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## A study of socio-cultural ties determining the international trade

Silvio Hong Tiing Tai

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THÈSE

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**Silvio Hong Tiing Tai**

le 6 mai 2009

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UNE ETUDE DES FACTEURS SOCIOCULTURELS  
DÉTERMINANT  
LE COMMERCE INTERNATIONAL

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Directeur de thèse: Thierry Mayer

JURY:

Lionel Fontagné  
Thierry Mayer  
Mathias Thoenig  
Farid Toubal

Professeur à l'Université Paris I Panthéon-Sorbonne  
Professeur à l'Université Paris I Panthéon-Sorbonne  
Professeur à l'Université de Genève (rapporteur)  
Professeur à l'Université d'Angers (rapporteur)



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## Résumé

Les recherches dans le cadre de ma thèse doctorale portent sur l'étude de plusieurs déterminants socioculturels du commerce international. Ces éléments influencent le commerce soit par une augmentation des préférences bilatérales, soit par une réduction des coûts de transaction. Leur prise en compte dans l'analyse des flux d'échanges entre pays permet d'expliquer un biais non traité par des analyses conventionnelles. Mes travaux doctoraux se concentrent sur deux facteurs: les migrations internationales et le commerce des produits culturels. Les résultats obtenus montrent l'importance des liens culturels et ethniques comme déterminants des échanges et ouvrent la voie à nouvelles recherches fort prometteuses.

### *Premier chapitre*

Le premier chapitre de la thèse est basé sur l'article "*Market Structure and the Link between Migration and Trade*" ("*Review of World Economics*", à paraître) et analyse l'impact de l'immigration sur le commerce en Suisse pour la période 1995-2000. Ce papier présente comme principal résultat une compréhension du rôle de la différenciation des produits dans

l'impact de l'immigration sur le commerce. Cet impact est décomposé en deux mécanismes: l'augmentation des préférences et la réduction des coûts d'exportation. Ce résultat est détaillé dans les paragraphes suivants.

Les produits très différenciés (par exemple les montres) sont plus facilement identifiés à une nationalité donnée et l'immigration peut provoquer un biais par rapport aux préférences envers ces produits. D'autre part, le commerce de ces produits requiert des connaissances très spécifiques que les immigrants ne sont pas forcément en mesure d'offrir.

Les produits très homogènes (par exemple le maïs) ne sont pas associés à une origine précise, l'immigration ayant peu d'impact sur les préférences pour ces produits. Concernant les coûts de transaction, le commerce de ces produits est souvent réalisé dans un cadre d'échange assez organisé qui laisse peu de marge à l'intermédiation d'un immigré.

En revanche, les produits avec un niveau de différenciation intermédiaire peuvent voir leurs coûts de transactions réduits par l'intermédiaire des immigrants. L'impact de l'immigration sur les coûts suit une courbe en forme de "U" inversé.

Ces résultats ont été obtenus via l'estimation d'une équation de gravité dérivée d'un modèle théorique de concurrence monopolistique. Ce modèle prend en compte la différenciation des produits par l'hétérogénéité des firmes dans un cadre multi secteurs. Le modèle, basé sur les travaux de Chaney (2008), est enrichi par l'introduction d'un terme captant les préférences bilatérales suivant une procédure proche de celle proposée par Combes et al. (2005). D'après l'hypothèse que l'immigration influence le commerce par les coûts fixes d'exportation et par les préférences, leurs respectives élasticités sur le commerce sont retenues du modèle théorique pour l'interprétation des résultats économétriques.

L'impact des coûts fixes sur le commerce est d'autant plus important que les biens échangés sont différenciés. Cette conclusion découle directement du modèle de Chaney (2008). Une réduction de ces coûts fixes permet l'entrée de nouveaux exportateurs sur le marché, abrités de la concurrence en raison de leur position de monopole sur la variété produite. Cette augmentation du nombre d'exportateurs correspond à la marge extensive. Cette marge l'emporte toujours sur la marge intensive. Cette dernière correspond à la situation dans laquelle les exportateurs déjà présents dans le marché augmentent leurs exportations suite à une baisse des barrières.

L'impact des préférences sur le commerce suit une tendance inverse. Une fois la préférence bilatérale définie, les produits très homogènes seront plus touchés car ils sont davantage substituables. A titre d'illustration, supposons que les préférences des consommateurs français envers les produits américains sont positivement influencées par un choc exogène. Comme le maïs est un produit homogène, les consommateurs français consommeront facilement davantage du maïs américain au détriment de celui produit par d'autres pays. A l'opposé, l'effet de ce choc sur la consommation des montres ne sera pas similaire. Les consommateurs seront plus réticents à remplacer une montre Suisse ou Japonaise par une montre Américaine car elles sont peu substituables.

Ce modèle théorique est estimé par une équation de gravité. L'effet total de l'immigration sur le commerce est pris en compte dans l'estimation. Les développements économétriques les plus récents sont appliqués. Nous retenons, en particulier, l'estimateur du type Poisson Maximum de Vraisemblance (PPML - Maximum Likelihood) suggéré par Santos-Silva et Tenreyro (2006) pour toutes les régressions. Cet estimateur permet d'inclure les flux de commerce nuls dans la régression et offre une estimation non biaisée des coefficients. La transformation logarithmique très répandue dans les études empiriques sur le commerce exige des conditions très spécifiques pour ne pas violer les conditions d'efficacité et d'absence de biais.

La comparaison entre le modèle théorique et les résultats des estimations empiriques permet d'analyser l'effet de l'immigration sur le commerce et ses canaux d'influence. Les élasticités théoriques fournissent la forme fonctionnelle de l'effet partiel des coûts fixes et des préférences sur le commerce. Les estimations empiriques fournissent l'effet total de l'immigration sur le commerce. Par différence on obtient l'effet partiel de l'immigration sur les coûts fixes et sur les préférences selon le degré de différenciation des produits commercialisés.

En termes pratiques, il est possible d'expliquer pourquoi, en Suisse, l'immigration a un impact moins important sur les exportations que sur les importations. La Suisse présente une distribution des exportations concentrée sur les produits différenciés alors que la distribution des importations couvre une gamme de produits plus homogènes. Les produits importés sont davantage influencés car ils sont plus substituables et donc plus susceptibles d'être affectés par les préférences, ou parce qu'ils demandent des transactions relativement simples. L'effet

résiduel de l'immigration sur les préférences augmente celles-là envers les produits suisses en raison de leur composition très différenciée.

## *Deuxième chapitre*

Le deuxième chapitre de la thèse est basé sur l'article « Social Interactions and Trade Outcomes » et approfondit la compréhension de l'effet de l'immigration sur les coûts de transactions. Le principal mécanisme avancé dans la littérature pour justifier cet effet est la formation des réseaux. Cet effet repose sur deux concepts fondamentaux. Premièrement, les communautés d'immigrés peuvent éviter les violations de contrats tacites engagés au sein de la communauté, chaque immigré n'ayant pas intérêt à être inscrit sur une "liste noire". Deuxièmement, les immigrés bénéficient d'informations privilégiées concernant les marchés dans leur pays d'origine et dans le pays d'accueil. Malgré son importance dans la littérature relative à l'immigration et au commerce, la formation de réseaux n'a pas été étudiée dans ce contexte.

Cette recherche reprend, tout en l'adaptant, le modèle théorique de Head et Mayer (2008) et suit la littérature récente sur les interactions sociales. Cette branche de l'économie se propose d'étudier les conséquences des effets d'un voisinage sur le comportement d'un individu et sur la composition de ce voisinage<sup>1</sup>.

Le modèle théorique explique la composition des immigrants par rapport à la population totale de chaque département en France métropolitaine par une utilité sociale. L'utilité est fonction de la part de compatriotes anticipée, non seulement dans le département étudié, mais aussi dans les autres départements Français. L'influence des autres départements est une fonction de leurs distances par rapport au département étudié. L'imposition d'un équilibre entre la part d'immigrés anticipée et la part d'immigrés effective permet d'obtenir une équation estimable. Pour expliquer la part d'une nationalité dans un département, ce modèle intègre une variable relative aux interactions sociales potentielles. Cette variable est égale à la somme de parts de compatriotes dans chaque autre département, divisées par la distance entre départements.

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<sup>1</sup> Durlauf (2004) propose une revue de la littérature récente sur les interactions sociales.

Ce modèle est testé sur des données de population pour les années 1968, 1975, 1982, 1990 et 1999. Le coefficient estimé pour la variable rendant compte des interactions sociales est significatif au seuil de 1%. L'interprétation de ces résultats montre que la part d'une nationalité dans un département augmenterait de 8.1% si les communautés où vivent ses compatriotes se rapprochaient de 40 Km de ce département.

Ces régressions contrôlent pour tous les effets spécifiques aux pays d'origine des immigrants, aux départements de destination, et à leurs variations temporelles. De ce fait, les résultats ne sont pas biaisés ni par des effets d'agglomération géographique (opposition Paris-Province par exemple), ni par des effets liés à un pays d'origine.

En outre, afin de tenir compte d'un potentiel biais de sélection parmi les immigrants, l'analyse empirique suit la procédure suggérée par Heckman (1976). La présence d'immigrants d'une nationalité donnée au sein d'un département français est conditionnelle à l'existence d'une immigration en provenance de ce pays et à destination de la France. Ce potentiel biais de sélection est contrôlé par une estimation en deux étapes, la première de ces deux étapes consistant en l'estimation d'un modèle probit.

Enfin, la méthode des variables instrumentales est appliquée pour corriger l'endogénéité potentielle. La variable de réseau d'immigrants retardée de seize années est utilisée comme instrument.

Cette première partie empirique confirme les prédictions du modèle théorique et l'existence d'un effet réseaux parmi les immigrants. La deuxième partie de cette démarche empirique teste cet effet réseau sur le commerce international.

Le commerce international des régions Françaises est analysé via l'estimation d'une équation de gravité tenant compte des développements récents de la littérature sur le sujet (Anderson et Wincoop, 2003; Redding et Venables, 2004; Santos Silva et Tenreyro, 2006; Baldwin et Taglioni, 2006). La variable relative au réseau d'immigrants est la principale variable d'intérêt dans notre estimation. En raison du manque de disponibilité de certaines données sur les flux de commerce, seules les années 2004 pour le commerce et 1999 pour l'immigration sont retenues. La méthodologie des variables instrumentales (variable retardée de huit ans) et des effets fixes origine et destination est appliquée. Les résultats confirment ceux mis en évidence dans la littérature, à savoir l'impact significatif de l'immigration sur le commerce.

L'asymétrie de l'impact sur les exportations d'une part et sur les importations d'autre part mis en évidence dans le premier chapitre de la thèse est à nouveau obtenue dans ce chapitre.

Plus intéressante encore est l'analyse comparant l'effet de cette mesure des réseaux d'immigrés avec celles utilisées dans la littérature. Une première comparaison est faite avec la simple comptabilisation du stock d'immigrés au sein de la région dont le commerce est analysé, procédure conventionnellement appliquée dans les recherches récentes. Une seconde comparaison est effectuée avec le stock d'immigrés présents dans les régions voisines, méthodologie appliquée par Herander et Saavedra (2005). Or, la mesure appliquée dans ce chapitre se révèle plus significative et robuste que ces deux autres mesures. Capturer les interactions sociales dans le contexte d'un pays dans son ensemble fournit une mesure plus complète de l'effet réseau et de ses impacts sur le commerce international.

### *Troisième chapitre*

L'article sur lequel se base le troisième chapitre de ma thèse: "Bilateral Trade of Cultural Goods" (*"Review of World Economics"*, à paraître) a été coécrit avec Anne-Célia Disdier, Thierry Mayer et Lionel Fontagné. Ce chapitre étudie la façon dont les croyances, valeurs et perceptions communes à deux pays peuvent être captées par le commerce de biens culturels et avoir un impact sur le commerce total. Ce chapitre propose une nouvelle mesure de la proximité culturelle des pays basée sur le commerce des biens culturels.

Les échanges de biens culturels ont fortement cru au cours des dernières décennies : entre 1980 et 1998, le volume de ces échanges a cru de 347%. De nombreuses discussions ont également opposées les partisans du libre-échange et les avocats d'une "exception culturelle". Cette recherche constitue la première tentative d'analyse à grande échelle de ce genre de commerce. L'échantillon étudié couvre 239 pays entre 1989 et 2005.

Outre les résultats traditionnels, tels l'effet négatif de la distance, nous montrons que le commerce de biens culturels présente quelques spécificités: la langue commune augmente les flux bilatéraux, notamment de livres et de journaux. De plus, un passé colonial commun renforce le commerce bilatéral des biens du patrimoine, comme les antiquités. Finalement, la consommation de biens culturels présente des effets d'hystérésis, la consommation passée

ayant un effet persistant sur la consommation actuelle.

### *Quatrième Chapitre*

La recherche concernant ce chapitre de la thèse a été réalisée dans le cadre d'un contrat de recherche requis par le Ministère de la Culture et de la Communication de la République Française ayant comme titre: *Etude sur les échanges internationaux de produits culturels français : situation et perspectives*. Les travaux scientifiques ont été conduit par le CEPII (Centre d'Etudes Prospectives et d'Informations Internationales, France) et exécutés conjointement avec Anne-Celia Disdier, Thierry Mayer et Lionel Fontagné. En complément au chapitre précédent, cette section décrit la distribution spatiale de l'industrie culturelle en France, analyse la concentration de cette industrie et étudie les effets de voisinage sur les exportations.

Afin d'examiner la distribution des entreprises produisant des biens et des services culturels en France, on utilise des données d'entreprises très détaillées issues des Enquêtes Annuelles Entreprises (EAE) de l'industrie et des services. Pour les entreprises exerçant principalement une activité industrielle, l'enquête est réalisée par le Service des Etudes et des Statistiques Industrielles (SESSI) du Ministère de l'Economie, des Finances et de l'Industrie. Pour les entreprises dont l'activité principale relève du secteur des services, l'enquête est gérée par l'Institut National de la Statistique et des Etudes Economiques (INSEE). La répartition géographique du nombre de firmes, de la quantité d'employés et du chiffre d'affaire est présentée pour les industries culturelles de biens<sup>2</sup> et de services<sup>3</sup>. Ces distributions sont détaillées au niveau de la région et du département concerné.

En outre, l'importance de l'agglomération des activités industrielles au sein des territoires est aujourd'hui largement reconnue : la production de biens et de services est inégalement

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2 L'industrie culturelle de biens comprend l'édition de livres, l'édition de journaux, l'édition de revues et périodiques, l'édition d'enregistrements sonores, les autres activités d'édition, l'imprimerie de journaux, l'autre imprimerie, la reliure, les activités de pré presse et les activités graphiques auxiliaires.

3 L'industrie culturelle de services comprend la production de films pour la télévision, la production de films institutionnels et publicitaires, la production de films pour le cinéma, les prestations techniques pour le cinéma et la télévision, la distribution de films cinématographiques, l'édition et distribution vidéo, la projection de films cinématographiques, l'activités de radio, la production de programmes de télévision, la diffusion de programmes de télévision, l'édition de chaînes généralistes, l'édition de chaînes thématiques, la distribution de bouquets de programmes de radio et de télévision et les agences de presse

répartie entre les pays ou à l'intérieur même des pays. Ces déséquilibres sont sources d'écarts dans la richesse relative des territoires et dans le bien-être des individus qui y résident. Différents indicateurs permettant de mesurer précisément la concentration spatiale des secteurs ont été proposés dans la littérature. Deux principaux indicateurs sont utilisés par les économistes : l'indice de Gini et celui d'Ellison et Glaeser (1997). Ces indices peuvent être appliqués pour mesurer la concentration spatiale d'une mesure d'activité donnée (emploi, production, etc.). Nous retenons ici les trois mesures mentionnées précédemment: nombre d'entreprises, effectifs employés et chiffre d'affaires réalisés.

Pour finir, ce travail se focalise sur l'analyse d'exportations de l'industrie culturelle. Dans un premier temps, les exportations sont détaillées au niveau de la région et du département concerné et leurs indices de concentration sont calculés. Dans un second temps, les rapports entre les indices de concentration et les exportations sont présentés graphiquement. Dans un dernier temps, l'effet de voisinage sur les exportations est vérifié avec des estimations économétriques.

Cette analyse permet de mettre en évidence quatre principaux résultats. Tout d'abord la région Ile-de-France est prépondérante quant à la localisation des entreprises produisant des biens et des services. De plus, les entreprises produisant de services culturels sont localisées dans des plus grandes agglomérations que celles qui fabriquent des biens culturels.

En outre, les résultats soulignent que les entreprises culturelles françaises se localisent à proximité les unes des autres. On constate également que les entreprises produisant des services culturels sont davantage agglomérées que celles produisant des biens. Enfin, nos estimations suggèrent que le montant exporté par les départements est positivement influencé par les exportations des départements limitrophes. Pour les services culturels, ce dernier résultat n'est vérifié que lorsque Paris est exclu des estimations.

# **General Introduction**

## **INTERNATIONAL TRADE**

International exchanges have been assuming a fundamental importance in the world economy for some decades with no precedent in history. The first period of a large increase in the level of trade is the nineteenth century, precisely from 1815 to 1914. The industrial revolution raised the intensity in the commercial operations among countries changing the structure of international trade and international division of labor.<sup>1</sup> The second and more noticeable period of globalization started after World War II and was intensified during the 1980s. Like in the previous period, technological advances and the reduction of costs of trade and transactions largely contributed to the raising of international exchanges. However, this second period was marked by the political willingness to liberalize trade and capital markets, contrasting to the globalization in the nineteenth century. To illustrate, from 1720 to 1998, world trade raises 27 times more than world GDP.<sup>2</sup>

This phenomenon of globalization provides benefits and stability to the countries, though unevenly distributed. However, after an increasing process of liberalization, trade is

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<sup>1</sup> The revolution took place and was firstly spread in the "north" European countries in opposition to "south" countries.

<sup>2</sup> Source: Maddison (2001). Original values of exports and GDP in constant dollars of 1990. The value

experiencing a general and abrupt fall. The World Trade Organization predicts a reduction of 9% in world trade<sup>3</sup> representing a threat of regression and protectionism.

Baldwin and Evenett (2009) present a study on the current crisis and the collapse of trade. They highlight two major reasons for this decrease of trade: the international supply chains and the drying up of short-term credit. According to Kei-Mu Yi (2009), the present vertical specialization engages many countries and implies serial fails in the demands within a given supply chain. Conversely, the credit crunch particularly affects trade credits. The absence of financial support, necessary to compensate uncertainties in commercial operations, deteriorates international exchanges.

The most successful methodology in the literature to study empirical trade flows is the gravity equation. Earlier applications of this equation on international trade were based on the physics' law of gravity. Initially considering planetary motions, Isaac Newton (1687) states that *everything pulls everything else*. He formulates a theory where any two bodies interact with each other. This interaction produces a force of attraction proportional to the body masses and inversely proportional to the square of the distance between them. These developments were of a huge importance on the history of science providing a simple rule to explain, for example, how planets move.

The effectiveness and the simplicity of this relationship inspired more recent economists to implement an analogy to international trade, even without economic theoretical fundamentals. Tinbergen (1962) is frequently cited as the first study applying gravity to economics; however, Isard and Peck (1954) had already studied gravity determinants of trade flows. The lack of underpinning did not avoid the extensive use of this equation after these first applications. Very robust results fitting exchange flows seemed to justify the application of the empiric tool.

Theories have been formally developed some years later. The model of monopolistic competition of Dixit-Stiglitz (Dixit and Stiglitz, 1977) provides micro-economics bases to the subsequent theoretical developments of the gravity equation. A broadly accepted foundation for trade patterns is the standard monopolistic competition-CES demand-Iceberg trade costs

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for trade in 1720 was obtained in Rostow (1978).

<sup>3</sup>WTO Press Release 554, 23 March 2009: [http://www.wto.org/english/news\\_e/pres09\\_e/pr554\\_e.htm](http://www.wto.org/english/news_e/pres09_e/pr554_e.htm).

model first introduced by Krugman (1980). The 2008 Nobel Prize winner provides explanations disregarded by the traditional trade theory, clarifying how increasing returns to scale explain trade between similar countries.

Alternative theoretical foundations of the gravity equation include very different assumptions: perfect competition with technology differences as in Eaton and Kortum (2002), monopolistic competition with different functional forms as in Melitz and Ottaviano (2008), or heterogenous firms operating in a Dixit–Stiglitz environment as in Chaney (2008).<sup>4</sup> Yet, important contribution is made by Anderson and Wincoop (2003) clarifying the importance of the theoretically underpinned the multilateral resistance.<sup>5</sup>

Chaney (2008) contributes to the last theoretical extension of the gravity equation based on monopolistic competition. He applies the concept of heterogeneity of firms (Melitz, 2003) to the gravity equation in opposition to Krugman's model (1980) with representative firms. Together with a fixed cost of exporting, the heterogeneity of firms allows to assess the extensive margin, the impact of the variation in the number of exporters in the market. Chaney (2008) demonstrates that the extensive margin predominates over the intensive margin<sup>6</sup> and the impact of barriers is diminished by the elasticity of substitution, unlike in Krugman (1980). This model discards the unrealistic assumption of symmetric firms exporting to each country in the world. Its framework with the elasticity of substitution defining the sensitiveness of the market is applied in the first chapter of this thesis with the assessment of the impact of migration on trade.

All this background information allows for the study of the determinants of trade, and in particular, the bonds between countries supporting privileged channels for trade flows. While some determinants are obvious, like the spatial configuration; others social or cultural factors are less evident.

The research developed in this thesis investigates socio-cultural determinants of international trade. These elements influence trade either through the raise of bilateral preferences or by

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<sup>4</sup> Empirical methodologies also had important developments and they are discussed in the three first chapters. Last advancements can be found in Feenstra (2004), Baldwin (2006), and Santos Silva and Tenreiro (2006).

<sup>5</sup> The multilateral resistance is the average trade barriers' effect imposed to the trade of two given countries by all other partners. Roughly, the multilateral resistance reduce the relative price of goods traded between these two countries.

the reduction in trade costs. The consideration of socio-cultural determinants in the analysis of the exchange flows between countries permits to explain a bias not treated by conventional approaches. This analysis focuses on two factors: international migration and cultural trade. This study applies the latest research in international trade theory and the most recent empiric methodologies to shed some light on these factors, contributing to an increasing but sparse literature.

It is agreed upon in the literature that common history is a large source of ties between nations. For example, past colonial connections implement logistical structures that remain operational and assist current trade. A common idiomatic language simplifies as well as increases the possibility of trading language-specific products; like books. These ties also reveal the cultural proximity two countries can have and the consequent impact on preferences. Nevertheless, these variables applied in the recent literature often suffer from a lack of coverage either in cases of the country or in terms of the years. Moreover, they are time-invariant, overlooking dynamic evolutions. The third chapter of this thesis proposes a new approach to fulfill these deficiencies using bilateral trade of cultural goods as a proxy for cultural affinity between countries.

To summarize, bilateral bonds can reduce trade costs or raise preferences of consumers from a country for products of the other country. Businesses or social networks are good examples. Indeed, a comprehension of the influence these kinds of links may have on trade requires further investigation about the socio-cultural aspects of the relationship between countries. Despite the potential for explaining important biases in trade, socio-cultural elements are not immediately measurable. Building on recent developments on trade theory and incorporating concepts from the literature about social interactions, the first two chapters extend the knowledge about the mechanisms through which migration impacts international trade.

## **MIGRATION**

In 2005 immigrants accounted for 191 million of the world's habitants<sup>7</sup>, roughly the

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<sup>6</sup> The intensive margin is the variation of the volume of trade of existing exporters.

<sup>7</sup> Source: International Organization for Migration - <http://www.iom.int>. Definition of immigrant: persons residing in a country other than their country of birth for a period of 2 months or more, both in regular

population of a country like Brazil, amounting to about 3% of the global population. While the relative figure is low, the impact of these immigrants on trade found in the recent literature is quite important. Interestingly, their impact on trade can be ambiguous. The literature puts forward two mechanisms through which migration could impact trade: migration would reduce costs of trade through a network effect, or migration would increase preferences.

The network mechanism is based on the enforcement of contracts and on the provision of market information. Immigrants can provide reliance when institutional failures allow for opportunistic behavior. Weidenbaum and Hughes (1996) provide an explanation based on punishment. They study the Chinese network and find that the violation of an agreement inside the network implies the inscription of the business owner on a "black list" and business ostracism in the Chinese community. Alternatively, Rauch (2001) supports the formation of "moral communities" that would prevent dishonest conduct, by the simple membership to a given community. This argument is based on Cohen (1969) that presents a study on Hausa trade diaspora in West Africa. According to the author the fair commercial relationships in these communities could not be entirely explained if the moral bond is not taken into account. This bond would be strengthened by marriages within Hausa business community and by the separate identity the diaspora minority claimed in the host societies.

Migrant's network can also operate by providing information about opportunities. Information frictions are a major barrier to trading opportunities, as highlighted by Portes and Rey (2005). Immigrants generally benefit of a privileged position which procures not only the knowledge about host and home countries, but also the possibility of contacts in these two countries. Focusing on international trade, immigrants can provide market information as they can match producers, distributors and consumers. Although recent advancements of the technologies of communication reduce the margin that an immigrant could supply information, the increasing complexity of traded products requires more complete information in their transactions. Rauch (1999) finds that the share of differentiated products in the world trade increased from 56.5% in 1970 to 67.1% in 1990. Figure I.1 in the first chapter provides another example of the recent importance of the trade of differentiated products for Switzerland.

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and irregular situations.

Finally, migration can impact international trade through a preference channel. Generally, this effect is justified by the individual consumption of immigrants. Nevertheless, the extremely small scale of this personal consumption compared with the corporate operations involved in cost reductions suggests other reasons. Bowles (1998) considers migration as an instrument of exposure to culture via different populations. While immigrant consumption is quantitatively limited to the number of immigrants, the spread of information and culture can potentially reach the entire community in the host and home countries. Section 2.2 of the first chapter of this thesis "Market Structure and the Link between Migration and Trade" offers a discussion about the preference mechanism. Yet, Rauch (2001) point to the fact that migration could include other endogenous factors. Immigration could be correlated with characteristics that enhance trade of the home country of the immigrant, like physical proximity. In this sense, migration flows would also contain information about the cultural proximity between two countries.

All of these mechanisms have been fundamental in explaining the empirical impact of migration on trade. Rauch (2003) raised important questions attempting to disentangle the information provision effect from the contract enforcement effect using the degree of differentiation of the traded products, since the former would be effective only for differentiated products. New developments in trade literature offer elements which permit a different answer to this question. The technique employed in the first chapter of this thesis "Market Structure and the Link between Migration and Trade" provides an alternative explanation for this issue. Rauch (2003) finds migration to have a greater impact on differentiated goods and justifies it using the market provision effect. However, in a world with heterogeneous firms, this difference could be explained by the extensive margin (new exporters of more differentiated goods are more sheltered from competition when they enter in the market). Alternatively considering the bilateral transmission of preferences, this difference could be explained by the fact that differentiated products have a greater sensibility to the preference bias which is enhanced by migration.

Conversely, networks can be studied with a focus on the social aspect. Traditional barriers between disciplines have been noticeably reduced in recent years. The empirics of sociology have developed to allow econometric applications. On the other hand, economic theory has been incorporating concepts about human behavior as its social interactions. Gary Becker registered the earlier evolutions:

"Modern economics, whether in textbooks or in the most advanced journal articles, typically assumes that individual behavior is not directly influenced by the action of the others. Of course, it is understood that every individual is greatly affected indirectly, since the behavior of other persons and of firms determines the relative prices of different goods, the rewards to different kinds of labor and capital, martial prospects, political programs, and most other aspects of economic, social, and political life. While these indirect effects are enormously important, they do not capture fully the influence of others on a person's behavior. Presumably for this reason, anthropologists and sociologists have repeatedly told economists about the importance of culture, norms, and social structure. Economists have not listened, however, mainly because these other fields have not developed powerful techniques for analyzing social influences on behavior... These examples should make it clear that social influences on behavior are common and even pervasive. We are especially interested in the mutual interaction between social forces and market behavior, which we call 'social markets'..."

Becker (2000, p. 3)

Durlauf and Young (2001) stress this new interdisciplinary approach between economics and sociology to study social relations. A good example is the application of this new social economics to the analysis of crime and neighborhood made by Glaeser et al. (1996). Particularly, Brock and Durlauf (2001 and 2002) have developed theoretical models for studying individual decisions, including social interaction effects, in the private utility. They model how the dynamics of a neighborhood can influence the decisions and actions of an individual. A general framework to the interdependencies between individual decisions and the decisions and features of a given group is provided. This social approach is applied in the second chapter of this thesis "Social Interactions and Trade Outcomes" in an attempt to estimate the so-called network effect not only on trade but also on the concentration of immigrants. As pointed by Jackson:

"...social circumstances can help explain observed economic phenomena (e.g. persistent wage inequality) in ways that narrower economic models cannot." Jackson (2007, p. 1)

## **ECONOMICS OF CULTURE**

The main limit in the study of cultural exchanges is the absence of consensus regarding a precise definition of cultural goods and services. The United Nations Educational, Scientific and Cultural Organization (UNESCO), in its research for the mutual recognition of, and

international agreement on cultures, implemented a Convention on the Protection and Promotion of the Diversity of Cultural Expressions in 2005.<sup>8</sup> The composition of cultural products covered by this convention is still relatively vague. According to this convention, "Cultural activities, goods and services' refers to those activities, goods and services, which at the time they are considered as a specific attribute, use or purpose, embody or convey cultural expressions, irrespective of the commercial value they may have. Cultural activities may be an end in themselves, or they may contribute to the production of cultural goods and services". UNESCO also provides two reports on international exchanges of cultural products (2000, 2005) based on the cultural content of goods and services<sup>9</sup> which offer data-driven classification.<sup>10</sup>

The economist Arjo Klamer, professor and the world's first chair of economics of arts and culture<sup>11</sup> suggests other definition of a cultural good:

"It may be a bridge, a piece of wood. Or a temple, a windmill, a painting, a piece of furniture, a mask, jewel, bead. It may even be a language, a ritual, or a practice. Whatever it is, it differs from other goods because people may consider it a symbol of something – a nation, a community, a tradition, a religion, a cultural episode – and endow it with various meanings over and above its usefulness. They may ascribe to it artistic, aesthetic or sacred qualities. They may draw inspiration from it, or value it because it gives rise to hatred in some and antagonizes others. Let us say, then, that the good has cultural value in that it is a source of inspiration or symbol of distinction. Therefore, we call it a cultural good." Klamer (2004, p. 17).

These definitions are essential to limit the scope of this study. However, it is primarily to evaluate the considerations developed by the economists. Classic economists (e.g. Adam Smith and David Ricardo) reserved a place for arts in the definition of leisure, with little effect on the wealth of the nations.

"Like the declamation of the actor, the harangue of the orator, or the tune of the musician, the work of all of them perishes in the very instant of its production." Smith (1776), Book II,

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<sup>8</sup> Report available in: [http://www.unesco.org/culture/culturaldiversity/convention\\_en.pdf](http://www.unesco.org/culture/culturaldiversity/convention_en.pdf).

<sup>9</sup> The definition of cultural content is given by the Convention on the Protection and Promotion of the Diversity of Cultural Expressions (2005), p. 5: "Cultural content" refers to the symbolic meaning, artistic dimension and cultural values that originate from or express cultural identities".

<sup>10</sup> Focusing on the report of 2005, the classification considers five categories of core cultural products: Cultural Heritage, Printed Matter, Music and the Performing Arts, Visual Arts, Audio and Audiovisual Media.

<sup>11</sup> Erasmus University Rotterdam.

chapter 3, p. 192.

Developments in cultural economics have mostly taken place in the last forty years.<sup>12</sup> These studies have an extensive vocation and integrate concepts from sociology and anthropology as the importance of culture on the growth of developing countries or the notion of cultural capital. Amartya Sen interestingly underlines the importance of culture even in very underprivileged contexts:

"Dedicated development experts, keen on feeding the hungry and banishing poverty, are often impatient with what they take to be premature focusing on culture in a world of manifold material deprivation. How can you... ..talk about culture while people succumb to starvation or undernutrition or easily preventable disease? The motivation behind this criticism cannot be dismissed, but the artificially separatist – and stage-wise – view of progress is unreal and unsustainable. Even economics cannot work as Adam Smith noted, without understanding the role of 'moral sentiments', and Bertold Brecht's note of cynicism in his Threepenny Opera, 'Food comes first, then morals' is more a statement of despair than of an advocated priority."  
Amartya Sen (1998, p. 317)

Cultural aspects of economics have been further developed and are the focus of an international association and a journal since the 1970s. Apparently overlooked in the past, this field of economics reveals intriguing features and important consequences on the economy.

The non-pecuniary value of cultural products presents some difficulties for their economic analysis. The creative process itself involves little rationale and much spontaneity. Conversely, consumers add to the financial asset other values such as the prestige of possessing a wished object and the educational instrument that the product can represent (Frey, 2006, p. 145). This immeasurable component of the return would, in the last instance, justify a return's difference in the market equilibrium. Indeed, several studies show that the rates of return of cultural products are noticeably lower than comparable financial products. Frey and Pommerehne (1989) calculate a real net rate of return equal to 1.5% per year using data on art auctions between 1635 and 1987 in the most important markets (New York, Paris, London). According to Frey (2006), an investment in government bonds in the same period

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<sup>12</sup> "The Liberal Hours" published in 1960 by John Kenneth is commonly cited as one of the pioneers study on art and economics.

would yield a rate of 3% per year. Baumol (1986)<sup>13</sup> finds a rate of 0.6% for paintings for the period between 1652 and 1961 and compares this number to 2.5%, the real annual rate of return of the British government securities.

Furthermore, cultural products are the representation of a population's character. They evoke the value of the countries' identity as being product of the national heritage. In this perspective, cultural products should deserve special treatment in order to preserve the peoples' culture. This argument would require a cultural exception procedure which would shelter the trade of cultural goods and services from the World Trade Organization general principles. However, this claim is countered by the partisans of free trade to whom any form of distortion implies economic inefficiencies.

Cultural values can affect the way one perceives the world and can particularly influence an individual behavior. Becker (1996, p. 16) envisages the strong impact that culture can have on a person's behavior, defining his or her preferences.<sup>14</sup> This kind of consideration suggests a causal relationship between culture and consumption with dynamic implications. Preference shocks may present long-lasting effects that can assume many forms from a habit to an addiction. Past and current consumptions are in this case complements, the former raising the marginal utility of the latter.

This "behavioral" characteristic of cultural products suggest a relationship between cultural trade and cultural proximity. Countries with close cultures could share their cultural production with each others, since the consumer market would be compatible. The third chapter of this thesis "Bilateral Trade of Cultural Goods" investigates this association and its impacts on international trade.

Besides these national identity aspects, the economic importance of cultural industries is not negligible. Expenditures on recreation and culture account for about 5% of GDP in the most developed countries (OECD, 2007).<sup>15</sup> Using another definition for cultural industries,

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<sup>13</sup> Cited in Throsby (1994).

<sup>14</sup> Becker (1996) gives as examples the taboo against eating pork among religious Jews and Moslems, or the tradition of filial obedience in Chinese culture.

<sup>15</sup> In most developed countries, household expenditures on recreation and culture account for at least 5% of GDP. In 2005, this share was 6.4% in the United States (US), 5.5% in Canada, 7.7% in the United Kingdom (UK) and 5.2% in France. In 1970, those were 4.5% in the US, 4.9% in Canada, 5.1% in the UK and 4.3% in France. Household expenditures on recreation and culture include purchases of audio-visual, photographic and computer equipment ; CDs and DVDs ; musical instruments ; camper vans ; caravans ; sports

Throsby (1994) estimates that these industries<sup>16</sup> contributed 2.5% of the American GDP in 1998. From 1980 to 1998 world trade of cultural goods<sup>17</sup> increased 1.8 times more than world trade of all commodities. The fourth chapter of this thesis analyzes the cultural industry in France, its spatial distribution and its export performance.

## ORGANIZATION OF THE DISSERTATION

The chapters of this thesis focus on the two abovementioned socio-cultural factors that determine international trade. The results obtained show the importance of cultural and ethnical links as determinants of exchanges and point to further potential research. The next sections detail each chapter.

### *First Chapter*

The first chapter of this thesis is based on the paper "*Market Structure and the Link between Migration and Trade*"<sup>18</sup> and analyses the impact of migration on trade in Switzerland for the period 1995-2000. The main contribution of this chapter is to provide a more comprehensive understanding of the role of product differentiation on the causal relation between migration and trade. This impact is broken down into two mechanisms: the reduction of export costs and the increase of preferences. This result is detailed in the next paragraphs.

