

# The Evolution of Global Immigrant-Links 1960-2000

Christopher Parsons<sup>1</sup>

In this paper I implement a new database of international bilateral migrant stocks to empirically examine the evolution of global immigrant-links; those bilateral trade flows fostered by international migrants. The panel comprises 188 origin and destination countries (and territories), from 1960 to 2000, and captures more than 99% of global trade and international migration. The gravity model of trade is then implemented to identify the extent to which immigrants and emigrants stimulate global exports. After accounting for censoring, which often confounds meaningful interpretations of the gravity model, I find that both immigrants and emigrants facilitate bilateral exports and that the influences of both have risen over the period. The rapid increase of the impact of immigrants on exports from the home country has been startling however, and this evidences the increasingly dominant impact of migrants bolstering trade flows through reducing transaction costs. The extent to which migrants influence exports also depends heavily upon the income levels of both the origin and destination countries.

This conference paper has been prepared for the ESRC-ITU/GEP joint workshop October 2009 at the ITU Faculty of Management, Macka, Istanbul. It introduces some new findings from an ongoing project that seeks to investigate in greater detail the global trade-migration nexus. Please do not cite without express permission of the author.

---

<sup>1</sup> The Leverhulme Centre for Research on Globalisation and Economic Policy (GEP), University of Nottingham

## 1. Introduction

In Freetown, Sierra Leone, the local producers of *Gara*, a traditional tie-dye material from which local clothes are made are fighting to stay in business because of the fierce competition they face from cheaper Chinese imports<sup>2</sup>. In the markets of Brixton, South London, emigrants from Sierra Leone can readily buy cassava from which to make their traditional delicacy *fufu*. These are just two ways in which migration may influence trade; either through exploiting superior market information or else by demanding commodities from abroad. This paper contributes to the literature by testing, for the first time, these effects on a global basis.

Between 1960 and 2000, world trade in goods increased by over a factor of 60<sup>3</sup>. Over the same period, the global stock of migrants more than doubled to 159 million (Parsons et al 2009)<sup>4</sup>. However, while the share of global trade relative to world income dramatically increased, the share of international migration relative to the world population has remained remarkably stable, hovering around 2.5%. International migration over this period, can be characterised by the dramatic growth in emigration from countries of the 'South' to the 'North' and a significant diversification both in terms of the number of nations from which destination countries will accept migrants, and the number of countries to which migrants wish to migrate. Between 1960 and 2000 the number of trading country-pairs rose by over 250%, while the number of migrating country-pairs increased by over 30%. Since migrants commonly possess knowledge of home markets and often have preferences for domestically produced goods, it is not unreasonable to suppose that this increased diversification of global migration will result in higher trade volumes internationally. The growing empirical discourse examining these links does predominantly find a significant and positive relationship between (im)migrant stocks and bilateral trade flows. These findings are robust to a number of different econometric specifications, time periods and alternative country settings.

Throughout the empirical literature however, and in part due to paucity of available migration data, there has been a preponderance with studying single - typically English-speaking OECD – countries and their trading partners since the early nineteen eighties. Additionally, constant elasticity models are usually implemented and thus little is known about how these immigrant-links have developed over

---

<sup>2</sup>See: <http://awoko.org/index.php?mact=News.cntnt01.detail,0&cntnt01articleid=4043&cntnt01returnid=15>.

<sup>3</sup> See: <http://comtrade.un.org>.

<sup>4</sup> This figure is necessarily lower than the estimate produced by the United Nations Population Division since the database produced by the World Bank focuses more upon 'economic migration'. As such many migrants classified as refugees that are interned in camps together with the 'Stateless' are omitted.

time. Nor is much understood about the degree to which these links are formed between developing countries or by migrants from rich countries residing in poor countries. Moreover, almost all existing studies fail to account for the Diasporas in both trading countries, focusing instead upon developed country immigrant-stocks for which data are more readily available. As such, our understanding of these links remains limited, despite the prospect of welfare gains and the implications of them for development policy.

In this paper, a new dataset of global bilateral migrant stocks, which comprises information on all bilateral migrations from 1960 to 2000, is used to overcome these shortcomings. As well as being able to compare how these links have developed over time and across countries in a unified framework; I account for the influence of Diasporas on both sides of international borders. Additionally, for the first time, I am able to examine the global impact of immigration on trade and track how these immigrant-links have evolved over time.

I find that both immigrants and emigrants facilitate bilateral exports and that the influences of both have risen over the period. The rapid increase of the impact of immigrants on exports from the home country has been startling however, and this evidences the increasingly dominant impact of migrants bolstering trade flows through reducing transaction costs. The extent to which migrants influence exports also depends heavily upon the income levels of both the origin and destination countries.

The following section provides a brief overview of the empirical literature. Section 3 details the theoretical framework and this is followed by the theoretical model. Section 5 describes the empirical model and the data and in section 6 the initial results of estimation are discussed. Finally I conclude.

## **2. Literature Review**

If the greatest potential benefits to trade exist between countries which are the least similar (Winters 2003), then migrants, who by definition have some experience of both locations, may be best placed to exploit those differences. Migrants are often bilingual, fluent in both their mother tongue and the language of their host nation. They may also possess knowledge of the available products in both countries, about the local laws and rules and regulations that govern the market and the institutions that oversee their functioning. Migrants are ideally positioned to exploit opportunities for arbitrage and match buyers and sellers through their superior market knowledge, thereby lowering the transaction costs of trade. This was the argument made by Gould (1994) who first demonstrated empirically that migrants foster trade linkages. Gould asserts that migrants lower the transaction costs of trade thereby

increasing both the imports and the exports of the destination country. Furthermore, he conjectures migrants' preferences for home products only affect destination country imports. Gould finds the prevalence of both effects in the US, since both the import and export elasticities with respect to migration are positive.

