GDPs in the trade equation (B.1). Equation (B.1) is used here because the sample is restricted international trade flows. Outcomes for the complete set of internal and cross-border trade are presented in the next section.

Results are displayed in the first two columns of table B.2. The last two columns show corresponding estimates if unitary coefficients on the size variables are imposed, as implied by the theory. By endogenizing the distance elasticity of trade, an elasticity value of -1.46 is obtained. This is significantly different from the one estimated under the linearity assumption in table B.1.

Note that almost identical distance elasticities are obtained when theory is considered more seriously and accordingly unitary coefficients are imposed on country GDPs. However, this additional assumption generates an important loss in the explanation power of the model. The positive share of non-traded goods and services in the national product also speaks against its use for the selected sample of observations.

B.3 Distance elasticity and border effects

In this section we consider the relationship between the distance elasticity of trade and border effects. Most European shipments both foreign and domestic being done by road, there is no *a priori* reason to encounter a different distance elasticity when both types of flows are jointly included in estimations. However, the mismeasurement of internal and

Table B.2: Nonlinear distance elasticity of trade estimation (international trade flows)

Variable	(1a)	(1b)	(2a)	(2b)
intercept	-0.55^b	-0.55^b	-4.67^a	-4.76^a
	(0.23)	(0.22)	(0.15)	(0.15)
ln GDP importer	0.76^a	0.76^a	1.00	1.00
	(0.01)	(0.01)		
ln GDP exporter	0.87^a	0.87^a	1.00	1.00
	(0.01)	(0.01)		
ln distance (θ)	-1.46^a	-1.47^a	-1.50^a	-1.48^a
	(0.02)	(0.02)	(0.02)	(0.02)
N	13388	13388	13388	13388
R^2	0.519	0.519	0.200	0.201
RMSE	1.933	1.933	1.981	1.980

Note: Standard errors in parentheses. ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

international distances due the inconsistency with distance elasticity estimates of the trade equation can generate an important bias in border effect.

Table B.3 shows estimates of equation (B.2) for manufactured trade between and within the same 25 European countries as in section B.2. Rather than using the *border* variable as McCallumn (1995) and a number of works on border effects, its conjugate *home* which takes the value 1 for internal trade flows and 0 otherwise is employed. This alters results only in a single way: The estimated coefficient on *home* is the opposite of the one on *border* variable. This specification is preferred as the exponential value of estimated coefficient gives exactly the magnitude of the border effect.

Columns in table B.3 correspond to four different distance measures, the same used in table B.1. Note that estimates are very similar to those obtained for international trade alone. According to the third column (national and regional GDPs used both for the calculation of distances and in the trade equation), European firms buy in average about 8.33[= exp(2.12)] times more from domestic partners than from foreign European partners. Border effects do not differ much upon the distance measure used when a linear

Table B.3: Gravity estimations with different distance variables: linear relationship with respect to the distance assumed (internal and international trade flows)

Model :	(1)	(2)	(3)	(4)
Dependent variable:	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$
intercept	-0.98^a	-0.92^a	0.59^b	0.57^b
	(0.24)	(0.24)	(0.25)	(0.25)
ln GDP exporter	0.87^a	0.88^a	0.88^a	0.89^a
	(0.01)	(0.01)	(0.01)	(0.01)
ln GDP importer	0.76^a	0.77^a	0.77^a	0.78^a
	(0.01)	(0.01)	(0.01)	(0.01)
ln distance	-1.38^a	-1.43^a	-1.65^a	-1.66^a
	(0.03)	(0.03)	(0.03)	(0.03)
home	2.07^a	1.97^a	2.12^a	2.14^a
	(0.11)	(0.11)	(0.10)	(0.10)
N	13843	13843	13843	13843
R^2	0.558	0.561	0.569	0.568
RMSE	1.949	1.943	1.926	1.927

Note: Standard errors in parentheses. ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

relationship with respect to the volume of trade is assumed. The ratio of internal to foreign trade corrected for economic size and shipping distance ranges from 7.2[= exp(1.97)] to 8.5[= exp(2.14)].

Again the nonlinear procedure described in section B.2 is applied to the data sample and estimates are presented in table B.4. In this case both internal and international flows are considered and trade equation (B.2) is used. Columns (1a) and (2a) correspond to the use of GDPs in distance computations, while columns (1b) and (2b) use regions' and countries' populations. Elasticity estimates are significantly lower in absolute terms compared to those obtained with cross-border flows only (table B.2). This is due to the weaker impact of distance on internal trade, which reflects the presence of cross-border trade costs increasing with the distance such as cultural, ethnic, and institutional heterogeneity.

