

TRADE AND EMIGRATION FROM A DEVELOPING COUNTRY: SOME EVIDENCE FROM PAKISTAN

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Emigrants possess knowledge regarding the cultures and social environments of host and sending countries that can help strengthen the economic relationship between these countries. We find this to be true for Pakistan and its selected Organization for Economic Co-operation and Development (OECD) trading partners on whom data are available. During the period 1990-2003, Pakistan had a positive trade balance, on average, with English speaking countries, and a negative balance with non-English speaking countries of the OECD. Gravity model estimates, obtained in this study, suggest that the annual increase in the number of Pakistani emigrants in OECD countries accounted for a quarter of the annual growth in Pakistani net exports to the English speaking countries over the period of this study. Pakistan's trade deficit with non-English speaking countries would have been at least 46 per cent higher had there been no increase in its expatriate population in those countries which appears to be engaged in import substitution activities. This study provides important input pertaining to the debate on the economic effects of emigration from developing countries.

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Key words: Migration, international trade, gravity model of international trade, South Asia, economic development, Pakistan.

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I. INTRODUCTION

Due to their slow or declining population growth rates, many developed countries in the western world are relying more and more on immigration to maintain their labour supply, especially in professional and skilled jobs.¹ Most immigrants arriving in these countries originate from developing countries of Asia and Africa. For example, in countries belonging to the Organization for Economic Co-operation and Development (OECD), developing countries account for about 64.5 per cent of total immigrants and 62 per cent of skilled immigrants (Docquier and others, 2007). In Canada, where about 20 per cent of the labour force is foreign-born, more than 60 per cent of annual immigrant arrivals are from developing countries. According to Citizenship and Immigration Canada (2008), by 2012, immigration will be responsible for nearly all of the growth in Canada's labour force. The Migration Policy Institute (2005) considers growing competition for skilled immigrants among the top issues of migration in the developed world.

Emigration of skilled workers from a developing country can have either a negative or a positive effect on the economy of the sending country. As noted by Barro and Salai-Martin (1995), a one-year increase in the average education of a nation's workforce increases the output per worker by between 5 and 15 per cent. Low levels of education slow economic growth, damage the earnings of low-skilled workers, and increase poverty. Hence, emigration of an educated workforce may be viewed as having an adverse effect on the economy of the sending country.

On the other hand, emigration can also be beneficial to the sending country. For example, home remittances from expatriates can help the economic development of the sending country. Using World Bank data, Carrasco and Ro (2007) have reported that remittances in developing countries were more than double in the first half of the last decade and have become a major source of income for them. Home remittances have led to improvements in household and community welfares.² Yang and Martinez (2005) have shown that home remittances in the Philippines reduced poverty rates among households through direct and spillover effects. Another beneficial effect of emigration is found in the "optimal brain drain theory" proposed by Lowell and Findlay (2002) who suggest and find support for the notion that emigration

¹ While it is true that many developed countries within Europe are also experiencing persistent unemployment, shortages in specific professional jobs are also emerging. For example, shortages of doctors in the United Kingdom of Great Britain and Northern Ireland (United Kingdom, 2007) have caused the United Kingdom to recruit doctors from India. Shortages of health professionals in Canada are also well known.

² Two specific examples include development of a new hospital in Senegal and of a new airport in Kerala, India (Carrasco and Ro, 2007).

for higher wages induces more students in the sending country to pursue higher education. Moreover, many of these highly educated students end up staying in the sending country rather than emigrating, thus improving the educational profile of their own countries.

Another way in which the emigration of human capital can affect a sending country's economy is by enhancing the sending country's trade relationship with the host, or receiving country of its emigrants. In a host country, migrants form social networks to establish social linkages among themselves as well as with those who are left behind by them in the source country. In this shrinking global village, these networks may stimulate a reverse flow of innovations and technological capacity. At the same time, they also function as information source for the residents of their host and sending countries, thereby helping to reduce the transaction costs of direct investment and trade between countries. Immigrants in their host country may also have a "taste for home goods" and thus be a source of demand for their homeland products (Hutchinson and Dunlevy, 1999). Finally, in the presence of asymmetric information and uncertainties associated with international trade, migrants can become another source of contract enforcement by reducing contract establishment and enforcement costs (Rauch, 2001).