Finessing this view, Rauch (2001), a protagonist of the 'network' view of trade, stresses the role of business contacts and social networks in overcoming informational asymmetries and informal trade barriers and in promoting 'trusting' contractual arrangements (see Grief 1993). Rauch contends that the degree to which migrants facilitate trade is a leading candidate for explaining the 'missing trade' identified by McCallum (1995) among others. Rauch and Trindade (2002) examine the extent to which concentrations of ethnic Chinese populations in 63 countries foster trade. These authors attempt to separate the matching effect of migrants with the contractual reinforcement effect. The Rauch (1999) goods classification is implemented that distinguishes between referenced and non-referenced goods. Non-referenced goods are the most differentiated and they are assumed not to embody sufficient information for international trade, thus presenting the opportunity for them to be matched by migrants. Non-referenced goods are further disaggregated into homogenous goods and those quoted on organized exchanges. Since this latter variety of goods has a functioning and efficient mechanism via which prices can be effectively communicated, any effect of Chinese migrants upon these goods is a strong indication of the 'enforcement' mechanism. In other words, the threat of sanctions should have an equal effect across all product classifications, whilst transaction cost effects should have a greater impact upon differentiated products. The authors find that the influence of Chinese ethnic networks is strongest on differentiated goods but that the role of colonial ties is stronger. This is consistent with the fact that both networks and colonial ties help match potential traders but that only the ethnic Chinese mechanism can help enforce contracts.

Both Gould and Rauch and Trindade find a diminishing marginal return to immigration, but Rauch and Trindade also find that the overall effect of ethnic Chinese networks upon trade diminished between 1980 and 1990. Whereas much of the subsequent literature implements constant elasticity relationships, this finding is important since it evidences that immigrant-link effects can change significantly over time. Rauch (2001) argues this could be because of improvements in communication and the degree to which international contracts can be more adequately enforced. Conversely, Rauch provides two forces that act in the opposite direction. Firstly, the information intensity of trade is increasing (Rauch 1999). Secondly, transnational networks are expanding whilst businesses are

becoming increasingly internationalized (Rauch 2001). One of the key contributions of this paper is to assess the degree to which these effects have changed over time on a global basis.

The growing empirical discourse examining these links generally follows the work of Gould (1994) in attempting to identify the relative importance of the 'transaction cost' mechanism and a 'preference effect' of migration; and Rauch and Trindade (2002) in attempting to better understand the underlying mechanisms governing the trade-migration nexus. Almost without exception, all papers find a significant and positive relationship between immigrant stocks and bilateral trade flows. These findings are robust to a number of different econometric specifications, time periods and alternative country settings, although these factors account for the broad range of estimates obtained (Wagner et al 2002). Head and Ries (1998) and Wagner et al (2002) investigate immigrant-links in Canada, finding that migrants exert a far greater influence on imports than exports. Dunlevy and Hutchinson (1999, 2001) examine historical data for the United States and find that migration has a greater impact on exports than imports and on finished and semi-finished goods as opposed to crude goods.

Girma and Yu (2002) examine the impact of migration on trade in the UK, additionally differentiating between individual (for example personal business skills) and non-individual specific effects (for example knowledge of foreign markets). They hypothesize that non-individual effects should be weakest with trade between the UK and commonwealth countries since they predominantly have British based institutions. Since no commonwealth effect is found, this would evidence non-individual effects. Thus, while Girma and Yu find that the UK has a higher propensity to trade with her ex-colonies; immigrants from elsewhere exert the greatest influence on bilateral trade flows. Blanes-Cristobel (2003) provides a similar conclusion in the case of Spain. Interestingly, Blanes-Cristobel fails to find a significant effect of migrants on imports, while Girma and Yu actually find a negative impact of migration on imports in one of their specifications. This they argue may be the result of a trade substitution effect such that migrants start producing in the destination country what they had previously imported (Diaz-Alejandro 1970).

Combes et al (2003), examine intra-departmental trade and migration in France and find the greatest immigrant-links between departments that are both senders and receivers of labour. This would suggest more idiosyncratic opportunities are available in France (i.e. individual effects). Wagner et al (2002) examine the international trade of Canadian provinces, while Bandyopadhyay et al (2006), Co et al (2004), Bardhan and Guhathakurta (2005), Heraner and Saavedra (2005) and Dunlevy (2006) all exploit American state level data. Importantly, Bandyopadhyay et al (2006), together with Rauch and Trindade

(2002), Girma and Yu (2002) and Dunlevy (2004 and 2006) are the only papers that allow the ethnic-network elasticity to vary across countries.

Dunlevy (2004) argues that the greatest trade stimulating effects will occur between the most dissimilar countries. Similarly, White (2007a) employs interaction terms between migrant stocks and the income levels of origin countries to investigate how immigrant-links vary with countries' 'stages of development'. He finds that immigrants from low income countries drive the US immigrant-trade link. White (2007b), for Denmark, reports positive immigrant-links for all home country income classifications regardless of product differentiation, but that Danish links decrease in magnitude as average home country income declines.