An even larger difference is observed for the coefficient of variable *home*. Border effect estimates are considerably lower when a nonlinear variation of trade with respect to the distance is assumed. Results in table B.4 show that in average domestic shipments are 3.7 to

Table B.4: Nonlinear distance elasticity of trade estimation (internal and international trade flows)

Variable	(1a)	(1b)	(2a)	(2b)
intercept	-0.38^c	-0.37^c	-4.99	-4.80
	(0.22)	(0.22)	(0.16)	(0.16)
ln GDP importer	0.75^a	0.75^a	1.00	1.00
	(0.01)	(0.01)		
ln GDP exporter	0.85^a	0.86^a	1.00	1.00
	(0.01)	(0.01)		
ln distance (θ)	-1.44^a	-1.45^a	-1.45^a	-1.48^a
	(0.02)	(0.02)	(0.02)	(0.02)
home	1.50^a	1.60^a	1.32^a	1.39^a
	(0.12)	(0.12)	(0.13)	(0.12)
N	13843	13843	13843	13843
R^2	0.567	0.568	0.298	0.300
RMSE	1.929	1.928	1.985	1.983

Note: Standard errors in parentheses. ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

5 times larger than international shipments after controlling for country size and distance. About 46% of the estimated border effect is explained by distance mismeasurement (column 3 in table B.3 compared to column 1a in table B.4). With population weights used to compute distances (last column in table B.3 and column 1b in table B.4), a 42% drop in the border effect is reached.

These findings confirm the result of Head and Mayer (2002b) of overestimation of border effects due to the disregard of empirical results in the computation of bilateral and internal distances. Note that border effects obtained from table B.4 are significantly lower than those found in the literature. The gap is even more shocking if one takes into account that the sample includes bilateral trade between Central and East European countries, a considerably less integrated region than Western Europe, and that industry data is used. Thus, a partial solution for the "missing" international trade is provided. Allowing for a nonlinear relationship between trade and distance results in a more accurate computation of internal and bilateral distances. Most empirical studies over-emphasize distances in general and to a greater extend the larger ones. When both internal and foreign trade flows are

considered, this results in amplified border effects.

Equation (B.2) assumes equal distance elasticity for all trade types and all distance levels. But nothing tells us that this should be the case. In reality distance elasticity varies across countries and industries. The evidence of that is the presence in the literature of a relatively large range of estimates of the distance coefficient in trade equations. Table B.5 gives the values of θ for different industries obtained with the nonlinear estimation procedure presented in section B.2. Elasticities are rarely statistically different on whether internal trade flows are encompassed in the sample. The largest difference is incurred for tobacco products. The largest absolute values of the distance elasticity are observed for printing and publishing and iron and steel industries, while some labour intensive products (textiles, leather, beverages) and high-value products (electrical, professional, and scientific goods) are the least sensitive to the shipping distance.

B.4 Summary

A nonlinear estimation method of the distance elasticity of trade integrated in the calculations of international and internal distances is proposed in this annex. It takes into account countries' internal geography and conciliates theoretical derivations of the distance equation with empirical estimates of the distance elasticity.

Allowing for a nonlinear relationship between trade and distance, in which the estimated distance elasticity of trade is used to compute distances which are to be used for trade estimations, yields lower absolute values of the distance elasticity of trade than under assumption of a linear relationship between trade and distance. Our nonlinear estimation procedure produces a elasticity of -1.47 for industry level manufactured trade between 25 European countries for the year 2000. Results are very robust and do not change when different starting elasticity values are used, but vary across sectors. Applied to both internal and international flows, the method generates border effect estimates by at least 40% lower, confirming the previous finding of Head and Mayer (2002b). Exaggerated distance values used in most empirical works considerably magnify border effects.

Table B.5: Distance elasticity of trade (θ) at industry level

Industry	Trade flows used in estimations	
	international	internal and international
Food	-1.60	-1.56
Beverage	-1.21	-1.18
Tobacco	-1.44	-1.35
Textiles	-1.16	-1.16
Wearing apparel	-1.36	-1.30
Leather	-1.30	-1.30
Footwear	-1.43	-1.39
Wood Products	-1.63	-1.59
Furniture	-1.42	-1.39
Paper products	-1.66	-1.63
Printing, publishing	-1.88	-1.83
Industrial chemicals	-1.56	-1.54
Other chemical products	-1.45	-1.42
Products of petroleum and coal	-1.69	-1.69
Rubber products	-1.48	-1.44
Plastic products	-1.60	-1.57
Pottery, china and earthenware	-1.30	-1.28
Glass and glass products	-1.73	-1.68
Other non-metallic mineral products	-1.65	-1.63
Iron and steel	-1.81	-1.78
Non-ferrous metals	-1.75	-1.71
Fabricated metal products	-1.64	-1.61
Machinery	-1.45	-1.45
Electrical apparatus	-1.26	-1.27
Transport equipment	-1.68	-1.67
Professional, scientific, etc. goods	-1.29	-1.26
Other manufacturing	-1.40	-1.38