Very differentiated products (e.g. watches) can be more easily distinguished and identified by their nationality of origin, and migration can induce a bias on the preferences for certain products. Furthermore, trade of these products requires very specific knowledge that migrants are not necessarily able to offer.

Homogeneous products (e.g. corn) are not associated with a precise origin and migration has little impact over preferences towards these products. Regarding transaction costs, this kind

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equipment ; toys ; domestic pets and related products ; gardening tools and plants ; newspapers ; tickets to sporting matches, cinemas and theatres ; and spending on gambling (including lottery tickets) less any winnings (Disdier et al. 2009).

<sup>16</sup> This definition includes arts, motion pictures, radio and television, and printing and publishing.

<sup>17</sup> Cultural goods included in this (UNESCO) definition are printed matter, literature, music, visual arts, cinema, photography, radio, television, games and sporting goods.

of product is frequently traded on organized exchanges, which clearly incorporate much of the potential intermediation an immigrant could perform.

Nevertheless, migration can reduce transaction costs of products with an intermediary level of differentiation. The impact of migration on costs follows an inverted "U" shape.

These results were obtained using a gravity equation derived from a theoretical model of monopolistic competition. This model takes into account the differentiation of products through the heterogeneity of firms in a multi-sector framework. This model, based on Chaney (2008) is extended by the introduction of a simple term capturing bilateral preferences following the procedure presented in Combes et al. (2005).

Assuming that migration affects just export fixed costs and preferences, their respective elasticities in terms of trade are selected from the theoretical model for the interpretation of econometric results.

The impact of fixed costs on trade is an increasing function of the differentiation degree of traded goods. This is a direct conclusion of Chaney's (2008) model. A reduction on the fixed costs permit the access of new exporters in the market, sheltered of competition according to their monopole position over the produced variety. This increase in the number of exporters corresponds to the extensive margin. This margin always predominates over the intensive margin. The latter corresponds to the situation where existing exporters raise their exports after a decline in the trade barriers.

The impact of preferences over trade follows an inverted tendency. Once the bilateral preference is defined, very homogeneous products are more affected because they are more substitutable. To illustrate, let's suppose that the preferences of French consumers to American products are positively influenced by an exogenous choc. As corn is a homogenous product, French consumers will buy more American corn than those from other countries. Inversely, the effect of this choc on the consumption of watches will not be similar. Consumers will be more reluctant to replace a Swiss or Japanese watch by an American one because they are less substitutable.

This theoretical model is estimated by a gravity equation. The total effect of migration on

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<sup>18</sup> Forthcoming in the *Review of World Economics* (Tai, 2009a).

trade is taken into account by the estimation. Most recent econometric developments are applied. Particularly, the estimator type Poisson Maximum Likelihood (PPML) suggested by Santos-Silva and Tenreyro (2006) is chosen for all regressions. This estimator allows including zero flow of trade in the regression and offers a non-biased estimation of coefficients. The logarithmic transformation, usual in the empiric studies of trade, needs very specific circumstances to observe the conditions of efficiency and absence of bias.

The comparison between the theoretical model and the results of empiric estimations permit the analysis of the effect of migration on trade and its influence's channels. Theoretical elasticities provide the functional form of the partial effect of fixed costs and preferences on trade. Empiric estimations provide the total effect of migration on trade. Considering the difference, it is possible to obtain the partial effect of migration on fixed costs and on preferences, according to the degree of differentiation of traded products.

In practical terms, it is possible to explain why, in Switzerland, migration has a smaller impact on exports than on imports. Switzerland presents its exports' distribution concentrated on differentiated products while the distribution of imports covers a range of more homogenous goods. Imported products are more affected because they are more substitutable and hence more easily replaceable for a given level of preferences, or because they require relatively simple transactions. The residual effect of migration on preference enhances preferences for Swiss products because of its highly differentiated composition.

## *Second Chapter*

The second chapter of this thesis is based on the paper “Social Interactions and Trade Outcomes”<sup>19</sup> and deepens comprehension of the effect of migration on transactions costs. The main mechanism suggested by the literature for justifying this effect is the formation of networks. This effect is based on two fundamental concepts. Firstly, the communities of immigrants can prevent violations in tacit contracts engaged within the community, each immigrant avoiding being "blacklisted". Secondly, immigrants benefit from privileged information about markets in the home country and in the host country. Despite its

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<sup>19</sup> This chapter is based on the WTO StaffWorking Paper RSD-2009-02 (Tai, 2009b).

importance in the literature on migration and trade, the formation of networks has not been studied in this context.

This research follows and adapts the theoretical framework of Head and Mayer (2008) and it is in line with the recent literature about social interactions. This research strand studies the consequences of neighborhood effects on the individual behavior and on the composition of this neighborhood.<sup>20</sup>

The theoretical model explains the composition of each county ("*département*") in metropolitan France by a social utility. The utility is a function of the anticipated share of compatriots, not only within the studied county, but also within other French counties. The influence of other counties is a function of their physical distances to the studied county. The imposition of equilibrium between the anticipated share of immigrants and the effective share of immigrants allows obtaining an estimable equation. In order to explain the share of a given nationality in a county, this model integrates a variable relative to the potential social interactions. This variable equals the sum of the compatriots' share in each other county, divided by the distance between counties.

This model is tested on population data for 1968, 1975, 1982, 1990 and 1999. The estimated coefficient for the social interactions variable is significant at the 99% level of confidence. The interpretation of these results shows that the share of a given nationality within a county would increase 8.1% if the communities where its compatriots live moved 40 km closer to this county.

This regressions control for every effect specific to home countries of immigrants, to destination counties, and for their time variations. Therefore, results are not biased neither by geographic agglomeration effects (the opposition between Paris and all other locations in the country, for example), nor by effects related to the home country.

In addition, to take into account a potential selection bias among immigrants, the empiric analysis follows the procedure suggested by Heckman (1976). The presence of immigrants from a given nationality within a certain county is conditional to the existence of migration from this country to France. This potential selection bias is controlled by a two-step

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<sup>20</sup> A recent review of the literature about social interactions is available in Durlauf (2004).

estimation, the first step being a probit model.

Finally, the method of instrumental variables is applied to correct potential endogeneity. The instrument is the sixteen year lag of the variable of immigrants' network.

This first empiric part confirms the predictions from the theoretical model and the existence of a network effect among immigrants. The second part of empiric developments tests this network effect on international trade.

The international trade of French regions is analysed through the estimation of a gravity equation, taking into account recent developments in the literature about this subject (Anderson and Wincoop, 2003; Redding and Venables, 2004; Santos Silva and Tenreyro, 2006; Baldwin and Taglioni, 2006). The variable representing the network of immigrants is the main variable of interest in these estimations. Due to the non-availability of certain data about trade flows, just trade of 2004 and immigration of 1999 are considered. The methodology of instrumental variables (lagged by eight years) and fixed effects for origin and destination are applied. Results confirm the literature and find a significant effect of migration on trade. The asymmetry of the impact on exports and imports, already commented in the first chapter, is again obtained in this chapter.

More interesting is the analysis comparing the effect of this measure of immigrants' network with those used in the literature. A first comparison is made by simply accounting the stock of immigrants. A second comparison is effectuated with the stock of immigrants living in neighbor regions, using the methodology applied by Herander and Saavedra (2005). The measure applied in this chapter reveals more significant and robust results than those two measures cited above. Capturing social interactions in the context of an entire country provides a more complete measure of the network effect and its impacts on international trade.

### *Third Chapter*

This chapter is based on the article "Bilateral Trade of Cultural Goods"<sup>21</sup> jointly written with

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<sup>21</sup> Forthcoming in the *Review of World Economics* (Disdier, Tai, Mayer and Fontagné, 2009).

Anne-Célia Disdier, Thierry Mayer and Lionel Fontagné. It studies the manner that beliefs, values and perceptions common between two countries can be captured by cultural exchanges and can have an impact on total trade. This research proposes a new measure of cultural proximity between countries based on the trade of cultural goods

Trade of cultural goods has impressively increased in recent years. Between 1980 and 1998, world imports of cultural goods have increased by 347%. The liberalization of these products reveals its very susceptible characteristic. Discussions oppose the partisans of free trade in cultural goods against the advocates of a “cultural exception”. This research constitutes a first attempt to analyze in a large scale this kind of trade. The sample studied covers 239 countries in the period between 1989 and 2005.

Additionally to traditional results such as the negative effect of distance, this study shows that trade of cultural goods presents specific aspects: common language raises bilateral flows, particularly the flows of books and newspapers. Moreover, a past colonial history reinforces bilateral exchanges of cultural heritage goods, like antiquities. Finally, the consumption of cultural goods presents hysteresis effects, having past consumptions a persistent effect on the current consumption.

#### *Fourth Chapter*

This chapter is based on the Report for the French Ministry for Culture and Communication: "Etude sur les échanges internationaux de produits culturels français : situation et perspectives", jointly written with Anne-Célia Disdier, Thierry Mayer and Lionel Fontagné. Complementing the previous chapter, this section describes the spatial distribution of the cultural industry in France, analyzes the concentration of this industry and sheds some light in the neighborhood effects on export performance.

Very detailed data at firms level from the "enquêtes annuelles entreprises" (EAE) are applied. Firms that have an industrial activity as core business are surveyed by the "Service des études et des statistiques industrielles" (SESSI) of the French Ministry of Economics, Finance and Industry. Firms that have a service activity as core business are surveyed by the "Institute National de la Statistique et des Etudes Economiques" (INSEE). The geographical allocation

of the number of firms, quantity of employees and total sales are presented for cultural industries of goods<sup>22</sup> and services.<sup>23</sup> These distributions are detailed at the region and county (“département”) levels.

Furthermore, the analysis of the uneven distribution of the production of cultural goods and services is deepened. These unbalances are source of disparity in the territories' relative wealth and in the welfare of the residents. Two main indicators that take into account industry's agglomeration are proposed in the literature. The Gini index and the index developed by Ellison and Glaeser (1997) are henceforth applied for cultural goods and services.

At last, the exports performance of cultural firms is analyzed. Exports are depicted at region and county level and their national concentration indexes are calculated. Graphic relationships between the concentration of exports and their volumes are presented. Finally, econometric estimations permit to verify the effect of neighborhoods on exports. They verify the existence of driving effects between counties for the exports. Regressions confirm neighborhood effects on exports for cultural goods. This effect is valid for cultural service only if Paris is not considered in the regression.

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<sup>22</sup> Goods' industries are: edition of books, edition of newspapers, edition of reviews, edition of audio records, other activities of edition, newspapers printing, other printing, binding, activities pre-printing and graphical auxiliary activities.

<sup>23</sup> Services' industries are: TV movies production, publicity and institutional movies production, cinema movies production, technical services for cinema and TV, distribution of cinematographic movies, edition and distribution of video, projection of cinematographic movies, activities of radio, production of TV programs, diffusion of TV programs, edition of general channels, edition thematic channels, distribution of packs of programs of radio and TV and agencies of press.

This chapter presents three main results. Firstly, the expected predominance of the region Ile-de-France in the location of firms of cultural goods and services. Secondly, firms that produce cultural services locate in larger agglomerations than those belonging to the sectors of cultural goods. Conversely, firms that produce cultural services are more agglomerated than those that produce goods. Finally, the estimations suggest that the amount exported by counties is positively influenced by the number of firms located in this county, by their total sales and by the exports of neighbor counties.

# Chapter I

## Market Structure and the Link between Migration and Trade<sup>1</sup>

### 1. INTRODUCTION

The link between migration and trade has been well established by recent literature. An immigrant can act as an intermediary for information, preferences and networks. These trade-impacting migration mechanisms<sup>2</sup> are generally presented to explain empirical findings. Yet the mechanisms themselves have not yet been identified empirically.

This paper addresses the question of how migration affects trade and sheds some light on the mechanisms of preferences and costs. It is an empirical assessment underpinned by a model of firm heterogeneity in a multisector economy developed by Chaney (2008). The impact of migration can be studied in greater detail by considering the role of market structure with

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<sup>1</sup> This chapter is based on a paper forthcoming in the *Review of World Economics* (Tai, 2009a).

<sup>2</sup> See Rauch (2001) for a survey of these mechanisms.

sector asymmetry throughout and each sector's level of product variety differentiation. Preferences and cost effects are then analyzed.

The literature endeavors to identify these mechanisms by treating a country's exports and imports differently. Basically, it is posited that the network effect impacts on both exports and imports by lowering costs, and that the preference effect has an impact solely on imports due to immigrant consumption. This would imply that migration has a greater effect on imports. However, Section 2 shows that Gould (1994) and Girma and Yu (2002) find migration has a greater effect on exports while Head and Ries (1998) and Wagner et al. (2002) find that migration has a greater impact on imports. Whereas the first set of papers studies a small sample made up largely of rich trade partners, the second set considers all the partners. This could suggest that, when the entire spectrum of traded products is considered, migration has a greater impact on imports.

The main contribution of this paper is to consider market characteristics by level of product differentiation. In the monopolistic competition framework adopted, the market can reflect all sorts of situations from monopoly to perfect competition with trade barrier effects differentiated. Any estimation of the migration effect is distorted if these differences are overlooked. For instance, take a country that exports highly differentiated products and imports homogeneous ones. Let's say this country exports watches and imports cocoa. So if immigration impacts more on imports than exports, the direct conclusion of a stronger effect of immigrants' preferences in the host country could be inaccurate. Maybe, in this case, the impact on imports is greater solely because they are structurally made up of products more likely to be affected by migration. My findings show that the product composition explains the different immigration effects.

Another contribution is the use of the migratory mirror flow, i.e. data on Swiss abroad. This kind of data is not readily available, but provides a definitive verification of migration effects. For example, consider a migration effect on Swiss imports introduced by foreigners in Switzerland. The corresponding effect should be found for Swiss people abroad on Swiss exports. In other words, if we assume that immigrants always raise preferences for the home country, Swiss emigrants should increase Switzerland's exports more than its imports.

It is common practice to study migration and trade focusing on just one country to prevent

measurement errors. Although the data used are reliable (bearing in mind that each country counts immigrants in its own way), two distortions are created. First, the composition of exports and imports can be different. Rich countries specialize in the production of more highly differentiated goods, so their exports are more concentrated in differentiated products than their imports. Conversely, the countries studied in the literature are those that attract migration because of their high level of development. This is the second distortion, since the opposite flow of nationals abroad is overlooked. For example, the studies consider solely immigrants in the United States or the United Kingdom, but not the opposite flow of American and British people abroad. These two distortions converge to create a bias in the comparison of the impact of migration on exports (of differentiated products) with the impact of immigrants on imports (of homogeneous products). My findings show that market structure has to be considered before any comparison can be made.

This paper focuses on Switzerland, using data from France to make some checks on endogeneity. Switzerland, to my knowledge, has never been studied for this kind of research. This is quite surprising given the high proportion of foreigners and its geographical position in the heart of Europe. Trade-migration effects have been studied for the United States (Gould 1994; Dunlevy and Hutchinson 1999), Canada (Head and Ries 1988; Wagner et al. 2002), and the United Kingdom (Girma and Yu 2002). Switzerland has a smaller surface area and greater population density than the United States and Canada (30 inhab/km<sup>2</sup> for the United States, 3 inhab/km<sup>2</sup> for Canada and 177 inhab/km<sup>2</sup> for Switzerland<sup>3</sup>), so one would expect to find more social interaction in the country boosting the business network and cultural transmission. An immigrant in Geneva is more likely to interact with another in Zurich than an immigrant in New York with another in Texas. These proportional distances are roughly equivalent for the two countries relatively speaking given their sizes, but correspond in absolute terms to about 290 km and 2,290 km respectively. However, like Switzerland, the United Kingdom also has a high population density. Yet the greater mobility of European Union nationals<sup>4</sup> could well distort migration statistics on EU nationals in the United Kingdom. This is not the case for Switzerland thus far (and definitely not in the period studied from 1995 to 2000).

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<sup>3</sup>Source: United Nations Demographic and Social Statistics  
<http://unstats.un.org/unsd/demographic/products/dyb/DYB2002/Table03.pdf>

<sup>4</sup><http://ec.europa.eu/youreurope/nav/fr/citizens/working/free-circulation/index.html>

The repercussions of migration have become an issue with the steady increase in migration in recent decades. In Switzerland, the number of foreigners has been on the rise since World War Two, despite a slight adjustment following the 1973 oil crisis. Switzerland wanted to attract immigrants in the early years following World War Two, the situation changed after the 1960s when the country started to adopt more restrictive immigration policies.<sup>5</sup> Despite migration barriers, the foreign population has grown more sharply than the Swiss population to the astonishing level of 20% of the country's population in recent years. New immigrants accounted for 62% of the net population increase from 1980 to 2000.

This paper is structured as follows. Section 2 looks at the relevant empirical literature. Section 3 presents the theoretical model and specification and Section 4 details the data. Section 5 reports on the findings and Section 6 presents the conclusion.

## **2. RELEVANT LITERATURE**

### *2.1 Review: The Effect of Migration on Trade*

The literature has been most consistent in its demonstration of robust, trade-enhancing migration effects. Gould (1994) is commonly cited as the pioneering study of the empirical relationship between migration and trade. He studies this link using American trade data from 1970 to 1986. Gould (1994) considers two basic mechanisms for this relationship. First, immigrants bring a preference for home-country products, which would imply an increase in imports in the host country. Second, immigrants bring foreign market information and contacts with the potential to lower transaction costs (e.g. by benefiting from the spread of the immigrant language in the host country, taking advantage of immigrant information on home varieties and preferences, and acting as go-betweens to strengthen otherwise unsound trade contracts). Gould (1994) studies the determinants of American trade with 47 countries, most of them (25) ranked as "high-income economies."<sup>6</sup> The restrictive nature of the sample

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<sup>5</sup>See Melo et al. (2002: Section 3) for an overview of Switzerland's immigration policy.

<sup>6</sup>In keeping with the 2006 World Bank classification in which 53 countries are ranked as low-income economies (GNI per capita of \$905 or less), 96 countries as middle-income economies (GNI per capita of \$906 to \$11,115) and 60 countries as high-income economies (GNI per capita of \$11,116 or more). Source:

could well distort certain findings since the market structure of trade is biased towards the United States' richest partners. Moreover, its main specification is most particular in that Gould (1994) regressed the log of trade on  $\beta (IMMI/(\theta+IMMI))$  (where  $\beta$  and  $\theta$  are estimated coefficients and *IMMI* is the number of immigrants) and posited that migration always has a stronger impact on exports than on imports. Nevertheless, he applies the usual log specification in the sensitivity analysis, finding that imports have a coefficient of 0.439 whereas exports have a coefficient of 0.176.

Girma and Yu (2002) also consider a small sample of countries. They study the United Kingdom's trade with 48 countries from 1981 to 1993, considering the same two mechanisms as above. Like Gould (1994), 22 of the 48 partners are ranked "high-income economies". They find that migration has a greater impact on exports than on imports. These findings confirm a robust trade-enhancing migration effect. However, also like Gould, the study contains a high proportion of the United Kingdom's richest partners, which could well bias the findings and prompt at least a partial interpretation of the relationship between migration and trade.

Looking at a larger sample of countries, Head and Ries (1998) study the determinants of Canadian trade with 136 countries over the 1980–1992 period. The authors also consider preference, superior knowledge and preferential access to market opportunities as mechanisms underlying the impact of migration on trade. Their findings contradict Gould (1994) and Girma and Yu (2002). Interestingly, the broader range of countries reduces the potential bias observed in the studies presented above. They find that migration has a greater impact on imports than on exports.

Wagner et al. (2002) agree with Head and Ries that migration has a greater effect on imports than on exports. They look at provincial Canadian trade data (5 provinces) with 160 countries from 1992 to 1995. This approach is very interesting, since the fixed country effects do not coincide with the fixed trade-pair effect, since each trade pair corresponds to a Canadian province and a foreign country duo.

The last two papers suggest that, when the sample of countries is representative enough, migration can be found to have a larger effect on imports than on exports. This finding is

significant and can be interpreted as over and above preference effects, when a complete market structure composition is considered, imports cover a configuration of goods such that their trade is more likely to be affected by migration. Since none of these studies looks at market structure, their findings could reflect a distortion introduced by the difference in market structure between exports and imports.

Rauch and Trindade (2002) address this subject from a different angle. They estimate the effect of Chinese networks around the world based on the probability of finding a Chinese immigrant in the population of each country. In addition, they make a distinction between differentiated and homogeneous goods. The paper studies the trade of 63 countries in 1980 and 1990. The findings show that migration has a stronger effect on differentiated products.

## 2.2 Are These Mechanisms Consistent?

The causal effect of migration on trade is well founded. Nevertheless, the identification of the channels through which migration affects trade flows and the differences between the impact of migration on exports and imports are not very clear.

The preference mechanism is based entirely on immigrant consumption of home-country products. The first problem with this definition is the extremely small scale of this personal consumption compared with the corporate operations involved in cost reductions. Head and Ries (1998)<sup>7</sup> find that each immigrant generates \$8,000 in imports and \$3,000 in exports. This would mean that each immigrant in Canada consumes an astounding  $(8,000-3,000)/12 = \$417$  per month in home-country products, due purely to their home-country preferences, and that immigrants consume almost twice as much as firms in trade. An asymmetric network effect could be considered to explain this difference, for example, a larger impact of networks on imports. However, Wagner et al. (2002, p. 511) consider a symmetric effect:

*“One mechanism applies only to imports, not exports. Immigrants may prefer certain goods from their country of origin, based on tastes developed before migration. These preferences would generate more imports from the country of origin.”*

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<sup>7</sup>Head and Ries (1998) present the most significant difference of the effect of migration on exports and imports (they are statistically different at the 95% level).

*“Head and Ries’ and Duvenly and Hutchinson’s results imply that the preference effect is approximately double the information/enforcement effect (since the immigration effect on imports is approximately three times the effect on exports).”*

The second problem with this definition of preferences is that it disregards cultural transmission. This oversight could create some sizeable misrepresentations, since cultural transmission reaches a much broader range of people. Immigrant consumption is quantitatively limited to the number of immigrants, while cultural spread can potentially reach the entire community in the host country.

The third problem is the unidirectional limitation of this concept of preference, due to the immigrant consumption assumption (applied solely in the direction of host country to home country). Nonetheless, the simple matching of immigrants with host country reveals an immigrant’s choice. This option is obviously determined by economic factors and circumstances, but affinity between countries should not be overlooked. Moreover, cultural traits are diffused in two directions: immigrants bring customs and values from the home country to the host country, but also from the host country to the home country. Bowles (1998) considers migration as an instrument of exposure to culture via different populations.

While previous studies have considered a narrow concept of preferences, I incorporate the notions above into a theoretical model of trade. Basically, the main difference in the model is the flexibility of the preference term, which is allowed to work bilaterally. Nevertheless, confirmation of this “two-way” characteristic of preferences is an econometric issue.

### **3. THEORETICAL MODEL AND SPECIFICATION**

#### *3.1 Trade Model*

This empirical study is underpinned by a monopolistic competition model with firm heterogeneity and a multisector economy. The mechanisms via which migration affects trade imply a reduction in trade costs and an increase in preferences, which vary according to the market structure. Hence the model needs to distinguish sector-based differences, trade costs

and preferences. One way to take into account these sector-based differences is to include a fixed export cost with firm heterogeneity by sector. This allows for extensive and intensive margins of trade whose impact varies with the extent of product substitutability. Consequently, fixed and variable costs are separated out to paint a clearer picture of the migration network's impact on costs.

Chaney (2008) develops a model with all these characteristics save the preferences term. I describe this model briefly and add a simple term  $a_{ij}$  for preferences between countries. This procedure is in keeping with Combes et al. (2005), where a weight is introduced in order to describe bilateral preferences between countries. This term means that preferences can be captured in both directions, from the immigrant's home country to host country and vice versa.<sup>8</sup> The model is outlined below.

The model considers a utility function with CES preferences. There are  $H + 1$  sectors with sector-specific elasticities of substitution  $\sigma_h$ .  $H$  represents the number of differentiated sectors and the homogeneous good is the numeraire. Considering that each sector has  $\Omega_h$  varieties and that a consumer consumes  $q_0$  units of good 0 and  $q_h(\omega)$  units of each variety  $\omega$  of good  $h$ , utility is expressed as:

$$U \equiv q_0^{\mu_0} \prod_{h=1}^H \left( \int_{\Omega_h} (a_{ij} q_h(\omega))^{\frac{\sigma_h-1}{\sigma_h}} d\omega \right)^{\frac{\sigma_h}{\sigma_h-1} \mu_h}, \quad (1)$$

with  $\mu_0 + \sum_{h=1}^H \mu_h = 1$  and  $\sigma_h > 1$ .

Firm productivity  $\phi$  in each sector follows a Pareto distribution  $dG_h(\phi) = \gamma_h \phi^{-\gamma_h-1}$  with cumulative distribution  $G_h(\phi) = 1 - \phi^{-\gamma_h}$  and  $\gamma > \sigma - 1$ . The cost of producing  $q$  units and selling them in country  $j$  is:

$$c_{ij}^h(\phi) = \frac{w_i \tau_{ij}^h}{\phi} q + f_{ij}^h, \quad (2)$$

where  $w_i$  is the wage.

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<sup>8</sup>See Section 2 for a justification.

A demand equation (3) can be derived from the utility function considering  $Y_j$  as the sum of income in country  $j$  with the dividends from firms from  $j$  located worldwide.

$$x_{ij}^h(\phi) = p_{ij}^h(\phi)q_{ij}^h(\phi) = \mu_h Y_j \left( \frac{p_{ij}^h(\phi)}{a_{ij} P_j^h} \right)^{1-\sigma_h}, \quad (3)$$

where  $P_j^h$  is the price index in sector  $h$  for country  $j$  and  $p_{ij}$  is the selling price.

Two trade barriers are considered in the model: a fixed export cost  $f_{ij}^h$  and a variable cost in "iceberg" form  $\tau_{ij}^h$ . Separating out these two costs is useful to be able to introduce an effect of market structure on trade differentiated by firm heterogeneity. Moreover, this form makes for a more suitable consideration of the effect of migration on trade costs. Cost reduction mechanisms refer to the preferential access to market opportunities and the contacts an immigrant may have.

For productivity level  $\phi$ , the threshold can be determined from what a firm is able to export. The productivity cutoff is the zero profits level.

$$\bar{\phi}_{ijh} = \lambda_1^h \left( \frac{f_{ij}}{Y_j} \right)^{\frac{1}{\sigma_h-1}} \frac{w_{ij} \tau_{ij}^h}{P_j}. \quad (4)$$

$\lambda_1^h$  is a constant by sector. It is described in Table I.1 at the end of this section.

The price index is defined by  $P_j^{1-\sigma} = \sum_{k=1}^N w_k L_k \int_{\bar{\phi}_{kj}}^{\infty} \left( \frac{\sigma_h}{\sigma_h-1} \times \frac{w_k \tau_{kj}}{\phi} \right)^{1-\sigma_h} dG(\phi)$ , using the determined threshold:

$$P_j^h = \lambda_2^h \times Y_j^{\frac{1}{\sigma_h} - \frac{1}{\sigma_h-1}} \times \theta_j^h, \quad (5)$$

with  $(\theta_j^h)^{-\gamma_h} \equiv \sum_{k=1}^N (Y_k / Y) \times (w_k \tau_{kj})^{-\gamma} \times f_{kj}^{-\left(\frac{\gamma}{\sigma_h-1}\right)}$ .

$Y$  is world output,  $L_k$  the labor income of country  $k$  and  $\lambda_2^h$  is a constant by sector described in Table I.1 below.

Demand equation (3) with this price index is written:

$$x_{ij}(\phi | \phi \geq \bar{\phi}_{ij}) = \lambda_3^h \times \left( \frac{Y_j}{Y} \right)^{\frac{\sigma_h-1}{\gamma_h}} \times a_{ij}^{\sigma_h-1} \times \left( \frac{\theta_j}{w_i \tau_{ij}} \right)^{\sigma_h-1} \times \phi^{\sigma_h-1}. \quad (6)$$

$\lambda_3^h$  is a constant by sector described in Table I.1 at the end of this section.

The aggregate exports are then obtained from the sum of all the firms' exports:

$$X_{ij}^h = \mu_h \times \frac{Y_i Y_j}{Y} \times a_{ij}^{\sigma-1} \times \left( \frac{w_i \tau_{ij}^h}{\theta_j^h} \right)^{\gamma_h} \times (f_{ij}^h)^{-\left(\frac{\gamma_h}{\sigma_h-1}\right)}. \quad (7)$$

This model allows for a multisector estimation. Its findings are consequential in view of the hypothesis that migration increases product preferences and reduces trade costs. Identifying each sector by its elasticity of substitution, note, first, that the preference effect is magnified by elasticity. In other words, once a bilateral preference is defined, consumption will follow this preference so long as the consumers are not concerned about variety substitution. A good with  $\sigma = 1$  will not be affected by preferences, since the varieties are not substitutable in this case. Otherwise, a good with a high value of  $\sigma$  will be easily influenced by preferences since its varieties are substitutable. The elasticity for preferences is:

$$\frac{d \ln X_{ij}}{d \ln a_{ij}} = \sigma - 1. \quad (8)$$

Second, an intensive margin is in operation, meaning that each exporter firm exports more when trade costs are reduced. This intensive margin is greater for sectors with a higher elasticity of substitution, which is the classic prediction made by Krugman (1980). Since competition is higher when products are more substitutable, a reduction in trade barriers prompts large differences in exports.

Third, with lower export costs, new and less productive firms start to export. Where  $\sigma$  is low, traded products have a high degree of differentiation and firms are sheltered from competition, reaching large shares of the market. Conversely, where  $\sigma$  is high, competition is high and low productivity is a serious disadvantage such that the firm can only reach a small share of the market. This is the *extensive margin*.

As Chaney shows, the effect of the extensive margin is greater than the effect of the intensive margin. The elasticity for variable costs  $\tau_{ij}$  is

$$\frac{d \ln X_{ij}}{d \ln \tau_{ij}} = \underbrace{-(\sigma-1)} + \underbrace{((\sigma-1)-\gamma)} = -\gamma \quad (9)$$

and for fixed costs  $f_{ij}^h$  is

$$\frac{d \ln X_{ij}}{d \ln f_{ij}^h} = \underbrace{0} + \underbrace{1 - \frac{\gamma}{\sigma-1}}. \quad (10)$$

Hence the general (restricting) effect of trade costs on trade increases with  $\sigma$ , as opposed to preferences.

Table I.1: Model's Constants by Sector

$$\lambda_1^h = \left( \frac{\sigma_h}{\mu_h} \right)^{\frac{1}{\sigma_h-1}} \left( \frac{\sigma_h}{\sigma_h-1} \right)$$

$$\lambda_2^h = \left( \frac{\gamma_h - (\sigma_h - 1)}{\gamma_h} \right) \left( \frac{\sigma_h}{\mu_h} \right)^{\frac{\gamma}{\sigma_h-1}} \left( \frac{\sigma_h}{\sigma_h-1} \right)^\gamma \left( \frac{1+\pi}{Y} \right)$$

$$\lambda_3^h = \sigma_h \lambda_4^{1-\sigma_h}$$

$$\lambda_4^h = \left( \frac{\sigma_h}{\mu_h} \times \frac{\gamma_h}{\gamma_h - (\sigma_h - 1)} \times \frac{1}{1 + \lambda_5^h} \right)^{\frac{1}{\gamma_h}}$$

$$\lambda_5^h = \frac{\sum_{h=1}^H \frac{(\sigma_h - 1) \mu_h}{\gamma_h \sigma_h}}{1 - \sum_{h=1}^H \frac{(\sigma_h - 1) \mu_h}{\gamma_h \sigma_h}}$$

$$\lambda^h = (1 + \lambda_5^h) + \mu_h$$

### 3.2 Extension for Migration

The theoretical model used separates out fixed and variable trade costs. I assume that migration affects just fixed costs (and preferences). The literature considers two main channels through which migration could reduce costs: privileged information about markets and opportunities and contract reinforcement. Both of them represent a fixed cost to be overcome. The supplier-buyer matching process clearly represents a fixed cost incurred before any shipment is made. However, contract reinforcement is less clearly defined as a fixed cost. Confusion can arise since a weak contract can generate additional variable costs such as "*debased metal, rotting fruits or stocking with runs*" (Rauch and Trindade 2002: 117), but this is a consequence of the contract and not the cost of the contract. Business partnership contracts are nevertheless sealed before shipments are made and their cost should not normally depend on the volume to be traded.

As regards the total impact of migration on trade, equation (11) follows the trade model incorporating a multisector differentiation where each sector is identified by its elasticity of substitution. The degree of substitutability will define cost and preference behavior:

$$\frac{d \ln Trade_{ij}}{d \ln mig_{ij}} = F(\sigma). \quad (11)$$

The decomposition of migration's effect on trade in terms of costs and preferences is written:

$$\frac{d \ln(Trade_{ij})}{d \ln(mig_{ij})} = \underbrace{\frac{\partial \ln Trade_{ij}}{\partial \ln a_{ij}} \times \frac{\partial \ln a_{ij}}{\partial \ln mig_{ij}}}_{\alpha_m} + \underbrace{\frac{\partial \ln Trade_{ij}}{\partial \ln f_{ij}} \times \frac{\partial \ln f_{ij}}{\partial \ln mig_{ij}}}_{\tau_f}. \quad (12)$$

In elasticity notation:

$$\tau_a \equiv \frac{\partial \ln Trade_{ij}}{\partial \ln a_{ij}}, \quad \alpha_m \equiv \frac{\partial \ln a_{ij}}{\partial \ln mig_{ij}}, \quad \tau_f \equiv \frac{\partial \ln Trade_{ij}}{\partial \ln f_{ij}} \quad \text{and} \quad \varphi_m \equiv \frac{\partial \ln f_{ij}}{\partial \ln mig_{ij}}$$

$$F(\sigma) = \tau_a \times \alpha_m + \tau_f \times \varphi_m. \quad (13)$$

The impact of migration on trade via the preference channel is determined by two elasticities:  $\tau_a$  and  $\alpha_m$  henceforth named preference (complementary) elasticities. These two elasticities have a positive sign since I assume that migration has a positive impact on preferences and preferences have a positive impact on trade.

Conversely, the impact of migration on trade via the cost channel is determined by:  $\tau_f$  and  $\varphi_m$  henceforth named cost (complementary) elasticities. These two elasticities have a negative sign since I assume that migration has a negative impact on costs (reducing costs) and costs have a negative impact on trade (reducing trade). The product of both of them and then their resulting impact is nonetheless also positive.

Hence the impact of migration on trade is a linear combination of preference and cost components. Since one component reaches the maximum value when the other equals zero, a simple way of writing the linear combination is to weight  $\beta$  to these maximum values,  $\beta \in [0,1]$ . Then  $\beta = 0$  when migration's entire effect on trade operates solely via the cost channel and  $\beta = 1$  when its entire effect operates solely via the preference channel. Equation (13) becomes:

$$F(\sigma) = \beta \times (\tau_a \times \alpha_m)_{max} + (1 - \beta) \times (\tau_f \times \varphi_m)_{max}. \quad (14)$$

Plugging equations (8) and (10) into (14):

$$F(\sigma) = \beta \times (\sigma - 1) \times (\alpha_m)_{max} + (1 - \beta) \times \left(1 - \frac{\gamma}{\sigma - 1}\right) \times (\varphi_m)_{max} \quad (15)$$

and

$$F(\sigma) = (\sigma - 1) \times (\alpha_m)_{max} = \left(1 - \frac{\gamma}{\sigma - 1}\right) \times (\varphi_m)_{max}. \quad (16)$$

It follows that:

$$\alpha_m = \beta \times (\alpha_m)_{max} \Rightarrow \alpha_m = \beta \times \frac{F(\sigma)}{\sigma - 1}, \quad (17)$$

$$\varphi_m = (1 - \beta) \times (\varphi_m)_{max} \Rightarrow \varphi_m = (1 - \beta) \times \frac{F(\sigma)}{1 - \frac{\gamma}{\sigma - 1}}. \quad (18)$$

### 3.3 Specification

Trade function (7) is estimated using a gravity equation. The first specification considers an OLS (ordinary least squares) estimator with traditional control variables such as population, common border and common language.<sup>9</sup> These control variables are important since migration could spuriously reflect trade channels established by colonial history or facilitated by a common language and adjacency. Dyadic variable preferences ( $a_{ijt}$ ), fixed costs ( $f_{ijt}$ ) and variable costs ( $\tau_{ij}$ ) are captured by:

$$a_{ijt} = mig_{ijt}^{\beta D} dist_{ij}^E \exp(A_a clang_{ij} + B_a colony_{ij} + C_a cbord_{ij})$$

$$f_{ijt} = mig_{ijt}^{(1-\beta)D} \exp(A_f lang_{ij} + B_f colony_{ij})$$

$$\tau_{ij} = dist_{ij}^E \exp(A_\tau lang_{ij} + B_\tau colony_{ij} + C_\tau cbord_{ij}),$$

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<sup>9</sup>The colony variable does not apply to Switzerland.