This paper contributes to the existing literature by implementing a new database of bilateral migrant stocks to investigate the evolution of global immigrant-links. The database details five origin-destination matrices of international migrant stocks that correspond to the last five completed census rounds. The database facilitates many extensions of the literature that due to the paucity of migration statistics have not been possible to date. Firstly, due to the expansive coverage of the dataset, immigrant-links can be estimated between many more country-pairs than has previously been possible. Until now, the discourse has emphasized those links between a single country and numerous trading partners. Some authors have drawn upon recent developments in migration data to examine groups of countries. Felbermayr and Toubal (2008) examine immigrant-links between the OECD and all her trading partners, while Hatzigeorgiou (2009) - the most comprehensive study to date in terms of geographical coverage - utilizes a database of global immigrant-stocks for the year 2000 (Parsons et al 2007), to examine immigrant-links between 75 nations. The application of the new database is especially important in the context of migrations to, and between, countries of the 'South', which, due to the paucity of the existing data has largely been ignored in the literature. Notable exceptions include Bacarreza et al (2006) and Hatzigeorgiou (2009).

Migration statistics are generally collected by recipient nations and so most studies focus upon immigrant stocks in developed countries for which data are more accurate and easily collected. As such, there is an inherent failure to document the impact of emigrant stocks on bilateral trade flows even though there is no reason *a priori* why this should be the case. Although, Bacarreza et al (2006), Hatzigeorgiou (2009) and Rauch and Trindade (2002) try and capture these effects in a variety of specifications, the application of the new dataset enables us to examine the immigrant and emigrant stocks to and from every nation.

Finally, a significant proportion of the papers in the current discourse - again in part due to the availability of migration statistics - investigate immigrant-links in the years after 1980. There are exceptions, notably Gould (1994) and the papers by Dunlevy and Hutchinson (1999 & 2001) who investigate historical links in the nineteenth century. Even so, since most of the literature focuses upon a single country and her trading partners. Therefore, observations in each time period are generally pooled to ensure that there are sufficient degrees of freedom in estimation. In other words, the bulk of the existing literature assumes a constant elasticity relationship, despite the fact that the impact of migration on trade might change over time. Since our data refer to the period 1960-2000, and given the greatly expanded number of country pairs in our dataset, estimation based on repeated cross-sections is possible. To this end, one of major contributions of this paper is in estimating the evolution of these immigrant links over time between various country groupings.

### **3. Theoretical Framework**

The majority of immigrant-link studies implement the gravity model of trade and uncover a strong, positive and robust relationship between migrant stocks and bilateral trade flows. The significant divergence in the estimates obtained however, is largely dependent upon the time period, geographical location and the selection of empirical specification. One of the advantages of the expansive new dataset applied in this paper is in being able to test and compare all of the previous findings in a unified framework. Nevertheless, the heterogeneity between the findings in the literature has naturally led to a concentration upon attempting to unearth the mechanisms underpinning the trade-migration nexus.

The most popular method used to disentangle the various mechanisms by which migrants may foster trade flows is to follow the methodology of Gould (1994). In this framework, both imports and exports are regressed on the immigrant stock together with a number of control variables. The elasticity of imports and exports with respect to immigration are then compared against one another under the assumption that migrant's preferences for home products will only affect destination country imports; while both import and export flows will be affected should migrants lower the transaction cost of trade. In many respects, such an approach is unsatisfactory since it is an oversimplified view of the trade-migration nexus, although given the level of aggregation in the data generally used to identify these international effects, such an approach is hardly surprising.

Many additional mechanisms via which migrants may facilitate trade can be hypothesised. Firstly, there is no reason to believe that migrant's preferences will solely relate to their specific country of origin.

Certain cultural products exist that relate to regions as opposed to specific countries, such that migrants, by maintaining their preferences for home country goods may actually bolster the bilateral trade between the host country and another country from their home *region*. For example, many West Africans consume cassava. West African migrants say in Europe, despite the fact that they might prefer cassava from their home country will likely buy cassava from elsewhere as opposed foregoing it altogether. Similarly, and especially in cases where countries are in close proximity, it might be the case that migrants have preferences for goods from elsewhere in their region, as opposed to specifically from their home country. Many Europeans for example enjoy Belgian chocolates, French champagne, Italian fashion or Dutch cheese. Lastly, there exists the possibility of migrants transferring their consumption behaviour to others in the host country (see for example Beine et al 2009). If true, the likely impact of migrant's preferences could be amplified significantly.

Some authors attempt to make further inferences about the mechanisms underpinning the trade-migration nexus through the imposition of additional assumptions. For example, Felbermayr and Toubal (2007), assume that any transaction cost effect of migrants will symmetrically influence imports and exports, while the additional demand created through migrants desire to consume home products will only affect imports. A more satisfactory identification strategy is to include additional covariates into estimation that better capture migrant heterogeneity. Alternatively, authors disaggregate trade flows such that it is possible to identify which goods migrants exert the greatest influence over. For example, Gould (1994) introduces migrants' skill level and length of stay, while Wagner, Head and Ries (2002) disaggregate the immigrant stock in Canada according to visa type.

Rauch and Trindade's (2002) strategy for identifying the mechanisms underpinning the trade-migration nexus differs fundamentally from almost all of the existing immigrant-link literature. While abstracting from migrant's preferences for home goods, these authors instead attempt to separately identify the degree to which migrants 'match' business opportunities or reinforce contracts. To this end, they include two variables that are constructed from the stock of migrants in *both* trading countries. The first is the product of the migrant stocks in both transacting countries used to capture the number of opportunities available i.e. the matching effect. The second variable is the product of the share of each migrant stock to the total in both transacting countries. This is equivalent to the probability that any two migrants picked at random from the migrant stocks of each country will be from the same origin. This variable is used to capture the contractual reinforcement effect.

In this conference paper, the strategy adopted is a combination of two aforementioned approaches. On the one hand, I focus upon trying to disentangle the two main hypotheses purported by Gould. In distinguishing between them however, I follow a methodology akin to Rauch and Trindade's in that I estimate the impact of *both* the immigrant and emigrant stock on bilateral trade flows. Rather than taking the product of the migrant stocks however, I estimate each separately. In this vein, rather than investigating a destination country's migrant stock's effect upon both imports and exports, I examine the extent to which immigrants or emigrants affect trade flows in one direction. The focus however, is upon how these links have developed over time, where they are greatest and where the largest potential future benefits might be.