Note: Coefficients are obtained with the nonlinear estimation procedure from section B.2 applied to trade flows for 25 European countries and across 27 industries for the year 2000. All reported coefficients are significant at the 1% level.

Appendix C

Appendix to Chapter 2

Institutional Variables

The Index of Economic Freedom computed by the Heritage Foundation is composed of ten institutional measures, evaluating the level of economic freedom in as many different dimensions. The European Bank for Reconstruction and Development has elaborated nine institutional measures to evaluate economic reforms in transition countries. These are published annually in the Bank's *Transition Report* and are listed bellow.

According to the Heritage Foundation, among EU countries United Kingdom and Ireland have the most liberalized economies, and Spain and Greece are the least liberalized. Among CEE countries the Czech Republic and Estonia take the lead, with Bulgaria and Romania at the bottom of the list. The former two economies are characterized by a level of economic freedom comparable to that of France. From the point of view of undertaken economic reforms, i.e. EBRD index score, Hungary shows the best performance, while Romania has the worst score of the sample. Hence, the well-functioning Czech and Estonian institutions at the beginning of the XXIst century are at least partially due to the inheritance of a relatively good institutional framework.

Table C.1: Description of institutional and trade policy variables

Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
		Institutional Variables			
IEF index	135	*0.60*	*0.12*	*0.28*	*0.81*
Trade policy	135	0.69	0.20	0.25	1.00
Fiscal burden of government	135	0.17	0.12	0.00	0.63
Government intervention	135	0.62	0.19	0.00	0.88
Monetary policy	135	0.58	0.42	0.00	1.00
Capital flow and foreign investment	135	0.73	0.11	0.25	1.00
Banking and finance	135	0.66	0.20	0.25	1.00
Wages and prices	135	0.66	0.14	0.50	1.00
Property rights	135	0.76	0.21	0.25	1.00
Regulation	135	0.56	0.17	0.25	1.00
Black market	135	0.69	0.28	0.00	1.00
EBRD index	192	*0.83*	*0.22*	*0.24*	*1.00*
Price liberalization	192	0.84	0.20	0.30	1.00
Foreign exchange and trade liberalization	192	0.97	0.08	0.61	1.00
Small-scale privatisation	192	0.94	0.14	0.21	1.00
Large-scale privatisation	192	0.85	0.22	0.30	1.00
Enterprise reform	192	0.79	0.26	0.00	1.00
Competition policy	192	0.76	0.30	0.00	1.00
Infrastructure reform	192	0.74	0.34	0.00	1.00
Banking sector	192	0.83	0.23	0.00	1.00
Non-banking financial institutions	192	0.76	0.31	0.00	1.00
KKM index	72	*0.71*	*0.12*	*0.46*	*0.89*
Fraser index	48	*0.63*	*0.12*	*0.31*	*0.82*
		Trade Policy Variables			
Import tariff	3126	*2.34*	*3.24*	*0.00*	*17.12*
NTB coverage	358	*0.24*	*0.24*	*0.00*	*0.97*
NTB frequency	3126	*2.34*	*3.24*	*0.00*	*17.12*

Table C.2: Correlation of institutional and trade policy variables

Variable	IEF index	EBRD index	KKM index	Fraser index	Import tariff	NTB coverage	NTB frequency
IEF index	1.00						
EBRD index	0.80	1.00					
KKM index	0.87	0.87	1.00				
Fraser index	0.88	0.88	0.89	1.00			
Import tariff	-0.42	-0.57	-0.51	-0.65	1.00		
NTB coverage	-0.16	-0.09			0.30	1.00	
NTB frequency	0.06	-0.08			0.42	0.84	1.00