Using the arguments cited above as a backdrop, the present paper analyzes the effect of Pakistani immigrant networks on Pakistan's international trade. Pakistan is one of the major source countries of immigrants for many western countries. For example, in Canada where about 250,000 immigrants arrive each year, Pakistan was the third largest source country of immigrants during 1996-2000 and continued to be on the list of top ten source countries of immigrants for the most part of the last decade. Between 2000 and 2001, Pakistan was also among the top ten source countries of immigrants in Denmark. It was also the second largest source of immigrants who were granted citizenship in the United Kingdom of Great Britain and Northern Ireland in 2006 (United Kingdom, 2007).

With a per capita income of about \$1,000 for the year 2010, Pakistan is now classified among lower middle-income countries.³ Vohra (2001) has shown that exports have a positive and significant impact on economic growth when a country has achieved some level of economic development. Hence, all factors that can cause increases in exports should be of interest to policy makers who wish to achieve economic growth.

³ <http://data.worldbank.org/about/country-classifications>.

The impact of Pakistani emigrants on Pakistan's international trade with the OECD countries is assessed by obtaining econometric estimates of a gravity model. Data on nine of the major OECD trading partners of Pakistan are used for the period 1990 to 2003.⁴ These countries have a sizeable Pakistani community and also account for one third of Pakistan's total international trade. Table 1 provides relevant data for the 1990s, the latest decade for which data are available.

Table 1. Number of Pakistani emigrants in, and Pakistan's bilateral trade with selected OECD countries over the 1990s

Years	Pakistani emigrants in OECD countries ^a	Trade with OECD countries (Million of United States dollars) ^b	Percentage share of Pakistan's trade with OECD countries
1991	395 713	5 472.3	33.8
1992	423 037	5 559.3	33.1
1993	438 138	5 178.6	33.6
1994	454 612	6 322.2	34.1
1995	507 261	6 332.8	30.8
1996	526 071	6 933.9	34.3
1997	554 688	6 548.1	34.9
1998	583 327	5 498.3	31.9
1999	612 732	5 967.6	31.6
2000	647 380	5 815.3	29.1

Notes: ^a Actual data on stock of Pakistani emigrants were available for census years which vary between countries. For remaining years, these were calculated using a stock-flow formula similar to the one used by Head and Reis (1998) for Canada and its trading partners and Girma and Yu (2002) for the United Kingdom and its trading partners. Details of calculations can be provided by the authors upon request.

^b Pakistan (2004).

⁴ These nine OECD countries include Australia, Canada, Denmark, Germany, Italy, Norway, Sweden, the United Kingdom and the United States of America. Our analysis is limited to these countries as no consistent data are available on the stock of Pakistani expatriates residing elsewhere. We are aware that most emigration from Pakistan is towards the oil rich countries of the Middle East which are also attractive destinations due to their geographic proximity. However, consistent data on their residents of Pakistani origin are hard to find.

Each year, about 240,000 people leave Pakistan to reside in a new country. According to some estimates, about 8 million people of Pakistani origin now reside outside of Pakistan (Pakistan, 2008). These people maintain their contacts with Pakistan individually as well as through their networks and associations. Their impact on international trade is important because, as Kavoussi (1985) has shown, international trade plays a vital role in the economic development of developing countries. Any study that demonstrates the economic impact of overseas Pakistanis on Pakistan will in turn demonstrate their role in the country's economic development.

The rest of this paper is organized as follows: section II provides a review of literature on emigration and trade. Section III presents the economic model to be estimated in this study. Section IV discusses the data used for the estimation of the economic model and also provides variable definitions. Section V presents the characteristics of data used in an econometric estimation of the economic model. The method of econometric estimation of the economic model and its results are discussed in section VI, which also provides concluding remarks and discusses policy implications of the study.