#### 4. Theoretical Model

First introduced into the literature by Tinbergen (1962), the gravity model in its simplest incarnation, states that trade flows are: proportional to the product of the economic masses of transacting parties and inversely related to the distance between them. Gravity models have since found a wide appreciation in economics due to their impressive explanatory power and ease of application. Indeed, the degree of success that the gravity model has enjoyed ultimately led to a variety of theoretical foundations being laid down as a justification for its use, among them Anderson (1979), Bergstrand (1985) and Deordorff (1998).

Following Head and Ries (1998), I begin the derivation by stating country  $i$ 's imports from country  $j$  as:

$$(1) \quad m_{ij} = s_{ij}Y_j$$

Such that country  $i$ 's imports are simply the share  $s_{ij}$  of country  $j$ 's national income that are consumed by residents of country  $i$ . Following Helpman (1984), Head and Ries (1998) argue that  $s_{ij}$  would be equal to country  $i$ 's share of world GDP if it were not for the introduction of transportation and transaction costs that directly impinge upon country  $i$ 's consumption patterns. These arguments can be formally written as:

$$(2) \quad s_{ij} = (Y_i/Y_w)/\tau_{ij}$$

Where:  $Y_w$  is simply the product of the GDP of all nations worldwide. Further I assume that  $\tau_{ij} = \exp(-X_{ij}\beta)$ , where  $X_{ij}$  is simply a vector of variables reflecting trade frictions such as transportation costs. Substituting (1) into (2) and taking logs throughout:

$$(3) \ln m_{ij} = \ln \left( \frac{Y_i Y_j}{D_{ij}} \right) + X_{ij} \beta$$

Vector  $X_{ij}$  therefore contains all those ‘bilateral’ variables that may bolster or inhibit bilateral trade flows. The most prominent bilateral variable in this vein is the influence of distance on trade. Distance is commonly interpreted as a proxy for transportation and communication costs. The greater the distance between trading partners, the lower is the expected bilateral trade between them. Similarly, a dummy variable is often included under the hypothesis that countries which border each other will typically trade more with one another. Since the focus of the current work is to estimate the degree to which migrants facilitate bilateral trade flows, I also include both the stock of immigrants (in the reporting country) and the stock of emigrants (from the reporting country). Following Girma and Yu (2002) and Blanes-Christobel (2003) I include a dummy variable for colonial ties. This variable is hypothesised to capture two effects. Firstly, colonial ties will account, in part, for the extent to which countries share similar institutions. This variable will also likely capture some historical aspect of migrants’ network effect. I also include dummy variables that equal one if country-pairs have at least 20% of the population sharing an official language or else sharing a common national language.  $X_{ij}$  can thus be written as:

$$(4) X_{ij} = [\ln \text{DISTANCE}_{ij} \ln \text{MIGRANT}_{ij} \ln \text{MIGRANT}_{ji} \text{CONTIGUOUS}_{ij} \text{COLONY}_{ij} \text{OFFICIAL\_LANG}_{ij} \text{ETHNIC\_LANG}_{ij}]$$

### 5. Empirical Model and Data

Numerous additional variables of interest can be found in the gravity model literature that would be suitable for estimation. However, since our sample includes such a diverse set of heterogeneous countries I instead implement origin fixed effects and destination fixed effects to account for all non-bilateral  $i$  and  $j$  variables. Although this strategy militates against obtaining separate coefficient estimates for some of the variables most commonly included in estimation, it has the twin advantages of circumventing the problem of measurement error among the developing countries in our sample, whilst also accounting for the unobserved heterogeneity that I cannot otherwise capture. Our model to be estimated is therefore:

$$(5) \ln M_{ij} = \ln \text{DISTANCE}_{ij} + \ln \text{MIGRANT}_{ij} + \ln \text{MIGRANT}_{ji} + \text{CONTIGUOUS}_{ij} + \text{COLONY}_{ij} + \text{OFFICIAL\_LANG}_{ij} + \text{ETHNIC\_LANG}_{ij} + \text{FE}_i + \text{FE}_j + \epsilon$$

Equation 5<sup>5</sup> is therefore similar to the specification advocated by Anderson and van Wincoop (2003). This will be estimated for each census round, 1960-2000, i.e. a repeated cross-section, such that the evolution of the coefficients emphasised in this paper can be evaluated over time.

The key variables of interest in the current study are the stock of immigrants and emigrants. These are obtained from a new resource detailing international bilateral migrant stocks developed by the World Bank (see Ozden et al 2009). In all, the resource consists of five origin-destination matrices that comprise every nation state, major territory and dependency from across the globe (226\*226). The dataset is based upon the foreign-born concept of migration and each matrix corresponds to one of the last five completed census rounds, 1960-2000<sup>6</sup>. As such it represents the most comprehensive dataset of international migration ever created.

The matrices were constructed from a new primary source, the United Nations *Global Migration Database*<sup>7</sup>, created through the collaboration of the United Nations Population Division, the Statistics Division of the United Nations, the World Bank and the University of Sussex. This unique database comprises 3,500 individual census and population register records from more than 230 destination countries and territories from across the globe. The database provides information on international bilateral migrant stocks (by citizenship and the place of birth), sex and age. In constructing the five matrices the authors make a number of assumptions to overcome the underlying weaknesses in the primary data. To account for the changes in geo-political landscape over the period the authors begin with a master set of 226 countries and regions, from which migrants originate from or migrate to; and migrants are assigned to one of these fixed regions such that migrations can be tracked meaningfully over time. These assignments, especially in cases where only aggregate data are available, are made using a number of alternative propensity measures that the authors calculate. These are based either on a destination country's propensity to accept migrants from overseas or else based on an origin countries' propensity to send migrants abroad.