Figure C.1: Evolution of the institutional framework of CEE countries

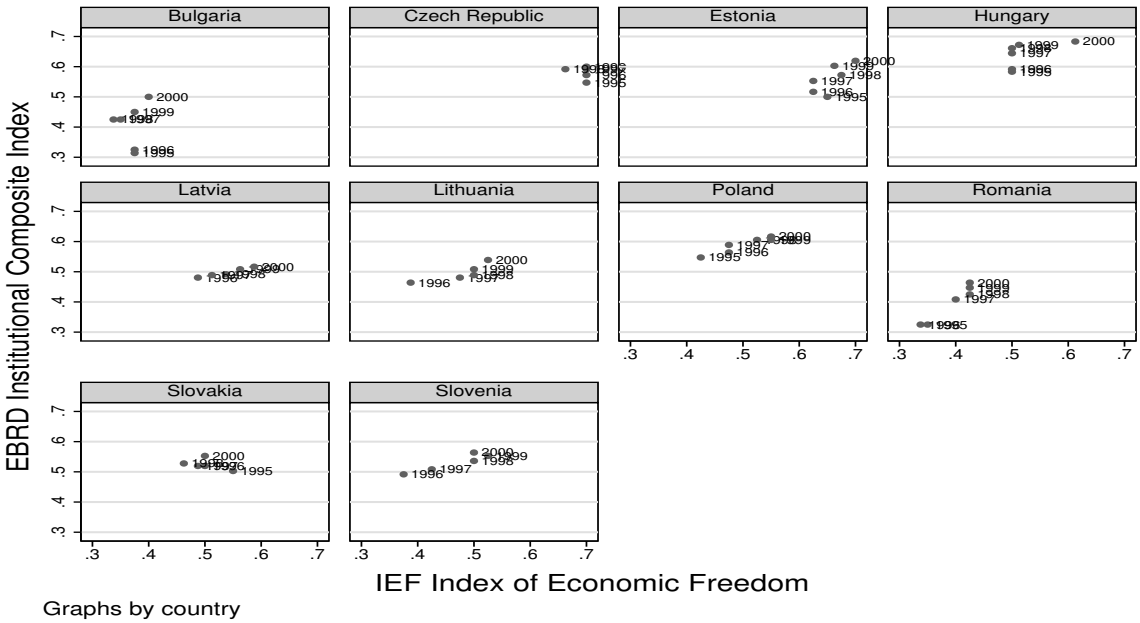


Table C.3: Correlation of IEF component indices

Varibles	Trade policy	Fiscal burden of gov'nt	Gov'nt interven-tion	Monetary policy	Capital flow and foreign inv'nt	Banking and finance	Wages and prices	Property rights	Regulation	Black market
Trade policy	1.00									
Fiscal burden of gov'nt	-0.16	1.00								
Government intervention	0.12	0.16	1.00							
Monetary policy	0.37	-0.31	0.03	1.00						
Capital flow and foreign inv'nt	0.36	0.00	0.04	-0.06	1.00					
Banking and finance	0.16	-0.04	0.09	0.29	0.25	1.00				
Wages and prices	0.24	-0.14	-0.21	0.26	0.38	0.46	1.00			
Property rights	0.26	-0.13	0.20	0.74	0.26	0.44	0.35	1.00		
Regulation	0.33	0.23	0.22	0.27	0.15	0.49	0.33	0.46	1.00	
Black market	0.24	-0.34	0.06	0.78	0.06	0.32	0.25	0.75	0.23	1.00

Table C.4: Correlation of EBRD component indices

Variable	Price liber-alization	Foreign ex and trade lib'n	Small-sle priv'n	Large-sle priv'n	Enterprise reform	Competi-tion policy	Infra-structure reform	Banking sector	Non-banking fin instit
Price liberalization	1.00								
Foreign exchange and trade lib'n	0.54	1.00							
Small-scale priv'n	0.54	0.73	1.00						
Large-scale priv'n	0.82	0.67	0.72	1.00					
Enterprise reform	0.94	0.64	0.68	0.89	1.00				
Competition policy	0.94	0.65	0.65	0.88	0.96	1.00			
Infrastructure reform	0.93	0.67	0.65	0.87	0.94	0.94	1.00		
Banking sector	0.93	0.66	0.70	0.87	0.95	0.92	0.95	1.00	
Non-banking fin instit	0.93	0.68	0.69	0.88	0.96	0.95	0.95	0.96	1.00