Where:<sup>10</sup>

$$X = (\sigma - 1)X_a + \left(1 - \frac{\gamma}{\sigma - 1}\right)X_f + (\gamma)A_\tau, \text{ for } X=A \text{ and } B$$

$$Y = (\sigma - 1)Y_a + (\gamma)C_\tau, \text{ for } Y=C \text{ and } E$$

$$D = \beta(\sigma - 1) + (1 - \beta)\left(1 - \frac{\gamma}{\sigma - 1}\right).$$

Country-specific variables are captured by gross domestic product. Time-fixed effects (F.E.<sub>t</sub>) are introduced to capture the overall variation in world trade and technology, concerning mainly transport and communication.

The estimated equation is then:

$$\begin{aligned} \ln X_{ijt} = & \lambda \ln(gdp_{it}) + \mu \ln(gdp_{jt}) + \nu \ln(pop_{it}) + \delta \ln(pop_{jt}) \\ & + A(\text{clang}_{ij}) + B(\text{colony}_{ij}) + C(\text{cbord}_{ij}) + D \ln(\text{mig}_{ijt}) + E \ln(d_{ij}) + F.E._t + \varepsilon_{ij}. \end{aligned} \quad (19)$$

Recent methodological progress has improved the estimation of gravity equations.<sup>11</sup> Two main improvements are incorporated: Omitted variables are captured by country-specific fixed effects and heteroskedasticity is corrected by a PPML (poisson pseudo maximum likelihood) estimator.

Country-fixed effects are added in to capture omitted country-specific effects. This greatly reduces the risk of the migration variable capturing omitted variables.

Despite the popularity of the log-linear form of the gravity equation, it overlooks heteroskedasticity issues. In fact, the multiplicative form of the gravity equation provides a stochastic error term that, in its log-linear form, does not violate OLS homoskedasticity conditions solely under highly specific conditions. Santos Silva and Tenreyro (2006) propose an exponential form estimated by a PPML estimator to correct this problem.

Considering these two developments, the estimated equation becomes:

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<sup>10</sup>For the sake of clarity, sector  $h$  indices are omitted henceforth.

<sup>11</sup>For more details, see Anderson and van Wincoop (2003), Feenstra (2004), and Santos Silva and Tenreyro (2006).

$$X_{ijt} = \exp \left[ \lambda \ln(gdp_{it}) + \mu \ln(gdp_{jt}) + \nu \ln(pop_{it}) + \delta \ln(pop_{jt}) \right. \\ \left. + A(\text{clang}_{ij}) + B(\text{colony}_{ij}) + C(\text{cbord}_{ij}) + D \ln(\text{mig}_{ijt}) + E \ln(d_{ij}) \right. \\ \left. + F.E._t + F.E._i + F.E._j + \varepsilon_{ij} \right] \quad (20)$$

Standard errors are corrected for heteroskedasticity by White's method (1980) and clustered by country pairs to take into account the correlation of errors over the years.

## 4. DATA

I use data mainly from Switzerland, although data from France are also used in a robustness check. In both cases, my data describe foreigners in the country (Switzerland or France) and nationals (Swiss or French) abroad.

The use of migration stock instead of flows avoids the problem of endogeneity raised by reverse causality or even by a missing agent. Moreover, migration flows would disregard resident stock, which has an influence on current economic outcomes.

The Swiss Federal Statistics Office and the Swiss Federal Department of Foreign Affairs provided the data for Switzerland. The data for France come from a census<sup>12</sup> and the French Ministry of Foreign and European Affairs. For the sake of data comparability, this paper uses data on the period 1995–2000 with the exception of data on immigrants in France, where only 1999 data are used due to availability and compatibility problems.

The number of immigrants in Switzerland is measured in mid-year, while Swiss emigrants are counted at the end of the year. This is why the number of immigrants is analyzed with a six-month lag such that, for example, 2000 data (collected in June/July) are considered as 1999 data.

The trade data used in this article are taken from NBER - United Nations Trade Data (Feenstra et al. 2005). This database provides four-digit SITC data aggregated into three digits for matching with the elasticity of substitution database.

The elasticities of substitution are based on the United States elasticities estimated by Broda

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<sup>12</sup>Source: INSEE - National Institute for Statistics and Economic Studies – France.

and Weinstein (2006) as proxies. Data on elasticities of substitution for each country are not available. Instead, the United States elasticities are used as proxies because of the country's representability in the world economy.

The sector-based trade data present some very high, broadly scattered elasticities. Figure I.1 of Section 5 shows that just 6.3% of imports and 4.0% of exports have an elasticity higher than 9 spread in a sigma interval from 9 to 33. These data are ultimately not considered,<sup>13</sup> as explained in Section 5 mainly because of their high dispersion and substantial potential for biasing the results.

Bilateral distances are calculated as the sum of the distances between the largest cities of both countries, weighted by the share of the population living in each city. Geographical variables such as common border (a dummy variable set to 1 for pairs of countries that share a border) and common language (dummies equal to one if both partners share a language) are extracted from the CEPII database.<sup>14</sup>

The data on gross domestic product and population are taken from the World Bank *World Development Indicators*.

## 5. FINDINGS

### 5.1 *The Impact of Immigrants on Switzerland's Aggregate Trade*

Taking first a conventional approach, Table I.2 reports the findings on the effect of immigrant stocks on Switzerland's aggregate exports and imports. Columns (1) and (2) show the results of the basic OLS gravity equation for Switzerland imports and exports respectively. The gravitational determinants are more or less equivalent for both flows except for partner population and adjacency. For a given level of GDP, the partner population affects exports

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<sup>13</sup> A total of 10.1% of imports and 18% of exports were deleted from the sector-based analysis for other reasons. Some NBER trade data sectors do not match with the elasticities data: 3.8% of imports and 11.7% of exports. In the case of exports, one code (900) alone accounts for 7.8% of this 11.7%. The authors of the trade database assume that the breakdown of Section 9 is essentially meaningless and reflects the reporting country's unwillingness to provide the product detail and, in some cases, partner detail as well. Therefore, these data are not included in the estimations.

negatively and has no statistical effect on imports. Given that per capita GDP measures level of development, this fact implies that Switzerland exports more to countries with a higher level of development while this criterion is indifferent for imports. Adjacency affects Switzerland's imports only and does not influence exports. Common language does not have an impact on trade, probably due to the fact that Switzerland is a multilingual country. For example, a French-speaking region of Switzerland does not have a language advantage over a German-speaking country, although the "common language" dummy assumes it nonetheless. Yet the correlation between language and common border is 0.32, which could justify a colinearity between these two variables. To sum up, Swiss products are consumed more by richer countries and the implications of a common border affect imports only.

Table I.2: Impact of Immigrants on Switzerland's Trade

Specification	OLS		OLS		PPML	
	Ln(exp)	Ln(imp)	Ln(exp)	Ln(imp)	Exp	Imp
Model	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-12.33*** (1.37)	-12.54*** (1.60)	-12.20*** (1.36)	-12.25*** (1.65)	2.50 (15.25)	8.96 (22.42)
Ln partner GDP	1.28*** (0.06)	1.18*** (0.08)	1.24*** (0.07)	1.13*** (0.08)	0.73*** (0.13)	0.14 (0.21)
Ln partner Pop.	-0.26*** (0.06)	-0.16 (0.10)	-0.31*** (0.06)	-0.23** (0.10)	-0.04 (0.67)	1.21 (1.02)
Ln distance	-0.38*** (0.08)	-0.37*** (0.12)	-0.28*** (0.08)	-0.24* (0.13)	-1.13*** (0.35)	-2.73*** (0.38)
Adjacency	0.10 (0.33)	1.15** (0.44)	0.05 (0.31)	1.09** (0.44)	-0.56 (1.21)	-1.43 (1.64)
Common language	-0.30 (0.20)	0.07 (0.28)	-0.33* (0.19)	0.02 (0.27)	-1.89 (2.76)	-3.10 (4.00)
Ln Immigrants in Switz.			0.10** (0.04)	0.13* (0.07)	0.27** (0.12)	0.30* (0.16)
Country-fixed effects	No	No	No	No	Yes	Yes
Observations	882	805	882	805	882	805
R-squared	0.88	0.77	0.88	0.78		

Note: Robust standard errors (country-pair clustered) in parentheses with \*, \*\* and \*\*\* respectively denoting significance at the 1%, 5% and 10% levels. Time dummies are included in all estimations.

<sup>14</sup><http://www.cepii.fr/anglaisgraph/bdd/distances.htm>

Regressions (3) and (4) introduce the logarithm of the stock of immigrants in Switzerland. The other variables have broadly the same effect on exports and imports, comparatively speaking. It is worth noting that the distance coefficient and its level of significance are smaller than in the previous regressions. Immigrant stocks seem to capture some information associated with distance. In this basic specification, immigrants have a greater influence on imports than on exports, even though this difference is not statistically significant. While this OLS estimator is appropriate for comparisons with other studies and provides a view of the gravitational determinants of Swiss trade, it is not the best specification for identifying the impact of immigrants in particular. The next specification takes into account omitted variables and heteroskedasticity issues.

Regressions (5) and (6) are estimated by a PPML and country-fixed effects are included. Country-fixed effects control for missing variables that could bias the migration coefficient, as explained in Section 3. Yet this methodology also controls for the dyadic dimension, since the trade concerns just one country. So all the dyadic variables such as distance and adjacency are colinear to these fixed effects and are not significant, even though they are included to ensure a complete control of the migration variable. The second upshot of this methodology is that it overcontrols for the impact of migration, resulting in underestimated coefficients for this variable. This disadvantage in terms of the coefficient's accuracy actually plays a positive role for its confidence, as applied by Gould (1994).

In regressions (5) and (6) we find a significant impact of immigrants on trade. A 10% increase in the stock of immigrants raises exports by 2.69% and imports by 3.03%. This difference is not statistically significant, but it tends to confirm the findings made by Head and Ries (1998) and Wagner et al. (2002).

Yet the inclusion of fixed effects could raise a potential endogeneity issue given the variations in the migration variable over time (with dyadic fixed effects). This is a problem because the change in migration over time (basically the migration flows) may well tie in with the trade flows. I use two strategies to address this issue: an instrumental regression with twice-lagged migration stock (see Table I.A1 in the Appendix) and the inclusion of French data (see Section 5.2). All checks confirm the results obtained in Table I.2.

These findings might imply that international flows of people create certain directional links

between countries, links that would be more beneficial to trade flowing from home country to host country. This means, for example, that a Chinese immigrant in the United States would contribute more for US imports from China than for US exports. Since the network can take effect in both directions (although its effect can be asymmetric), this phenomenon would be conventionally explained by a preference for home-country product consumption.

## 5.2 The Impact of Immigrants on Switzerland's Disaggregated Trade

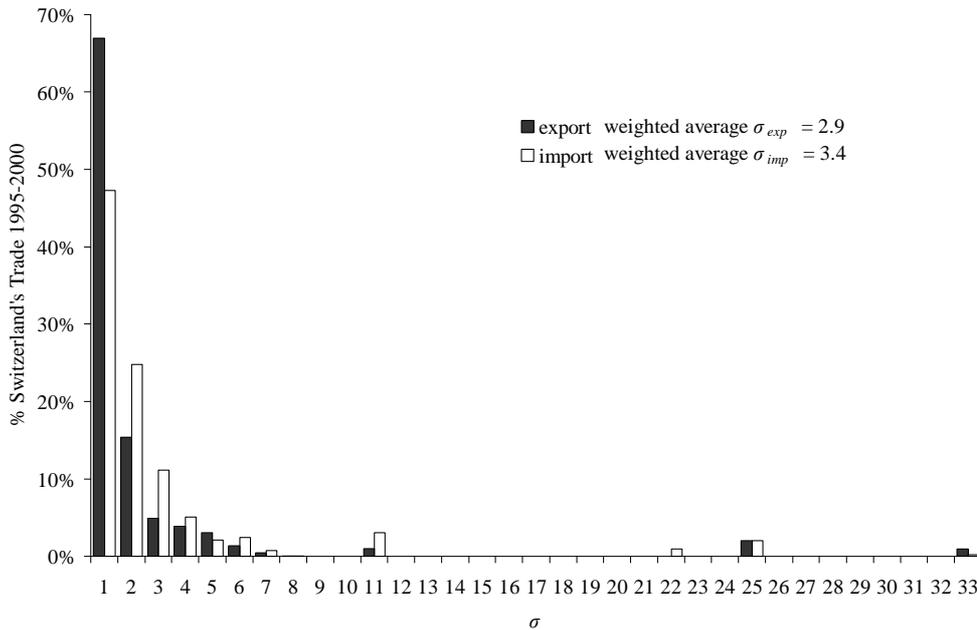
These migration mechanisms are fairly intuitive and have been developed by past studies. However, these analyses have overlooked the market structure of trade. Migration could affect exports and imports of different sectors in a systematically different way. Then, migration mechanisms could be distinguished only if the degree of trade flow substitutability were the same. One way of testing this assertion is to pool sector-based trade considering each sector as a good with differentiated varieties. Consequently, the interaction with the sector elasticity of substitution could verify the impact of the market structure.

Before proceeding to these estimations, it is worth analyzing the trade distribution of these sectors. Figure I.1 shows the share of Swiss exports and imports by integer  $\sigma$ . The data for the values of  $\sigma$  are provided by Broda and Weinstein (2006).<sup>15</sup> The graph shows the distribution of Switzerland's trade on  $\sigma$ , and especially the concentration of exports in more differentiated products (low values of  $\sigma$ ).

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<sup>15</sup> This graph calculates sector trade for each integer  $\sigma$  (elasticity of substitution) from 1995 to 2000. This quantity is then divided by total trade. For example, the first bar is calculated as the sum of the trade of all sectors between  $\sigma = 1.00$  and  $\sigma = 1.99$  and this amount is then divided by total trade.

Figure I.1: Switzerland's Sigma Specialization



This graph calculates sector trade for each integer  $\sigma$  (elasticity of substitution) from 1995 to 2000. This quantity is then divided by total trade. For example, the first bar is calculated as the sum of the trade of all sectors between  $\sigma=1.00$  and  $\sigma=1.99$  and this amount is then divided by total trade.

Turning now to the estimation of disaggregated sector-based export and import data from 1995 to 2000, the most reliable estimator (PPML) is used for this regression with the trade data being derived from Feenstra et al. (2005). Elasticity-of-substitution statistics are not available for each country, so data on the United States are used as proxies. Broda and Weinstein (2006) estimate these elasticities for the period 1990–2000.

This estimation corresponds to function (11). This function assumes a polynomial form:

$$F(\sigma) = f_0 + f_1 \times \sigma + f_2 \times \sigma^2 + \dots + f_n \times \sigma^n,$$

where  $f_0, \dots, f_n$  are migration terms of interaction.

A small number of interactions makes for a more general estimator. A high value of  $n$  customizes the estimation by incorporating part of the errors into the predictions. Alternatively, the first derivative of preference elasticity is always negative if  $\sigma$ 's exponent is less than 2. This could be problematic because it could permanently induce a behaviour not predicted by the theoretical model. Squared  $\sigma$  is then taken for the estimations. Higher

powers were tested (results available upon request), but the results were not robust to the different databases used in this article.<sup>16</sup>

The pooled estimation presents a very uneven distribution of data. Figure I.1 clearly shows that most of the data (95%) are concentrated in a narrow range from  $\sigma = 1$  to  $\sigma = 9$ , while a residual amount of trade is spread in a large interval from  $\sigma = 9$  to  $\sigma = 33$ .<sup>17</sup> Table I.3 reports on the migration variable coefficients for the three samples: all data,  $\sigma < 9$ , and  $9 < \sigma < 33$ . The estimator used is the PPML with all dummies and controls applied so far. Migration influences trade in the entire sample and the second sample. The coefficients and their degree of significance are similar. Data from the third sample are therefore not included in the following estimations.

Table I.3: Sector-Pooled Estimation: Restricting the Sample

Dependent variable	Exp and imp pooled		
	All Data	$\sigma < 9$	$\sigma > 9$
Sample	(1)	(2)	(3)
Model			
Ln immigrants in Switzerland	0.191** (0.091)	0.181** (0.089)	0.583 (0.410)
Observations	74457	70735	3722
% available trade	100%	94.9%	5.1%

Note: Robust standard errors (country-pair clustered) in parentheses with \*, \*\* and \*\*\* respectively denoting significance at the 1%, 5% and 10% levels. Time and country dummies are included in all estimations. All models are estimated by PPML

Table I.4 presents the results of the disaggregated sector data regressions for exports and imports. Migration is then interacted twice with  $\sigma$  and  $\sigma^2$ . Columns (1)–(4) report on the findings for Switzerland, and columns (5) and (6) add data from France for an endogeneity check. The data on immigrants in France are available for 1999 only and on French people abroad for the period 1995–2000. The pooling of data on these two countries is useful because it tones down the effect of country-fixed effects. These fixed effects could cause endogeneity because, in the presence of just one country, they also are dyadic fixed effects,

<sup>16</sup>These databases are: Swiss people abroad, foreigners in France and French people abroad.

<sup>17</sup>These outliers can considerably disrupt the findings. Since the estimates are made based on  $\sigma$ 's interaction, the "leverage" of these points on  $\sigma$  is high. Moreover, the spread is too diffuse: there are 4 points (counting by integer  $\sigma$ ) in the interval from  $\sigma = 9$  to  $\sigma = 33$ . No regression could be representative in this case.

which are colinear to the cross-sectional dimension of the migration variable. The results for the migration interacted terms are quite similar to those found in columns (1)–(4), suggesting that there is little endogeneity. This fact, combined with the results of the instrumental regression on Swiss immigration in Table I.A1 in the Appendix, validates the estimated results obtained. This robustness also validates the functional form of  $F(\sigma)$  with terms to the power of 1 and 2.<sup>18</sup>

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<sup>18</sup>A test to the power of 3 (not reported) failed this same test.

Table I.4: Exports and Imports Disaggregated: Sigma Interaction

Specification Dependent variable	PPML					
	Swiss'				French and Swiss'	
	Exports	Imports	Exp & imp pooled		Exp & imp pooled	
Model	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-5.741*** (1.215)	-11.880*** (3.302)	-6.872*** (1.663)	3.864 (4.018)	-16.614*** (3.647)	-14.373 (12.198)
Ln partner GDP	0.628*** (0.115)	0.294 (0.223)	0.483*** (0.133)	0.414*** (0.132)	0.563*** (0.079)	0.551*** (0.085)
Ln country GDP					0.520*** (0.039)	0.706*** (0.319)
Ln partner Pop.	-0.338 (0.641)	0.387 (0.915)	-0.275 (0.613)	-0.087 (0.548)	-0.248*** (0.056)	-0.516 (0.498)
Ln distance	0.777 (1.318)	0.667 (2.490)	1.165 (1.321)	-0.661 (1.414)	0.243 (0.170)	0.082 (0.166)
Adjacency	0.629 (3.236)	0.718 (8.511)	3.311 (4.356)	-2.575 (4.528)	1.094*** (0.169)	1.204*** (0.125)
Common language	0.687 (2.419)	1.251 (4.873)	-1.091 (3.494)	1.997 (3.096)	-0.129 (0.124)	0.022 (0.127)
Colonial links					0.054 (0.070)	0.100 (0.084)
Ln immigrants in country	-0.074 (0.089)	0.065 (0.188)	-0.065 (0.108)		-0.048 (0.073)	
Ln IMMi. × Sigma	0.138*** (0.040)	0.158*** (0.045)	0.178*** (0.033)		0.151*** (0.038)	
Ln IMMI. × Sigma <sup>2</sup>	-0.018*** (0.004)	-0.022*** (0.005)	-0.023*** (0.004)		-0.018*** (0.004)	
Ln nationals abroad				0.239 (0.167)		-0.218*** (0.082)
Ln nation. × Sigma				0.128*** (0.040)		0.151*** (0.037)
Ln nation. × Sigma <sup>2</sup>				-0.018*** (0.004)		-0.019*** (0.004)
Sigma	-2.275*** (0.385)	-1.763*** (0.493)	-2.325*** (0.339)	-1.784*** (0.354)	-1.463*** (0.366)	-1.418*** (0.333)
Sigma <sup>2</sup>	0.260*** (0.043)	0.230*** (0.059)	0.275*** (0.040)	0.223*** (0.041)	0.166*** (0.040)	0.170*** (0.034)
Imports F. E.			-0.020 (0.114)	-0.018 (0.114)	0.119** (0.059)	0.102** (0.047)
Observations	43,548	27,187	70,735	70,484	32,949	192,547

Note: Robust standard errors (country-pair clustered) in parentheses with \*, \*\* and \*\*\* respectively denoting significance at the 1%, 5% and 10% levels. Time and country dummies are included in all estimations. All models are estimated by PPML.

Country- and time-fixed effects are applied and a dummy variable is included for imports in order to control for size difference effects for exports and imports. The results for Switzerland in columns (1)–(4) show, as expected, that the dyadic variables' coefficients are not significant. Columns (1) and (2) present the findings for exports and imports respectively. The composition of trade of the sectors seems to determine the impact of migration similarly on imports and on exports. The interaction terms have a significant coefficient (at the 99% level) and generate similar parabolas. Both point out that intermediate values of  $\sigma$  (3.59 and 3.83) correspond to a maximum impact (0.27 and 0.28). Above the asymmetry between imports and exports, migration impacts on trade depend largely on the sector. This could be verified by pooling together exports and imports into one regression. Such specification provides a robustness check for the effects of sector differentiation with a more complete distribution of trade on  $\sigma$ . The products of some sectors are only exported or imported, and then exports and imports present individually an incomplete range of sectors. Results presented in column (3) confirm previous results. These results can be expressed in elasticity notation as follows:

$$F(\sigma) = \frac{\partial \ln(\text{Trade})}{\partial \ln(\text{mig})} = 0.178 \times \sigma - 0.023 \times \sigma^2. \quad (21)$$

Therefore,  $F(\sigma)$  has the same shape for the three specifications, indicating a robust relationship. A last test is conducted in column (4). Data on the Swiss abroad are used to estimate the effect of these emigrants on Switzerland's exports and imports. So far I have considered the immigration to Switzerland, which could select a kind of immigrant who looks for a higher level of development. Results confirm that the functional form of equation (21) holds independently of a possible idiosyncrasy bias of migrants.

### 5.2.1 Disentangling Migration Effects

Substituting  $F(\sigma)$  in (17) and (18), we obtain:

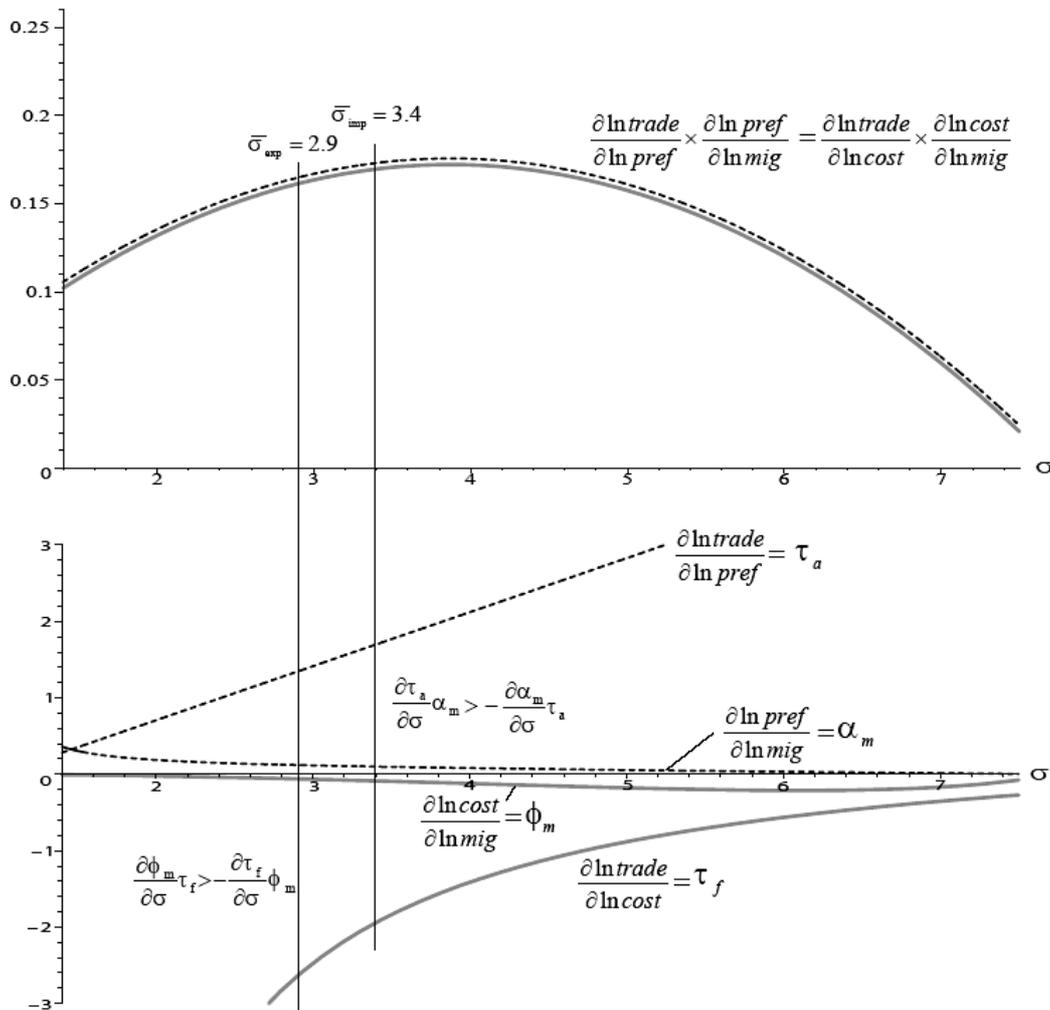
$$\alpha_m = \beta \times \frac{0.178\sigma - 0.023\sigma^2}{\sigma - 1}$$

$$\varphi_m = (1 - \beta) \times \frac{0.178\sigma - 0.023\sigma^2}{1 - \frac{\gamma}{\sigma - 1}}.$$

The relationship between migration and market structure is identified based on the theoretical model:  $\tau_a = \sigma - 1$  and  $\tau_f = 1 - \frac{\gamma}{\sigma - 1}$ .

Maintaining  $\gamma = 9$  in order to respect the model's condition  $\gamma > \sigma - 1$ , Figure I.2 charts the overall impact of migration on trade (top graph) and the partial effects of migration on trade by costs and preferences (bottom graph). Since  $\beta$  is not estimated, this analysis applies  $\beta = 50\%$ , which simulates a situation where 50% of migration effects channel through costs and 50% through preferences.<sup>19</sup>

Figure I.2: The Relationship between Migration, Costs and Preferences



<sup>19</sup> Relative behavior between complementary elasticities does not change for any value of  $\beta$ .

Some direct conclusions can be drawn from Figure I.2. First, the total elasticity of migration with respect to trade comes to a maximum of  $0.17 + 0.17 = 0.34$ , meaning that a 10% increase in the stock of immigrants raises trade by up to 3.4%. Second, to disentangle the impacts, the direct effects of migration on preferences ( $\alpha_m$ ) and on costs ( $\varphi_m$ ) are very small compared to the subsequent effect of preferences on trade ( $\tau_a$ ) and the effect of costs on trade ( $\tau_f$ ). This is quite natural: preferences and costs can have a huge effect on trade while migration slightly biases preferences and costs. To quantify these effects, at the abovementioned peak level, a 10% change in preferences and costs prompts a 20% and -15% change in trade, respectively. A 10% change in the stock of immigrants implies a 0.8% change in preferences and -1.1% in costs.

In addition, this paper's theoretical model finds that the effect of preferences on trade ( $\tau_a$ ) increases with  $\sigma$ . This happens because homogeneous products are more easily replaceable for a given level of formed preferences. It is a *substitutability* effect. The model also finds that the impact of costs on trade ( $\tau_f$ ) decreases with  $\sigma$  due to the *extensive margin*. The extensive margin predicts that a reduction in trade barriers enables new exporters of differentiated goods to reach larger shares of the market than new exporters of homogeneous goods. The impact of migration on preferences ( $\alpha_m$ ) then decreases with  $\sigma$  while it affects costs ( $\varphi_m$ ) in an inverted U-shape. This shape is highly asymmetric and concentrated in high values of  $\sigma$ , with a maximum of  $\sigma = 6.1$  converging very quickly to zero.

These findings imply that preferences are more affected by migration in differentiated sectors (with low elasticity of substitution). For example, a migrant might influence preferences for watches and clocks (sector 885 with  $\sigma = 1.34$ ) to a greater extent than cocoa (sector 072 with  $\sigma = 7.76$ ). It seems logical that migration should have a greater effect on preferences for differentiated products, since they can be more easily distinguished and identified by their nationality of origin. At the opposite extreme of the equation where  $\sigma = +\infty$ , migration has no effect on preferences since there is just one choice of variety that is constant across all the nationalities. The corresponding migration mechanisms in this case are the *transmission of preferences* such as cultural transmission and information transmission (about a new variety). Immigrant consumption of home-country products also has an influence, albeit lesser, on these preferences.

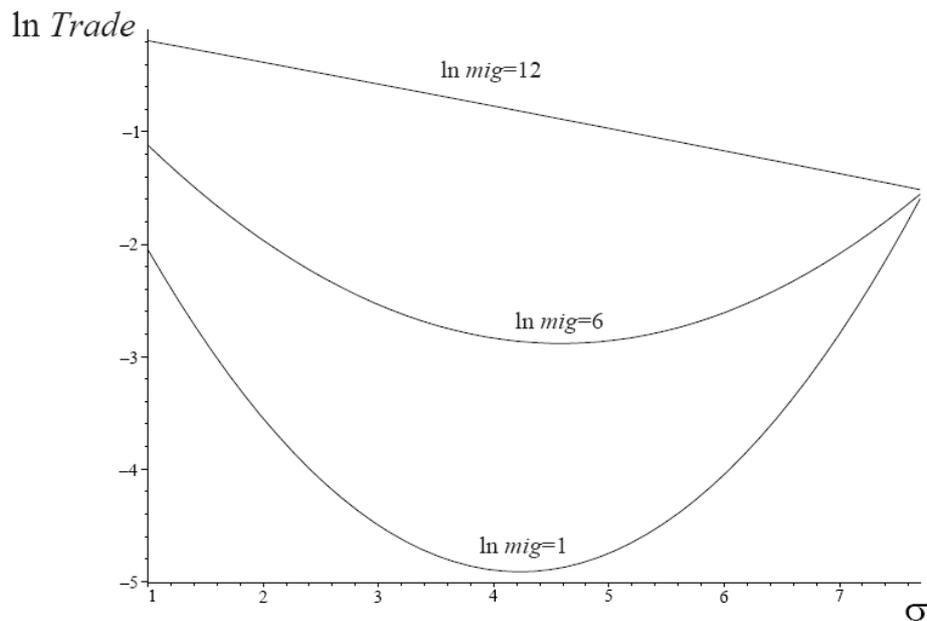
The second finding is that migration has an increasing impact on costs for more homogeneous goods up to a break point from where the impact of migration on costs diminishes quickly. These products may benefit from a trade channel established by migration, even if their trade is not sensitive to preferences. In this case, migration reduces the fixed export costs, allowing for the entry of new exporters. The explanation for this behavior is that more differentiated products require more specialized transactions. For example, the supplier–buyer match is more complex for “optical instruments” (sector 871 with  $\sigma = 1.05$ ) than for “soap” (sector 554 with  $\sigma = 4.95$ ). Trade barriers will be harder to overcome for the former because of the need for highly specific knowledge about the market and transport. So, the more homogeneous a product, the simpler the trade barriers and the more easily an immigrant can overcome the trade barriers. At higher  $\sigma$  values, the transactions become so straightforward that there is little leeway for migration effects. Rauch (2002) defines homogeneous goods as being those traded on organized exchanges, which clearly incorporate much of the potential intermediation an immigrant could perform. The corresponding mechanism for the effects of migration on costs is the formation of *networks*, i.e. the relationship between immigrants and those who have remained in the country of origin, which could generate new exports.

However, it could be useful to analyze the direct effect of the elasticity of substitution on trade. This impact is expressed by:<sup>20</sup>

$$\ln(\text{Trade}) = -2.325 \times \sigma + 0.178 \times \ln(\text{mig}) \times \sigma + 0.275 \times \sigma^2 - 0.023 \times \ln(\text{mig}) \times \sigma^2 .$$

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<sup>20</sup> Still considering the reference regression (3) in Table I.4.

Figure I.3: The Impact of  $\sigma$  on Trade

This function is plotted in Figure I.3. It predicts that, in the absence of migration, the effect is not monotonous: For low values of  $\sigma$ , trade is an increasing function of product differentiation, whereas for high values of  $\sigma$ , trade is a decreasing function of product differentiation. So highly differentiated products are traded more because of the exclusivity of their origins. Conversely, extremely homogeneous products can be easily substituted. Intermediate products are neither exclusive nor replaceable enough and are therefore traded less.

It is interesting to note that an increase in the number of migrants drives up the effect on trade until it eventually becomes linear and monotonous: where there are high numbers of migrants, trade is an increasing function of product differentiation for any  $\sigma$ .

### 5.2.2 Defining the Predominant Effects of Migration on Trade

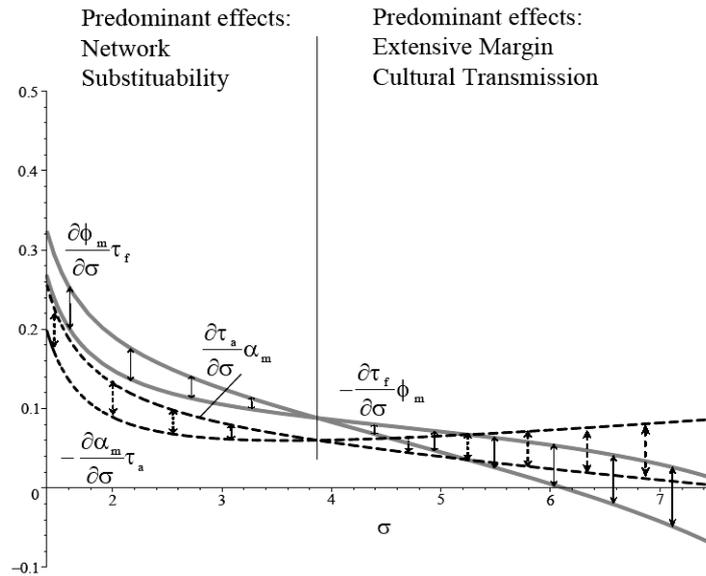
Once these direct migration relationships have been clarified, we can define how complementary elasticities diverge. On the cost side, network and extensive margin have mostly opposite effects on trade as  $\sigma$  increases. Figure I.2 shows that the network effect is mostly an increasing function of  $\sigma$  while the extensive margin effect is a decreasing function of  $\sigma$ . On the preferences side the substitutability effect is an increasing function of  $\sigma$  while

the cultural transmission effect is a decreasing effect of  $\sigma$ . Differentiating equation (13) on  $\sigma$ , we can determine predominating effects according to  $\sigma$ :

$$\frac{\partial F}{\partial \sigma} = \left( \frac{\partial \tau_a}{\partial \sigma} \alpha_m + \frac{\partial \alpha_m}{\partial \sigma} \tau_a \right) + \left( \frac{\partial \tau_f}{\partial \sigma} \phi_m + \frac{\partial \phi_m}{\partial \sigma} \tau_f \right).$$

Each term  $\frac{\partial \tau_a}{\partial \sigma} \alpha_m$ ,  $\frac{\partial \alpha_m}{\partial \sigma} \tau_a$ ,  $\frac{\partial \tau_f}{\partial \sigma} \phi_m$  and  $\frac{\partial \phi_m}{\partial \sigma} \tau_f$  is presented in Figure I.4.