The dependent variable is a country's exports and these data are taken from the UN's COMTRADE database. When the trade and migration data are merged, the resulting sample includes 188 countries

---

<sup>5</sup> Note that since the imports of one country equal the exports of another, equation 5 can be estimated for either imports or exports.

<sup>6</sup> Additionally, the data are also disaggregated by gender.

<sup>7</sup> Available at <http://esa.un.org/unmigration>.

from across the globe, see Appendix 1. In the year 2000, these countries account for over 99% of both world migration and global trade. The remaining gravity model variables were downloaded from CEPII<sup>8</sup>.

Recently, the applicability of gravity models of trade has been called into question due to the inherent bias that results from the numerous zeroes which are frequent in the underlying data. In an extremely influential paper, Santos Silva and Tenreyro (2006) estimate the gravity model of trade according to a number of alternative empirical specifications. They find that gravity model estimates can be extremely biased in the face of heteroskedasticity and advocate the application of the Poisson Pseudo-Maximum Likelihood technique. Conversely, Martin and Pham (2008) champion instead the Heckman Selection model for dealing with this problem. They argue that the Poisson Pseudo-Maximum Likelihood technique is unsuitable since estimates are severely biased when trade values are zero. Similarly, Martinez-Zarzosa et al (2006) find evidence against the use of the Poisson Pseudo-Maximum Likelihood technique. In this conference paper therefore, I present estimates using the Heckman Selection model.

## **6. Estimation Results**

In this conference paper I focus upon two sets of results that serve to motivate future work. The first set of estimates implements the Heckman two-step selection model on the entire sample for each decade from 1960 to 2000. This model is run as a repeated cross-section such that the evolution of the various coefficient estimates can be tracked over time, see table 1<sup>9</sup>.

Turning first to our two key variables of interest, both the stock of immigrants and emigrants are highly significant in every decade. In 2000, a 10% rise in either the stock of immigrants and emigrants is associated with an increase in exports from the home country of approximately 1.5%. Between 1960 and 2000 the influence of both immigrants and emigrants upon global exports has increased, although the increase in the former has been far more significant, more than doubling over the period. At the same time, the standard errors of the estimates also declined significantly, perhaps in part reflecting superior quality data in later years. In every decade, with the exception of the year 2000, the emigrants from the home country exert a greater influence upon home country exports than do immigrants. In terms of our proposed hypotheses, these preliminary results suggest that both the preference and the transaction cost channels are important in fostering international exports. Assuming that immigrants in

---

<sup>8</sup> See: <http://www.cepii.fr/anglaisgraph/bdd/bdd.htm>.

<sup>9</sup> Although ideally in the first stage of these regressions one would include an exclusion restriction, this is omitted in the current work. Since the lambda in the selection equation is found to be significant in each of our equations it can be concluded that this omission will not significantly bias our results (see Wooldridge 2006).

the home country *only* affect home country exports via the transaction cost mechanism however, the results show the increase in the relative importance of the transaction cost mechanism. Indeed, in 2000, the effect of immigrants surpassed that of emigrants and since the influence of the emigrants is hypothesised to comprise both the transaction and preferences channels, the result demonstrates that the transaction mechanism dominates preference effects.

**Table 1. Initial Estimates from the Heckman Selection model, 1960-2000**

	2000	1990	1980	1970	1960
Immigrants	0.152*** (0.008)	0.119*** (0.010)	0.103*** (0.012)	0.112*** (0.012)	0.079*** (0.014)
Emigrants	0.146*** (.008)	0.128*** (.011)	0.113*** (.012)	0.139*** (.012)	0.119*** (.014)
Distance	-1.189*** (0.025)	-1.080*** (0.034)	-1.069*** (0.040)	-0.741*** (0.039)	-0.667*** (0.045)
Border	0.282*** (0.095)	0.128 (0.133)	-0.244 (0.149)	0.116 (0.135)	0.289* (0.153)
Official Language	0.423*** (0.073)	0.571*** (0.093)	0.415*** (0.105)	0.341*** (0.096)	0.383*** (0.114)
Ethnic Language	0.176** (0.074)	-0.083 (0.092)	-0.011 (0.104)	0.259*** (0.0956)	0.183 (0.114)
Colony	0.444*** (0.109)	0.678*** (0.131)	0.920*** (0.146)	0.997*** (0.138)	1.062*** (0.150)
Observations	35344	35344	35344	35344	35344
No. Censored Obs	18230	26027	26735	27637	30534

Figures in parentheses are standard errors. \*\*\* significant at 1%, \*\* significant at 5%, \* significant at 10%

As predicted, distance has a significantly negative effect on bilateral trade. Interestingly however, despite the numerous developments in transport and communications between 1960 and 2000, the effect of distance has actually increased in magnitude over the period. Although many authors frame their explanation for this phenomenon in terms of increasing trade frictions, Melitz (2007) argues that this paradoxical finding can be explained by the decline in the impact of differences in latitude between the North and the South. Having controlled for distance, I find in the majority of decades that sharing a

common border does not have any statistical impact on bilateral exports. While sharing an official language has a statistically significant and positive effect on exports, the effect of sharing an ethnic language is far less conclusive. The colony variable however, is important throughout the period. Countries that share a colonial history export relatively more to one another. The result can be interpreted as a proxy for historical migrant networks or alternatively as a proxy for two countries sharing similar institutions. Perhaps unsurprisingly, the effect of the colony variable decreases significantly over the period. In the context of both of these explanations this result seems realistic since over time countries' institutions will likely diverge from one another and the impact of historical network effects will likely diminish.