Appendix D

Appendix to Chapter 3

Additional results on cultural trade and social networks

Table D.1: Bilateral imports of cultural goods

Product group k:	cinemato-graphic films	books, pamphlets, maps, etc.	other printed matter	newspapers, periodi-cals	magnetic tapes recorded	other recorded media	alcoholic beverages
Dependent variable:	$\ln c_{ij}$	$\ln c_{ij}$	$\ln c_{ij}$	$\ln c_{ij}$	$\ln c_{ij}$	$\ln c_{ij}$	$\ln c_{ij}$
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
intercept	2.49^a	-0.85^a	0.31^b	-0.33^a	1.43^a	-9.13^a	1.48^a
	(0.49)	(0.16)	(0.15)	(0.21)	(0.47)	(0.40)	(0.15)
ln GDP importer	0.20^a	0.44^a	0.36^a	0.38^a	0.59^a	0.63^a	0.34^a
	(0.02)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)
ln GDP exporter	0.19^a	0.51^a	0.56^a	0.56^a	0.30^a	0.90^a	0.39^a
	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)
ln distance	-0.20^a	-0.56^a	-0.64^a	-0.71^a	-0.23^a	-1.07^a	-0.43^a
	(0.03)	(0.01)	(0.01)	(0.02)	(0.03)	(0.03)	(0.01)
common border	-0.06	0.51^a	0.64^a	0.89^a	-1.44^a	0.52^a	0.61^a
	(0.10)	(0.04)	(0.04)	(0.05)	(0.13)	(0.11)	(0.05)
militarized dispute	-0.38	-0.64^a	-0.83^a	-0.15	0.34	-1.39^a	-0.69^a
	(0.36)	(0.15)	(0.16)	(0.24)	(0.38)	(0.28)	(0.18)
common official language	0.33^a	1.23^a	0.69^a	0.93^a	0.65^a	1.23^a	0.39^a
	(0.07)	(0.03)	(0.03)	(0.04)	(0.06)	(0.05)	(0.03)
colonial relationship	0.22^b	1.02^a	0.51^a	0.76^a	0.06	-0.38^a	0.82^a
	(0.09)	(0.04)	(0.04)	(0.05)	(0.14)	(0.11)	(0.05)
mill's ratio	-0.03	0.29^a	0.22^a	0.33^a	-3.52^a	2.40^a	0.20^a
	(0.07)	(0.03)	(0.03)	(0.04)	(0.20)	(0.26)	(0.04)
N	2548	18783	18139	8391	10666	19216	22744
R^2	0.119	0.417	0.415	0.416	0.28	0.352	0.27
RMSE	1.198	1.274	1.219	1.273	2.146	2.222	1.561

Note: Heckman estimations with year fixed effects. Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

Table D.2: Bilateral imports of non-cultural products : selected samples

Country sample identical to:	cinematographic films	books, pamphlets, maps, etc.	other printed matter	newspapers, periodicals	magnetic tapes recorded	other recorded media	alcoholic beverages
Dependent variable:	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
intercept	1.39^a	0.09^a	0.58^a	0.43^a	-0.87^a	-2.00^a	-0.86^a
	(0.24)	(0.11)	(0.11)	(0.14)	(0.17)	(0.14)	(0.11)
ln GDP importer	0.66^a	0.74^a	0.75^a	0.69^a	0.88^a	0.84^a	0.78^a
	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)
ln GDP exporter	0.66^a	0.74^a	0.69^a	0.73^a	0.79^a	0.92^a	0.87^a
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)
ln distance	-0.51^a	-0.62^a	-0.60^a	-0.56^a	-0.80^a	-0.82^a	-0.79^a
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
common border	0.61^a	0.60^a	0.60^a	0.60^a	0.48^a	0.58^a	0.69^a
	(0.06)	(0.04)	(0.03)	(0.04)	(0.05)	(0.05)	(0.04)
militarized dispute	0.23	-0.83^a	0.15^c	0.11	-0.77^a	-0.60^a	0.00
	(0.24)	(0.12)	(0.14)	(0.18)	(0.20)	(0.16)	(0.14)
common official language	0.35^a	0.22^a	0.45^a	0.36^a	0.76^a	0.64^a	0.71^a
	(0.04)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.02)
colonial relationship	0.36^a	0.43^a	0.38^a	0.17^a	0.02^a	0.16^a	0.50^a
	(0.05)	(0.03)	(0.03)	(0.03)	(0.07)	(0.06)	(0.03)
same country	0.97^a	0.29^a	0.26^a	0.22^a	0.07^a	0.35^a	0.23^a
	(0.11)	(0.06)	(0.06)	(0.06)	(0.09)	(0.08)	(0.06)
N	2548	18698	18110	8379	10222	18289	22744
R^2	0.771	0.707	0.725	0.735	0.736	0.695	0.748
RMSE	.805	1.076	1.021	.939	1.138	1.223	1.194

Note: Estimations with year fixed effects. Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

Table D.3: Bilateral imports of non-cultural products and cultural links (cultural trade residual), fixed-effects