II. LITERATURE REVIEW

Most empirical studies that have investigated international trade effects of international migrants used data for developed countries and have analyzed the collective effects of their resident migrant populations on international trade without focusing on any particular country of origin. For example, with regard to Canada, Head and Reis (1998) found a statistically significant impact of immigrants on imports from and exports to its 136 trading partners. The impact was higher regarding imports, which the authors attributed to a possible preference among immigrants for their home country products, and to immigrants' own involvement in the import business from their countries of origin. Turning to the United Kingdom, Girma and Yu (2002) found that while immigrants from non-commonwealth countries increased both exports and imports, those from commonwealth countries increased exports but reduced imports. This was possibly due to import substitution in the United Kingdom's manufacturing sector, fuelled by higher demand of those immigrants. In the United States of America, Hutchinson and Dunlevy (1999) found a higher effect of immigrants on imports originating from English-speaking countries, thereby concluding that the role of immigrant networks in developing international trade relations is enhanced by the presence of common language and similar culture in the sending and receiving countries of immigrants. Gould (1994) investigated the impact of immigrants on the United States bilateral trade with the countries of origin of its immigrant populations. He found that the trade enhancing effect of immigrants is

stronger in cases of consumer manufactured goods than in cases of producer goods. The stronger impact on consumer manufactured goods is attributed to strong information and knowledge sharing induced by immigrants.

To the best of our knowledge, only three studies have analyzed country-specific trade effects of emigrants and all have used the gravity model approach. Bacarreza and others (2006) found that the marginal effect of emigrant stock on Bolivia's intra-industry trade was small. This was possibly due to the reduction of transaction costs as well as migrants' preference for products made in their countries of origin.⁵ Bolivian expatriates may also have established businesses in Bolivia and in their host countries within the same industries, to serve markets both within Bolivia and outside. For Asian countries, Rauch and Trindade (2002) studied the impact of ethnic Chinese networks on bilateral trade among countries where Chinese emigrants reside. Using data from 63 countries for the years 1980 and 1990, their gravity equation estimates showed that Chinese immigrants significantly affect international trade within countries where they reside. Kumagai (2007) compared the role of ethnic Chinese and Japanese networks in influencing bilateral trade of China and Japan with other countries. It was found that while Japanese networks affect international trade, their impact on trade is not as strong as that of Chinese networks.

In summary, empirical analysis confirms that migrant networks enhance trade between sending and receiving countries, and that this result is largely attributed to a reduction of transaction costs of trade, preference for source country products, language and culture common to migrants, and their countries of origin and current residence. All studies noted above have used a gravity model of international trade.

III. GRAVITY MODEL OF INTERNATIONAL TRADE

Following the empirical literature which was reviewed above, the present study will also use the gravity model approach to analyze data from Pakistan (for brevity, it will be referred to as gravity model only). The gravity model was first developed by Tinbergen (1962) and Poyhonen (1963) to study global trade among countries. In migration literature, this model was first adopted by Gould (1994) who assessed the impact of migrants on bilateral United States international trade relations with home countries of immigrants living in the United States.

⁵ Transaction cost of trade is reduced because migrants have superior legal and market information regarding their countries of origin.

The gravity model of international trade is based on the gravitational law propounded by Newton in the discipline of physics. The gravitational pull between two bodies is proportional to their masses and is inversely related to the distance between them. This analogy can be applied to explain international trade as trade between two countries is directly proportional to the economic masses, usually proxied by the gross domestic products (GDP) of the respective countries, and is inversely proportional to the distance between them due to the fact that trade costs increase with distance. The model is augmented to include other determinants of international trade. For the present study, the following form of the model is estimated.

$$\ln T_{ijt} = \beta_1 \ln \text{ENG} * M_{jt} + \beta_2 \ln \text{NENG} * M_{it} + \beta_3 \ln (\text{GDP} * \text{GDP})_{ijt} + \beta_4 \ln \text{GDPD}_{ijt} + \beta_5 \ln (\text{PGDP} * \text{PGDP})_{ijt} + \beta_6 \ln \text{DIS}_{ijt} + \beta_7 \text{CLT} + \beta_8 \ln \text{TRF} + \mu_{ijt} \quad (1)$$

Where subscript j denotes Pakistan's trading partner and t denotes the time period. T shows the trade flows (export (EXP) and import (IMP) equations are estimated separately), M shows the stock of Pakistani emigrants residing in country j , ENG and NENG are the dummy variables for English speaking and non-English speaking countries respectively, $\text{GDP} * \text{GDP}$ shows the product of gross domestic products of Pakistan and of its trade partner, GDPD denotes the ratio of GDP deflators of Pakistan and its trading partner, $\text{PGDP} * \text{PGDP}$ denotes the product of per capita GDP of Pakistan and of its trading partner, DIS denotes the distance between the capital cities of Pakistan and its trading partners, CLT is the dummy variable used for the colonial ties between Pakistan and the United Kingdom, TRF shows the tariff rate and μ is an error term. Justifications for the inclusion of each variable in the above equation are provided in the next section.