Figure I.4: Partial Effects of Migration,  $\beta = 0.5$



For the sectors with  $\sigma > 3.87$ <sup>21</sup> the cultural transmission effect predominates the preference channel and the extensive margin effect predominates the cost channel. For the sectors with  $\sigma < 3.87$  the substitutability effect predominates the preference channel and the network effect predominates the cost channel. This means that, for an increase of  $\sigma$ , the proportional increase in “substitutability” will overcompensate the decrease in “preference transmission”. This is roughly the case for Switzerland, with an average  $\sigma = 2.9$  for exports and  $\sigma = 3.4$  for imports, imports being more affected by migration because of the higher substitutability of their products, even though preferences for exported products are greater than those for imported products. This is a very surprising result. It demonstrates that cultural and

<sup>21</sup> 3.87 is the point maximizing the impact of migration on trade, determined by equation (21). It is where  $\frac{\partial \tau_a}{\partial \sigma} \alpha_m = \frac{\partial \alpha_m}{\partial \sigma} \tau_a$  and  $\frac{\partial \tau_f}{\partial \sigma} \phi_m = \frac{\partial \phi_m}{\partial \sigma} \tau_f$ .

information transmission have a much greater impact on defining preferences than the immigrant's individual consumption. Moreover, this transmission clearly moves in both directions, from home country to host country and from host country to home country. Conversely, the "network" effect in the cost channel overcompensates the "extensive margin". Whereas the "extensive margin" is beneficial to exports, the immigrant "network" effect has more of an impact on imports. In this case, the network effect predominates, raising imports more than exports.

## **6. CONCLUSION**

This paper conducts an empirical study of the effects of migration on trade using a new approach that considers the market structure of exports and imports and inference mechanisms such as cultural and information transmission and network formation.

Swiss and French migration data are used along with sector-based trade data. The market structure is then studied in terms of these sectors' differentiation as shown by their elasticity of substitution. A suitable theoretical model taking into account sector heterogeneity based on Chaney (2008) predicts how preferences and costs vary as a sector's substitutability level varies.

The findings are in keeping with comparable studies inasmuch as migration has a greater effect on imports than on exports. However, a multisector analysis interacting migration with the elasticity of substitution suggests that market structure determines to a large extent how migration affects trade. Migration is found to influence preferences more in differentiated products and impact costs in an inverted U-shape, being more intense in products with an elasticity of substitution close to 6 and less intense as this elasticity approaches 1 or 7.8.

Switzerland's imports are more affected by migration than its exports. As regards the preference channel, this happens because Swiss imported goods are more substitutable and hence more easily affected by preferences. As regards the fixed-cost channel, this happens because imported goods call for more straightforward trade transactions that immigrants are more able to intermediate. The residual effect of migration on preference enhances preferences for Swiss products because of its highly differentiated composition.

**I.A INSTRUMENTAL VARIABLES**

Table I.A1: Instrumental Variable for Immigrants in Switzerland

Specification Dependent variable Model	PPLM	
	Exp (1)	Imp (2)
Intercept	-6.81*** (2.40)	-7.80*** (2.15)
Ln partner GDP	0.80*** (0.15)	0.25 (0.20)
Ln partner Pop.	0.01 (0.73)	1.20 (1.09)
Ln distance	-0.71 (1.54)	-1.76 (2.16)
Adjacency	-2.29 (8.53)	-0.10 (1.28)
Common language	1.22 (5.27)	0.09 (1.98)
Ln immigrants in Switz.	0.52* (0.29)	0.84** (0.39)
Observations	878	801

Note: Robust standard errors (country-pair clustered) in parentheses with \*, \*\* and \*\*\* respectively denoting significance at the 1%, 5% and 10% levels. Time and country dummies are included in all estimations. All models are estimated by PPML

## **Chapter II**

# **Social Interactions of Migrants and Trade Outcomes<sup>1</sup>**

### **1. INTRODUCTION**

An anecdotal fact can illustrate the role of immigrant networks in their location and economic activities. Although these events did not occur in France, they exemplify the kind of phenomenon this paper studies. I describe a family in Brazil that has been immigrating from China for 4 generations. People of each generation were born in China and moved to Brazil. The first generation immigrated to the city of Vitória in the Southeast Brazil in the 1920's. The second generation has chosen the economically booming city of São Paulo also in the Southeast Brazil since the 1950's. The network structure established from the first generation in Vitória<sup>2</sup> was essential to the settlement in São Paulo, providing the first job and housing facilities with local compatriots. The third generation divided between São Paulo and

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<sup>1</sup> This chapter is based on the WTO Staff Working Paper RSD-2009-02 (Tai, 2009b).

<sup>2</sup> The city of São Paulo is located 882 km far from Vitória.

Curitiba in the 1980's due to São Paulo becoming saturated and business opportunities being sparse. In contrast, Curitiba had become a rapidly developing city in Brazil. Some 3230 km separate São Paulo from Curitiba, but the social interactions between the Chinese community these two cities meant that this location choice was apt. The fourth generation immigrated at a very young age joining their parents in São Paulo.

Some stylized facts can be added to this episode. Firstly, new immigrants depend on the compatriot's community, since they face barriers of language, habits and culture. Job, loans, associates and relationships are found in this specific community. Secondly and conversely, as time passes, and immigrants are more integrated into Brazilian culture, they become less dependent to a specific community. Generations born in host country become further disconnected to the Chinese community as can be seen in their choice of more diversified professions and lifestyle. Thirdly, the network effect determining location choice is robust with different economical contexts. Since the first migration in the beginning of the XX<sup>th</sup> century, Brazil has been experiencing increasingly diverse situations and has responded to particular economic, social and political shocks. Nevertheless, migration movements have remained constant due to an ever existing network of ties, bonds and connections.

These interdependencies are observed independently of the country's level of development. Although France presents a different economic situation, the distribution of foreigners on its territory reveals a large concentration. Immigrants have a tendency to cluster at higher densities relative to local population. Figure II.1 shows the over-concentration of immigrants in France, in comparison to the French population as a whole: 70% of the foreigner population<sup>3</sup> is more concentrated than the French population<sup>4</sup>. Particularly, counties<sup>5</sup> belonging to the region Ile-de-France are above the 45° line. While there could be specific reasons within a region, results show that this cannot provide a complete explanation for this over-concentration of immigrants.

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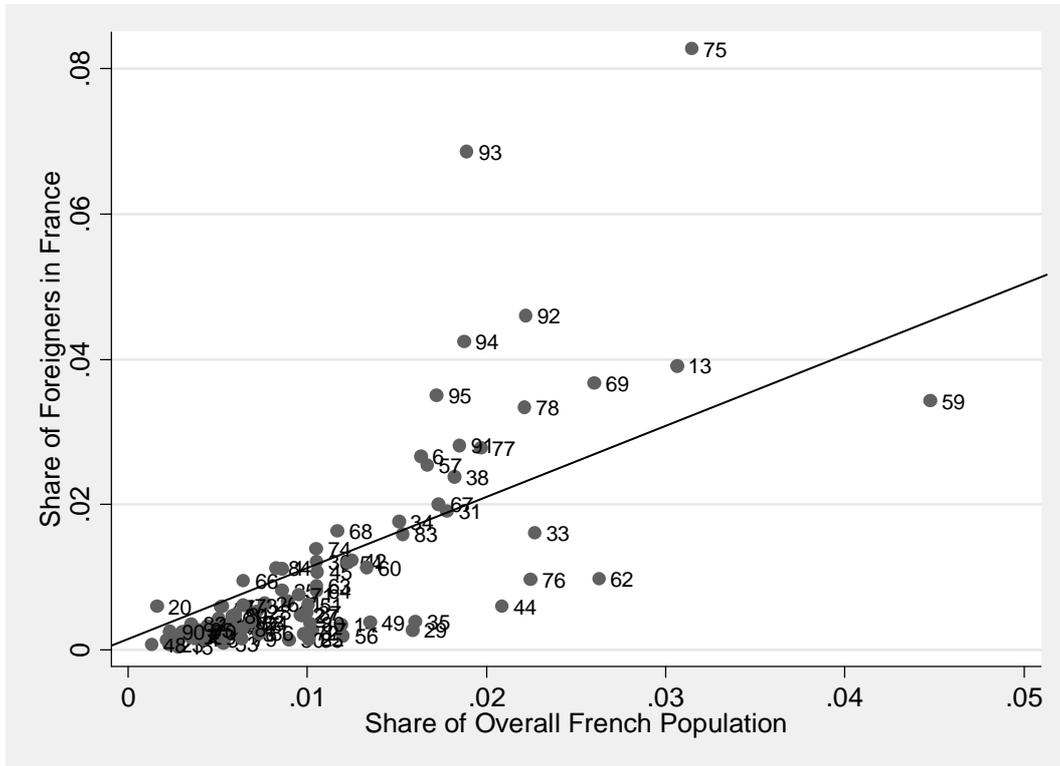
<sup>3</sup> This figure is all the more important that the children of foreigners born in France have the right to the French nationality.

<sup>4</sup> The foreigner population in France has a coefficient of geographical concentration  $G=0.24$ . This positive concentration coefficient equals 0 if foreigners are distributed exactly the same as the total population.

Chiswick, Lee and Miller (2002): *"Where the overseas born group has a distribution across regions the same as the total population, G equal to 0. Where the overseas born group is completely segregated, the upper bound of G will equal (100-GS), where GS is the percent of the total population accounted for by the specific birthplace group."*

<sup>5</sup> These counties are (75) Paris, (77) Seine-et-Marne, (78) Yvelines, (91) Essonne, (92) Hauts-de-Seine, (93) Seine-Saint-Denis, (94) Val-de-Marne and (95) Val-d'Oise.

Figure II.1: Foreigners share versus French share, by French County



This graph compares the population's portion of foreigners in each county of France to the portion of the French population in each county. The data is from 1999 census. Eg: 8% of all the foreigners living in France resided in Paris whilst only 3% of French population as a whole did so in this year.

This paper attempts to formalize these kinds of social interactions within a community. Particularly, this study addresses the question of how social interactions can impact the geographical composition of immigrants, and how these interactions can develop trade networks. In this large sense, social interactions relate to the relations inside an immigrant group, including marketing and non-marketing interactions.

Social networks provide a major explanation for the impact of immigrants on international trade. James Rauch and co-authors (1998, 1999, 2001, 2002, and 2004) have contributed much to this area of the literature demonstrating theoretical reasons and empirical evidence for this. However, the conception of social interaction itself is not based on a formal framework, and a measure of these networks is not provided. This study follows and extends the paper of Herander and Saavedra (2005) which outlines a conception of this immigration network based on states that share a common boundary.

This paper brings a more elaborate concept of immigrants' network based on the application

of sociology to economics. These interactions defining the concentration of migrants are behind the same phenomenon that creates networks that foster trade.

The contribution of this paper to the literature is threefold. Firstly, by building on existing literature, it develops a framework for immigrants' social interactions which is then used on data on the distribution of immigrants in France. This country provides an interesting case of immigration, counting 7.4% of immigrants<sup>6</sup> in the population, with an important colonial past and a particular model of integration that reinforces the assimilation of new immigrants to French values. Secondly, it proposes a functional form to the impact of distance on social interactions. Thirdly, the aforementioned analyses are applied to international trade and the economic impacts of social interactions are evaluated.

This paper is structured as follows. Section 2 analyses the relevant literature on social interactions as well as the nexus between migration and trade. Section 3 presents the theoretical framework while Section 4 describes the dataset and the variables used. Section 5 reports on the findings before some conclusions are made in section 6.

## **2. RELEVANT LITERATURE**

### *2.1 Previous Literature on Social Interactions*

Further studies have recently updated the literature on social interactions. Networks can be studied with a focus on its social feature. In reality, traditional barriers between disciplines have been reduced in the recent years and the empirics of sociology have gained formal allowing to econometric applications. Although not treating these interactions as determinant of an economical effect, Durlauf and Young (2001, 2002) stress this new interdisciplinary approach between economics and sociology to study social relations. They succeed to develop a theoretical model that integrates social relations. Head and Mayer (2008) have extended this work and have also provided empirical evidence which has confirmed that the choices that parents make in naming their offspring is influenced by the environment in

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<sup>6</sup> Data from the Institut National de la Statistique et des Etudes Economiques, 1999: [http://www.insee.fr/fr/themes/document.asp?reg\\_id=0&ref\\_id=ip748](http://www.insee.fr/fr/themes/document.asp?reg_id=0&ref_id=ip748)

which they are embedded. This section provides an overview of this field of research.

Gary S. Becker has early contributed to the literature<sup>7</sup> on social interactions. The Nobel Prize winner of 1992 was awarded to him "*for having extended the domain of microeconomic analysis to a wide range of human behaviour and interaction, including non-market behaviour*".<sup>8</sup> The book jointly written with Kevin M. Murphy (Becker and Murphy, 2000) provides a synthesis of existing academic thought in this field and the link between the social and economic realms is explored further. It acknowledges that the consumption of common goods can be influenced by a social dimension.

More recently, Brock and Durlauf (2001) have developed theoretical models for studying individual decisions, including social interaction effects, into the private utility. They model how the dynamics of a group can influence the decisions and actions of an individual. Building on the literature on discrete choice, Brock and Durlauf investigate for self-consistent equilibriums that present a hyperbolic tangent shape.<sup>9</sup>

Head and Mayer (2008) analyze the extent of non-market interactions and investigate the social transmission of parental preferences regarding the naming of their children. They argue that the frequency of existing child names in the neighborhood can influence parent's choice of how to name their son or daughter. Head and Mayer use data on the geographic distribution of names in France to explain the popularity of three types of names: Saints names, Arabic names and American names. They find that the importance of geographic distance declines over time while differences in class and national origins have increasing explanatory power.

While this paper follows the developments of Brock and Durlauf (2001) and Head and Mayer (2008), other valuable researches have been developed in the same theme. Manski (1993) and Glaeser et al. (1996) provides theoretical frameworks and empirical evidence on social interactions.

Manski (1993) relates social interaction to the reflection problem. The latter describes the difficult to distinguish between the influence of a group on the individual behavior and the

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<sup>7</sup> Scheinkman (forthcoming) , Manski (2000) and Glaeser and Scheinkman (2003) provide surveys of the literature and discuss different approaches to define and model social interactions.

<sup>8</sup> Definition from the Nobel Prize Foundation

identification of group behavior as a simply aggregation of individual behaviors. He develops numerous models which take three main hypotheses: "(a) *endogenous effects, wherein the propensity of an individual to behave in some way varies with the behavior of the group; (b) exogenous (contextual) effects, wherein the propensity of an individual to behave as in some way varies with the exogenous characteristics of the group, and (c) correlated effects, wherein individuals in the same group tend to behave similarly because they have similar individual characteristics or face similar institutional environments.*" The first hypothesis generates a social multiplier effect creating mimetic behavior in a group. The second hypothesis distinguishes exogenous and independent determinants of behavior whilst the third relates to correlated determinants of behavior.

The paper of Glaeser et al. (1996) is another example of the application of sociology's elements to economics. They present a model where, after controlling for economical and social conditions, social interactions explain the high variance of crime rates across cities. An index of social interactions is constructed using data from the FBI and the New York City Police Department. Where the crime is more serious such as in murder, social interactions are less likely to have played a major role in provoking a criminal act.

Furthermore, several empirical studies point out to the immigrant's concentration. Bartel (1989) finds that U.S. immigrants are geographically concentrated at higher densities compared to the American population as a whole. Bartel found that education was significant in explaining the distribution of these immigrants, with increased dispersion being associated with higher levels of education. Moreover, immigrants were found to internally migrate more frequently relative to the native population. This finding is confirmed by other studies as Chiswick and Miller (2004), Chiswick, Lee and Miller (2002), Funkhouser (2000) and Gonzalez (1998). These authors find numerous determinants that explain the existence of ethnic enclaves. Furthermore, these studies show that the transmission of culture and lifestyle choices is strengthened when there are higher densities of immigrant populations. Quoting Funkhouser (2000, page 489): "*The geographic concentration of immigrants is an important part of the assimilation process, allowing immigrants to maintain some cultural ties to their country of origin*". This network externality causes migrants to follow the culture and habits of their home country rather than the country in which they presently live.

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<sup>9</sup> See Durlauf 2004 for a complete analysis of the neighbourhood effects.

Finally, theoretical work from the field of New Economic Geography has provided certain explanations for the concentration of immigrants. The theoretical Core-Periphery model (Fujita et al. 2000 and Baldwin et al. 2005) describes a self-reinforcing mechanism of agglomeration. On the one hand, firms in the presence of transport costs and economies of scale, choose regions where the demand for consumer goods is higher. On the other hand, individuals look for a wide range of commodities and a low cost of living due to lower transport costs. Furthermore, the market crowding effect considers a dispersion mechanism which reflects the fact that imperfectly competitive firms have a tendency to locate in regions with relatively few competitors. Crozet (2004) and Poncet (2006) apply models from New Economic Geography models to empirically discover that market access is significant in explaining the degree of regional immigration. This approach explains the agglomeration by pure economical reasons for an entire population, but it overlooks the fact that a concentration of immigrants is related to non-market reasons as well.

## *2.2 The Impact of Migration on Trade*

The impact of migration on trade has been attested by many studies in the literature.<sup>10</sup> Several mechanisms have been presented to justify this association, such as preference and network effects associated in different ways to imports and to exports.

Most of the literature limits the preference effect to the consumption made by immigrants of home-country products, what would affect only the importations. Nonetheless, Bowles (1998) considers migration as a way to transmit preferences through the exposure to different cultures that could have an effect also on exports. Tai (forthcoming) also endorses the idea of a cultural transmission effect through migration, and argues that the personal consumption of immigrants does not fully explain the implied amounts of trade.<sup>11</sup> Instead, migration would affect preferences both for exports and for imports. The relative impact of preferences and networks on trade has been covered elsewhere (Tai, forthcoming) and is outside the scope of this paper, which instead will focus on the network effect.

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<sup>10</sup> See Rauch (2001) and Wagner (2002) for a synthesis of literature in this area.

<sup>11</sup> Basing on the results of Head and Ries (1998), Tai (forthcoming) shows that if the impact of migration on trade was limited to the consumption made by immigrants, each immigrant would have to consume \$417 per month on home-country products.

The network effect relies on two fundamental concepts. Firstly, immigrant communities have the potential to deter violations of informal contracts. Secondly, immigrants benefit from privileged information on the home-country and host-country markets. This mechanism impacts both imports and exports, but not necessarily in a symmetric manner.<sup>12</sup>

The trade-creating effects of immigration in France have been studied by recent papers. Combes et al. (2005) investigate the impact of social networks composed by internal migrants in France and compare it to the impact of business networks composed by interconnected plants (those belonging to the same business group). Despite the correlation of these two networks, results show positive and significant impact of both networks on inter-county trade in France, with a stronger effect of the business network. This study provides an interesting comparison opposing migrant's network which operates by preference and information effects and plants' network which operates by pure information business effect. In addition Koenig (2007) studies the impact of immigration on the export decision of firms from France to the immigrant's home country. Applying export data at firm-level to 61 countries and migration at county level, a significant effect of immigration is found on the probability that firm start to export. This paper studies this effect of immigrants on trade with a more formal framework for the formation of this network.

The existing literature commonly uses the quantity of migrants to ascertain the impact of this network. Rauch and Trindade (2002) innovatively used the probability that in any two given countries, both individuals will be Chinese in origin. This immigrant's network can be an analysis of the interaction of immigrants amongst themselves in the host-country as well as acquaintances in the home-country, as Rauch and Trindade (2002) tests. However, what is neglected in this paper is an appreciation that networks can also operate within the host-country.

Immigrants living in a certain province have the ability to interact with compatriots living in other provinces located in the same country. Herander and Saavedra (2005) analyze the impact of immigrant networks on trade within each state of United States of America. For example, for Colorado, the authors have estimated the impact that the compatriots residing in the neighboring states of Wyoming, Nebraska, Kansas, Oklahoma, New Mexico and Utah

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<sup>12</sup> Tai (forthcoming) shows that the impact through the network effect can be asymmetric and also depends on the composition of the export and import flows.

have on the trade of Colorado. Yet noteworthy is that this impact is not as great as the effect induced by within-state immigrants and confirms that intra-national networks do have a significant effect. This effect is reduced by distance, since immigrants who are located further away from each other have a lower effect on trade. Nonetheless Herander and Saavedra do not consider a framework or any empirical support for explaining these networks. Moreover, their concept of a network is limited in that it only accounts for immigrants residing in neighboring states. Using a specific framework and empirical evidence, this paper attempts to underpin the eminence of immigrants' networks thereby extending the overly simplistic concept of a network that only exists between states that share a common border.

### 3. SOCIAL INTERACTION FRAMEWORK

This section presents the framework to assess the extent that immigrants can interact changing a socio-economic context. The framework, in line with the last developments in the literature about social interactions, explains the composition of foreigners a region can have. The model obtains, through self-consistent equilibrium, a closed-form solution to the composition of foreigners in a given region

For the sake of clarity time subscripts are omitted. Two terms are used to design geographic location. The term "County" refers to the French term "*département*", there are 95 counties in continental France.<sup>13</sup> The term Region refers to each of the 21 French continental regions<sup>14</sup>, each region comprehending several counties. This is necessary because while migration data is available at county level, trade is only available at the regional level.

The neighborhood effect presents an adequate structure to the analysis of the spatial composition of foreigners. Counties with a large share of compatriots offer better conditions to an immigrant. Therefore this expected network and other exogenous factors shape the composition of strangers of a county. Ultimately, these connections generate economic externalities such as the formation of trade channels.

The study of trade's determinants is well defined by the literature. Instead, it is worth to detail

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<sup>13</sup> E.g.: Côte-d'Or, Ile-et-Vilaine, Loire, Vendée, etc.

<sup>14</sup> E.g.: Bourgogne, Bretagne, Ile-de-France, etc.

how to considerate the social interactions of immigrants. Besides economic factors or amenities, the composition of a county is determined by the expected composition of other counties in the country.

This development follows Head and Mayer (2008) with slight adaptations. The social utility an immigrant can have depend on the possible interactions she or he can count on. It depends not only on the quantity of compatriots available, but also on the extent these compatriots are reachable. Physical distance can make the accessibility harder, but the dispersion of these immigrants in the resident population is another important factor that can raise the friction opposing interactions. The probability of interaction between two compatriots living in a same county (the physical distance being constant) is a decreasing function of the resident population.<sup>15</sup>

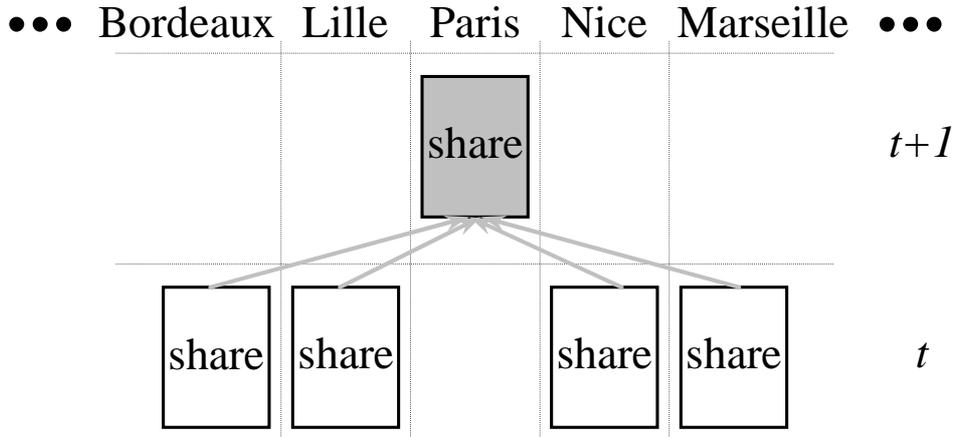
The utility function has two social components: the local utility and the global utility. Locally, the quantity of immigrants living in the same county raises the possibilities of social interactions, while the quantity of the local resident population reduces them. The local utility is therefore a function of the expected share of these immigrants in the total county's population.

The global utility counts the expected interactions with immigrants settled in other counties of the country. It sums together the share of immigrants in each region, divided by its distance to the "local" county. Assuming the inverse relationship between distance and social interaction, the framework used in this paper takes the inverse of the distance for calculating the extent of the network. The choice to use the inverted distance follows the same functional form of many applications in economics, such as the market potential. Figure II.2 illustrates the geographic distribution of immigrants and potential interactions within a network. Share stands for the share of a given nationality on the total population of a county. In this example the share of immigrants living in Paris at the period  $t+1$  is determined by a pre-existent network of immigrants residing in other French counties at the period  $t$ . This pre-existent network does not account for the share of immigrants residing in Paris at the period  $t$ , this procedure is applied to mitigate endogeneity and it is explained in the section 4.

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<sup>15</sup> For a given stock of compatriots within the county

Figure II.2: Spatial-Time Distribution of Immigrants<sup>16</sup>



"Share" is the share of a given nationality in the total population of a county

The utility for an individual  $h$ , of nationality  $k$ , living in a county  $i$  is written:

$$U_{hki} = \lambda \left[ s_{ki}^e + \sum_{j \neq i} \frac{s_{kj}^e}{r_{ij}} \right] + \zeta_{hk} \quad (1)$$

Where  $\lambda$  is the intensity of the social interactions,  $r_{ij}$  is the distance between the county  $i$  and county  $j$  and  $\zeta_{hk}$  is the private utility.

The composition of a county  $i$  is determined by the probability that the utility of a nationality  $k$  is higher than any other nationality  $l$ . Henceforth, the share of a nationality  $k$  in a county is given by:

$$s_{ki} = \Pr(U_{hki} > U_{hli}, \forall l \neq k) \quad (2)$$

This probability is usually addressed by a multinomial logit (MNL). Nonetheless, this form implies nonlinearity and it is impossible<sup>17</sup> to achieve a self-consistent equilibrium. Moreover, the main advantage of this approach (MNL) would be the possibility of comparing all nationalities, assessing for example the utility of being American in Paris comparing to

<sup>16</sup> Figure II.2 shows the names of some known cities in France to better illustrate the spatial relationship immigrants can have. Nevertheless, the data applied in this paper is at the county level, a county comprehending many cities. Therefore the city of Bordeaux belongs to the county of Gironde, Lille to Nord-Pas-de-Calais, the city Paris to the county Paris, Nice to Alpes-Maritimes and Marseille to Bouches-du-Rhône.

<sup>17</sup> Under very specific cases a solution can be obtained.

being Moroccan, Bolivian, Japanese, French, etc. However, focusing in a nationality  $F$  (for a given foreigner nationality), this paper focus on the antagonism between this nationality with the native  $N$  one.<sup>18</sup>

The share of foreigners in a region is therefore equivalent to the probability that the utility of being foreigner exceeds the utility of being native:

$$V_{hi} = U_{hFi} - U_{hNi} = \lambda \left[ s_{Fi}^e - s_{Ni}^e + \sum_{j \neq i} \frac{1}{r_{ij}} (s_{Fj}^e - s_{Nj}^e) \right] + \zeta_{hF} - \zeta_{hN} \quad (3)$$

With  $s_{Fi}^e + s_{Ni}^e = 1$

$$V_{hi} = 2\lambda \left[ s_{Fi}^e - \frac{1}{2} + \sum_{j \neq i} \frac{1}{r_{ij}} \left( s_{Fj}^e - \frac{1}{2} \right) \right] + \zeta_{Fi} - \zeta_{Ni} \quad (4)$$

The error terms  $\zeta_{hF} - \zeta_{hN}$  are the private (non social) heterogeneity of each nationality. This difference is assumed a uniform distribution of this difference centered in zero and with upper and lower bounds equal to  $-\alpha$  and  $\alpha$ , respectively. This is addressed in the empirical section by the application of country and region fixed effects.

The share of foreigners of a region is given by the probability that  $V_{hi} > 0$ :

$$s_{Fi} = \frac{\alpha + 2\lambda \left[ s_{Fi}^e - \frac{1}{2} + \sum_{j \neq i} \frac{1}{r_{ij}} \left( s_{Fj}^e - \frac{1}{2} \right) \right]}{2\alpha} \quad (5)$$

The self-consistent equilibrium imposes  $s_{F1} = s_{F1}^e$ . Hence, the estimate equation is:

$$s_{Fi} = a + b \sum_{j \neq i} \frac{s_{Fj}^e}{r_{ij}} + \Omega_{jt} + \Omega_{it} + Mills + cte \quad (6)$$

Where  $\Omega_{jt}$  and  $\Omega_{it}$  are fixed effects for region-time and country-time. Being  $C$  the total number of counties, the coefficients are:

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<sup>18</sup> Empiric estimations consider the comparison between populations of each nationality to the total

$$a = \frac{\alpha - C\lambda}{2(\alpha - \lambda)} \text{ and } b = \frac{\lambda}{\alpha - \lambda}$$

While country of origin  $i$  may be any country in the world, destination counties  $j$  are all restricted to one country, in this case France. This implies a selection bias since each immigrant who had chosen county  $j$  had previously chosen France as a destination country. This bias is corrected by a probit estimator. The variable *Mills* is the inverse of the Mills ratio which has been estimated from the first stage probit<sup>19</sup> estimator, following the Heckman (1976) method.

The compatriot's network is hypothesized to capture the structure that resident immigrants can offer to a new one, such as assistance with bureaucracy, language, housing, employment and business opportunities, access to home produce and leisure. This practice can operate at a distance from one county to another, assuming that the new location is either deemed to be more attractive or less saturated.

Section 5 analyzes results of the empirical estimations. Subsection 5.1 reports results of regressions studying the composition of foreigner populations of the counties, based on equation (6). Subsection 5.2 reports results of the impact of immigrants' network on international trade.

## 4. DATA AND VARIABLES CONCEPTION

### 4.1 Data on Migration

The migration data used in this paper comes from the French census of 1968, 1975, 1982, 1990 and 1999. These provide information on the stock of immigrants living in each of the 95 French continental counties in that particular year. The total French populations are obtained

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population in a county.

<sup>19</sup> The selection variable is the distance between the countries of origin and France, since it captures the costs of immigration to this country. Other independent variables of the first step probit are: the log of origin GDP, the log of origin population, dummies for common border, common language, colonial links and fixed effects for counties and time.

from Insee (*Institut National de la Statistique et des Etudes Economiques*)<sup>20</sup>. The first part of the estimations in section 5.1 determines the composition of the population of the counties and uses all years of the panel. The second part of the estimations in the section 5.2 determines the international trade of French regions and, because trade data availability, only uses the data from 1999 (data from 1990 is also used as instruments).

The French model of integration particularly reinforces the need that new immigrants should incorporate French moral values – the so-called "Jacobin" model of migration integration according to Schain, (2004). This is seen to be more important than any consideration into the demographic characteristics of an individual such as ethnicity, sex or religion. This ideal contrasts, for example, with the American model which is based on ethnic diversity where the rhetoric is that of a "nation of nations" (Schain, 2004). Further research needs to be done in other countries in order to provide comparisons.

While figure II.3 shows the distribution of the GDP and GDP per capita in France, figure 4 details the distribution of immigrants from some nationalities in France. The distribution of the GDP shows that some areas in France concentrate somehow the economic activity. Nonetheless the distribution of the GDP per capita points out that the concentration of GDP corresponds to the population's concentration. Some regions are just denser than others, but not richer. Except for the Parisian region and the county of Rhône (and some other counties) the GDP per capita is quite uniformly distributed<sup>21</sup>.

Figure II.4 details the spatial distribution of, in the order, the total population of each French county, the total population of immigrants, immigrants from Portugal, Morocco, Algeria, Italy, Spain, Germany, United Kingdom, Senegal, China, United States, Lebanon, Brazil and Japan<sup>22</sup>.

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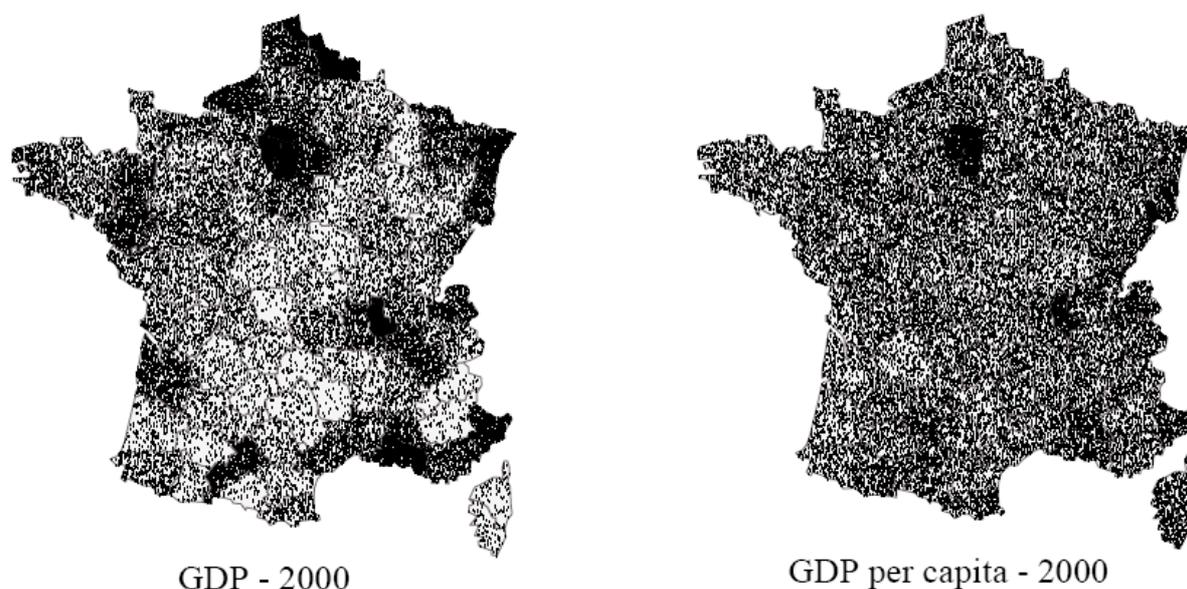
<sup>20</sup> French institute of statistics. Source:

[http://www.insee.fr/fr/themes/tableau.asp?ref\\_id=NATnon02145&reg\\_id=0](http://www.insee.fr/fr/themes/tableau.asp?ref_id=NATnon02145&reg_id=0)

<sup>21</sup> Taking out the counties 69, 75 and 92, the standard error of the GDP per capita is equal to 2 591 euros and its average is equal to 20 149 euros

<sup>22</sup> These nationalities were chosen by their significant presence in France or by their economic importance or to provide a sample of other countries.

Figure II.3: Geographical Distribution of the GDP in France



French GDP: 1 481 743 millions of euros (current 2000). French GDP per capita: 21 187 euros (current 2000)

Focusing on economic factors, one could expect two behaviors from immigrants. Either they would target places with intense economic activities and in that case they would present a distribution similar to the whole population in the country, or they would over concentrate in richer places. However, several other factors can determine the distribution of these immigrants like historical factors, amenities and proximity to home country. For example, Spanish immigrants locate close to Spain, as do Italians with Italy. German people locate close to Alsace and Lorraine, following historical ties in addition to the physical proximity.<sup>23</sup> These kinds of influences are controlled in the econometric analysis where a clear-cut evaluation is provided.

Nonetheless, it is interesting to notice that immigrants present a very dissimilar distribution not only comparing to the total population but also between them. On the one hand, regions with intensive economic activities (high GDP) or rich regions (high GDP per capita) seem to be preferred. On the other hand, immigrants seem to agglomerate and the first enclaves appear to determine the location over time of compatriots in a very robust way, even in areas that do not present an economic potential.