Product group in first stage estimations k:	cinemato-graphic films	books, pam-phlets, maps, etc.	other printed matter	newspapers, periodi-cals	magnetic tapes recorded	other recorded media	alcoholic beverages
Dependent variable:	$\ln g_{ij}$	$\ln g_{ij}$	$\ln g_{ij}$	$\ln g_{ij}$	$\ln g_{ij}$	$\ln g_{ij}$	$\ln g_{ij}$
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
intercept	16.26^a	9.60^a	13.27^a	15.57^a	14.05^a	17.33^a	10.04^a
	(0.92)	(0.66)	(0.67)	(0.88)	(1.16)	(22331.7)	(0.95)
ln distance	-0.65^a	-0.87^a	-0.85^a	-0.75^a	-1.14^a	-1.15^a	-1.00^a
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
common border	0.77^a	0.32^a	0.44^a	0.48^a	0.08^c	0.17^a	0.45^a
	(0.05)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.03)
militarized dispute	0.03	-0.81^a	-0.17^c	-0.12	-0.63^a	-0.48^a	-0.07
	(0.16)	(0.09)	(0.10)	(0.12)	(0.15)	(0.12)	(0.11)
common official language	0.00^a	0.17^a	0.28^a	0.23^a	0.46^a	0.45^a	0.40^a
	(0.04)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.02)
colonial relationship	0.32^a	0.82^a	0.80^a	0.36^a	0.53^a	0.53^a	0.97^a
	(0.04)	(0.02)	(0.02)	(0.03)	(0.06)	(0.05)	(0.03)
same country	0.41^a	0.48^a	0.28^a	0.24^a	0.25^a	0.51^a	0.22^a
	(0.09)	(0.05)	(0.05)	(0.05)	(0.07)	(0.06)	(0.05)
cultural trade residual	0.08	0.17^a	0.26^a	0.23^a	0.06^a	0.10^a	0.27^a
	(0.05)	(0.05)	(0.06)	(0.07)	(0.01)	(0.01)	(0.10)
N	2548	18698	18110	8379	10222	18289	22744
R^2	0.923	0.848	0.862	0.894	0.868	0.831	0.861
RMSE	.485	.782	.73	.604	.812	.916	.894

Note: Estimations with year fixed effects. Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

Table D.4: Imports of non-cultural products, cultural ties and migration

Cultural goods used in first stage estimations:	cinematographic films	books, pamphlets, maps, etc.	other printed matter	newspapers, periodicals	recorded magnetic tapes	other recorded media	alcoholic beverages
	Selected second stage estimates:						
Dependent variable:	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$
ln immigrants	0.13^a	0.11^a	0.11^a	0.05^a	0.06^a	0.08^a	0.09^a
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
cultural trade residual	0.04^b	0.14^a	0.15^a	0.11^a	0.06^a	0.08^a	0.05^a
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	951	4643	4202	2632	2530	4711	5706
R^2	0.872	0.822	0.841	0.809	0.796	0.765	0.826
Dependent variable:	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$	$\ln m_{ij}$
ln migrations	0.13^a	0.10^a	0.11^a	0.05^a	0.06^a	0.08^a	0.09^a
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
cultural trade residual	-0.08	-0.03	-0.04	0.05	0.01	0.11^a	0.07^a
	(0.08)	(0.03)	(0.03)	(0.05)	(0.03)	(0.03)	(0.03)
ln migrations × cult resid	0.02^a	0.03^a	0.03^a	0.01^a	0.01^a	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)
N	951	4643	4202	2632	2530	4711	5706
R^2	0.873	0.823	0.843	0.809	0.796	0.765	0.826

Note: Estimations with year fixed effects. Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

Table D.4: Imports of non-cultural products, cultural ties and migration (continued)