The structural gravity model is stated in multiplicative form. Its logarithmic form provides a linear equation in which the coefficient of each variable is the elasticity of trade with respect to that variable.⁶ To account for autoregressive behaviour of exports and imports, lagged dependent variables are also introduced in each equation. This introduction controls for the long-run impacts of the variables included in equation 1.

⁶ Distribution of logarithmic variables is also more likely to be normal which is a requisite property to obtain Best, Linear, Unbiased, and Efficient (BLUE) estimates in a regression analysis.

IV. DATA USED AND VARIABLE DEFINITIONS

The study is based on a pooled time series and cross sectional data spanning 1990 to 2003. Although most emigrants from Pakistan are destined for the Middle Eastern countries with which Pakistan also has strong trade and investment relationships, we are not able to consider these countries due to a lack of the availability of data on the population of Pakistani migrants who reside there. More consistent data are available to conduct the analysis for only 9 of the 34 OECD countries where a large number of Pakistani emigrants reside. These countries include Australia, Canada, Denmark, Germany, Italy, Norway, Sweden, the United Kingdom, and the United States. Hence, to determine the impact of Pakistani migrants on Pakistan's trade, the analysis in this study is specific to these nine countries.

The gravity model is estimated separately for imports to and exports from Pakistan in order to assess the impact of Pakistani migrant networks on these variables.

The dependent variables are defined as the dollar value of goods and services imported to and exported from Pakistan with regard to the OECD countries included in this study. Consistent data on annual exports/imports between Pakistan and these countries were obtained from the Government of Pakistan (Pakistan, 2004) while other independent variables are discussed below.

The population of emigrants from Pakistan who are living in OECD countries is used to reflect the strength of the network of these expatriates. With an increase in the expatriate population of a country, come greater ties of kinship, friendship and feelings of a shared origin, which following Massey and others (1993), are signs of the formation of a network of migrants originating from a single country. As discussed earlier in this study, this network of migrants can have an impact on the economic relationship between the sending and host countries. A quantitative assessment of the impact of Pakistani migrant networks on Pakistan's international trade is a primary objective of the present study. Hence, this variable is used as one of the independent variables in the present model. Consistent data on annual emigration are hard to obtain from Pakistani sources. The Migration Policy Institute (2005) publishes data on immigrant flows and populations (stocks) throughout the world, based on data obtained from the official sources of each host government. Therefore, data on Pakistani migrants residing in OECD countries are obtained from the official website of the Migration Policy Institute. However, since annual data on stock of immigrants are usually available after each census year, these are collected with a gap of five or ten years, depending on when a census is conducted in a country. Therefore, annual

inflows of immigrants had to be combined with stock of immigrants at the time of each census to estimate the annual stock of immigrants.⁷

One important determinant of international trade is the language used for communication among trading partners. Commonality of languages used in countries engaged in trade may reflect the strength of their past and current ties which can be an impetus for their continued cultural relationships. At the same time, it can also help reduce the transaction cost of negotiating business contracts between traders. In Pakistan, most legal documents are drafted in English, which is also the main medium of instruction at the post-secondary level of education. In our sample, English is the official language of four countries: Australia, Canada, the United Kingdom, and the United States. We expect the network effect of Pakistani expatriates in these countries to be stronger on bilateral trade through further reduction in transaction costs. Hence, we have introduced two separate dummy variables, ENG, which takes a value 1 for these English speaking countries and zero otherwise; and NENG, which takes a value of 1 for the non-English speaking countries and zero otherwise. Each of these variables is interacted with the stock of Pakistani migrants.

We also use the product of the GDP of Pakistan with that of its trade partner to proxy for their economic masses. In a simple macroeconomic model, each country's GDP determines its import. Hence, while imports from Pakistan are determined by the country's GDP, its exports are determined by the GDP of its trading partner country. The use of the two countries' GDP in multiplicative form is based on the expectation that the impact of each country's GDP on its trade with the other country is enhanced by the latter's GDP and is consistent with the previous studies which were reviewed in the previous section. The trade enhancing effect of this variable is probably because there will be mutual agreements between trading countries for adopting flexible trade policy towards each other. Data on GDP were obtained from World Bank (2005).