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<sup>23</sup> This same phenomenon is observed for the study of the spatial distribution of firms (Crozet et al., 2004)

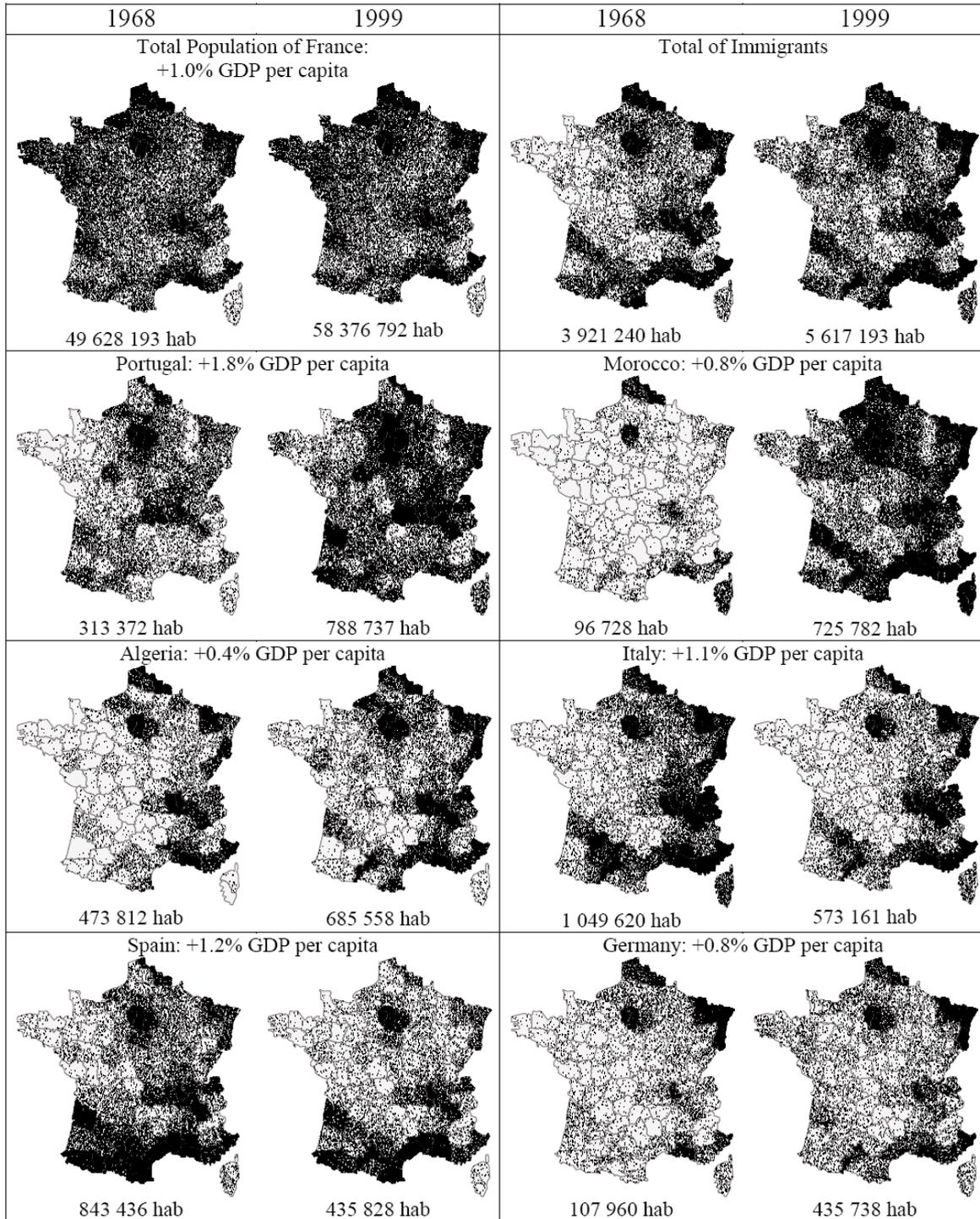
The maps of figure II.4 provide a graphic evidence for the over-concentration addressed in the introduction and treated by the literature (Chiswick and Miller, 2004; Chiswick, Lee and Miller, 2002; Funkhouser, 2000 and Gonzalez, 1998). Immigrants do not follow uniquely economic opportunities, but they also compose communities and agglomerate around them.

Immigrants from Senegal locate mainly in Paris and in the Seine-Maritime (North West of Paris)) in 1968. After 31 years, other Senegalese communities were formed, but those two agglomerations gave origin to a large network of compatriots. It is noteworthy the extent new immigrants locate this region when we compare to all other distributions.<sup>24</sup>

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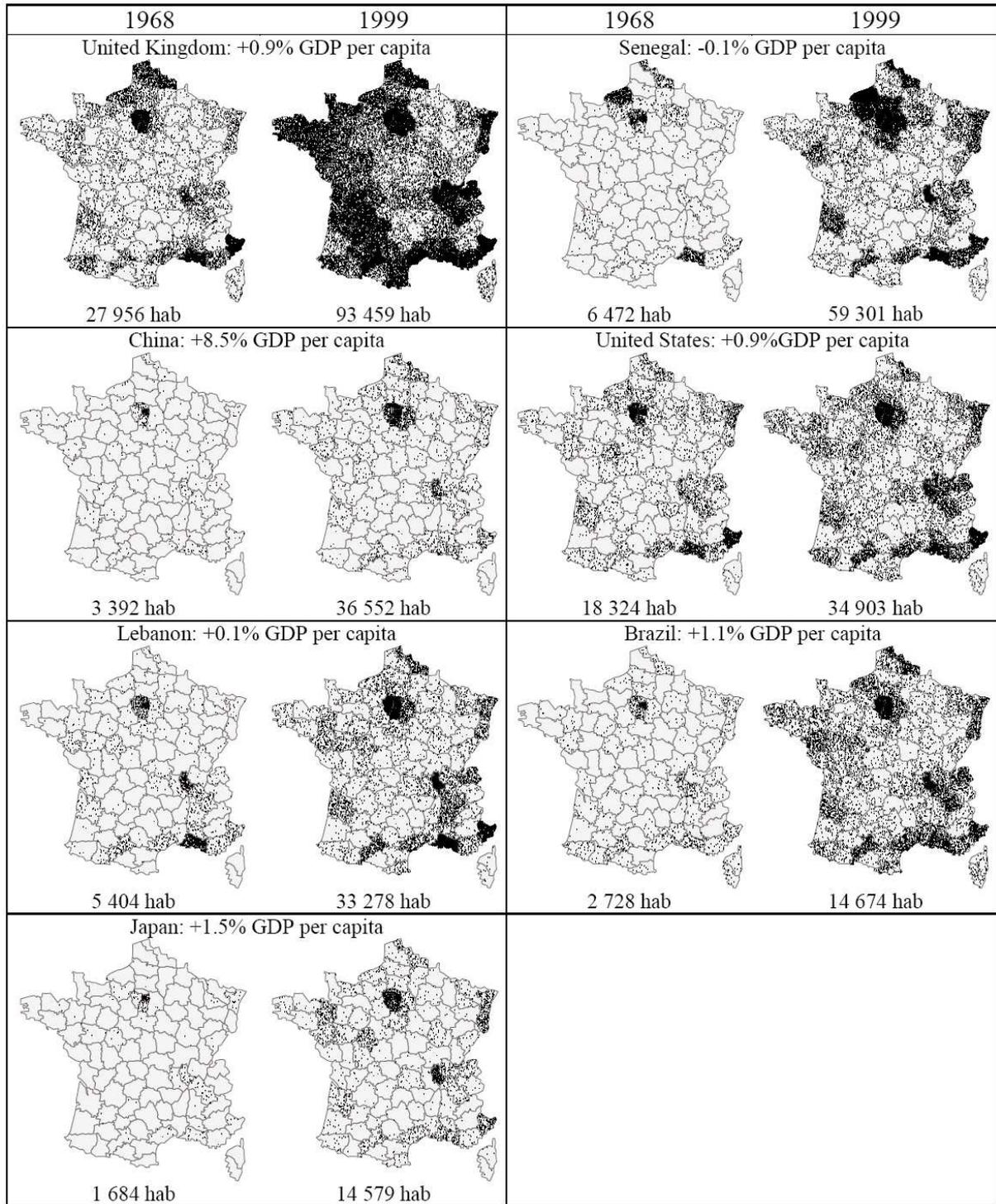
<sup>24</sup> An alternative explanation for this location is the access to England.

Figure II.4: Geographical Distribution of the Population in France<sup>25</sup>



<sup>25</sup> The GDP variation calculated for each country takes into account constant values of GDP between 1968 and 1999. Exception made to Germany (between 1971 and 1999) and Lebanon (between 1988 and 1999) because of the data availability. The geographic dispersion of dots (the relationship between the black points and the quantity of immigrants) is consistent within countries but not between countries, the quantity of immigrants from each nationality is explicated below each map. Quantities of immigrants can vary accordingly to some definitions as the accountability of people having multi-nationalities, the accountability of foreigners born in

Figure II.4: Geographical Distribution of the Population in France cont'd



France, etc.

## 4.2 Data on Trade

Data on French trade at a regional level is available<sup>26</sup> from the French Ministry of Ecology, Energy, Sustainable Development and Town and Country Planning<sup>27</sup>. This data is available online for a restricted sample of countries from 2003 to 2004. Namely, these countries are Australia, Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Hungary, Ireland, Lithuania, Latvia, Malta, The Netherlands, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom. The year 2004 is chosen for this study as it is close to the year 1999, as it is more of a complete dataset compared to that of 2003. Therefore, data on trade of the year 2004 is regressed on data of migration of the year 1999 (migration of 1990 is also used as instruments).

Geographical variables such as “common border” (a dummy variable set to 1 for pairs of countries that share a border) and “common language” (dummies equal to one if both partners share an official language) are extracted from the CEPII database.<sup>28</sup>

The data on Gross Domestic Product and national population are taken from the World Bank “World Development Indicators”.

## 4.3 A Description of the Instrumental Variables

There are two potential problems concerning endogeneity. The first one is due to the use of the share of immigrants as a dependent variable. Figure II.5 extends figure II.2 for more time periods and illustrates the share of a given nationality on the total population of a county. This figure shows that part of the immigrants’ population of period  $t$  (the grey colored square) is already present at the period  $t$ . Then, the network variable based on the stocks of neighbor counties at  $t$  has a reverse causality relationship with the dependent vector. This would lead to over-estimated coefficients for the network variable. This endogeneity is corrected by the instrumental variable method with the two lags of the network variable. This corresponds to 24 years<sup>29</sup> between the dependent variable and the instrument. Based on the

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<sup>26</sup> [http://www.statistiques.equipement.gouv.fr/rubrique.php3?id\\_rubrique=402](http://www.statistiques.equipement.gouv.fr/rubrique.php3?id_rubrique=402)

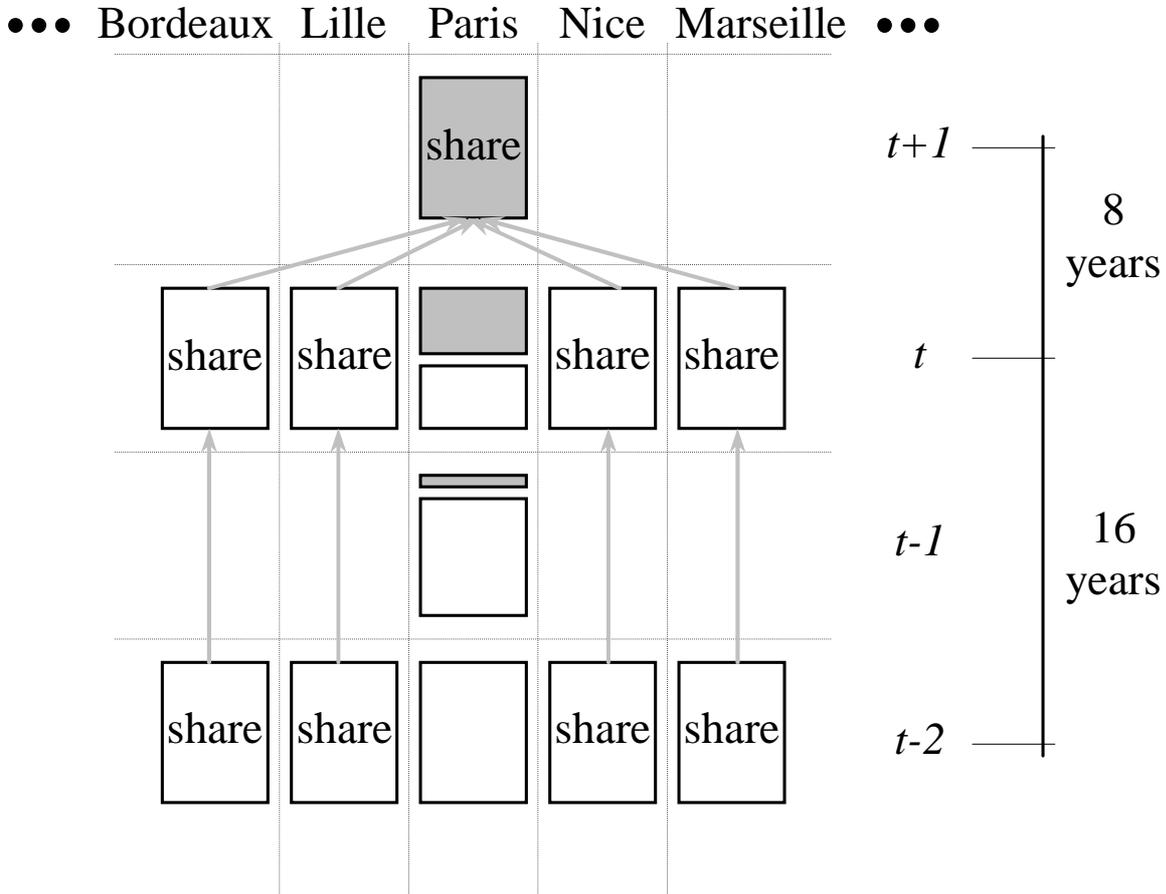
<sup>27</sup> Ministère de l'Écologie, de l'Énergie, du Développement durable et de l'Aménagement du territoire

<sup>28</sup> <http://www.cepii.fr/anglaisgraph/bdd/distances.htm>

<sup>29</sup> Migration data is obtained from the French census of 1968, 1975, 1982, 1990 and 1999. Each lagged

data, there is no intersection between the stock of immigrants at  $t+1$  and the stock of immigrants at  $t-2$ <sup>30</sup>.

Figure II.5: Endogeneity and the Stock of Immigrants



"Share" is the share of a given nationality in the total population of a county

The second issue is that the network variable does not take into account the stock of immigrants for the reference county<sup>31</sup>. In the Figure II.5, the network variable does not take into account the immigrants living in Paris at the period  $t$ , which could cause an over-estimation by a missing agent. However, since the reverse causality is controlled for, this

variable corresponds to 8 years difference on average. The number 24 is obtained from  $((t+1)-(t-2))*8$

<sup>30</sup> This conclusion is made based on data from the Institut National d'Etudes Démographiques, from France (<http://www.ined.fr/>): The sum of immigration flows from 1999 to 2005 is 119 422, the respective difference in the stocks is 652906. Of the total population of immigrants in 2005 (4 959 000) 31.98% were not in France in 1999. On average, each year from 1999 to 2005 6% of the population is composed of new immigrants (immigrants who arrived in the current year).

<sup>31</sup> The reference county is the one for which the composition is determined by estimations, in figure II.5 is Paris.

effect captures the impact of immigrants living in the reference county at period  $t$  who do not live there at the next period (the white square underneath the grey square).<sup>32</sup> Instead, these immigrants are part of the resident network and should henceforth be accounted for. This second issue allows an improvement of the estimation as it partially considers the network within the region.

Another predicament is that of endogeneity, which is due to not considering explanatory variables that may have a significant effect. However, this is mitigated by using origin and destination fixed effects, which can be interacted with time fixed effects.

#### 4.4 The Network Variable

As defined in the theoretical section, the network variable corresponds to the expected interactions with immigrants settled in other counties of the country. The network of a certain nationality  $F$  in a county  $i$  is given by the sum of the shares of other counties  $j$  divided by the distance between  $i$  and  $j$ . The following variable is calculated for each foreigner nationality  $F$ :

$$S_{Fi} = \sum_{j \neq i} \frac{S_{Fj}^e}{r_{ij}}$$

At the county level, the network variable is applied as a determinant of the composition of population of a reference county. This specification does not take into account immigrants residing in the reference county to avoid "mechanical" endogeneity, as explained in the previous subsection.

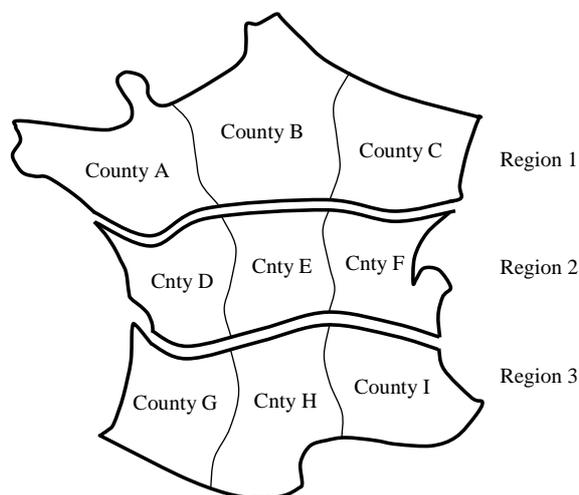
However, when this network variable is applied as a determinant of trade, two issues arise: trade data is aggregated by French regions and immigrants residing inside the region of interest should be taken into account. Figure II.6 illustrates hypothetical counties and regions in France. Henceforth, to explain the trade of, for example, region 2 the following calculation is done to obtain the network variable. Firstly the network of each county within region 2 is calculated. For County  $D$  it is summed together the share of immigrants in each county ( $A$ ,  $B$ ,  $C$ ,  $E$ ,  $F$ ,  $G$ ,  $H$  and  $I$ ) divided by the distance from  $D$  to each of these counties. The same

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<sup>32</sup> Internal migration is not considered in this methodology.

calculation is made for counties *E* and *F*. The network variable corresponding to region 2 is the average value of the networks of *D*, *E* and *F*. This conception allow to the regional aggregation considering interdependencies internal to regions.

Figure II.6: Network variable: aggregate measure by region



## 5. RESULTS

### 5.1 Composition of the Population of the Counties

This section investigates how and to what extent immigrants interact with each other. Following the theoretical framework, the composition of the county's population is studied taking into account the surrounding network. Therefore, the share of each nationality in a county is explained by the network variable: the sum of the share of compatriots living in other counties in the country weighted by the distance between counties<sup>33</sup>. Results of the composition of the population of the counties are shown in the table II.1.

A first concern in the empirical analysis is to control for agglomeration forces other than social interactions. For example, Paris is a very centralizing city in France, as confirmed by many studies cited in section 2. Exogenous economical factors or some amenities could explain a huge concentration of immigrants in this county. I control it applying destination

<sup>33</sup> This variable is detailed in section 4.4

fixed effects interacted with years fixed effect.

A second concern is the bias due to the pre-selection. A nationality can compose the population of a county conditionally to the fact that this nationality is present in France. I control it applying Heckman two steps procedure. The selection variable is the distance between the countries of origin and France, since it captures the costs of immigration to this country.

Finally, endogeneity is addressed by the instrumented variable procedure using as instrument 8 and 16 years lagged variables as described in the section 4.3. Dyadic fixed effects are also used for controlling non-observed factors that could drive dependent and independent variables.

The distance between the countries of origin of the county of destination is only a control. Because of fixed effects, the interpretation of this coefficient is meaningless. The inverse of the Mills ratio is always positive and significant. This implies a correction for unobserved variables that increase the probability of selection simultaneously to the probability of higher values of the dependent variable.

Regression (1) applies the Heckman procedure on the whole sample with origin and destination fixed effects. The network variable presents a positive and very significant coefficient. Nonetheless this result can be biased by endogeneity. Next estimations provide more accurate results.

Regression (2) limits the sample supplying comparable results to the following ones. This regression introduces origin and destination fixed effects interacted with time fixed effects. The magnitude of the network's coefficient diminishes but it is still significant at the 99% confidence level. Even controlling for all specific geographic effects over time, the quantity and the proximity of pre-existing people from the same nationality determine the share of immigrants. This kind of networks offers benefits to communication, housing, job and business possibilities, access to home produce, and leisure. These effects are analyzed by some recent studies (eg. Chiswick and Miller, 2004) that highlight to the evidence of a large concentration of immigrants in contrast to the national population.

Table II.1: Composition of the Counties

Regression	(1)	(2)	(3)	(4)	(5)	(6)
Specification	Heckman			Heckman – IV		
				8 yr lag	8 yr lag	16 yr lag
Ln Compatriots' Network	0.81*** (0.02)	0.73*** (0.02)	0.08*** (0.003)	0.05** (0.03)	1.03*** (0.04)	0.81*** (0.05)
Ln Distance	-0.36*** (0.08)	-0.33*** (0.08)			-0.28*** (0.08)	-0.31*** (0.08)
Mills	11.92*** (0.87)	12.81*** (0.94)	0.09*** (0.02)	0.07*** (0.03)	11.48*** (0.89)	12.90*** (1.34)
Constant	-33.63*** (3.15)	8.59*** (0.72)	-10.18*** (0.04)	-10.47*** (0.36)	-28.14*** (3.33)	-9.79*** (2.42)
Origin, destination and time F.E.	Yes	No	No	No	No	No
Pair (origin-destination) and time F.E.	No	No	Yes	Yes	No	No
Origin*time and destination*time F.E.	No	Yes	No	No	Yes	Yes
Observations	54815	43320	43320	43320	43320	30970
R-squared	0.865	0.865	0.305		0.864	0.860
Nb of pairs (origin-destination)			17290	17290		

Note: Robust pair-clustered standard errors in parentheses with \*, \*\* and \*\*\* respectively denoting significance at the 1%, 5% and 10% levels. Independent variable is the log of the share of each nationality in each county.

Regression (3) introduces country-county fixed effects. This method controls for all effects that are specific to each pairing of a country and county. The coefficient of the network measures the impact within each geographical pair considering just the time variation of the network variable. Therefore, after controlling to any effect specific to the pairs county-country (e.g.: twin cities), the network effect within pairs is still highly significant.

Regression (4) replicates regression (3) using nonetheless IV method with 8 years lagged variable<sup>34</sup> for the network. Its coefficient is smaller, but still significant at the 95% confidence level.

Regression (5) applies the IV method with 8 year lagged variable with origin and destination fixed effects interacted with time fixed effects. It presents a coefficient even larger than the one obtained in its correspondent OLS regression (2) and significant at the 99% level. This could indicate a negative relationship in the OLS regression such as an unobserved factor that increases trade and reduces migration in the same year. In any case, endogeneity seems to not bias considerably the coefficient obtained.

Regression (6) presents results for the same specification with 16 years lagged variable. This

<sup>34</sup> Because data are provided by 1968, 1975, 1982, 1990 and 1990 census, one lag represents 8 years in average.

period of time is more than enough to control for the endogeneity, as discussed in section 4.4. The coefficient is smaller than the one obtained before, but still positive and significant. Taking a reference county, if each immigrant's community moves 39.8 km closer<sup>35</sup> to this county, the quantity of immigrants living in the reference county raises 8.1%.

These regressions confirm the existence of social interactions of migrants above any specific effect. An immigrant counts on the network of compatriots when deciding for a county in the host country. This natural dependence implies economic consequences, since the network assistance includes not only help in the moving process, but also business and job developments. The next section analyzes the trade output resulting from these interactions.

## 5.2 International Trade

Table II.2 reports results from a trade analysis. A limited sample is available which includes the following countries: Australia, Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Hungary, Ireland, Lithuania, Latvia, Malta, The Netherlands, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom. Data on trade of the year 2004 is regressed on data on migration of the year 1999 (migration of 1990 and 1982 are also used as instruments). This data gathers exports and imports of the 21 continental French regions with the home countries of the immigrants.

These regressions follow the last advancements in trade literature. The Poisson Pseudo Maximum Likelihood estimator is applied (Santos Silva and Tenreyro, 2006) and specific country and region effects are controlled by fixed effects. Exports and imports are regressed separately.

Regressions (1) and (2) estimate the impact of the Compatriot's Network on exports and imports, respectively. In these regressions, the distance shows an expected coefficient (Disdier and Head, 2008). Immigrants' network presents a positive impact on trade. Its coefficient is significant at the 99% level of confidence. In addition, as Tai (forthcoming), the impact of migration on imports is higher than the impact on exports. Following this reference, the reason for this is that France imports less differentiated products than exports. Immigrants

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<sup>35</sup> 398 km is the average distance between French counties weighted by the stocks of the immigrants.

act as a medium for the betterment of the trade of less differentiated products because they do not need specific knowledge. Alternatively, these products are easily replaceable and therefore more sensitive to a positive shock in their preferences.

Regressions (3) and (4) apply the instrumental variable method. This corrects for a potential endogeneity between trade flows and migration. This bias is already mitigated by the use of Immigrant's stock instead of flows. However, the instrumental variable with a lag of 8 years<sup>36</sup> can offer a more accurate result. Coefficients are positive and significant at the 99% level of confidence. Magnitudes raise and the coefficient for imports remains higher than the coefficient for exports.

Table II.2: Trade Regressions

Regression	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent Variable	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
Specification	PPML		PPML - IV							
Ln Compatriots' Net	0.67*** (0.17)	1.14*** (0.23)	0.80*** (0.21)	1.78*** (0.38)	0.82** (0.36)	2.00*** (0.69)			0.69** (0.27)	1.04** (0.50)
Ln Immig Stk within Region					-0.01 (0.12)	-0.09 (0.23)	0.17** (0.07)	0.38*** (0.13)		
Ln Immig Stk Neighboring Regions									0.08 (0.16)	0.74** (0.33)
Ln Distance	-0.51*** (0.08)	-0.56*** (0.15)	-0.81*** (0.11)	-0.52*** (0.17)	-0.82*** (0.11)	-0.55*** (0.18)	-0.86*** (0.12)	-0.63*** (0.18)	-0.79*** (0.12)	-0.20 (0.23)
Constant	21.23*** (3.30)	31.20*** (4.34)	26.08*** (4.09)	44.22*** (7.26)	18.09*** (3.89)	49.08*** (14.57)	10.24*** (1.39)	6.18*** (2.23)	17.10*** (3.86)	27.95*** (9.91)
Observations	525	523	525	523	525	523	525	523	525	523

Note: Robust standard errors in parentheses with \*, \*\* and \*\*\* respectively denoting significance at the 1%, 5% and 10% levels. IV variables are the networks variables lagged once, which corresponds to 8 years averagely.

Regressions (5) to (10) provide a comparison to other studies of the impact of migration on trade. Regressions (5) to (8) introduce the quantity of compatriots living in the reference region. It is exactly the approach normally used in the literature: the total quantity of immigrants living in a region determines the trade of this country. From these estimations it is clear that this kind of procedure is missing a key part. In columns (5) and (6), the stock of migrants presents a non significant coefficient when the Compatriot's Network is controlled for. This means that the network variable incorporates more information than the stock

<sup>36</sup> The 16 years lagged variable is not necessary in this section. The independent variable (trade) does not imply “mechanic” endogeneity with the variable for social interactions.

variable. Regressions (7) and (8) do not control for the Compatriot's Network. Even there, the coefficients are smaller than the ones of the network.

Regressions (9) and (10) apply a variable with the quantity of compatriots living in regions that share a common border. This approach is the same of Herander and Saavedra (2005). One can see that this variable is significant just for imports. By contrast, the Compatriot's Network variable remains significant at the 95% level of confidence for exports and imports. Yet again, the method for counting immigrants' network proposed in this study seems to give a better explanation on the impact of these networks on trade.

## **6. CONCLUSION**

This paper investigates the extent to which social interactions impact the geographical composition of immigrants and develop trade networks. Empirical evidence strongly supports this conclusion. Data from French census allows for immigrants to be accounted for by their nationality, in the county level (95 counties), for five years<sup>37</sup>. Results prove that the immigrant's share in a county depends strongly on the residing network from which he or she can benefit, even when destination county, origin country, and time specific factors are controlled.

A function for the role of the distance on social interactions is presented and empirical outputs show that these interactions diminish following the inverse of the distance between two immigrants. Therefore, an immigrant benefits from the compatriot's network of destination region and also from the network installed in other regions of the country.

Social interactions get ease the immigrant's settlement, but also provide business opportunities that are verified by a very significant impact of networks on international trade. The trade of a certain region is determined not only by the social interactions of immigrants within the region, but also by the social interactions of the whole network of immigrants living in the country. This measure of network is more robust and complete than those measures in previous research.

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<sup>37</sup> These data are aggregated by regions (21 regions) to correspond to trade data



## Chapter III

# Bilateral Trade of Cultural Goods<sup>1</sup>

### 1. INTRODUCTION

In most countries, household expenditures on recreation and culture<sup>2</sup> account for around 5% of GDP. In 2005, this share was 6.4% in the United States, 5.5% in Canada, 7.7% in the United Kingdom and 5.2% in France. In 1970, those were 4.5% in the United States, 4.9% in Canada, 5.1% in the United Kingdom and 4.3% in France (OECD, 2007). Apart from the increase in income per capita, a frequent and presumably important explanation of this growth of cultural expenditures over the last decades is the emergence of the information society, combined with the development of leisure and of cultural tourism. This growth in consumption is associated with an impressive rise in trade. Between 1980 and 1998, world imports of cultural goods<sup>3</sup> have increased by 347% going from 47.8 to 213.7 billion of US

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<sup>1</sup> This chapter is based on a paper forthcoming in the *Review of World Economics* (Disdier, Tai, Mayer and Fotagné, 2009).

<sup>2</sup> Household expenditures on recreation and culture include purchases of audio-visual, photographic and computer equipment; CDs and DVDs; musical instruments; camper vans; caravans; sports equipment; toys; domestic pets and related products; gardening tools and plants; newspapers; tickets to sporting matches, cinemas and theatres; and spending on gambling (including lottery tickets) less any winnings.

<sup>3</sup> Cultural goods included in this (UNESCO) definition are printed matter, literature, music, visual arts, cinema, photography, radio, television, games and sporting goods.

dollars (UNESCO 2000). According to United Nations Comtrade data, world imports of all commodities increased by 189% between 1980 and 1998. An unexpected outcome is that in 1996, cultural products became the largest export industry of the United States, surpassing, for the first time, traditional manufacturing industries.<sup>4</sup> An interesting characteristic of these cultural trade flows is their high concentration: most of world trade in cultural goods is the fact of a remarkably small number of countries. In 2002, the United States, the United Kingdom, China (including Hong Kong and Macao), Germany and France accounted for 55.5% of total exports and 53.5% of total imports (UNESCO 2005). For global trade, these percentages were 39.7% for exports and 45.3% for imports.

Furthermore, trade liberalization of these flows was one of the most sensitive issues of recent -and current- multilateral negotiation rounds. Discussions set the partisans of free trade in cultural goods against the advocates of a “cultural exception”. The latter consider that cultural goods and services reflect countries’ identities and individuals’ diversity and as such should not be submitted to GATT/WTO general principles, for fear of generating a worldwide standardization of tastes and behaviours.<sup>5</sup> Cultural goods trade is therefore an empirically important phenomenon, and politically sensitive topic. In addition, there has been a recent surge of academic interest in “cultural economics”, understood as the quest for cultural origins of various economic outcomes such as regional development (Tabellini 2007), diffusion of innovations (Spolaore and Wacziarg 2009) or labour market performance (Algan and Cahuc 2007).

It is therefore somehow surprising that despite this wide interest in the topic, this type of exchanges has not been much studied in the literature. In this paper, we investigate the determinants and the influence of bilateral trade in cultural goods. We first focus on the sensitivity of cultural flows to usual spatial friction and cultural proximity variables. Next, we use bilateral trade in cultural goods as a measure of countries’ cultural proximity. Used as a proxy for bilateral preferences, these data help shed light on the spatial spread of cultures and their impact on trade flows.

The impact of bilateral cultural “affinity” on trade patterns has been recently analyzed in details in several papers (e.g. Guiso et al. (2007) on bilateral trust or Disdier and Mayer (2007) on bilateral opinions). Also related to this literature are the issues of linguistic

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<sup>4</sup> <http://portal.unesco.org/culture/>

<sup>5</sup> François and van Ypersele (2002) provide academic justification for this view.

proximity (Boisso and Ferrantino 1997; Melitz 2008), and past colonial links (Rose 2000; Eichengreen and Irwin 1998) or the link between immigration and trade (Wagner et al. 2002). However, these papers have to rely on proxies that often cover a low number of countries, and/or do not exhibit time variance. Trade in cultural goods has the advantage of world coverage and large changes over time.<sup>6</sup> An additional contribution of our paper is to provide up-to-date estimates in terms of gravity equation estimation technology. Our results first show that cultural goods are traded over shorter distances than non-cultural ones. Besides, common language fosters trade of cultural goods with a written support, while past colonial relationships influence consumers' preferences for cultural heritage goods and visual arts. Current cultural flows are also strongly influenced by past ones, which suggests the presence of what has been analyzed as addictive behaviour in the literature. Finally, we show that cultural flows have a positive and significant influence on overall trade and capture countries' cultural proximity better than traditional measures do. This last result differs from the one obtained for genetic distance, a measure of cultural proximity recently used in the literature. Giuliano et al. (2006) suggest that genetic distance between countries captures the impact of transportation costs and not of cultural differences in trade flows.

The paper proceeds as follows: the related literature is briefly surveyed in Section 2. Section 3 describes our data and specifies the gravity model. In Section 4, we provide results for the determinants of trade in cultural goods and for its influence on flows of other commodities. Section 5 concludes.

## 2. RELATED LITERATURE

### 2.1 Trade in cultural goods

Few trade economists have investigated trade in cultural goods.<sup>7</sup> Schulze (1999) asks whether new trade theory can be applied to trade in art. His analysis suggests that this theory is a good

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<sup>6</sup> Close to our approach is the work by Dreher et al. (2008). The authors use trade in books as a measure of countries' cultural proximity and investigate the effects of several dimensions of globalization on economics in a time-series cross-section context. Felbermayr and Toubal (2007) is another very recent paper using bilateral votes in the Eurovision song contest to measure changes in bilateral cultural affinity over time.

<sup>7</sup> For a very detailed analysis of production and consumption of arts, see Throsby (1994). Here, we focus only on international trade in cultural goods.

candidate to explain exchanges in reproducible art (e.g. recorded music, books, movies), which are characterized by scale economies and product differentiation. However, it seems to be a less likely explanation for unique art (like paintings and sculptures), which is dominated by exchanges between consumers. Schulze (1999) also emphasizes that trade patterns are influenced by a second characteristic of art products, namely the addictive character of their consumption.<sup>8</sup> As a first consequence, trade between very dissimilar countries will be limited, since there is not enough accumulation of “cultural consumption capital” to raise reciprocal appreciation in terms of art. Second, trade in cultural goods should exhibit a strong hysteresis effect, reinforcing the position of countries that currently dominate exports of cultural goods.

Schulze’s (1999) empirical application focuses on non-reproducible art products only. His data come from the DOTS database and are averaged over the 1990-1994 period. He estimates a naive gravity equation with a sample that covers the 49 largest importing countries. Marvasti and Canterbury (2005) investigate the determinants of US motion pictures exports to 33 countries. The estimation of a gravity equation over the period 1991-1995 reveals a positive impact of language, education and religion on exports. Interestingly, their analysis shows that protection and trade barriers applied by importing countries are endogenous and grow up as US exports rise. Recent studies on cultural goods have also focused on the welfare impact of trade policy. Francois and van Ypersele (2002) show that barriers to trade could raise welfare in both countries when cultural goods are characterized by fixed costs in production and heterogeneity in consumers’ tastes. In the same way, Janeba (2007) who models cultural identity as the result of the interaction of individual consumption decisions, suggests that - under certain conditions - free trade does not Pareto-dominate autarky. Olivier et al. (2008) build up a simple model where microfounded dynamics of cultural identity are endogenous and interact with an international trade equilibrium. They show that social integration causes cultural convergence and can counterbalance the effects of goods market integration.

## 2.2 Cultural proximity, transaction costs and tastes

Our study is also related to the recent literature on the impact of cultural proximity on

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<sup>8</sup> This habit formation effect is obviously not specific to cultural goods but can also be observed for goods such as alcohol, tobacco, etc., as well as for goods that may have some origin-country feature (such as wine from Tuscany, French cheese, ...).

economics. Different papers<sup>9</sup> have focused on cultural proximity between countries and found it to have a positive influence on trade. Linguistic similarity, past colonial links, migrants, bilateral trust, and opinions have all been shown to be trade-enhancing. The main explanation provided by this literature for this positive effect is the reduction of trade costs induced by cultural proximity.

Our paper provides two contributions to this literature. First, we use trade in cultural goods as a proxy for cultural preferences. This new measure of countries' cultural proximity presents two main advantages: it varies over time (which is not the case for traditional measures based on common language or colonial links, or for genetic distance used more recently) and does not suffer from a problem of availability and coverage (like migrations or bilateral trust and opinions). The drawback of this new proximity measure is however its potential endogeneity, which could bias the estimation results. However, to date, no exogenous measure of cultural proximity with a large time and country coverage has been proposed in the literature. The construction of such a measure represents a promising area of research. Maystre et al. (2008) develop an index of countries' cultural proximity based on data from the World Economic Survey, for which endogeneity seems at first sight less severe. However, the coverage in terms of years of their index is rather small. More important, Maystre et al. (2008) show that globalization *does* impact the index of cultural proximity between countries over time, casting serious doubt on how exogenous that variable would be for our purpose.

Second, using this measure, we make use of most recent advances in gravity equation estimation. In particular, we follow the recommendations of Baldwin and Taglioni (2006), and try to avoid most usual mis-specifications and other mistakes made by authors using the traditional simplest gravity framework. This involves in particular controlling for prices. Several methods have been suggested in the literature (simulation techniques as in Anderson and van Wincoop (2003), normalization with some anchor country, etc.). Here, we introduce importer and exporter fixed effects. Baldwin and Taglioni (2006) show, however, that in the case of panel data, time-invariant country fixed effects are not sufficient to remove all the "omitted price bias": the cross-section bias will be removed but not the time-series bias. To remove the latter, we interact our country fixed effects with year dummies. We also use the Poisson estimator suggested by Santos Silva and Tenreyro (2006). The authors show that in the presence of heteroskedasticity, ordinary least squares (OLS) method can yield biased

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<sup>9</sup> See, e.g. Boisso and Ferrantino (1997), Melitz (2008), Rose (2000), Eichengreen and Irwin (1998),

estimates and argue that the most robust estimation method for multiplicative equations like gravity is Poisson pseudo-maximum likelihood (PPML). In their specification, the dependent variable is measured in levels, although it provides estimates that are comparable to elasticity estimates from the standard linear-in-logs specification.