Cultural goods used in first stage estimations:		newspapers, periodicals	recorded magnetic tapes	other recorded media	alcoholic beverages
Similar non-cultural goods in first stage estimations:		newsprint rolls and sheets	unrecorded magnetic tapes	other blank media	acyclic monohydric alcohols
Dependent variable:		$\ln g_{ij}$	$\ln g_{ij}$	$\ln g_{ij}$	$\ln g_{ij}$
ln migrations		0.12^{a}	0.10^{a}	0.07^{a}	0.11^{a}
		(0.01)	(0.01)	(0.01)	(0.01)
cultural trade residual		0.11^{a}	0.06^{a}	0.09^{a}	0.01
		(0.01)	(0.01)	(0.01)	(0.01)
non-cultural trade residual		0.04^{a}	0.07^{a}	0.05^{a}	0.07^{a}
		(0.01)	(0.01)	(0.01)	(0.01)
N		1176	1912	3259	2797
R^2		0.892	0.827	0.795	0.854
Dependent variable:		$\ln g_{ij}$	$\ln g_{ij}$	$\ln g_{ij}$	$\ln g_{ij}$
ln migrations		0.12^{a}	0.10^{a}	0.07^{a}	0.11^{a}
		(0.01)	(0.01)	(0.01)	(0.01)
cultural trade residual		0.07^{c}	0.03	0.13^{a}	-0.05
		(0.05)	(0.03)	(0.03)	(0.04)
non-cultural trade residual		-0.07^{b}	0.04	-0.02	0.03
		(0.04)	(0.03)	(0.03)	(0.04)
ln migrations × cult resid		0.00	0.01	-0.01	0.01^{c}
		(0.01)	(0.01)	(0.00)	(0.01)
ln migrations × non-cult resid		0.02^{b}	0.01^{a}	0.01^{a}	0.01
		(0.01)	(0.00)	(0.00)	(0.01)
N		1176	1912	3259	2797
R^2		0.893	0.828	0.795	0.854

Appendix E

Appendices to Chapter 4

E.1 Descriptive statistics

Table E.1: Data description

Variable	Obs	Mean	Std. Dev.	Variance	Min	Max
ln imports	55239	12.55	2.42	5.86	0	19.36
ln exports	11869	12.63	3.49	12.18	0	20.19
average-size French subsidiaries	231	35.87	39.13	1531.16	0	192.94
ln GDP	346	21.93	1.55	2.40	18.52	25.74
ln per capita GDP	346	6.12	0.74	0.55	4.48	8.26
ln distance	357	8.51	0.38	0.14	7.50	9.14
colony	357	0.76	0.42	0.18	0	1
ln aid	357	3.52	0.88	0.77	0.67	5.02
armed dispute	357	0.21	0.45	0.20	0	1
ln (1+tariff/100)	133	0.19	0.09	0.01	0.06	0.57
ln immigrants	154	6.10	1.58	2.50	2.40	9.79
association	357	0.27	0.44	0.19	0	1
new associations	357	0.45	0.92	0.86	0	5
total migrant associations	357	3.37	5.58	31.14	0	41
economic migrant associations	357	2.36	4.18	17.47	0	31
budget	357	14.19	17.60	309.78	0	119

E.2 Additional estimation results

Table E.2: Trade, tariffs, immigrants, and home country associations: differentiated goods

Dependent variable: imports from France $\ln IMP_{ijt}$					
Model :	(1)	(2)	(3)	(4)	(5)
ln distance	-0.71^a	-0.84^a	-0.61^a	-0.76^a	-0.77^a
	(0.21)	(0.22)	(0.21)	(0.20)	(0.20)
colonial relationship	0.63^a	0.80^a	0.57^a	0.66^a	0.70^a
	(0.16)	(0.18)	(0.17)	(0.16)	(0.16)
ln foreign aid	0.11^b	0.13^b	0.12^b	0.11^b	0.11^b
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
armed conflict	-0.10^c	-0.13^b	-0.13^b	-0.10^c	-0.09^c
	(0.05)	(0.06)	(0.06)	(0.05)	(0.05)
ln (1 + tariff/100)	-0.54	-0.24	-1.03^c	-0.45	-0.31
	(0.49)	(0.60)	(0.54)	(0.50)	(0.50)
ln immigrants	0.16^a	0.15^a	0.18^a	0.15^a	0.13^a
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
association created in t		0.068			
		(0.052)			
association created in $t-1$		0.120^b			
		(0.051)			
association created in $t-2$		0.060			
		(0.049)			
association created in $t-3$		-0.071			
		(0.056)			
association created in $t-4$		-0.052			
		(0.072)			
association created in $t-5$		0.050			
		(0.069)			
number of new associations in t			0.007		
			(0.036)		
number of new associations in $t-1$			-0.020		
			(0.026)		
number of new associations in $t-2$			-0.009		
			(0.026)		
number of new associations in $t-3$			-0.150^a		
			(0.052)		
number of new associations in $t-4$			-0.116^c		
			(0.060)		
number of new associations in $t-5$			0.010		
			(0.036)		
total number of associations in t				0.012	
				(0.011)	
average associations' budget in t					0.006^b
					(0.003)
country, year, and product FE	Yes	Yes	Yes	Yes	Yes
N	7899	7899	7899	7899	7899
R^2	0.507	0.510	0.509	0.507	0.508

Note: Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent statistical significance at 1%, 5% and 10%.