We have also included a ratio of GDP deflator of Pakistan with its trading partner, the product of its GDP per capita with its trading partner, and a distance variable giving the distance of Islamabad, the capital city of Pakistan, from its trading partner's capital city.

⁷ The data on stock and inflows of immigrants are obtained from the website of the Migration Policy Institute, i.e. www.migrationpolicy.org. Details on the calculations of missing data in each country can be provided upon request.

The inclusion of the ratio of GDP deflator allows the incorporation of the effect of relative prices as suggested by Head and Reis (1998), who argue that in the absence of the law of one price, due to prevailing trade barriers, relative prices have an effect on trade.⁸ A rise in this ratio is expected to increase exports and vice versa. The data on GDP deflators were obtained from World Bank (2005).

The per capita GDP is usually considered a proxy for the average wealth in each country. The product form of per capita GDP of Pakistan and its trading partner is used, following Rauch and Trindade (2002), to assess the impact of their joint wealth on bilateral trade.

The distance variable incorporates the effect of transaction and transport costs of trade. It is expected that the transaction and transportation costs of trade rise with an increase in distance between trading partners. Transaction costs also rise due to increased cultural disparity and lack of knowledge about the operation of each other's economic and trading system. In this study, distance between Pakistan's capital city, Islamabad, and the respective capitals of trading partners is calculated by great circle formula.⁹

Being a former colony of the United Kingdom, Pakistan has more established ties with the United Kingdom than with any other country in our sample. La Porta and others (1998), among others, argue that former British colonies inherited a legal system from their colonizer that produced superior economic outcomes for them. Head and others (2010) found a gradual trade deterioration with the colonizers following independence. A dummy variable for colonial ties is included in our model to incorporate the effect of colonial ties with the United Kingdom.

To incorporate the effect of changing trade restrictions, we also include a lagged value of average tariff rate.¹⁰ Data on tariff rates are obtained from the Government of Pakistan (Pakistan, 2004; 2008).

⁸ Trade barriers are variables that increase cost of trade and include transaction cost, information cost, tariffs, import or export quota, distance, etc.

⁹ According to Head (2003) the great circle formula is calculated as follows:

$$D_{ij} = 3,962.6 \text{ arc cos } ([\sin(Y_i) \sin(Y_j)] + ([\cos(Y_i)\cos(Y_j)]\cos(X_i-X_j)))$$

Where X is longitude in degrees multiplied by 57.3 to convert it to radians and Y is latitude multiplied by -57.3 (assuming it is measured in degrees west).

The data on distance are obtained from the website <http://www.cepii.fr/anglaisgraph/bdd/distances.htm> which is an official website of Centre d'Etudes Prospectives et d'Informations Internationales, a French research centre in international economics.

¹⁰ The average tariff rate is expressed as a percentage of imports. We include a lagged value to avoid any endogeneity issue in the import equation.

V. CHARACTERISTICS OF THE DATA

Before presenting the econometric results, we discuss the data characteristics by obtaining the average values of the variables included in the gravity model. These are presented in table 2. For ease of interpretation, average values of actual data are reported, not their logarithmic transformations. The average growth rates of these variables during the period of study are also provided in the same table.

Table 2. Descriptive statistics of variables used in the regression model

Variables	Average	Average annual growth rate (per cent)
EXP (\$)	3.5 billion	7.2
IMP (\$)	2.7 billion	4
M	528 000	5
GDP*GDP (\$)	8.85E+23	10
GDPD (\$)	1.48	-9
PGDP*PGDP (\$)	110.3 million	7
TRF	0.19	-8
DIS (Kilometres)	7 215	-

Notes: 1) EXP = Pakistan's exports to its OECD partners, IMP = Pakistan's imports from its OECD partners, M = Stock of Pakistani emigrants living in the host country, GDP*GDP = Product of Pakistan and its trading partner gross domestic products, GDPD = GDP deflators ratio of Pakistan with respect to each of its trading partner, PGDP*PGDP = Product of per capita gross domestic products of Pakistan and each of its trading partner, TRF = Lagged value of average tariff (Import duty/imports) and DIS = Distance between Pakistan and its trading partners capitals. 2) National averages for exports are \$9,678,105,010 which grew at 7 per cent per annum during the period; imports are \$11,130,314,989 which grew at 3 per cent during the period. 3) Sample includes following countries: Australia, Canada, Denmark, Germany, Italy, Norway, Sweden, the United Kingdom and the United States. Complete data are available only for Denmark, Sweden and the United States. For other countries in the sample, migrants' stock data are missing for some years. Therefore, models are estimated using unbalanced data. Data can be obtained from authors upon request.