Contrary to the recent findings on genetic distance (Giuliano et al. 2006), our results suggest that trade in cultural goods is an appropriate measure of countries' cultural proximity.<sup>10</sup>

### 3. DATA AND ECONOMETRIC SPECIFICATION

#### 3.1 Data

Our main variable of interest is bilateral trade in cultural goods. One of the major difficulties of our study is the absence of a consensus about the definition of cultural products. Consequently, these products are often defined by what they are not, rather than what they are. In 2005, the UNESCO proposed a new classification, which distinguished between core cultural products (such as books, recorded media, visual arts) and related ones (such as blank CDs or television receivers) using the notion of cultural content. Table III.1 presents the UNESCO classification for cultural goods.<sup>11</sup> Core cultural goods are essentially produced by “cultural” industries, while related ones are made by “creative” industries. According to UNESCO, creative industries take into account a wider view of the creative process than cultural ones and include areas such as software, advertising, architecture and business intelligence services. Our study will be restricted to core goods.

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Wagner et al. (2002), Guiso et al. (2007) and for a review of this literature Disdier and Mayer (2007).

<sup>10</sup> The debate on whether genetic distance is a legitimate proxy for cultural distance is still open. Focusing on the diffusion of development, Spolaore and Wacziarg (2009) argue that genetic distance provides an ideal summary of divergence in slowly changing genealogically transmitted characteristics, including culturally transmitted traits (habits, customs, etc.) and find a positive and significant relationship between measures of genetic distance and cross-country income differences. Guiso et al. (2007) also dispute the critique of genetic distance by Giuliano et al. (2006).

<sup>11</sup> Our analysis focuses only on goods and does not study cultural services.

Table III.1: Core and related cultural goods (UNESCO classification)

CORE CULTURAL GOODS	RELATED CULTURAL GOODS
<p><b>CULTURAL HERITAGE</b> Collections and collectors’ pieces Antiques of an age exceeding 100 years</p> <p><b>BOOKS</b> Books, brochures, leaflets, etc. Children’s pictures, drawing/coloring books</p> <p><b>NEWSPAPERS AND PERIODICALS</b></p> <p><b>OTHER PRINTED MATTER</b> Printed music Maps Postcards Pictures, designs and photographs</p> <p><b>RECORDED MEDIA</b> Gramophone records Discs for laser-reading systems for reproducing sound only Magnetic tape (recorded) Other recorded media for sound</p> <p><b>VISUAL ARTS</b> Paintings Other visual arts (statuettes, sculptures, lithographs, etc.)</p> <p><b>AUDIOVISUAL MEDIA</b> Video games used with a television receiver Photographic and cinematograph films, exposed and developed</p>	<p><b>EQUIPMENT/SUPPORT MATERIAL</b> Musical instruments Sound player recorder and recorded sound media Cinematog. and photographic supplies Television and radio receivers</p> <p><b>ARCHITECTURE PLANS AND DRAWING TRADE AND TRADE ADVERTISEMENT MATERIAL</b></p>

Source: UNESCO (2005, p.15).

UNESCO (2005, p.12) also provides a clear definition of trade in cultural goods. Trade is defined “as the exports and imports of tangibles and intangibles conveying cultural content that might take either the form of a good or a service”. It also includes “the goods and services which are required to produce and disseminate such content [...] as well as ancillary services even if they are only partly cultural in their content”. The aim of such a definition is to take into account the large changes that have occurred over the last decade in the Information and Communication Technologies.

Different statistical sources offer data on international flows of core cultural goods. In our paper, we mainly use the BACI database developed by CEPII<sup>12</sup>. This database uses original procedures to harmonize the United Nations COMTRADE data (evaluation of the quality of country declarations to average mirror flows, evaluation of cost, insurance and freight (CIF)

rates to reconcile import and export declarations) (Gaulier and Zignago 2008). It covers 239 countries over the period 1989-2005 and all cultural goods mentioned in the UNESCO 2005 report. Due to technical constraints, our estimations will use three years moving average data between 1989 and 2005.

A closer look at cultural flows included in this database however suggests the likely presence of large scale outsourcing from the United States to mainly Canada and the United Kingdom. In particular, in 1991-1992, 1995-1997, 2000-2003, and 2005, American imports of cultural goods from the United Kingdom are reported to be bigger than the ones of the United Kingdom from the United States. The common official language and other similarities in the structure of the motion picture industry in these three countries can naturally explain this outsourcing phenomenon. The privileged commercial access of the United Kingdom to the European market and the geographical proximity of Canada (together with preferential trading relationships under NAFTA) can also be part of the explanation. This phenomenon could bias our results. For example, a movie with an American scenario and American actors will be perceived in the rest of the world as an American movie although it is included in the statistics as an export from the United Kingdom or Canada. We will therefore check the robustness of our results by using two alternative statistical sources: the UNESCO and Eurostat-AUVIS databases (cf. Section 4.3). The main weakness of those alternative databases is their low coverage. The UNESCO database focuses only on movies. The Eurostat-AUVIS data do not report flows of cultural goods in the traditional sense but the number of cinema entries in each country disaggregated by nationality of films. For this latter data set, only a few countries and years are available.

### *3.2 Econometric specification*

Our theoretical foundation for trade patterns is the standard monopolistic competition-CES demand-Iceberg trade costs model first introduced by Krugman (1980).<sup>13</sup> Producers operating under increasing returns in each country produce differentiated varieties that they ship, with a

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<sup>12</sup> <http://www.cepii.fr/anglaisgraph/bdd/baci.htm>

<sup>13</sup> Alternative theoretical foundations of the gravity equations include very different assumptions: perfect competition with technology differences as in Eaton and Kortum (2002), monopolistic competition with different functional forms as in Melitz and Ottaviano (2008), or heterogenous firms operating in a Dixit–Stiglitz environment as in Chaney (2008). All of those however yield a strictly equivalent estimable specification for our purposes.

cost, to consumers in all countries. The parameter  $\phi_{ijt}$  measures the bilateral “free-ness” of trade between country  $i$  and country  $j$  in year  $t$ , involving both actual price-raising trade impediments and the sensitivity of consumers to an increase in price ( $\phi_{ijt} \equiv \tau_{ijt}^{1-\sigma}$  where  $\tau_{ijt}$  is the ad valorem trade cost). The utility function used here contains a preference term of consumers in  $j$  for varieties produced in  $i$  ( $a_{ijt}$ ). The total value of exports from  $i$  to  $j$  in  $t$  can be written in logs as (see Redding and Venables (2004) for instance):

$$\ln x_{ijt} = \ln(n_{it}p_{it}^{1-\sigma}) + \ln \phi_{ijt} + (\sigma - 1) \ln a_{ijt} + \ln(Y_{jt}P_{jt}^{\sigma-1}), \quad (1)$$

with  $n_{it}$  and  $p_{it}$  representing respectively the number of varieties and prices in country  $i$  in  $t$ , and  $Y_{jt}$  and  $P_{jt}$  representing the expenditure and price index of the importer in  $t$ .

Different specifications of this equation have been estimated. The usual practice consists in proxying  $n_{it}p_{it}^{1-\sigma}$  and  $Y_{jt}P_{jt}^{\sigma-1}$  with the GDPs and GDPs per capita of both countries before estimating (1) with OLS. However, the relevance of this specification has been recently questioned for its distance to theory. Therefore, we follow Hummels (1999) and Redding and Venables (2004), and include importer and exporter fixed effects interacted with year dummies. These fixed effects incorporate the size effects, but also the price and number of varieties of the exporting country and the size of demand and the price index of the importing country. We also use the Poisson estimator suggested by Santos Silva and Tenreyro (2006).

The next step is to specify “free-ness” of trade ( $\phi_{ijt}$ ) and bilateral preferences ( $a_{ijt}$ ). Transaction costs that reduce  $\phi_{ijt}$  are assumed to include two different elements: transport costs and information costs. Bilateral distance ( $d_{ij}$ ) and common border ( $\text{cbord}_{ij}$ ) are standard proxies for transport costs. Common language ( $\text{clang}_{ij}$ ) and colonial links ( $\text{colony}_{ij}$ ) are used to proxy for information channels about profitable trade opportunities between the two countries.

$$\ln \phi_{ijt} = \zeta \ln d_{ij} + \lambda_{\phi} \text{cbord}_{ij} + \mu_{\phi} \text{clang}_{ij} + \nu_{\phi} \text{colony}_{ij}. \quad (2)$$

Bilateral distances are calculated as the sum of the distances between the biggest cities of both countries, weighted by the share of the population living in each city. The dummy variable  $\text{cbord}_{ij}$  is set to 1 for pairs of countries that share a border. Similarly,  $\text{clang}_{ij}$  and  $\text{colony}_{ij}$  are

dummies equal to 1 if both partners share a language or have had a colonial relationship. Data for these variables are extracted from the CEPII database on distance and geographical variables.<sup>14</sup>

Bilateral preferences are a function of countries' cultural proximity. In addition to an unobservable random term, we assume that these preferences are influenced by adjacency, common language, and colonial links but also, for overall trade, by exports of cultural goods.

$$\ln a_{ijt} = \lambda_a \text{cbord}_{ij} + \mu_a \text{clang}_{ij} + \nu_a \text{colony}_{ij} + \xi \ln x_{ijt}^c + \varepsilon_{ijt}. \quad (3)$$

Our preferred equation for estimating the determinants of overall trade is therefore<sup>15</sup>:

$$\ln x_{ijt} = fe_{it} + fe_{jt} + \zeta \ln d_{ij} + \lambda \text{cbord}_{ij} + \mu \text{clang}_{ij} + \nu \text{colony}_{ij} + \xi \ln x_{ijt}^c + \varepsilon_{ijt}, \quad (4)$$

where  $\varepsilon_{ijt} = (\sigma - 1)\varepsilon_{ijt}$ , and  $x = x_\phi + (\sigma - 1)x_a$ , for  $x = \lambda, \mu$  and  $\nu$ . The specification for trade in cultural goods is parallel:

$$\ln x_{ijt}^c = fe_{it}^c + fe_{jt}^c + \zeta^c \ln d_{ij} + \lambda^c \text{cbord}_{ij} + \mu^c \text{clang}_{ij} + \nu^c \text{colony}_{ij} + \varepsilon_{ijt}^c. \quad (5)$$

In all regressions, the correlation of errors across years for a same country-pair is taken into account by appropriate clustering and heteroscedasticity is corrected with White's (1980) method.

Fieler (2008) criticizes standard gravity models, which do not account for non-homothetic preferences. One way to deal with this issue is to include population and GDP per capita of both partners in the estimations. As suggested by Fieler (2008), this allows for the elasticities of trade with respect to these variables to diverge. Unfortunately, following the introduction of country fixed effects interacted with time dummies, these variables are dropped from the estimations. To test for the non-homotheticity of preferences, we therefore run estimations including income per capita, population, country fixed effects and time dummies separately. The main results of the paper remain unchanged. Due to space constraints, these results are not reported in the paper but are available from the authors upon request.

<sup>14</sup> <http://www.cepii.fr/anglaisgraph/bdd/distances.htm>

<sup>15</sup> When this equation is estimated by a PPML estimator, the left-hand-side term is taken in levels.

## 4. RESULTS

### 4.1 Determinants of trade in cultural goods

We first estimate the determinants of bilateral flows of cultural goods. Table III.2 presents the results. Importer and exporter fixed effects interacted with year dummies are included in all our regressions. The first column reports the linear in logs fixed effects estimation, while all other columns use the PPML estimator. The first two columns report results pooling all cultural goods, whereas columns (3)–(9) detail results for each core cultural good identified by the UNESCO (2005) (see Table 1). In the first two columns, cultural goods specific fixed effects are included and set relative to cultural heritage goods.

Our results in column (1) are in line with the gravity literature. Distance has a negative and significant impact on trade flows, while contiguity, common language and past colonial links foster bilateral trade. The PPML estimation causes changes in the results (column 2). The magnitude of the coefficients on distance and past colonial links is significantly reduced. Furthermore, the magnitude of the coefficient on common border slightly increases.

Our results for each cultural good (columns (3)–(9)) show some differences, which suggests the existence of good-specific characteristics. Distance coefficients are ranging between -0.23 and -1.04 (always significant at the 1 percent level, except for visual arts: significant at the 5 percent level). Besides, common language fosters exchanges of cultural goods with a written support. For example, it raises flows of books by a factor of  $\exp(1.61) = 5.0$  and flows of newspapers and periodicals by a factor of  $\exp(1.68) = 5.4$ , everything else equal. On the other hand, past colonial relationships seem to influence consumers' preferences for cultural heritage goods and visual arts. Having had past colonial links makes countries' bilateral trade in cultural heritage goods  $\exp(1.35) - 1 = 286\%$  larger (120% larger for trade in visual arts). These results are quite expected if trade in cultural goods reflects similarity in cultural tastes and this tends to make us confident for our later use of cultural trade as a proxy for cultural proximity.

As an illustration of differences across different goods, we computed the average distance between partners. If we consider all cultural goods simultaneously, this distance is equal to 6085 kilometers. If we take each good separately, the average distances are

as follows: cultural heritage goods (6450 km), books (6207 km), newspapers and periodicals (5335 km), other printed matter (6056 km), recorded media (5392 km), visual arts (6548 km), and audiovisual media (5915 km). By comparison, for overall trade, the average distance is 7429 kilometers. Two conclusions can be derived from these findings: first, non-cultural goods are traded over longer distances than cultural ones. Next, among cultural goods, the average distance is the highest for heritage goods and visual arts. Interestingly, one can note that cultural heritage goods and visual arts essentially include non-reproducible goods.

Table III.2: Determinants of trade in cultural goods

Dep. var. & specification Model	Ln(imports), FE (1) Pooled	Imports, PPML							
		(2) Pooled	(3) Cultural heritage	(4) Books	(5) Newspapers, period.	(6) Printed matter	(7) Recorded media	(8) Visual arts	(9) Audiov. media
Ln distance	-0.91*** (0.02)	-0.52*** (0.05)	-0.31** (0.07)	-0.53*** (0.05)	-1.04*** (0.07)	-0.62*** (0.06)	-0.58*** (0.09)	-0.23** (0.08)	-0.68*** (0.10)
Common border	0.63*** (0.07)	0.70*** (0.13)	0.33* (0.18)	0.77*** (0.14)	0.71*** (0.15)	1.14*** (0.15)	0.31* (0.18)	0.36* (0.20)	0.63*** (0.23)
Common language	0.82*** (0.04)	0.81*** (0.16)	0.26* (0.14)	1.61*** (0.12)	1.68*** (0.16)	0.65*** (0.13)	0.66*** (0.16)	0.26 (0.18)	0.22 (0.20)
Colonial links	0.76*** (0.06)	0.48*** (0.12)	1.35*** (0.11)	0.12 (0.13)	0.52*** (0.17)	0.22* (0.13)	-0.05 (0.20)	0.79*** (0.13)	-0.55* (0.31)
Cultural heritage goods	-	-							
Books	1.28*** (0.03)	1.49*** (0.21)							
Newspapers and period.	0.09** (0.04)	0.70*** (0.27)							
Other printed matter	0.20*** (0.03)	-0.04 (0.23)							
Recorded media	-1.56*** (0.04)	-2.20*** (0.23)							
Visual arts	1.11*** (0.03)	1.43*** (0.16)							
Audiovisual media	-0.11*** (0.03)	0.80*** (0.29)							
No. of obs.	172,176	172,176	14,013	41,272	19,662	30,772	8,926	38,314	19,217

Note: Country x time fixed effects in all estimations. Standard errors (country-pair clustered) in parentheses with \*\*\*, \*\* and \* denoting significance at the 1%, 5% and 10% level.

As emphasized in the literature review, the consumption of cultural goods can be thought to be addictive. The most common approach in the empirical trade literature to test for such a hysteresis effect consists in simply adding lagged imports to the specification (see for example Eichengreen and Irwin (1998)). Results, available upon request, show positive and significant estimated coefficients on the lagged variable, which confirm the presence of an addictive behaviour.

To test for the hysteresis effect, one can also refer more directly to the literature on addiction and introduce the addictive stock of past consumption in the estimation. Our calculation is based on Chaloupka (1991). The author uses Becker and Murphy's (1988) model of rational addiction to derive and estimate cigarette demand equations that explicitly account for the addictive nature of cigarette smoking. In his model, a stock consumption variable is elaborated considering a yearly depreciation of past consumption by a factor  $\delta$  (see the Appendix for a detailed presentation). The choice of the depreciation rate depends on the expected influence of past consumption. For Chaloupka (1991), high depreciation rates do not mean a lower addiction but rather a faster decline of the addiction after the end of the consumption. In our study, we use a depreciation rate of 0.7. As shown in the Appendix, this choice does not affect significantly the results of our estimations. Results are presented in Table III.3. When applied to cultural trade, estimated coefficients on the stock variable are weaker than the ones previously obtained on lagged imports but remain positive and significant. Put together, those results validate the presence of a hysteresis effect in cultural goods consumption. Such a hysteresis effect is important since it will tend to reinforce strong and long-established market positions in cultural exports. Furthermore, those self-reinforcing patterns have larger consequences than just trade in cultural goods, since those actually impact more general trade flows as we will see in the next section.

Table III.3: Test of the hysteresis effect (using the addictive stock of past consumption)

Dep. var. & specification Model	Ln(imports), FE	Imports, PPML							
	(1) Pooled	(2) Pooled	(3) Cultural heritage	(4) Books	(5) Newspapers, period.	(6) Printed matter	(7) Recorded media	(8) Visual arts	(9) Audiov. media
Ln distance	-0.48*** (0.01)	-0.24*** (0.03)	-0.21*** (0.05)	-0.39*** (0.04)	-0.74*** (0.06)	-0.46*** (0.05)	-0.50*** (0.09)	-0.16*** (0.06)	-0.37*** (0.06)
Common border	0.47*** (0.06)	0.30*** (0.10)	0.25 (0.16)	0.55*** (0.13)	0.51*** (0.12)	0.92*** (0.13)	0.22 (0.16)	0.19 (0.18)	0.28* (0.16)
Common language	0.40*** (0.03)	0.37*** (0.11)	0.31*** (0.11)	1.13*** (0.14)	1.22*** (0.13)	0.51*** (0.11)	0.61*** (0.16)	0.21 (0.13)	0.16 (0.14)
Colonial links	0.40*** (0.05)	0.30*** (0.08)	1.11*** (0.11)	0.09 (0.09)	0.34*** (0.11)	0.18* (0.10)	-0.04 (0.19)	0.65*** (0.10)	-0.37* (0.20)
Ln addict. stock past imports	0.31*** (0.01)	0.55*** (0.04)	0.22*** (0.04)	0.30*** (0.04)	0.27*** (0.04)	0.24*** (0.03)	0.13*** (0.02)	0.28*** (0.06)	0.43*** (0.04)
Cultural heritage goods	-	-							
Books	0.59*** (0.03)	0.70*** (0.15)							
Newspapers and period.	-0.04 (0.03)	0.45*** (0.15)							
Other printed matter	-0.08*** (0.02)	-0.07 (0.13)							
Recorded media	-1.06*** (0.03)	-1.29*** (0.15)							
Visual arts	0.50*** (0.02)	0.63*** (0.13)							
Audiovisual media	-0.20*** (0.03)	0.60*** (0.16)							
No. of obs.	172,176	172,176	14,013	41,272	19,662	30,772	8,926	38,314	19,217

Note: Country x time fixed effects in all estimations. Standard errors (country-pair clustered) in parentheses with \*\*\*, \*\* and \* denoting significance at the 1%, 5% and 10% level.

#### 4.2 *The impact of cultural proximity on overall trade*

This section analyses the influence of cultural proximity on overall trade. In addition to the traditional measures of cultural proximity considered in the literature (shared language, colonial links, etc.), we use trade in cultural goods as a proxy for proximity in cultural tastes. We study if bilateral trade is more important when both countries have proximate cultural tastes. The existing literature (Giuliano et al. 2006; Guiso et al. 2007) uses the level of bilateral trust, genetic or linguistic distances, and historical variables such as the number of wars fought as proxies and/or instruments for cultural proximity. While there is a lot of debate in this literature about the adequacy of each of those variables, a common feature is that they rely on the cross-sectional variance only to measure their impact. Our variable has the advantage of allowing for both bilateral and time variances in the measurement of cultural proximity.

Results are reported in Table III.4. As previously, we rely on the seven categories of cultural goods defined by the UNESCO (2005). Our dependent variable is the total value of bilateral imports minus bilateral imports of cultural goods. Trade data are extracted from the BACI database. Trade in cultural goods represents on average 0.7% of overall trade between 1989 and 2005.

Estimations use three years moving average data between 1989 and 2005. To control for the representativeness of our sample, we first estimate a simple gravity equation including only traditional proxies of cultural proximity (column 1). To allow comparisons of results, we restrict our sample to observations for which there is trade in cultural goods. The results are very similar to the ones usually found in the literature: coefficient on distance is negative and statistically significant; adjacency and common language have a positive impact on trade; and as in Santos Silva and Tenreyro's study (2006), the estimated coefficient on colonial links is not significantly different from 0.

In column (2), we test for the potential influence of cultural tastes on trade in goods by introducing the total value of cultural goods' imports. This inclusion causes several changes: the impact of distance and common border is reduced, and common language is no longer significant. The estimated coefficient on the log of cultural goods imports is significant at the

1% level and positive, suggesting that cultural flows influence all trade relationships. A 10% increase in cultural exchanges raises overall trade by 2.8%.

The comparison of columns (1) and (2) shows that the inclusion of cultural flows significantly affects the estimated coefficients on the other proximity variables (common language and colonial links) as well as on the distance and contiguity variables. All these results indicate the existence of collinearity between distance, traditional proximity variables and trade in cultural goods. This collinearity was expected and means, first, that cultural flows are partially determined by countries' cultural proximity. Furthermore, it also suggests that traditional measures do not fully capture country's cultural proximity. One advantage of the use of trade in cultural goods is to capture the proximity not captured by traditional measures.

Instead of using total imports of cultural goods, column (3) of Table 4 uses the residual of the estimate of cultural imports on traditional proximity variables (distance, common border, common language and colonial links) and country-time fixed effects. The coefficients estimated on common language and colonial links are now positive and significant. Furthermore, the coefficient on the residual is significantly positive - although slightly smaller than the one on the total imports of cultural goods (column 2), suggesting that cultural proximity not captured by traditional measures but captured by cultural trade flows has an effect on overall trade flows.

In columns (4) and (5), we exploit the panel dimension of our data and perform pooled cross-section time-series regressions. Both regressions include country-pair fixed effects in addition to the exporter-time and importer-time individual effects. Coefficient estimates on total imports of cultural goods are smaller than the one obtained in column (2) but remain positive and significant at the one percent level. These results suggest that countries' cultural proximity is partially captured by an unobservable time-invariant component. However, the time variance of cultural proximity also explains overall trade. This last result confirms the relevance of using a time-varying variable for measuring countries' cultural proximity.

A question arising with the latter estimations is the potential endogeneity of trade in cultural flows. Whether this variable is correlated with an unobserved variable is the key issue here. We are rather confident in the specification used however, since country fixed effects

interacted with time dummies are included in all specifications. Also, column (3) uses the residual of the estimate of cultural imports on traditional proximity variables and thus largely avoids the collinearity problem of column (2). Furthermore, columns (4) and (5) of Table 4 include, in addition to the exporter and importer individual effects interacted with time, a country-pair fixed effects.

Table III.4: Impact of cultural proximity on overall trade<sup>a</sup>

Dep. var. & specification	Total imports, PPML	Total imports, PPML		Ln(total imports), FE	Total imports, PPML
Model	(1)	(2)	(3)	(4)	(5)
Ln distance	-0.70*** (0.02)	-0.50*** (0.02)	-1.38*** (0.02)		
Common border	0.56*** (0.09)	0.38*** (0.06)	0.60*** (0.08)		
Common language	0.19** (0.08)	-0.08 (0.06)	0.58*** (0.04)		
Colonial links	0.02 (0.11)	-0.16* (0.09)	1.09*** (0.07)		
Ln total imports of cultural goods		0.28*** (0.02)		0.11*** (0.01)	0.21*** (0.01)
Residual of the estimate of cultural imports on traditional variables			0.18*** (0.01)		
No. of obs.	55,336	55,336	55,336	55,336	51,151

<sup>a</sup> Imports of cultural goods not included.

Note: Columns (1) and (2) include country x time fixed effects. Columns (3) and (4) include country x time fixed effects and country-pair fixed effects. Std. errors (country-pair clustered) in parentheses with \*\*\*, \*\* and \* denoting significance at the 1%, 5% and 10% level.

### 4.3 Robustness checks

In this section we test the robustness of our results. To do so, we consider two alternative data sources: the UNESCO and Eurostat-AUVIS databases. Both databases provide the production place of the cultural content rather than the export place of the cultural good and thus are not affected by the outsourcing phenomenon mentioned above. However, their coverage is more restrictive. Comparisons with results from the previous sections should be made carefully, because of differences in the coverage of samples.

The UNESCO database focuses on trade in movies. It provides for about 135 countries the number of produced films and the number of films imported by country of origin. However, disaggregated statistics are available only for main countries of origin that is the United

States, France, Germany, Russia, Japan, India, Hong-Kong, the United Kingdom, and Italy. Other exporters are aggregated in a group “other countries”. Data cover the years 1970-1977, 1980, 1985, and 1990-1999.<sup>16</sup> The analysis of countries’ exports share shows a strong increase of the American share in the expense of all other major producers of movies. Some exporting countries like France seem to resist to this trend; others (the United Kingdom and India) have succeeded to reinforce their position after several years of deep crisis. Italy and Russia lost most of their initially large market shares. The second alternative source we use is the Eurostat-AUVIS database. Data do not concern the international flows of movies but the number of movie theatre entries in each country disaggregated by nationality of origin. The coverage is low both in terms of countries and years available. Our sample includes entries for films made in various EU-15 countries and in the United States, and viewed in Denmark, Finland, France, Italy, the Netherlands, Portugal, Spain and Sweden over the period 1980-2001.

We first investigate the determinants of cultural flows. Results are reported in the two first columns of Table III.5. Data in column (1) come from the UNESCO. The dependent variable is the share of movies imports coming from the main producers (the United States, France, Germany, Russia, Japan, India, Hong-Kong, the United Kingdom and Italy). Regressions use the PPML estimator. The estimated coefficient on distance is relatively close, but slightly lower, than the ones obtained with the BACI database (-0.52, see Table III.2). Furthermore, cultural and historical proximity strongly influences movies imports. The colonial relationship raises the share of bilateral imports by a factor of  $\exp(0.47) = 1.60$ , while sharing a language makes bilateral trade  $\exp(0.68)-1 = 97\%$  larger. Countries like France and the United Kingdom benefit from the links created by historical movements of population, similarity of institutions, close cultural tastes. On average, their movies’ exports to one of their former colonies with which they share a language are three times larger than their exports to a similar country but with which they have neither colonial nor linguistic links.

Column (2) reports the results using the Eurostat-AUVIS database. The dependent variable is the number of entries by movie’s nationality. The distance coefficient is not significant. But this could result from our sample, which mainly includes European countries and the United

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<sup>16</sup> Recent years are available on the web: <http://www.uis.unesco.org/>. Previous years are taken from the statistical yearbooks of UNESCO.

States.

The last four columns study the effect of cultural proximity on overall trade. Imports of cultural goods have been subtracted from overall trade. Columns (3) and (5) include only traditional measures of countries' cultural proximity (common language, colonial links). The samples are restricted respectively to observations for which data on the share of imported movies (column 3) and the cinema entries (column 5) are available. In column (4), we include the share of imported movies as an explanatory variable. In column (6), we add the log of cinema entries. Both coefficients on the share of imported movies and the log of cinema entries are statistically significant and positive, suggesting the existence of a positive effect of cinema imports on overall trade. The magnitude of both coefficients is smaller than the one obtained with the BACI data (Table III.4). This result might be explained by the lower representativeness of the UNESCO and Eurostat data, which do not cover all cultural goods.

Table III.5: Robustness checks (alternative cultural trade data sets)

Dependent variable Source (for the dep. variable) Specification Model	% imported movies UNESCO PPML (1)	Cinema entries Eurostat- AUVIS PPML (2)	Imports <sup>a</sup> BACI PPML (3) (4) (5) (6)				
	Ln distance	-0.42*** (0.06)	-0.06 (0.20)	-0.66*** (0.06)	-0.65*** (0.06)	-0.32** (0.15)	-0.29** (0.12)
	Common border	-0.21 (0.14)	-0.11 (0.27)	0.53*** (0.13)	0.54*** (0.13)	0.34*** (0.11)	0.33*** (0.11)
Common language	0.68*** (0.13)	-0.19 (0.22)	0.18 (0.18)	0.08 (0.17)	0.30 (0.22)	0.28 (0.19)	
Colonial links	0.47*** (0.12)	1.84*** (0.28)	0.05 (0.19)	0.10 (0.19)	0.19 (0.24)	0.14 (0.22)	
Share of imported movies (UNESCO)				0.09*** (0.02)			
Ln cinema entries (Eurostat- AUVIS)						0.09** (0.04)	
No. of obs.	7,418	645	3,205	3,205	451	451	

<sup>a</sup> Imports of cultural goods not included.

Note: Country x time fixed effects in all estimations. Standard errors (country-pair clustered) in parentheses with \*\*\*, \*\* and \* denoting significance at the 1%, 5% and 10% level

## **5. CONCLUSION**

There is considerable concern in the civil society as well as among policy makers with regards to (free) trade in cultural goods and services. We ask here whether there is something special about trade in cultural goods, using various databases and applying modern trade theory to our empirical work.

Using BACI data for the period 1989-2005, covering a wide range of importing and exporting countries, and a number of reproducible cultural goods, we estimate a large set of gravity equations. Beyond the traditional results (negative impact of distance), trade in cultural goods presents some specificity: common language fosters bilateral flows, in particular of books and newspapers. Besides, having had past colonial links reinforces bilateral trade in cultural heritage. Last, the consumption of cultural goods is shown to be addictive. The robustness of these results is tentatively addressed using two alternative data sources (UNESCO and Eurostat-AUVIS) on international exchange of movies. Both databases provide information on the production place of the cultural content and thus get rid of the outsourcing problem present in BACI for trade in cultural goods. Results are overall robust, despite more limited samples.

While trade flows of cultural goods seem overall impacted by the same factors than goods in general, we might however argue that the specificity of cultural trade is to impact deeply values, perceptions, etc. of the importing country, as often stressed out by politicians (and as Maystre et al. (2008) very recently showed). From an economic point of view, an empirical validation of such a hypothesis implies that cultural trade has a facilitating impact on non-cultural trade. This hypothesis is considered empirically here by adding to the traditional measures of cultural proximity (shared language, colonial links, etc.), trade in cultural goods as a proxy for proximity in cultural tastes. Bilateral trade is more important when both countries have close cultural tastes and trade more in cultural goods. The issue of causality between trade in cultural goods and the proximity of tastes remains however an open question left for future research.

## II.A: DEPRECIATION OF THE PAST CONSUMPTION STOCK OF CULTURAL GOODS

The addictive stock of past consumption is defined as follows (Chaloupka 1991):

$$A(t) = \sum_{i=0}^{t-1} (1-\delta)^{t-1-i} C(i),$$

where  $\delta$  is the constant rate of depreciation of the addictive stock over time and  $C(t)$  the consumption in year  $t$ . This equation can be rewritten as:

$$A(t) = \sum_{i=0}^{t-1} C(i)D(i) = t\overline{CD} + t \text{cov}(C(i)D(i)),$$

where  $D(i) = (1-\delta)^{t-1-i}$  and  $\overline{CD}$  is the product of the mean value of  $D$  and the mean consumption. The covariance is assumed to be relatively small and is ignored.

Following Chaloupka (1991), we assume high depreciation rates considering that withdrawal effects shortly disappear after consumption cessation. If rates of depreciation are between 60% and 90%, remaining consumption effects last between 2 and 5 years. By comparison if  $\delta = 20\%$ , remaining consumption effects last more than 20 years. Results are described in Table III.6. In this table, we normalize initial consumption to 1 and consider that the effects persist until remaining consumption represents only 1% of the initial one. Moreover, past consumption stock tends to stabilize after some years. We consider that the stock is stabilized if its variation from one year to another is less than 5%. If  $\delta$  is set to 60%, the stock variation is equal to 4.1% between the third and fourth years. Therefore in such case, the number of years before stabilization is 4. Similarly, if  $\delta = 70\%$ , the stock variation is 1.9% between the third and fourth years and the number of years before stabilization is 4. If  $\delta = 80\%$ , the variation is 3.3% between the second and third years and we conclude that the stock is stabilized after 3 years. In our study, we set  $\delta$  to 0.7.

Table III.6: Depreciation rate and consumption effects

Depreciation rate ( $\delta$ )	0.6	0.7	0.8	0.9
Remaining consumption effects (no. of years) $t = \ln(y) / \ln(1 - \delta)$ with $y$ : remaining consumption ( $y = 0.01$ )	5	3.8	2.9	2
Years of consumption before stock stabilization	4	4	3	2
Coefficient estimate on the stock of past consumption	0.572 (0.037)	0.573 (0.037)	0.574 (0.037)	0.574 (0.037)

Using these depreciation rates, we estimate gravity equations for the aggregate value of cultural goods imports. The stock of past imports is included among explanatory variables. Coefficient estimates on this stock are reported in Table III.6. These estimates are not significantly affected by the value of the depreciation rate. Thus, the choice of a depreciation rate depends essentially on the expected time of influence of past consumption.



## Chapter IV

# The Spatial Distribution of the Cultural Industry in France<sup>1</sup>

The cultural industry has been assuming an important role in the exports' profile of certain countries. Not only the global exchange of cultural products and services has been increasing over time, but also trade in this sector has been increasingly concentrating on some countries. Five countries (U.S.A., United Kingdom, China, Germany and France) are responsible for about 55% of the total trade in the world (Disdier et al., 2009).

These kinds of products and services reveal an identity feature that gathers individuals sharing a common culture. This fact leads some countries to request a specific treatment in the context of international exchanges. A cultural exception clause is claimed by those in order to protect the cultural diversity. Nevertheless, besides any cultural-preserving aspect of the so-called "*exception culturelle*", countries like France have economic reasons to promote this sector of their economy. In 2005 household expenditures on recreation and culture account for 5.2% of the GDP in France. This chapter studies the geographic distribution of

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<sup>1</sup> This chapter is based on Mayer et al. (2007)

the French cultural industry and investigates the effects of its agglomeration on the French exports.

Agglomeration economies have been studied as an important factor for the performance of firms in France (Koenig, 2005; Martin et al., 2008). Benefic effects of accessing markets (consumer market, input market, labor market) and spillovers of knowledge can improve the economic situation of clustered firms.

This study provides a complement to Disdier et al. (2009) which studies the international bilateral trade of cultural goods. It is an attempt to understand the internal spatial structure of the firms in the cultural industry and its implications on the exports. Drawing on the Agglomeration Economies and particularly on the New Economic Geographic theory and disposing on data on the firm level, this study analyses the geographical distribution of the producers of cultural goods and services in France and their spatial interdependencies.

The chapter proceeds as follows. Section 1 describes the agglomeration economies and the New Economic Geographic (NEG) theory. Section 2 presents the distribution of the cultural production in France. Section 3 analyses the characteristics of the industrial concentration and section 4 analyses the exports of cultural firms in France. Finally section 5 concludes.

## **1. AGGLOMERATION ECONOMIES AND NEG**

### *1.1 Agglomeration Economies*

The spatial agglomeration of the economic activities has been vastly studied by the literature<sup>2</sup>. Alfred Marshall (1920) suggested three main sources for these concentrations: the possibility of sharing inputs, the labor market externalities and the spillovers of knowledge.

Assuming scales economies, an upstream firm can offer intermediary goods at a lower price if many downstream firms locate at a same place. Another implicit assumption in this mechanism is the existence of transport costs, otherwise a downstream firm could be isolated

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<sup>2</sup> See Rosenthal and Strange (2004) for a survey of the empiric literature about the agglomeration

and still benefit of the low prices. The combination of these two assumptions is fundamental to the NEG theory.

The agglomeration of economic activities also provides a pool of labor skills which offer a better match between employer and employees. Indeed, more and more specialized workers are available in an industrial cluster than abroad.