Table E.3: French subsidiaries, immigrants and migrant associations: Negative binomial model, incidence-rate ratios

Dependent variable: number of average-size French subsidiaries N_{jt}						
Model :	(1)	(2)	(3)	(4)	(5)	(6)
ln GDP	2.52^a	2.56^a	2.46^a	2.50^a	2.49^a	2.44^a
	(0.10)	(0.20)	(0.19)	(0.19)	(0.19)	(0.19)
ln per capita GDP	0.56^a	0.54^a	0.58^a	0.59^a	0.62^a	0.63^a
	(0.04)	(0.07)	(0.08)	(0.08)	(0.09)	(0.09)
ln distance	$.63^a$	0.69^b	0.69^b	0.73^b	0.70^a	0.69^a
	(0.05)	(0.10)	(0.10)	(0.11)	(0.10)	(0.09)
colonial relationship	1.45^a	1.03	1.00	1.06	1.20	1.24
	(0.17)	(0.30)	(0.29)	(0.31)	(0.35)	(0.36)
ln foreign aid	1.45^a	1.79^a	1.66^a	1.69^a	1.67^a	1.66^a
	(0.08)	(0.19)	(0.19)	(0.19)	(0.18)	(0.17)
armed conflict	0.91	0.81^c	0.77^b	0.81^c	0.83^c	0.83^c
	(0.07)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
ln immigrants		1.08	1.10^c	1.10	1.06	1.04
		(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
association created in t			1.29^b			
			(0.15)			
association created in $t-1$			1.07			
			(0.12)			
association created in $t-2$			1.05			
			(0.11)			
association created in $t-3$			0.95			
			(0.10)			
association created in $t-4$			0.88			
			(0.10)			
association created in $t-5$			0.92			
			(0.11)			
number of new associations in t				1.05		
				(0.05)		
number of new associations in $t-1$				1.02		
				(0.05)		
number of new associations in $t-2$				1.05		
				(0.06)		
number of new associations in $t-3$				0.98		
				(0.06)		
number of new associations in $t-4$				0.98		
				(0.07)		
number of new associations in $t-5$				1.01		
				(0.05)		
total number of associations in t					1.02^b	
					(0.01)	
average associations' budget in t						1.01^a
						(0.00)
N	240	97	97	97	97	97
Pseudo R^2	0.180	0.140	0.146	0.144	0.146	0.147
overdispersion parameter α	0.152	0.167	0.153	0.159	0.153	0.149
p-value	(0.018)	(0.033)	(0.031)	(0.032)	(0.031)	(0.030)

Note: Standard errors in parentheses: ^{a}, ^{b} and ^{c} represent respectively statistical significance at the 1%, 5% and 10% levels.

Summary

This dissertation studies the burden of international trade costs on trade between countries, and the contribution of two non-traditional factors to lowering these costs. It evaluates the size of overall border-related trade costs, and the extent to which their reduction can be achieved via regional economic integration. A central place in this discussion is attributed to non-traditional trade determinants, represented by country-specific institutions, and by transnational social and business networks. The latter furnish foreign contacts and information about potential partners and increase the security and contract enforcement in international transactions, which all translate in lower costs and reduced uncertainty of cross-border exchanges. This study is important not only for a more thorough understanding of a series of phenomena observed in international economics, but also for the development of specific economic policies assisting countries in achieving their long term objectives.

The work presented in this thesis consists mainly of an empirical analysis of the abovementioned issues. But it also takes advantage of the recent theoretical advances in international trade literature. This thesis shows that there is room for non-traditional trade costs in explaining missing international trade. Trade potentials may actually have been underestimated in the literature, and trade creation associated with regional economic integration might be much larger than expected. This finding is illustrated in the particular case of trade between East and West European countries. Results presented in different chapters confirm the pro-trade effect of both institutions and transnational networks. The well-functioning of domestic and foreign institutions is a factor comparable in importance to foreign trade policies. Even after all tariff and non-tariff barriers are removed, institutional reforms can generate a large increase in international trade. Social networks promote trade not only via common ethnic, linguistic and other ties that connect their members, but also via information and tastes acquired from the consumption of foreign cultural goods. A particular form of business networks, home country associations established by immigrants in their host country, is studied in the last part of the dissertation. Migrant associations have a stronger effect on trade than social network ties, they shape foreign trade and affect decisions to invest abroad.

Field: Economic Sciences (05).

Keywords: International trade, trade potential, trade policy, institutions, social and business networks, cultural trade, migration, home country associations.

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