Given the proposition that the greatest benefits to trade will exist between the least similar countries, I next divide the world into country groups based on income classifications. By interacting the migrant stock with the level of income from each of these country groupings, those migrants driving the immigration-trade link in each country grouping can be better identified. Countries are assigned an income group according to the World Bank Atlas method<sup>10</sup> and the regressions refer to the year 2000.

The second column in table 2, shows the results for the 'mean' country in our sample. As expected the results for all of the variables included in the first set of regressions are similar. The interaction terms however, reveal that migrants originating from the high income non-OECD, lower middle income and low income country groupings have the greatest impact on bilateral exports globally. Turning to our results grouped by country income levels, the increasingly negative effect of distance can again be observed. The border variable is insignificant over each income classification except the low income category, in which case it has an extremely strong and positive effect. It is reasonable to suppose that the world's poorest nations will trade relatively more with bordering nations since the constraints to international trade they face will be relatively greater. While sharing an official language leads to greater bilateral exports from all country groupings, sharing an ethnic language is only of relevance for the three least wealthy country groupings. Perhaps unsurprisingly, the colony variable is large and positive for the OECD countries and the lower middle and low income countries; those country groupings that include the majority of colonies and colonisers.

---

<sup>10</sup> See:

<http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20421402~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html>

**Table 2. Estimates by Income Classifications, 2000**

	All Countries	High Income OECD	High Income Non-OECD	Upper Middle Income	Lower Middle Income	Low Income
Emigrants	0.147*** (0.008)	0.084*** (0.012)	0.166*** (0.025)	0.142*** (0.017)	0.172*** (0.018)	0.134*** (0.023)
Distance	-1.200*** (0.026)	-1.225*** (0.040)	-1.517*** (0.074)	-1.310*** (0.054)	-1.133*** (0.063)	-0.828*** (0.115)
Border	0.276*** (0.095)	-0.104 (0.152)	-0.309 (0.423)	0.055 (0.198)	0.118 (0.200)	2.00*** (0.279)
Official Language	0.433*** (0.073)	0.257*** (0.095)	0.398* (0.220)	0.470*** (0.183)	0.316** (0.159)	0.477** (0.200)
Ethnic Language	0.164** (0.074)	0.044 (0.096)	-0.256 (0.219)	0.352** (0.179)	0.339** (0.159)	0.526** (0.211)
Colony	0.465*** (0.110)	0.799*** (0.104)	-0.118 (0.526)	-0.072 (0.252)	0.629** (0.313)	1.277*** (0.479)
High Income OECD* Immigrants	0.095*** (0.012)	0.017 (0.020)	-0.023 (0.045)	0.145*** (0.028)	0.138*** (0.031)	0.082* (0.049)
High Income Non- OECD* Immigrants	0.181*** (0.015)	0.109*** (0.018)	-0.017 (0.051)	0.224*** (0.0370)	0.171*** (0.040)	0.136* (0.077)
Upper Middle Income* Immigrants	0.095** (0.012)	0.112*** (0.015)	0.225*** (0.036)	0.174*** (0.026)	0.193*** (0.028)	0.158 (0.046)
Lower Middle Income* Immigrants	0.163*** (0.011)	0.165*** (0.015)	0.155*** (0.032)	0.202*** (0.025)	0.144*** (0.027)	0.109*** (0.040)
Low Income* Immigrants	0.155*** (0.012)	0.137*** (0.016)	0.176*** (0.040)	0.231*** (0.032)	0.074*** (0.026)	0.250*** (0.039)
Observations	35344	5076	4700	8084	9588	7896
No. Censored Obs	18230	310	2488	3874	5894	5664

Figures in parentheses are standard errors. \*\*\* significant at 1%, \*\* significant at 5%, \* significant at 10%

The interaction terms between the immigrant-stock and income variables reveal that the various migrant groupings have radically different impacts on the exports of the various country groupings. The

exports of the two upper income country groupings are only affected by immigrants originating from countries less developed than themselves. However, while migrants from the two lowest income groupings have the greatest impact on OECD country exports – a conclusion similar to White (2007a, 2007b); immigrants from the upper middle country grouping most affect high income non-OECD country exports. That is, whereas among the OECD nations migrants from arguably the least similar countries make the greatest difference, in the high income non-OECD countries, some of the most similar migrants affect bilateral exports the most. In contrast, in both the upper middle and lower middle income groupings, migrants from all country income groups influence bilateral exports, although their impacts vary significantly between the two. Lastly, immigrants from all backgrounds facilitate low income country exports with the exception of those from the upper middle income group. Interestingly however, migrants originating from low income countries residing in other low income nations have the most significant impact. Indeed, of all immigrants across all country groupings, it is these immigrants that are associated with the greatest increases in international exports. These results although somewhat mixed, do indicate a clear distinction between the effects of immigrants in and from the upper, middle and low income groupings. As such these effects warrant further investigation.

## **7. Conclusion**

This conference paper presents the preliminary findings from a new study investigating the evolution of global immigrant-links over the period 1960 to 2000. Because of the implementation of new expansive database of bilateral migrant stocks, these links are examined across a far broader spectrum of countries than has previously been possible; 188 in total, which capture over 99% of both global goods trade and international migration.