The concentration of economic activities promotes interactions between individuals through which information and knowledge can be exchanged. This information externality can operate procuring improvements in many ways (e.g. production, exporting markets) to the clustered firms.

More recently other sources were proposed to complement the abovementioned ones. The availability for consumption offered only by these agglomerations like leisure options (theaters, restaurants), public services and urban amenities defined as structures aesthetically pleasing to current residents of the city (architecture, parks, etc).

Finally, the NEG theory provides further mechanisms that explain economic agglomeration. This theory is detailed in the next section.

While the identification of the potential sources is essential for the comprehension of the concentration of the economic activities, it is important to define the modalities these relations occur. Rosenthal and Strange (2004) classify them in industrial scope, temporal scope and geographic scope.

The industrial scope relates to the reducing effect of the industries' heterogeneity on the benefits of the agglomerations. Indeed, these benefits are optimized if firms belong to the same industry. Firms from different industries have dissimilar inputs, hire employees with specific skills and apply diverse knowledge.

The temporal scope defines the intensity of the relation between agents across time; an interaction made at a certain moment could have persistent effects for some years. Nevertheless, it can also be understood as the accumulation of several interactions along a period of time, as it is usual for the spillovers of knowledge.

The geographic scope characterizes the effects of the spatial distribution on the agglomeration economies as interactions are limited to a geographic location. Alternatively, they are a reducing function of the distance.

## *1.2 The New Economic Geographic Theory*

Building on the traditional theories of international trade, industries' agglomeration is a secondary effect linked to the specialization of the countries according to their comparative advantages resulting from exogenous differences (endowments, technologies). Without these differences, considering a constant return to scale and perfect competition, the economic activity between countries has a symmetric distribution.

Agglomeration economies provide an explanation for the industrial concentration that depends on the assumption of the existence of those economies themselves, the self-referential problem referred in Baldwin et al. (2005 p. 2-1). Instead, the NEG can provide a formal framework from where the industrial concentration is a possible output. The fundamental model of the NEG, the Core-Periphery<sup>3</sup> (CP) model (Krugman 1991) is a good example to illustrate this application.

The intuition of this model is that firms locate close to consumer markets, while the size of this market depends on the number of workers attracted by firms. The latter is essentially justified by the raise of the varieties available, by the raise of factor's price due to firms' agglomeration and by the reduction of the price index because of the decrease of the transaction costs. The increase in the number of consumers raises the local demand attracting new firms within the region. Similar mechanisms can be applied to the relationship between firms in the intermediary goods' market. As initially showed by Venables (1996) the backwards and forward linkages encourage the agglomeration of firms. It brings intermediary good's producers to locate close to the existing demand for these products and final good's producers to locate close to their suppliers, in order to benefit of a large market and reduced costs of transaction.

This self-reinforcing mechanism is based on three main effects. Firstly, monopolistic firms

tend to distribute their production optimizing the market access that provided by their location. Secondly, products are cheaper in the firm's location, since products sold locally do not incorporate trade costs in their prices. Thirdly, firms avoid competition and have a tendency to locate in regions with few competitors. The NEG studies the endogenous determinants of the spatial concentration of the activities. It explains why agents agglomerate in a homogenous space considering its exogenous characteristics. This phenomenon mainly results from a trade-off between agglomeration forces provoked by the two first effects above and dispersion forces caused by the last effect. While the two first effects promote the agglomeration, the third effect induces the dispersion. The balance between these effects is obtained considering the magnitude of the trade costs, being the self-reinforcing mechanism activated when agglomeration effects are higher than the dispersion effect.

As commented in the section 1.1, the assumptions of increasing returns to scale and trade costs are very important for the NEG. Without trade costs the space does not present heterogeneity and the location of agents is indifferent. A downstream firm could locate everywhere without paying for any transport cost. The existence of the increasing returns to scale permit to avoid autarky situations. In the case where the resources are equitable distributed between locations, where the trade costs are zero and where the returns to scale are constant, no trade happens and the economy is in the autarky situation. Because of the constant returns to scale, the spatial concentration does not allow for any gain compensating the transaction costs. Each agent produces to the own consummation. Only the introduction of increasing returns to scale allows to a gain from the agglomeration and permits the exchanges.

Therefore, if trade costs equal zero, dispersion and agglomeration forces are reduced. On the one hand, the competition is not localized, firms located in a region can sell in another region for the same price, and then firms do not need to locate in regions with fewer competitors. On the other hand, firms and consumers do not need to locate closer to the supply market, since prices are the same everywhere. Conversely, if trade costs are very elevated, dispersion and agglomeration effects are higher. Theoretical predictions state that in this case dispersion force is stronger than agglomeration forces. However dispersion force decreases more than agglomeration forces when the trade cost is reduced. Under a certain level of trade cost, the

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<sup>3</sup> Baldwin et al., 2005 provide the derivation of this model.

agglomeration effects are higher than the dispersion effect and henceforth the mechanism of self-reinforced agglomeration is triggered.

There are other types of externalities (non-pecuniary) that are intentionally overlooked by this model. Nevertheless they can still have an important influence. The knowledge spillovers treated in the section 1.1 are externalities that have undoubtedly an impact on the industries agglomeration. Firms can be attracted to regions where competitors are numerous because of the positive effect of these externalities over their productivity. Therefore the impact of the competitors' location is ambiguous: The existence of externalities encourages firms from a same industry to agglomerate while the competition presses the firms to look for less crowded places. The predominance of one effect over the other is an empirical issue.

Because each firm chooses the location that offers the highest profit, a very important determinant of the profit is the possibility of sales a firm can do over all the markets and the costs of production. Several studies show that the latter have less impact on the location choice than the former. Wage costs are rarely essential in this decision. Producers are usually attracted to central regions that assure a good access to the target markets. The market potential of a region  $i$  is defined the sum of the demands in different regions  $j$  weighted by the facility of difficulty of the access to the consumers of each region  $j$  from  $i$ . The attraction of a certain region depends on its intensity of competition. Within regions where the demand is perceived elevated, the number of producers present is generally high, what induce more competition and less profits.

Summing up, the New Economic Geography predicts that the choice of location is positively influenced by the demand size and negatively associated to the production costs and the intensity of local competition (the number of firms is usually applied as an approximation to the latter). Among these different determinants, the perceived demand has a predominant influence in the location choice. Before presenting precise measures of the cultural industries' agglomeration within France, an overview of the geographical distribution of these activities is exposed with maps and statistics.

## 2. DISTRIBUTION OF CULTURAL FIRMS OVER THE FRENCH TERRITORY

In order to investigate the distribution of firms that produce cultural goods and services in France, firm data level from the "*enquêtes annuelles entreprises*" (EAE) are applied. These surveys are made yearly by postal way. Firms that have an industrial activity as core business are surveyed by the "Service des études et des statistiques industrielles" (SESSI) of the French Ministry of Economics, Finance and Industry. Firms that have a service activity as core business are surveyed by the "*Institute National de la Statistique et des Etudes Economiques*" (INSEE). The objective of these surveys is to collect the main data about the structure of the firms and particularly information about the situation of the firms (main activity, juridical category and structure change), employment, investments and total sales. There is a potential bias of selection in the available sample since only firms with more than 20 employees are surveyed for EAE goods and only firms with more than 30 employees or with a total sales superior to 5 millions euros for EAE services.

The data covers different sectors of the French Nomenclature of Activities (NAF 700). The distribution of the observations is exposed in table IV.1 (for the cultural goods production) and in table IV.2 (for the cultural service production). These observations relate the periods 1992 to 2002 for goods and 1996 to 2002 for services.

Table IV.1: Distribution of the observations for the production of cultural goods  
(period 1992 to 2002)

Code NAF 700	Title	Observations
221A	Edition of books	1487
221C	Edition of newspapers	1095
221E	Edition of reviews	2952
221G	Edition audio records	231
221J	Other activities of edition	188
222A	Newspapers printing	275
222C	Other printing	10364
222E	Binding	1039
222G	Activities pre printing	1720
222J	Graphical auxiliary activities	282
Total		19633

Table IV.2: Distribution of the observations for the production of cultural services  
(period 1996 to 2002)

Code NAF 700	Title	Observations
921A	TV movies production	2212
921B	Publicity and institutional movies production	3820
921C	Cinema movies production	3381
921D	Technical services for cinema and TV	2480
921F	Distribution of cinematographic movies	899
921G	Edition and distribution of video	933
921J	Projection of cinematographic movies	1706
922A	Activities of radio	1403
922B	Production of TV programs	925
922C	Diffusion of TV programs	696
922D	Edition of general channels	9
922E	Edition thematic channels	67
922F	Distribution of packs of programs of radio and TV	22
924Z	Agencies of press	1185
Total		19738

The firms' distribution in France is exposed with maps. The first ones are detailed at the regional level (21 regions in France). Then following maps are detailed at the level of one French county (95 "départements" in metropolitan France). Different criteria can be chosen to analyze the concentration (or the dispersion) of the production activities of the cultural goods or services. This study focus on the three elements: the number of firms, the quantity of employees and the total sales.

For each of these maps, the distribution is decomposed in six categories defined as follows:

 : ] 95<sup>th</sup> percentile ; maximum]

 : ] 3<sup>rd</sup> quartile ; 95<sup>th</sup> percentile]

 : ] median ; 3<sup>rd</sup> quartile]

 : ] 1<sup>st</sup> quartile ; median]

 : ] 5<sup>th</sup> percentile ; 1<sup>st</sup> quartile]

 : [minimum ; 5<sup>th</sup> percentile]

The definition of bottom and top bonds of these intervals and the number of observations within each one are function of the observed distribution. The value of these bonds and the number of observations vary for each map. For the clarity sake, these values are not reported. The maps of Table IV.3 give the regional distribution and then the distribution at the county level of the firms which are producers of cultural goods. These correspond to the firms belonging to the sectors NAF 700: 221 and 222 (cf. table 1). In Table IV.4 the cultural service firms are shown (sum of firms belonging to the sectors NAF 700: 921, 922 and 924, cf. table IV.2). These maps are made for the year 2002.

Table IV.3: Distributions at the level of region and county of firms that produce cultural goods (Sectors NAF 700 : 221 and 222)

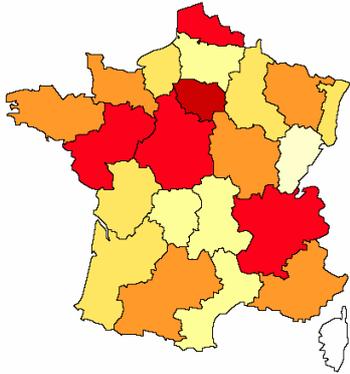
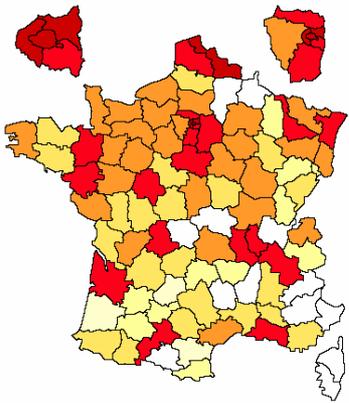
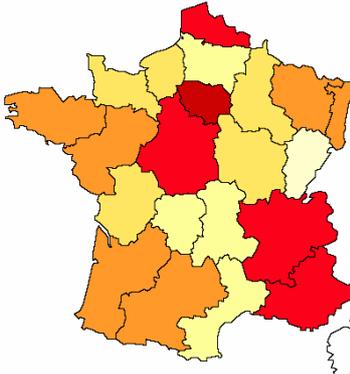
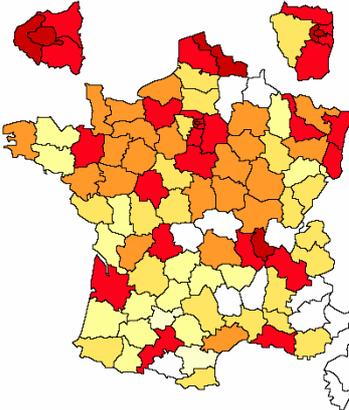
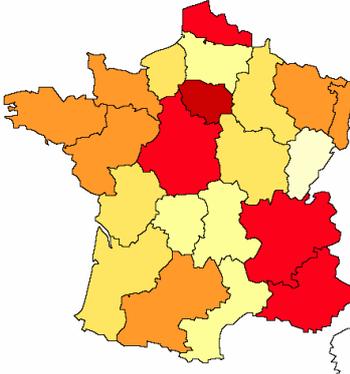
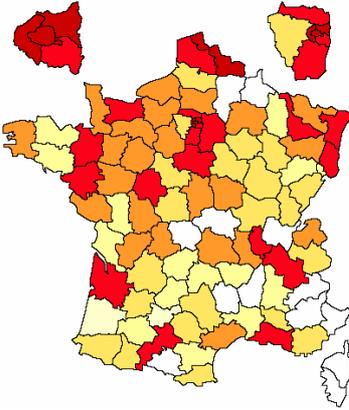
	Distribution at the Region Level	Distribution at the County Level
	Cultural Goods	Cultural Goods
Number of Firms		
Employees		
Total Sales		

Table IV.4: Distributions at the level of region and county of firms that produce cultural services (Sectors NAF 700 : 921, 922 and 924)

	Distribution at the Region Level	Distribution at the County Level
	Cultural Goods	Cultural Goods
Number of Firms		
Employees		
Total Sales		

### *2.1 Regional Distribution:*

Maps with regional detail show that the production of cultural goods is mainly located at Ile-de-France. This result is verified for all criteria (number of firms, employees or total sales). Follow the regions Rhône-Alpes, Centre and Nord-Pas-de-Calais. The region Provence-Alpes-Côte-d'Azur (PACA) also belongs to this second group of regions if one considers the employees or the total sales. The same for the region Loire if one considers the number of firms. At the bottom of the list the regions of Franche-Comté and Corse appear for any criteria.

The observation of the cultural service firms' distribution confirms the domination of the region Ile-de-France over all other regions. The region Rhône-Alpes is still at the top of the list with the region of PACA and Bretagne, while the regions of Nord-Pas-de-Calais and particularly Centre have their attractiveness significantly reduced. It is worth to note the presence in this second group of the regions: Aquitaine, for the number of firms; Alsace, for the employees and Poitou-Charentes, for the total sales

Finally, the attractiveness of the region Franche-Comté seems to improve when cultural services are considered, but the attractiveness of the region Corse is still very weak.

### *2.2 Distribution at the county level:*

Within the region Ile-de-France, the county Yvelines is the county which attract less the firms. Among the other counties of Ile-de-France, the counties Paris and Hauts-de-Seine present the highest level of attractiveness followed by the county Seine-Saint-Denis.

For the other regions than Ile-de-France, the maps point out to a strong attractiveness of

- In the region Nord-Pas-de-Calais the two counties that compose this region: the Nord and the Pas-de-Calais with the predominance of the former,
- In the region Centre, the counties of Loiret et Indre-et-Loire,
- In the region Alsace, the county Bas-Rhin et Haut-Rhin with the predominance of the former if one considers the number of firms,
- In the region Bretagne, the county of Ille-et-Vilaine,

- In the region Pays-de-la-Loire, the county Loire-Atlantique,
- In the region Aquitaine, the county Gironde,
- In the region Midi-Pyrénées, the county Haute-Garonne,
- In the region Rhône-Alpes, the counties Rhône and Isère, followed by Loire,
- In the region PACA, the county Bouches-du-Rhône

Comparing these results to those of cultural services, in the region Ile-de France the county Yvelines attracts more cultural services' firms than those that produce cultural goods, while the attractiveness of the counties Val-d'Oise and Essone is smaller. In the region Nord-Pas-de-Calais the county Nord dominates. At East of France the most attractive counties are Bas-Rhin and Haut-Rhin, followed by Doubs and Moselle. In the region Bretagne the county Morbihan presents a good performance. At the south-west of France, the county Gironde attracts a large number of firms, followed by the county Charente-Maritime. Turning to the east, the county Haute-Garonne keeps its place among the counties which highest concentration of firms.

In the region Rhône-Alpes, the county Loire attracts fewer firms of cultural services than firms of cultural goods while the county Haute-Savoie presents a high attractiveness. Finally, the region PACA presents many attractive counties like the Var, the Bouches-du-Rhône and the Alpes-Maritimes. This attractiveness is extended to the region Languedoc-Roussillon with the counties Gard and Hérault.

### *2.3 Sector Analysis*

This section proceeds to the analysis of the distribution at the sector level of the cultural goods and services. As mentioned in tables IV.1 and IV.2, data is available for 5 sectors (2 for goods and 3 for services). The following maps are drawn at the county level. Table IV.5 regards goods while Table 6 details services.

#### *2.3.1 Cultural Goods*

The analysis by sectors confirms the results of the global analysis. For Ile-de-France the

counties Paris and Hauts-de-Seine have the highest activity. For the rest of France the most attractive counties are the same as above. Therefore, this section focuses on the differences in the distribution at the county level of firms from sectors 221 and 222.

Firstly, the sector 221 has its firms more concentrated than those of the sector 222. The same occurs, less intensively, with employees and total sales.

The differences between these sectors are also noticeable within the region Ile-de-France. Sector 221, differently to sector 222, has a scarce presence in the Val-de-Marne and Essone. This latter result is particularly clear to the maps based on employees and total sales. Outside Ile-de-France, the sector 221 has a large presence in Finistère, unlike the sector 222. Finally, the counties Haute-Garonne, Hérault and Gironde attract firms of the sector 221.

Table IV.5: Distribution at the county level and by sector of firms that produce cultural goods  
(Sectors NAF 700 : 221 and 222)

	Distribution at the county level	
	Goods: Sector NAF 221	Goods: Sector NAF 222
Number of Firms		
Employees		
Total Sales		

### 2.3.2 Cultural Services

The observation of the maps in Table IV.6 shows that the sector 921 is more dispersed in the French territory. Instead, the sectors 922 and 924 are located only in certain counties. This difference is largely explained by the availability of observations for each sectors (see table IV.2). Moreover, Paris and Hauts-de-Seine remain the most active counties, for all sectors.

It seems that cultural services' firms are located in the counties having a great agglomeration. Besides Paris the other counties that are attractive are Bas-Rhin (Strasbourg), Rhône and Isère (Lyon and Grenoble), Bouche-du-Rhône (Marseille), Gironde (Bordeaux), Nord (Lille) and Alpes-Maritimes (Nice). This result is justified by the need of the firms to be located close to their demand. The notion of market potential seems therefore be more important in the location choice of cultural services' firms than cultural goods' firms. One raison for this could be that services are less transportable than goods.

Table IV.6: Distribution at the county level and by sector for cultural services' firms (Sectors NAF 700 : 921, 922 and 924)

	Distribution at the county level		
	Services : sector NAF 921	Services : sector NAF 922	Services : sector NAF 924
Number of Firms			
Employees			
Total Sales			

## 2.4 Time Evolution

The set of maps presented above are related to 2002. This section analyses how the activity of these firms vary in time. The available data covers the period from 1992 to 2002 for cultural goods and the period from 1996 to 2002 for the cultural services. Only the main regions in France are shown: Ile-de-France, Rhône-Alpes, PACA, Nord-Pas-de-Calais, Pays de la Loire and Aquitaine.

Results are reported below for cultural services and goods by sectors. The region Ile-de-France presents a larger activity comparing to all other regions. For the clarity sake, this region is included and excluded of the tables.

Each result's series (variation of the number of firms, variation of employees and variation of total sales) has four graphics as follows:

A	B
C	D

- With
- A: Cultural goods, with Ile-de-France
  - B: Cultural goods, without Ile-de-France.
  - C: Cultural services, with Ile-de-France
  - D: Cultural services, without Ile-de-France

The legend for the graphics is:

 Ile-de-France	 Nord-Pas-de-Calais	 Pays de la Loire
 Aquitaine	 Rhône-Alpes	 Provence-Alpes-Côte d'Azur

Figure IV.1: Variation of the number of firms in the main regions

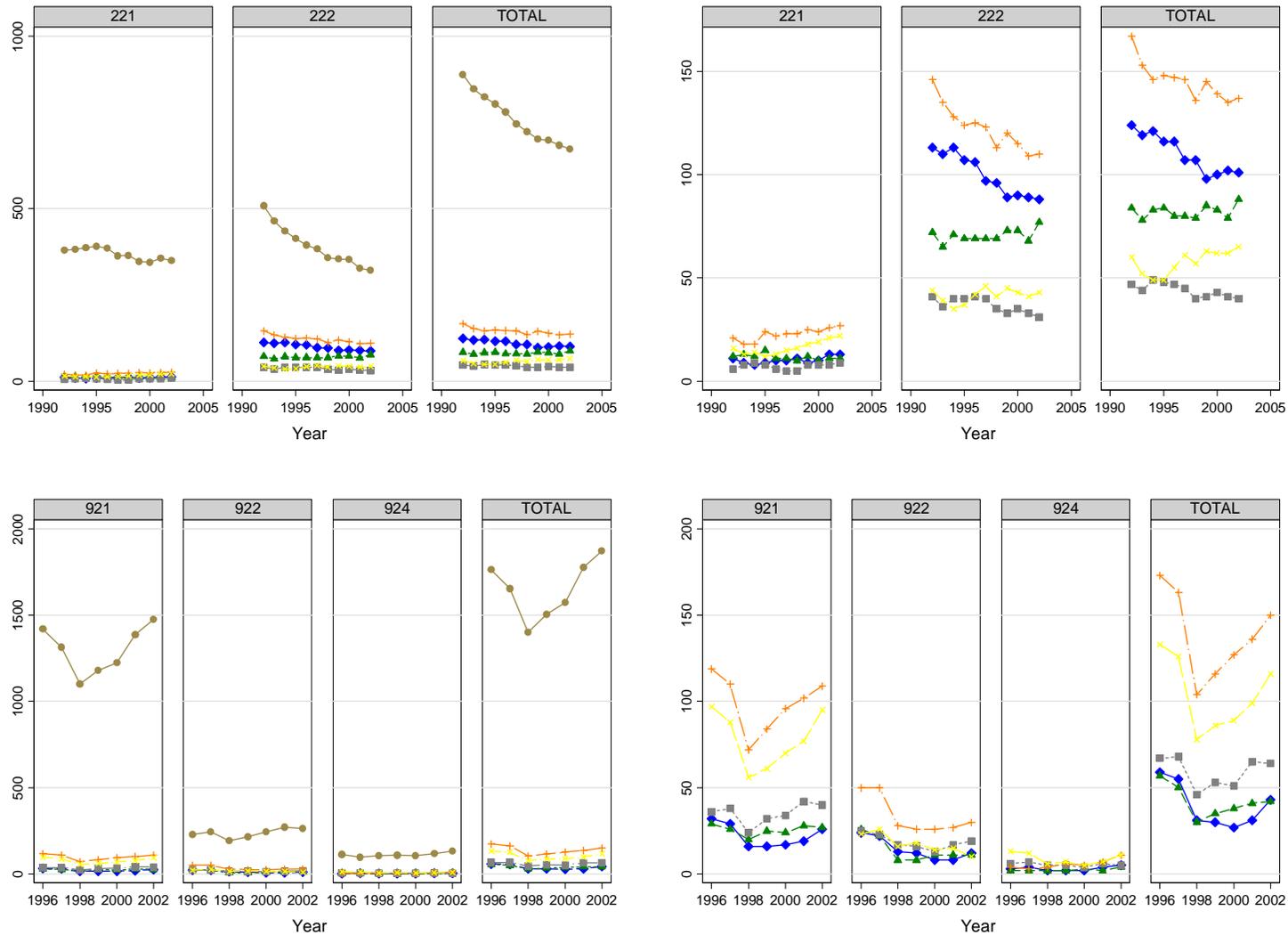


Figure IV.2: Variation of the employees in the main regions

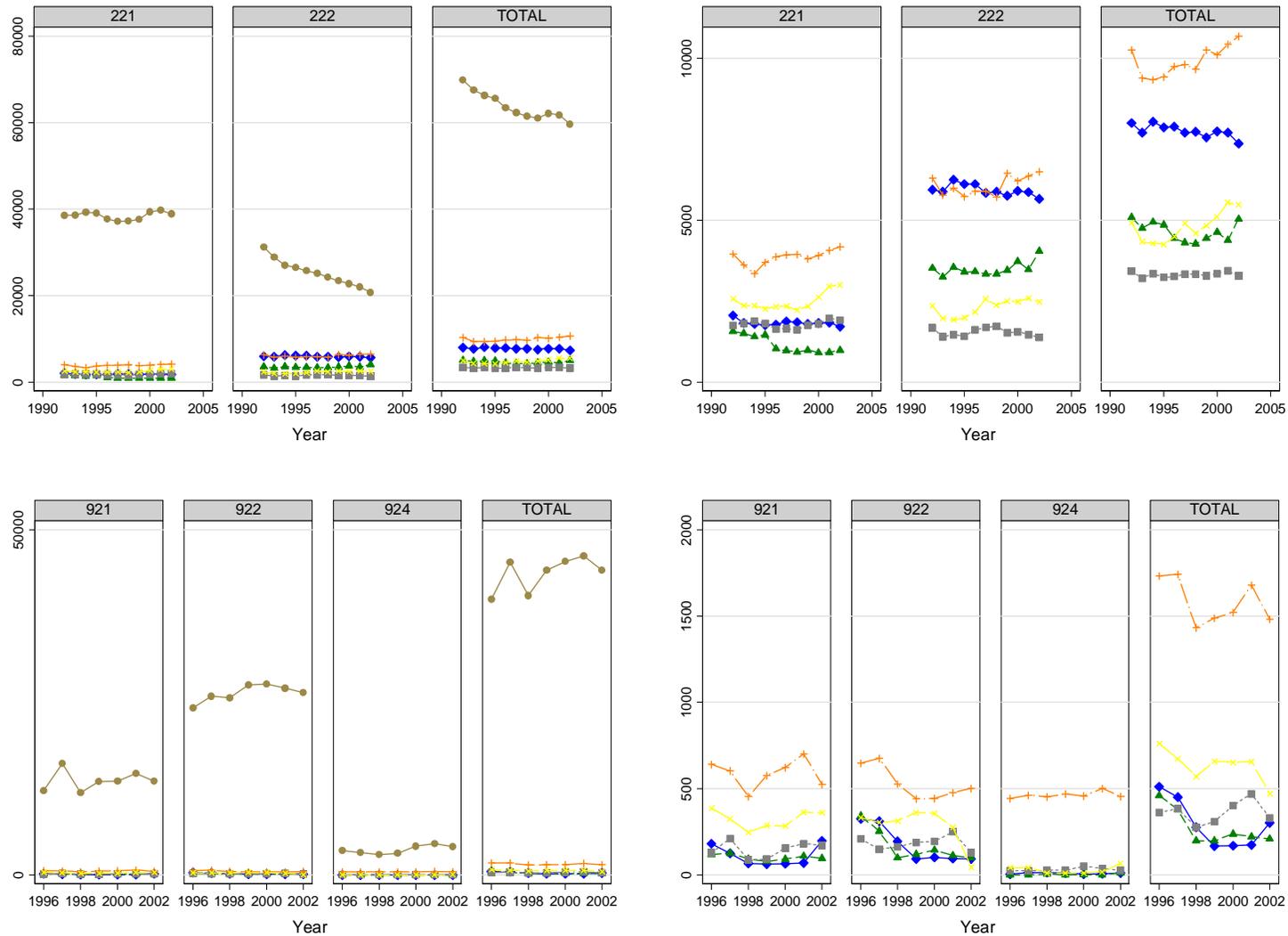
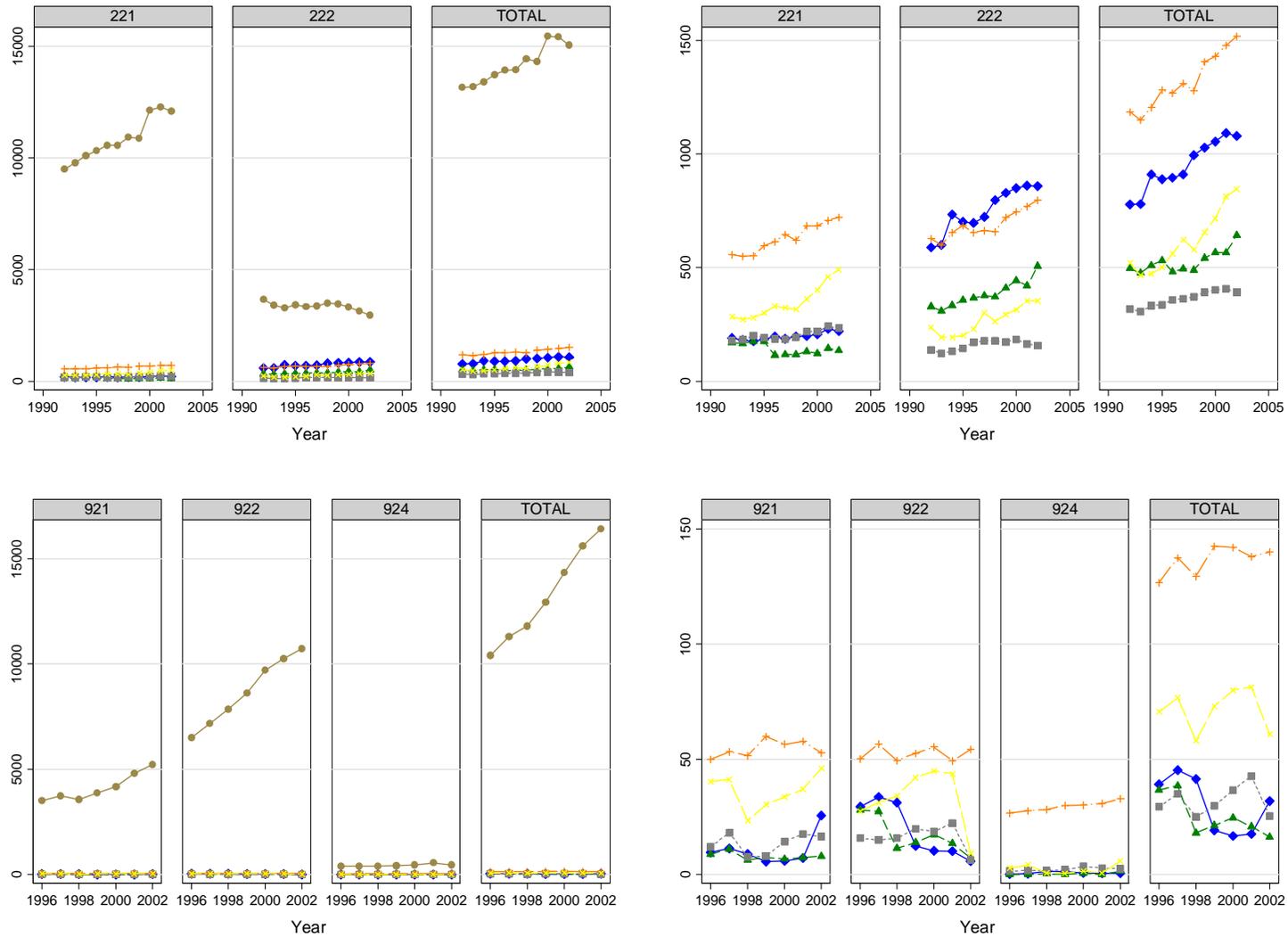


Figure IV.3: Variation of total sales (in Millions €) in the main regions



#### 2.4.1 The evolution of the number of firms

The observations of the figure IV.1 suggest that the number of firms tends to reduce in the sectors of cultural goods and for all regions (except by the region PACA where this number increases since 1995) and to increase since 1998 for the sectors of cultural services.

For the cultural goods, this reduction is due to the sector 222. The number of firms belonging to the sector 221 is relatively stable in Ile-de-France and raise slightly in other regions. For the sectors of cultural services, the increase in the number of firms is mainly due to the sector 921. For the sector 922, the number of firms reduced between 1996 and 1998 and it stabilized afterwards. A small reduction on the number of firms is observed for the sector 924 between 1996 and 1998. After 1998 the number of firms in this sector tends to stabilize.

Ile-de-France concentrates more firms than any other region either for cultural goods or for cultural services. Nonetheless, the order of other regions differs, the (decreasing) order for cultural goods is: Ile-de-France, Rhône-Alpes, Nord-Pas-de-Calais, Pays de la Loire, PACA and Aquitaine. For cultural services, the order is: Ile-de-France, Rhône-Alpes, PACA, Aquitaine, Pays de la Loire and Nord-Pas-de-Calais.

#### 2.4.2 Evolution of the Number of Employees

Certain results obtained for the number of firms are confirmed by the evolution of the number of employees (figure IV.2). On the one hand, the reduction in the number of firms of the sector 222 in Ile-de-France analysed above is followed by a reduction of the employees of this sector in this region. On the other hand, the relative stability of the number of firms in the sector 221 corresponds to the stability of the number of the employees. Conversely, the increase in the number of firms for the region PACA is followed by the increase of employees. However, the reduction in the number of firms of the sector 222 in the region Rhône-Alpes and Aquitaine is not followed by a reduction of employees, the latter even raise in Rhône-Alpes at the end of the period.

For services, the evolution of employees seems to be more uneven. In Ile-de-France there is a raise in 1997 in the sectors 922 and 922, followed by a strong reduction in the latter in 1998. Besides, if the number of employees is increasing between 1998 and 2001, the trendy seems

to invert in 2002 for all three sectors 921, 922 and 924. Regarding other sectors, the number of employees in the cultural services is reduced between 1996 and 1998 (except by Rhône-Alpes where the reduction occurs between 1997 and 1998). This reduction is followed by a slight take over between 1998 and 2001, then a new reduction in 2002 (except by the region Nord-Pas-de-Calais). The number of employees of the sector 924 is relatively stable within the period. Therefore, the variations observed for the aggregated sectors result from the variations of the sectors 921 and 922.

#### 2.4.3 Evolution of the Total Sales

The total sales of the cultural goods' firms progress along the time inversely to the reduction in the number of firms and employees, indicating a concentration of the production on fewer firms or the improvement in the level of productivity. The total sales of cultural services' firms have an erratic evolution.

For cultural goods, the firms of the sector 221 in Ile-de-France and those of the sectors 221 and 222 located out of Ile-de-France have their total sales increased continuously between 1992 and 2002. Only firms of the sector 221 located in Ile-de-France have a reduction in their total sales in this period.

For cultural services, firms located in Ile-de-France have an improvement in their total sales in the sectors 921 and 922 between 1996 and 2002. Yet, the variation and magnitude of the total sales for the sector 924 is extremely small. For other regions, the evolution of the total sales for the firms of the sectors 921 and 922 seems very irregular. For the sector 924, only the total sales of the region Rhône-Alpes seem significant and increase slightly in the period.

These observations suggest that the activities of the sectors of cultural goods and cultural services are unequally distributed in the French territory. However, this kind of observation remains relatively vague. Next section analyses more precisely the relative degree of spatial agglomeration of these sectors.

### 3. CHARACTERISTICS OF FIRMS' CONCENTRATION

The importance of the geographic agglomeration of industrial activities in is largely recognized: the production of goods and services is unequally distributed between countries or even within the countries. These unbalances are source of disparity in the territories' relative wealth and in the welfare of the residents.

Different indicators that permit to precisely measure the spatial concentration of sectors are suggested in the literature. Before detailing these indicators, it is worth to differentiate the geographical concentration of a sector (which is a measure of an activity's distribution between different regions) and the specialization of a region (which is the measure of the activities' distribution within a region, as described in the section 1.1). In this study only the indicators of concentration are considered.

Duranton and Overman (2005) mentioned five criteria for an indicator of concentration:

- Be comparable between sectors
- Take into account the general level of concentration of the economy (a reference standard to be compared to each sector of the economy)
- Take into account the number of firms in the sector and the number of possible localizations
- Be invariant with the choice of geographical unit
- Present a measure of statistical confidence (deviation to the standard)

Two main indicators are used by the literature: The Gini index and the index developed by Ellison and Glaeser (1997). These indexes can be applied to measure the spatial concentration of a given activity (employment, production, etc.). For this study, this index is applied to the three measures used before: the number of firms, the number of employees and the total sales.

#### 3.1 Gini Index

This index compares the activity's distribution of a sector among regions to the total

distribution of all sectors among regions. This index measures the inequality in the distribution of a sector's activity relatively to the total activity in the territory.

The Gini Index varies between 0 and 1. More the value of this index is elevated, more the inequalities between regions are important. An index equal to 0 means the perfect equality (all regions have the same activity's share) and an index equal to 1 means the perfect inequality (the whole activity is concentrated in one region).

The Gini Index presents the advantage of being comparable between sectors and takes into account the general level of concentration of the economy. Nevertheless, as mentioned by Ellison and Glaeser (1997), this index suffers from a size problem. If the sector has a small number of business units and a large number of locations, the Gini Index is necessarily elevated in the absence of any force.