The first set of results, from repeated cross-sections on the entire sample, for each decade between 1960-2000, show a strong and positive complementarity between the stock of immigrants to, and emigrants from, the home country and home country exports. Importantly, the influence of both these effects have increased over the period, although the effect of immigrants on exports has more than doubled over the period. This provides evidence that increasingly migrants affect bilateral exports through reducing transaction costs, as opposed to simply maintaining preferences for goods produced in their country of origin.

The second set of results, show that the degree to which exports are influenced by migration depends upon the income level of the exporting country and the income level of migrants' origin. Exports from

the world's richest nations are only facilitated by migrants from countries poorer than themselves. In the middle income countries of the world, migrants from all backgrounds exert an influence, although the extent of these effects depends heavily upon the income level of their country of origin. Migrants from the world's poorest nations affect low income country exports the most and this is estimated to be the strongest immigrant-link across all country income groups. Since the greatest benefits to migration will likely accrue to developing nations (Walmsley and Winters 2005), this finding is particularly important to the extent that developed countries can be 'reimbursed' for more liberal immigration policies through greater export volumes.

However, in light of the previous literature and given the comprehensive nature of the available data many more avenues of enquiry have yet to be explored. These include introducing a disaggregated goods classification, allowing for the effect of migration to diminish over time and accounting for inertia in trade volumes. More pertinently however, future work will also seek to better understand the complex interplay between trade and migration, for example in migrants preference for cultural products or the degree to which immigrant facilitate import penetration.

## **Bibliography**

- Anderson, J.E., (1979), "A Theoretical Foundation for the Gravity Equation", *American Economic Review*, vol. 69 (1), pp. 106-116.
- Anderson, J.E., and E. van Wincoop, (2003), "Gravity with Gravitas: A Solution to the Border Puzzle", *American Economic Review*, vol. 93(1), pages 170-192, March.
- Bacarreza, C., J. Gustavo and L. Ehrlich, (2006), "The Impact of Migration on Foreign Trade: A Developing Country Approach", MPRA Paper 1090, University Library of Munich, Germany.
- Bandyopadhyay, S., and C.C. Coughlin and H. J. Wall, "Ethnic Networks and U.S. Exports", (2006), IZA Discussion Paper No. 1998; FRB of St. Louis Working Paper No. 2005-069A.
- Bardhan, A.D., and G. Subhrajit, (2004), "Global Linkages of Subnational Regions: Coastal Exports and International Networks," *Contemporary Economic Policy*, Western Economic Association International, vol. 22(2), pages 225-236, 04.
- Beine, M., F. Docquier and M. Schiff, (2009), "International Migration, Transfers of Norms and Home Country Fertility", World Bank Policy Research Working Paper Series.
- Bergstrand, J.H., (1985), "The Gravity Equation in International Trade - Some Microeconomic Foundations and Empirical Evidence", *Review of Economics and Statistics*, Vol.67, pp.474-481.
- Blanes-Cristóbal, J.V., (2003), "The link between immigration and trade in Spain", Seville, Universidad Pablo de Olavide, Paper presented at XXVIII Simposio de Análisis Económico, 11-13 December, Seville.
- Co, C.Y., P. Euzent and T. Martin (2004), "The export effect of immigration into the USA," *Applied Economics*, vol. 36(6), pages 573-583, April.
- Combes, P., M. Lafourcade, and T. Mayer, (2003), "Can Business and Social Networks Explain the Border Effect Puzzle?", CEPR Discussion Paper No. 3750.
- Diaz-Alejandro, C.F., (1970), Essays on the Economic History of the Argentine Republic, Yale University Press: New Haven, CT.
- Deardorff, A., (1998), "Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World? In The Regionalization of the World Economy edited by J. A. Frankel. Chicago: University of Chicago Press.

- Dunlevy, J., and W. Hutchinson (1999), "The Impact of Immigration on American Import Trade in the Late Nineteenth and Twentieth Centuries", *Journal of Economic History* 59 (4): 1043–1062.
- Dunlevy, J., and W. Hutchinson (2001), 'The pro-trade effects of immigration on American exports during the period 1870 to 1910', Vandablit University Working Paper 01-W25.
- Dunlevy, J., (2004) "Interpersonal Networks in International Trade: Evidence on the Role of Immigrants in Promoting Exports from the American States," working paper, Miami University.
- Dunlevy, J., (2006), "The Influence of Corruption and Language on the Protrade Effect of Immigrants: Evidence from the American States", *Review of Economics and Statistics* 88(1).
- Felbermayr, G.J., F. Toubal, "Revisiting the Trade-Migration Nexus: Evidence from New OECD Data", *SSRN Library*.
- Girma, S., and Z. Yu, (2002), "The link between immigration and trade: evidence from the UK", *Weltwirtschaftliches Archive*.
- Gould, D., (1994), "Immigration Links to the Home Country: Empirical Implications for US Bilateral Trade Flow", *Review of Economic and Statistics* 76 (2): 302–316.
- Greif, A., (1993), "Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition", *American Economic Review* 83 (3): 525–548.
- Hatzigeorgiou, A., (2009), "Migration as Trade Facilitation: Accessing the Links between International trade and migration", submitted to *B.E. Journal of Economic Analysis and Policy*.
- Head, K., and J. Ries (1998), "Immigration and Trade Creation: Econometric Evidence from Canada", *Canadian Journal of Economics* 31 (1): 47–62.
- Helpman, E., (1984), "A Simple Theory of International Trade and Multinational Corporations," *Journal of Political Economy*.
- Martin, W., and Pham, C.S., (2008), "Estimating the Gravity Equation when Zero Trade Flows are Frequent", MPRA Paper 9453, University Library of Munich, Germany.
- Martinez-Zarzoso, I., F. Nowak-Lehmann, and S. Vollmer (2006), "The Log of Gravity Revisited", *SSRN Library*.
- McCallum, J., (1995), "National Borders Matter: Canada-U.S. Regional Trade Patterns", *American Economic Review*, vol. 85(3), pages 615-23, June.

- Melitz, J., (2007), "North, South and distance in the gravity model," *European Economic Review*, vol. 51(4), pages 971-991, May.
- Ozden, C., C. Parsons, M. Schiff, and T. Walmsley, (2009) "Where on Earth is Everybody? The Evolution of International Bilateral Migrant Stocks 1960-2000", World Bank working paper (forthcoming).
- Parsons, C., R. Skeldon, T. Walmsley and L.A. Winters (2007), "Quantifying International Migration: A Database of Bilateral Migrant Stocks in International Migration", *Economic Development and Policy*, edited by C. Özden and M. Schiff. Washington, DC: World Bank/Palgrave Macmillan.
- Rauch, J.E., (1999), "Networks versus markets in international trade" *Journal of International Economics*, 48 (1): 7–35.
- Rauch, J.E., (2001), "Business and Social Networks in International Trade", *Journal of Economic Literature*, vol. 39(4), pages 1177-1203, December.
- Rauch, J.E., and V. Trindade, (2002), "Ethnic Chinese Networks In International Trade", *Review of Economics and Statistics*, vol. 84(1), pages 116-130, February.
- Santos Silva, J. M. C., and S. Tenreyro, (2006), "The Log of Gravity", *Review of Economics and Statistics*, MIT Press, vol. 88(4), pages 641-658, 09.
- Tinbergen, J., (1962), *Shaping the World Economy*, New York: Twentieth Century Fund.
- Wagner, D., K.C. Head, J. C. and Ries, (2002), "Immigration and the Trade of Provinces", *Scottish Journal of Political Economy*, Vol. 49, pp. 507-525, 2002.
- White, R., (2007a), "Immigrant-Trade Links, Transplanted Home Bias and Network Effects," *Applied Economics* 39, 7: 839-852 (April).
- White, R., (2007b), "An Examination of the Danish Immigrant-Trade Link," *International Migration* 45, 5: 62-86 (December).
- Walmsley, T., L.A. Winters, (2005) "Relaxing the restrictions on the temporary movement of natural persons: a simulation analysis", *Journal of Economic Integration*, vol. 20, no. 4 (December), pp. 688-726.
- Winters, L.A., (2003), 'The Economic Implications of Liberalizing Mode 4 Trade', in A. Mattoo and A. Caarsaniga (Eds) *Moving People to Deliver Services*, World Bank, Washington D.C.
- Wooldridge, J.M., (2006), *Econometrics analysis of Cross-section and Panel Data*, MIT Press.

## **Appendix 1: Countries included in the dataset**

Afghanistan	Congo	Honduras	Moldova
Angola	Colombia	Croatia	Madagascar
Albania	Comoros	Haiti	Maldives
Netherlands Antilles	Cape Verde	Hungary	Mexico
United Arab Emirates	Costa Rica	Indonesia	Macedonia
Argentina	Cuba	India	Mali
Armenia	Cyprus	Ireland	Malta
Antigua and Barbuda	Czech Republic	Iran	Mongolia
Australia	Germany	Iraq	Mozambique
Austria	Djibouti	Iceland	Mauritania
Azerbaijan	Dominica	Israel	Mauritius
Burundi	Denmark	Italy	Malawi
Belgium	Dominican Republic	Jamaica	Malaysia
Benin	Algeria	Jordan	Namibia
Burkina Faso	Ecuador	Japan	Niger
Bangladesh	Egypt	Kazakhstan	Nigeria
Bulgaria	Eritrea	Kenya	Nicaragua
Bahrain	Spain	Kyrgyzstan	Netherlands
Bahamas	Estonia	Cambodia	Norway
Bosnia & Herzegovina	Ethiopia	Kiribati	Nepal
Belarus	Finland	Saint Kitts and Nevis	New Zealand
Belize	Fiji	Republic of Korea	Oman
Bermuda	France	Kuwait	Pakistan
Bolivia	Micronesia	Laos	Panama
Brazil	Gabon	Lebanon	Peru
Barbados	United Kingdom	Liberia	Philippines
Brunei Darussalam	Georgia	Libyan Arab Jamahiriya	Palau
Bhutan	Ghana	Honduras	Papua New Guinea
Botswana	Guinea	Croatia	Poland
Central African Republic	Gambia	Saint Lucia	Puerto Rico
Canada	Guinea-Bissau	Sri Lanka	Democratic People's Republic of Korea
Switzerland	Equatorial Guinea	Lesotho	Portugal
Chile	Greece	Lithuania	Paraguay
China	Grenada	Luxembourg	Qatar
Côte d'Ivoire	Guatemala	Latvia	Romania
Cameroon	Guyana	Macao	Russian Federation
Democratic Republic of the Congo	Hong Kong Special Administrative Region	Morocco	Rwanda
Saudi Arabia	Slovakia	Tonga	Saint Vincent and the Grenadines

Serbia & Montenegro	Slovenia	Trinidad and Tobago	Venezuela
Sudan	Sweden	Tunisia	Viet Nam
Senegal	Swaziland	Turkey	Vanuatu
Singapore	Seychelles	Taiwan	Samoa
Solomon Islands	Syrian Arab Republic	United Republic of	Yemen
Sierra Leone	Chad	Tanzania	South Africa
El Salvador	Togo	Uganda	Zambia
Somalia	Thailand	Ukraine	Zimbabwe
Sao Tome and Principe	Tajikistan	Uruguay	
Suriname	Turkmenistan	United States of	
		America	
		Uzbekistan	