### *3.2 The Index Ellison and Glaeser*

Addressing this issue, Ellison and Glaeser (1997) recommend a new measure of concentration. These authors suggest comparing the geographical concentration degree observed in a given sector to those that would be obtained if the same business units of these sectors were located in a random way. Therefore, the reference is not anymore the uniform distribution or the total activity's distribution, but the value of the index when the business units are randomly distributed. The difference between the Gini index and the index of Ellison and Glaeser is that the latter explicitly recognize the existence of a limited number of business units. This fact limits a certain part of the activity to locate in the same places, what influences the spatial concentration of the sector but not necessarily reflects the action of an agglomeration force.

If the distribution of the business units is random and independent, this index is equal to 0. Nevertheless, if the spatial concentration of the business units is bigger than those expected when they are randomly and independently distributed, then the index is bigger than 0. This index can assume negative values if the business units are less concentrated than if they locate by a random processes. Most of the empirical studies show nonetheless that the economic activities studied are more present a positive index.

If the Ellison Glaeser Index presents some advancements comparing to the Gini Index, it suffers however from a sensitiveness issue according to the geographical scale. The calculation of the Ellison Glaeser Index considers the business units allocated into boxes (countries, regions, etc.). If one considers these boxes like independent entities and does not consider the possible geographical proximity, the Ellison and Glaeser index (like the Gini Index) will underestimate the agglomeration degree of the activities. However, this index remains the most satisfactory for measuring activities' concentration.

### *3.3 Values of the Indexes*

Tables IV.7 and IV.8 show results of the indexes of Gini and Ellison and Glaeser by activity sectors for the firms of the cultural industry.

Table IV.7: Geographical Concentration of French Firms that produce Cultural Goods.

Indexes Gini and Ellison and Glaeser

Cultural Goods		Gini Index			Ellison & Glaeser Index		
		1992	1996	2002	1992	1996	2002
Number of Firms	Sector 221	0,76	0,75	0,74	0,28	0,26	0,22
	Sector 222	0,57	0,51	0,49	0,02	0,02	0,01
Employees	Sector 221	0,76	0,78	0,79	0,18	0,18	0,17
	Sector 222	0,61	0,57	0,55	0,02	0,02	0,02
Total Sales	Sector 221	0,86	0,87	0,88	0,35	0,36	0,32
	Sector 222	0,65	0,61	0,58	0,03	0,02	0,02

Table IV.8: Geographical Concentration of French Firms that Produce Cultural Services.

Indexes Gini and Ellison and Glaeser

Cultural Services		Gini Index		Ellison & Glaeser Index	
		1996	2002	1996	2002
Number of Firms	Sector 921	0,80	0,79	0,25	0,25
	Sector 922	0,62	0,71	0,08	0,17
	Sector 924	0,65	0,67	0,21	0,20
Employees	Sector 921	0,87	0,88	0,27	0,28
	Sector 922	0,94	0,95	0,59	0,46
	Sector 924	0,93	0,93	0,51	0,48
Total Sales	Sector 921	0,94	0,95	0,41	0,38
	Sector 922	0,97	0,97	0,72	0,46
	Sector 924	0,95	0,94	0,58	0,54

Results show that the French firms that produce cultural goods and cultural services locate close to each other. The comparison of the two tables also point out that cultural services' firms are more agglomerated than those producing cultural goods. The coefficients of the Table IV.8 are most of the time larger than those of the Table IV.7.

Focusing on the sectors of cultural goods (Table IV.7), the sector 222 is more dispersed than the sector 221, for any modality (number of firms, employees or total sales). Moreover, the indexes of Gini and Ellison and Glaeser based on the number of firms and employees are smaller than those obtained for the total sales. Besides, while Gini Index presents coefficients for the number of firms and employees very close to the Ellison and Glaeser index, the

former are larger than the latter. Analyzing the time variation, the sector 222 presents a tendency to disperse when the Gini Index is considered. The coefficients obtained for the Ellison Glaeser Index for this sector are though very stables. For the sector 221, the time variations remain reduced in the period from 1992 to 2002.

Results for cultural services' firms indicate that the sector 921 is the most concentrated considering the number of firms. However, for the number of employees and total sales, the sectors 922 and 924 are more agglomerated. Besides, the values obtained for the Gini Index are frequently extremely elevated and relatively close to 1, what suggest that the distribution of cultural services' firm in France is strongly unequal. Between 1996 and 2002 this uniqueness does not seem to vary according to the Gini Index, and even the Ellison and Glaeser Index show a reduction for these coefficients, particularly for those of total sales.

## **4. INTERNATIONALIZATION OF THE FRENCH CULTURAL FIRMS**

### *4.1 Geographical Distribution of the Exports and Concentration Indexes*

The internationalization of the firms is frequently considered like an advantage for the economy dynamism. This section investigates the exports of the French cultural firms. Table IV.9 reports the exports distribution at the county level of the firms of cultural goods and cultural services. As mentioned before, Ile-de-France (mainly Paris and Hauts-de-Seine, and Seine-Saint-Denis for services) concentrates a large number of exporters.

Among other performing location, one can find for cultural goods the counties Nord and Haut-Rhin, and with less performance, Bas-Rhin, Moselle, Vosges, Rhône, Isère, Haute-Savoie, Seine-et-Marne, Loiret, Aube, Eure, Nièvre, Loire-Atlantique, Charente, Haute-Vienne and Bouches-du-Rhône. Cultural goods' exporters seem to locate on the Parisian basin and on the East of France.

To compare, the cultural services' exporters are more located on the South-West and on the South-East of France. Particularly on the counties Gironde, des Pyrénées-Atlantiques, Haute-Garonne, Hérault, Bouches-du-Rhône, Var, Alpes-Maritimes and Haute-Corse

Table IV.9: Distribution at the county Level of the Cultural Exporters (Sectors NAF 700: 221 and 222 for Goods and 921, 922 and 924 for Services)

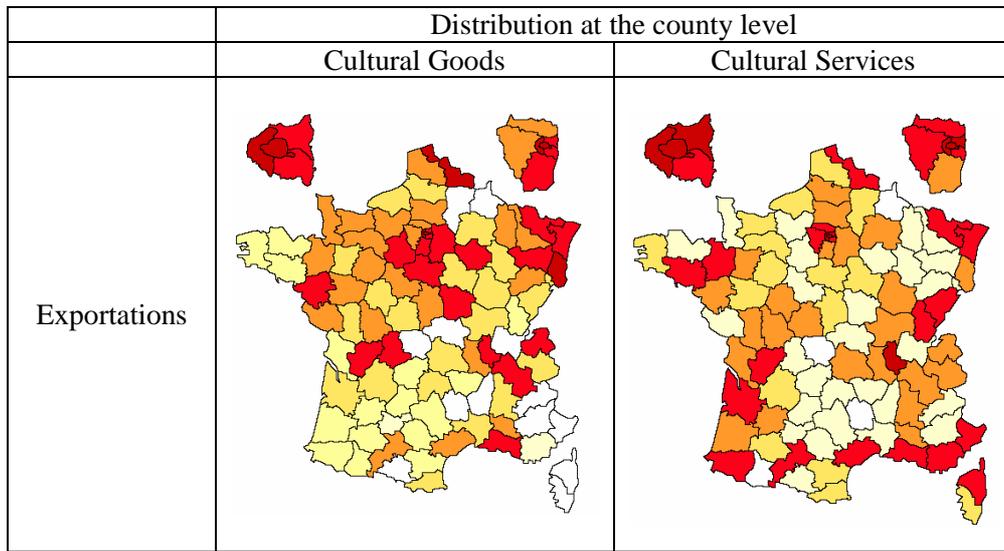
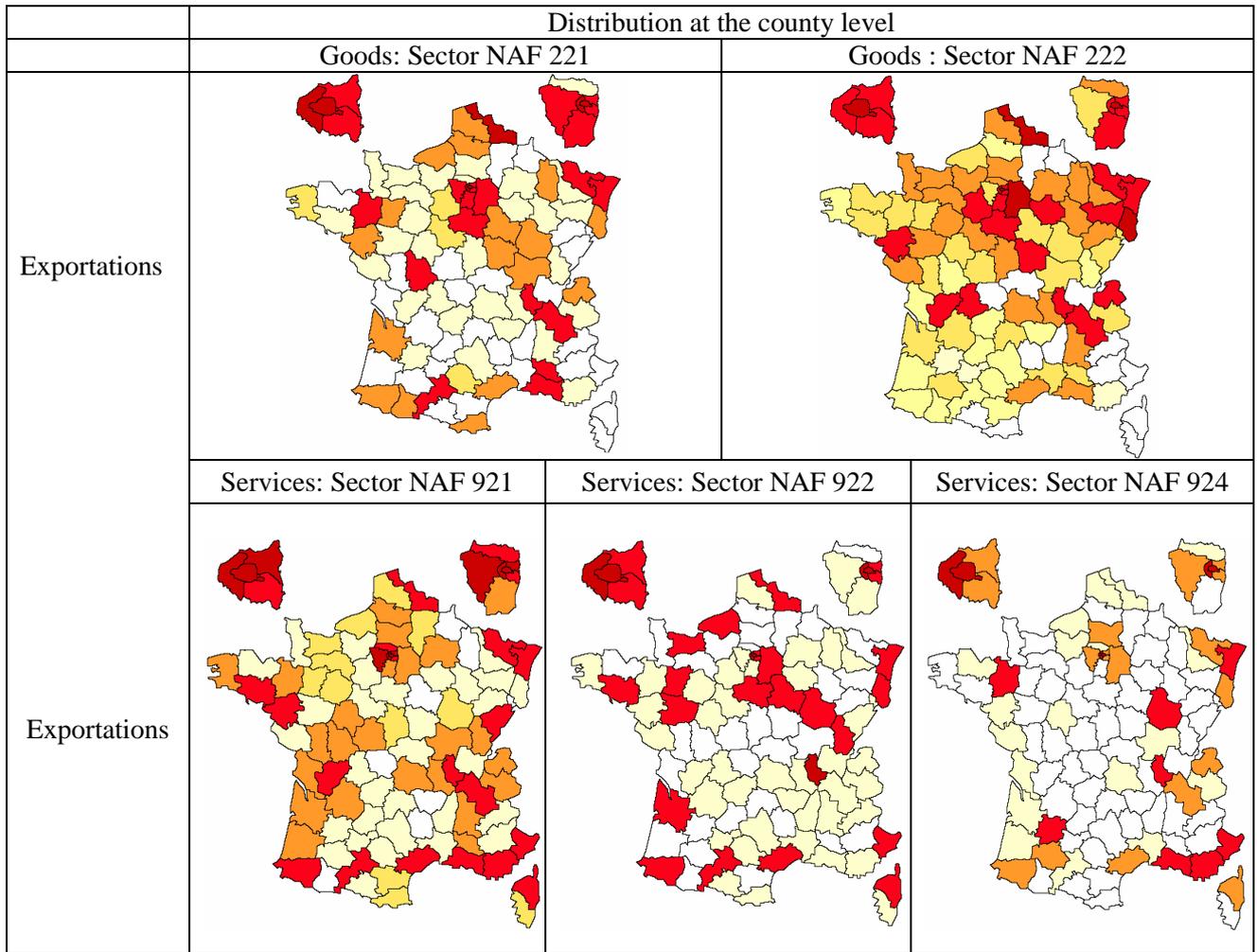


Table IV.10: Distribution at the county Level and by Sector of Cultural Exporters



The observation of the distribution by county level and by sector confirms the importance of the Parisian agglomeration (Paris, Val-de-Marne, Seine-Saint-Denis and Hauts-de-Seine) for the firm's location, for any sector. Nonetheless the sectors concentrate differently, while the sector 222 is relatively dispersed over the counties, exporters of the sectors 922 and 924 are concentrated in only few counties. In other words, for these two sectors, the intermediary classes of the distribution have a very limited number of observations. These results are confirmed by the indexes Gini and Ellison and Glaeser (Table 11). The sector 222 presents the smallest coefficients. Besides, the value of the Gini Index for this sector is slightly reduced between 1992 and 2002. Nonetheless, other sectors and particularly for service sectors, present a Gini Index very stable and close to 1.

Table IV.11: Geographical Concentration of French Exporters of Cultural Goods or Cultural Services. Indexes Gini and Ellison and Glaeser

	Gini Index			Ellison & Glaeser Index		
	1992	1996	2002	1992	1996	2002
Cultural Goods - Exportations						
Sector 221	0,96	0,96	0,95	0,54	0,55	0,43
Sector 222	0,81	0,79	0,77	0,03	0,04	0,04
Cultural Services - Exportations	1996	2002		1996	2002	
Sector 921	0,97	0,97		0,39	0,39	
Sector 922	0,98	0,98		0,34	0,74	
Sector 924	0,97	0,97		0,61	0,67	

Finally, figure IV.4 present the time evolution of exportation. As before, firms are distinguished between those producing cultural goods and those producing cultural service. Results are reported with and without the region Ile-de-France. The graphics are organized as follows:

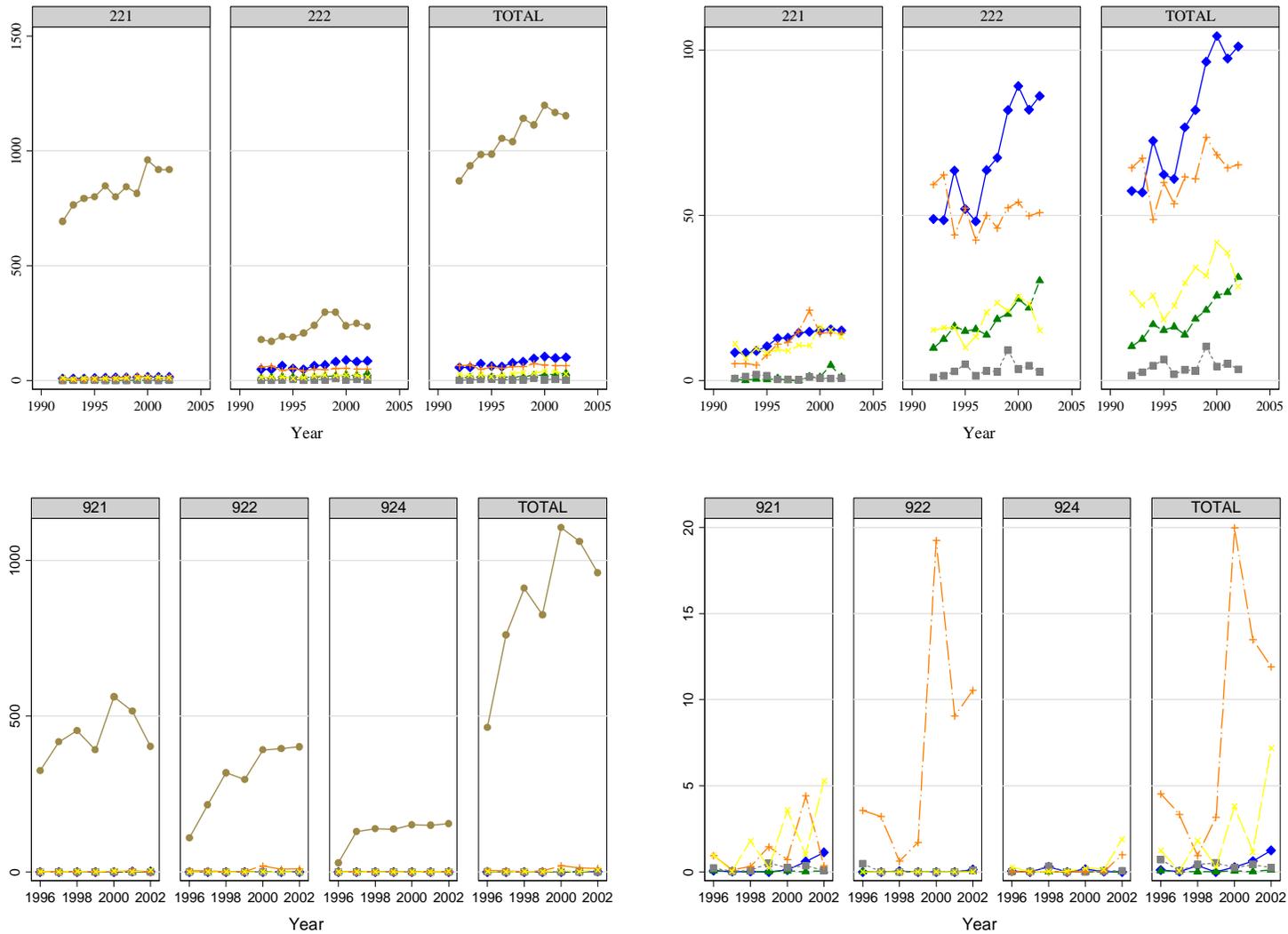
A	B
C	D

- With
- A: Cultural goods, with Ile-de-France
  - B: Cultural goods, without Ile-de-France.
  - C: Cultural services, with Ile-de-France
  - D: Cultural services, without Ile-de-France

The legend for the graphics is:

 Ile-de-France	 Nord-Pas-de-Calais	 Pays de la Loire
 Aquitaine	 Rhône-Alpes	 Provence-Alpes-Côte d'Azur

Figure IV.4: Variation of exports (millions €) in the main regions.



Regarding exporters of the sector 221 located in Ile-de-France, their exportations increase till 2000 with a strong rising between 1999 and 2000. In 2001, these exports slightly fall and then get stable in 2002. For the exporters of the sector 222, the growth of these flows stops in 1999. Since 2000, the exports of this sector are stable. For the other regions (and differently to Ile-de-France), the exports of firms from the sector 222 are clearly higher than those of the sector 221. Besides, there is a general rising trend to both sectors 221 and 222. This trend is particularly strong for the firms of the sector 222 located in the Nord-Pas-de-Calais.

The exports of cultural services provided by firms located in Ile-de-France increase in the sectors 921 between 1996 and 2000 (except by 1999), and they fall in 2001 and 2002. While in the sector 922 the evolution of exports is relatively similar to those of the sector 921 till 2000, in 2001 and in 2002 there is a divergence. Finally, exports of the sector 924 the exports strongly increase between 1996 and 1997 and they maintain a reduced growth afterwards. Among the regions, just two of them present significant exports (the region PACA in the sector 921 and the region Rhône-Alpes in the sectors 921 and 922) but with very erratic evolutions, particularly to the region Rhône-Alpes in the sector 921.

Before proceeding to the econometric estimations of the determinants of exported amounts, it is worth to present some graphics made by sector that: i) Relate the exports to the index Ellison and Glaeser (calculated from the exports) and ii) Relate the ratio between exports and total sales to the index Ellison and Glaeser (calculates from exports).

The graphics are organised as follows:

A	B
C	D

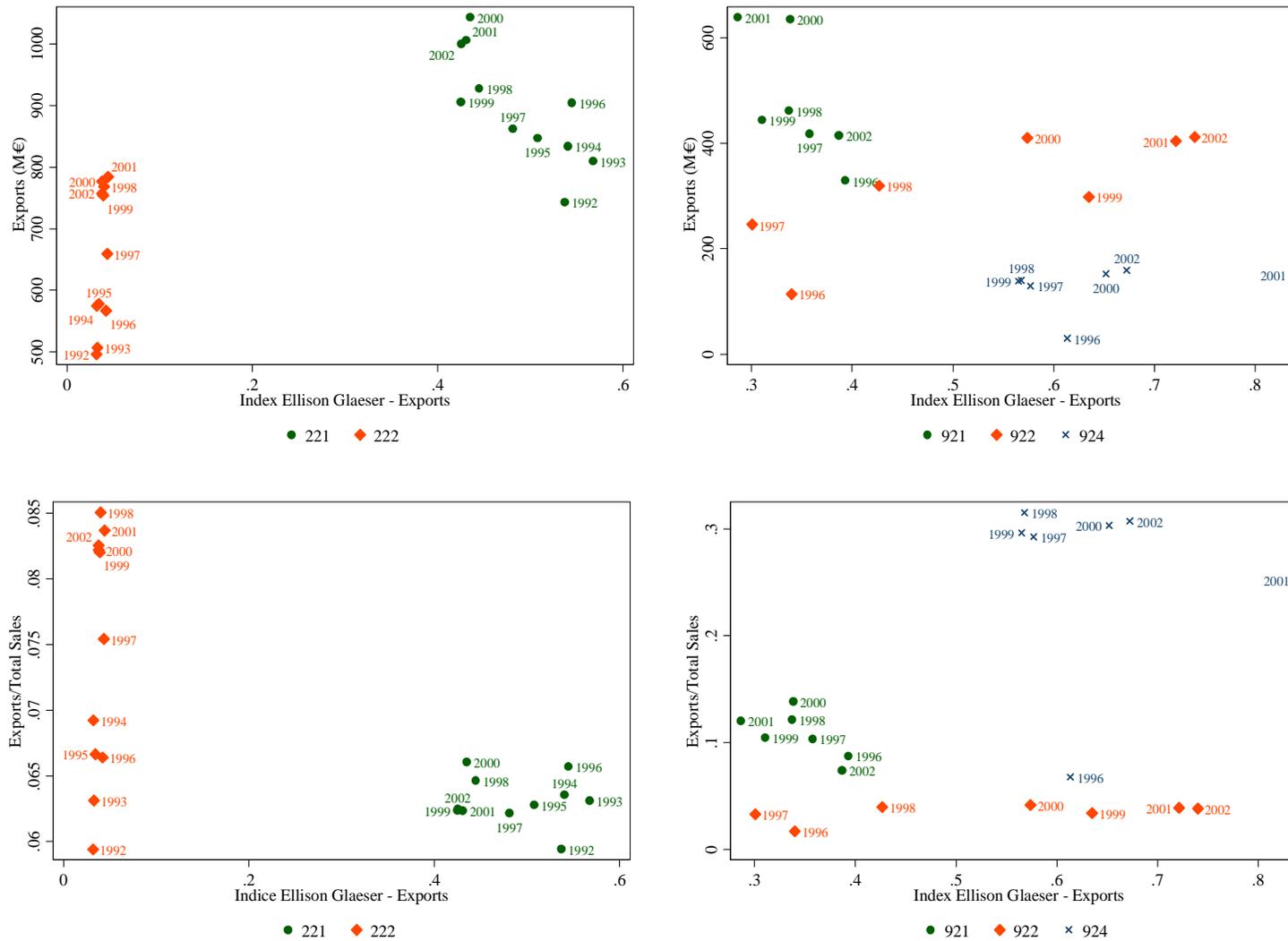
With A: Exports vs. Index Ellison and Glaeser, cultural goods

B: Exports vs. Index Ellison and Glaeser, cultural services

C: Ratio between exports and total sales vs. Index Ellison and Glaeser, cultural goods

D: Ratio between exports and total sales vs. Index Ellison and Glaeser, cultural services

Figure IV.5: Exportations and Ellison and Glaeser index, by sector



These graphics provide an overview of the distribution of exports according to the index Ellison Glaeser. It is not possible to infer direct effects of neighborhood from these aggregated data and concentration indexes. Next section proceeds to econometric estimations addressing neighborhood effects.

Three main distributions are observed from these graphics. These regimes are similar for exports and for the ratios between exports and total trade. Firstly, the general level of exports raises over time for a constant value of concentration, this is the case of the sector 222. Secondly, the level of exports increases over time while the index of concentration decreases over time; this is the case of sectors 221 and 921. Finally, the level of exports remains constant over time but the index of concentration increases over time, this is the case of sectors 922 and 924.

Furthermore, cultural services present a more dispersed configuration comparing to cultural goods. The ratio between exports and total sales is quite different for the cultural goods and cultural services: for goods the ratio is between 6% and 8.5%, while for services this ratio reaches 30% for the sector of press agencies.

#### *4.2 Neighborhood Estimations and the Determinants of the Exports*

This last section investigates the determinants of the exports of French cultural firms. The yearly firms' surveys (enquêtes annuelles entreprises – EAE) supply the total exported amount by year from each firm. Unfortunately these data are not bilateral and information about the country of destination is not available. Nevertheless, the EAE data provides information about the county's (county) location of each firm.

This analysis addresses the question of the existence of driving effects between counties for the exports. In other words, will a county export more whether, besides certain characteristics specific to its firms (as the total sales), this county counts on numerous firms specialized in cultural sectors and it shares common borders with other counties with dynamic exports. The amount exported by each county  $i$  is explained by the amount exported by neighbor counties, the number of cultural firms in the county  $i$  and by their total sales (minus the exports). Estimations are reported in Table IV.12 (cultural goods) and IV.13

(cultural services). As discussed in the other chapters, two estimators are used: ordinary least squares (OLS) and Poisson pseudo maximum likelihood (PPML). Inversely to the last section, the econometric estimations permit to directly evaluate the neighborhood effects on the firms' exports. Particularly, these levels of neighbor exports can vary for a given concentration at the country level.

For cultural goods (Table IV.12), the results of the estimations indicate that the exports of the counties are positively and significantly influenced by the exports of neighbor counties. The estimated coefficient is indeed positive and significant in all estimations, excepted by the one based on the OLS estimator with fixed effects. Nonetheless, the fixed effects specification presents a significant coefficient with the estimator PPML (column 4). Regression (5) introduces the number of cultural firms located in each county and the coefficient is strongly reduced, but still significant. The value obtained for the coefficient of this variable "number of firms" is also positive and significant. These two results: (i) positive and significant influence of the amounts exported by neighbor counties and (ii) positive effect of the number of firms in the considered county suggest the existence of positive externalities between the firms on the one hand, in the same county, and on the other hand, in neighbor counties. The agglomeration of firms, besides the implied competition, seems to promote the diffusion of the externalities about the opportunities of sales in other countries, about the comprehension of the international markets, about the preferences of foreigner consumers. The variable for the total sales (minus exports) of firms located in the considered county is introduced in regression (6). This variable impacts positively and significantly the exports. Column (7) includes at the same time the three variables (the exports in the neighbor counties, the number of firms and the total sales minus exports). The estimated coefficients for each of these variables are lower than those obtained in the columns (5) and (6) but they are still positive and significant at the 99% level. Finally, the last column verifies if these results are not driven by the very centralizing effect of Paris. The estimation indicates, inversely, that the coefficients are even higher than those obtained in the regression (7).

Table IV.12: Determinants of the Exports of Cultural Goods

Dependent variable Model	Ln (Exports)		Exports					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Specification	OLS	Fixed Effects	PPML	PPML	PPML	PPML	PPML	PPML Without Paris
Ln Export Neig.	0.373*** (0.016)	0.231*** (0.022)	0.797*** (0.005)	0.945*** (0.014)	0.286*** (0.020)	0.449*** (0.018)	0.287*** (0.021)	0.345*** (0.023)
Ln Number of Firms					1.009*** (0.025)		0.602*** (0.041)	0.972*** (0.049)
Ln Total Sales <sup>1</sup>						0.752*** (0.020)	0.386*** (0.031)	0.410*** (0.033)
Constant	0.108** (0.044)	-0.458*** (0.152)	-0.441*** (0.023)	-2.902*** (0.203)	-2.410*** (0.203)	-3.999*** (0.208)	-3.127*** (0.213)	-3.736*** (0.219)
Time Fixed Effects	No	Yes	No	Yes	Yes	Yes	Yes	Yes
County Fixed Effects	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Sector Fixed Effects	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Observations	1754	1754	1754	1754	1754	1754	1754	1732
R <sup>2</sup>	0.243	0.779						
Pseudo R <sup>2</sup>			0.370	0.900	0.930	0.930	0.930	0.850

Note: Robust pair-clustered standard errors in parentheses with \*, \*\* and \*\*\* respectively denoting significance at the 1%, 5% and 10% levels. <sup>1</sup> without exports

Table IV.13: Determinants of the Exports of Cultural Services

Dependent variable Model	Ln (Exports)		Exports					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Specification	OLS	Fixed Effects	PPML	PPML	PPML	PPML	PPML	PPML Without Paris
Ln Export Neig. counties	0.094*** (0.006)	-0.011* (0.006)	0.470*** (0.005)	-0.433*** (0.016)	-0.366*** (0.017)	-0.382*** (0.016)	-0.293*** (0.016)	0.057** (0.024)
Ln Number of Firms					0.777*** (0.083)		1.264*** (0.080)	0.454*** (0.112)
Ln Total Sales <sup>1</sup>						0.914*** (0.035)	1.070*** (0.037)	1.344*** (0.055)
Constant	0,532*** (0,029)	0,064 (0,141)	1,179*** (0,023)	-6,843 (6,870)	-8,001 (6,871)	-7,114 (6,870)	-9,253 (6,871)	-7,347 (6,873)
Time Fixed Effects	No	Yes	No	Yes	Yes	Yes	Yes	Yes
County Fixed Effects	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Sector Fixed Effects	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Observations	1344	1344	1344	1344	1344	1344	1344	1323
R <sup>2</sup>	0.167	0.797						
Pseudo R <sup>2</sup>			0.430	0.920	0.930	0.940	0.950	0.950

Note: Robust pair-clustered standard errors in parentheses with \*, \*\* and \*\*\* respectively denoting significance at the 1%, 5% and 10% levels. <sup>1</sup> without exports

Table IV.13 reports econometric results for cultural services exports. Several differences are

worth to note: The exports of neighbor counties have a negative and significant impact on the considered county. The variables "Number of Firms" and "Total Sales" keep their positive and significant influence, while the estimated coefficients for the total sales is now higher than that estimated for the number of firms. When these variables are introduced at the same time in regression (7), the estimated coefficient for the number of firms is again higher than that of the total sales, but the difference between them is clearly lower than the one observed for the cultural goods. Finally, the exclusion of Paris impacts strongly the estimations and suggest that the results of the previous regressions were in a large part influenced by this county: indeed, after eliminating Paris, the estimated coefficient for the exports of neighbor counties become positive and significant at the 99% level, even if its value is clearly lower than the one observed for the cultural goods (Table IV.12). One explanation for this fact is the very high concentration of services in the main regions as one can verify in tables IV.10 and IV.11. Extreme concentrations may indicate neighborhood effects within the county, but not between counties.

## **5. CONCLUSION**

This analysis allowed for four main results.

The domination of the region Ile-de-France in the location of firms of cultural goods and services. Among the counties of this region, Paris and Hauts-de-Seine dominate the production

The firms that produce cultural services are more located in the counties that have a large agglomeration, comparing to the firms belonging to the sectors of cultural goods

Results indicate that French cultural firms are located close one to other. The firms that produce cultural services are more agglomerated than those that produce goods.

Finally, the estimations suggest that the amount exported by counties is positively influenced by the number of firms located in this county and by their total sales. For the cultural goods, it is besides positively and significantly influenced by the exports of the neighbor counties. For the cultural services, the latter result is only verified when Paris is excluded of the estimations.

These conclusions confirm those obtained by Greffe et al. (2006). In their study, the authors mention the importance of the region Ile-de-France and they found that this region is the "locomotive of the cultural sector". They also conclude that the surviving of the cultural firms depend on the geographical agglomeration.



## **General Conclusion**

This thesis discusses the influence of socio-cultural ties between countries on trade relations. Increasing literature has elaborated on studies of classic trade determinants to include the role of social or cultural factors on international exchanges. These factors provide advantaged channels through which trade costs are reduced and bilateral preferences are increased. This study focuses on two factors in order to investigate socio-cultural bonds in a context of international trade: migration and cultural proximity.

The first chapter proposes a novel approach to the study of migration's impact on trade. Building on a gravity model with heterogeneous firms, this study proceeds to estimate the cross-sector impact of migration on trade for Switzerland from 1995 to 2000. As a result of comparing costs and preferences elasticities of trade with empirical results, this chapter determines that migration influences impact costs and preferences according to the degree of the products' differentiation. These findings on the preferences' channel demonstrate that differentiated products can be distinguished and identified by their place of origin. Considering the costs' channel, it is important to take into account that differentiated products require specific knowledge that is frequently unavailable or unknown to migrants. In addition, homogenous products are usually traded through organized exchanges, leaving a small margin for participation for migrant businesses. Finally, this chapter concludes that the composition of sectors primarily determines the impact of migration on trade.

The second chapter focuses on the effects of migration networks on trade. From an alternative perspective, studies have examined how social networks and sociological concepts influence economics. The impact of immigrant networks on trade can be identified through their tacit contracts within the community, and the provision of market information. These arguments imply that there are interdependencies between immigrants in the host country that can be potentially influenced by compatriots in neighboring regions. The composition of immigrants living in French counties derived from a theoretical model is influenced by existing and potential interactions they have with compatriots in the neighboring counties. Applying data at French county level for 1968, 1975, 1982, 1990 and 1999, estimations show that this particular type of social interactions explains significantly the composition of immigrants in French counties. This finding attests to the existence of social interactions between immigrants. Furthermore, this study demonstrates that this measure of social interaction influences the international trade of a given region more robustly than previous papers.

The third and fourth chapters introduce the study of cultural exchanges with respect to cultural proximity between countries. The third chapter investigates the determinants of cultural trade and the extent to which this kind of trade impacts total trade. The sample studied covers 239 countries in the period between 1989 and 2005. This study presents the advantage of extensively examining the coverage in countries in terms of years and the variation over time unlike variables as colonial links or genetic distance. Certain aspects of cultural trade are confirmed in this study, such as the importance of having a common language in the trade of books and newspapers. However, the main finding of the chapter is the confirmation that countries with close cultural ties have more intense bilateral exchanges.

The fourth chapter applies data at firm level and analyses the spatial distribution of the cultural industry in France and its implications on the country's exports. The high prevalence of this industry is demonstrated through the use of maps and indexes of concentration like the Gini index and the index developed by Ellison and Glaeser (1997). Not surprisingly, data shows a large predominance of the region Ile-de-France and particularly the counties Paris and Hauts-de-Seine. Econometric estimations confirm that the geographic placement of cultural firms in France reflects interdependencies between firms fostering their exports. The export volume of firms in a county is significantly influenced by the exports of those located in the neighbor counties.

This thesis clarifies the role of socio-cultural connections between countries on trade and considers social networks and cultural proximity in this relation. Firstly, it elucidates the different channels fostering trade established by international migration. Secondly, the production and the exports from cultural sectors are investigated in the case of France. This type of product is empirically verified as a proxy for the proximity in cultural ties. Socio-cultural relationships seem to significantly influence international exchanges. In addition to economic determinants, these bonds have a significant importance in the comprehension of international flow of goods and services.



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## Résumé

Cette thèse approfondit la compréhension de l'influence des liens socioculturels entre les pays sur le commerce international. Une littérature de plus en plus dense qui se base sur les déterminants classiques du commerce international, étudie le rôle qu'occupent les facteurs sociaux ou culturels dans les échanges commerciaux. Ces facteurs procurent des voies de commerce privilégiées soit par une réduction des coûts de commerce, soit par une amélioration des préférences bilatérales.

Le premier chapitre propose une nouvelle approche à l'étude de l'impact de l'immigration sur le commerce en considérant le niveau de différenciation des produits. Ainsi, il est possible de conclure que l'immigration influence les préférences d'autant plus que les produits commercialisés sont différenciés. D'autre part, l'immigration a un impact sur les coûts de transaction représenté par une courbe sous forme de « U » inversé, avec plus d'intensité pour les produits de différenciation intermédiaire.

Le deuxième chapitre se concentre sur l'effet de réseau produit par l'immigration sur le commerce. Cette recherche prend en compte des éléments provenant de la littérature qui aborde les interactions sociales. L'existence et l'impact possible sur le commerce international de ces interactions sont vérifiés. De part le regroupement de la notion d'interaction sociale avec le commerce, les résultats obtenus sont plus robustes que ceux fournis par la littérature reliant immigration et commerce.

Le troisième et le quatrième chapitre traitent de l'échange culturel pour désigner de manière approximative la proximité culturelle entre les pays. Le troisième chapitre recherche les déterminants du commerce culturel. De plus, il évalue la part de la proximité culturelle que ce commerce capture et l'impact que ceci a sur le commerce international. Cette nouvelle mesure d'affinité culturelle a l'avantage de pouvoir étudier la relation entre un grand nombre de pays et ce pour une longue durée. En outre, elle permet de présenter les variations de la proximité culturelle entre différents pays dans le temps. Le quatrième chapitre décrit la distribution spatiale de l'industrie culturelle en France et les implications que ceci a sur les exportations. Cette industrie s'avère être très concentrée sur le territoire Français et les estimations économétriques mettent en évidence un important effet d'entraînement entre les départements pour les exportations.

**Discipline** : Sciences Economiques (05)

**Mots-clés** : Commerce international, migration, commerce de biens et services culturels

**Intitulé et adresse du laboratoire :**

TEAM & CNRS (UMR 8059), Université de Paris I Panthéon-Sorbonne  
Maison des Sciences Economiques, 106-112 Boulevard de l'Hôpital  
75647 Paris CEDEX 13