During 1990-2003, an average of 528,000 Pakistani migrants resided in the nine OECD countries in any given year, and their population grew at an annual rate of 5 per cent. There is no standard value with which the average value of GDP*GDP can be compared; its positive growth rate of 10 per cent is an indicator that the joint size of the economies of Pakistan and the OECD grew during our period of analysis.¹¹ The average value of the GDP deflator ratio indicates that the combined price level in its trading partners of the OECD region has been about 48 per cent higher than the price

¹¹ The average growth rate of GDP was 5.9 per cent in Pakistan and 3.9 per cent in OECD.

level in Pakistan itself. This is most likely because of higher wages in OECD. However, the negative growth rate in this variable indicates a closing of the gap in prices over time. The average value of PGDP*PGDP grew at 7 per cent per annum indicating a growth in joint wealth of Pakistan and its trading partners.¹² The average distance from Pakistan to one of its trading partners is 7,215 kilometres. The tariff rate declined over the period at an average rate of 8 per cent indicating a tendency towards flexible trade policies.

Over the period, exports from Pakistan to the nine OECD countries were 28 per cent higher than its imports, and grew faster (at 7 per cent per year) than imports (which grew at 4 per cent only). Imports from OECD also grew faster than did the total imports in Pakistan, which grew only at a 3 per cent rate, while exports to OECD grew slower than did their total exports, which grew at a rate of 7 per cent. Overall, 36 per cent of the total exports of Pakistan in a given year went to the nine OECD countries and 24 per cent of its imports came from them.¹³

In table 3 we provide the means, average annual growth rates and standard deviations of the migrant stock and trade variables separately for the English and non-English speaking countries that are included in our sample.

Table 3. Descriptive statistics of important variables for English and non-English speaking OECD countries

Variables	Migrants stock		Exports		Imports	
	English	Non-English	English	Non-English	English	Non-English
Mean	474 000	54 500	2.54 billion ^a	942.3 million	1.72 billion ^a	1 billion
Average growth rate (per cent)	4.9	8.5	9.7	2.1	5.2	2.7
Std Dev.	139 076	24 839	847.11 million	104.21 million	342.93 million	253.4 million

Source: Authors' own calculations based upon data obtained from the Migration Policy Institute's website (<http://www.migrationinformation.org/datahub/comparative.cfm>) and Pakistan (2004).

Note: ^a Exports and imports mean values are in US dollars.

¹² The PGDP growth was 1.9 per cent in Pakistan and 3.3 per cent in the OECD countries.

¹³ Data reported in this paragraph are not reported in table 2.

As expected, stocks of Pakistani migrants residing in English speaking countries are higher than those residing in non-English speaking countries. Pakistan's international trade with English speaking countries is also higher. The higher annual average growth rate of Pakistani migrants in non-English speaking countries may be reflective of stronger policy initiatives adopted in those countries to attract immigrants.

VI. ECONOMETRIC RESULTS

The results of our econometric estimations, which utilize panel data, are provided in table 4. The fixed effect model has been criticized due to the presence of heteroskedasticity of unknown form between the error term and the independent variables (Santos and Tenreyro, 2006). Therefore, we used the generalized least squares (GLS) method to account for the unobserved heteroskedasticity that could result from correlation between the error term and the independent variables. We also estimated a dynamic version of the model by including lagged values of exports and imports in both models to analyze emigrants' impacts in the long run. Data were checked for multi-collinearity using simple correlations between independent variables and Klein's rule of thumb. These two tests are discussed in annex table A.1. We also tested for data stationarity using Levin, Lin and Chu (2002), whose results are reported in annex table A.2. The country specific effects are reported in annex table A.3.

The coefficient of tariff rate (TRF) variable is statistically insignificant in cases of static export equation, but is significant and unexpectedly positive in cases of static import equation. One possible reason is that a decline in the international prices of significant import items, such as capital goods, has offset the expected negative effect of declining tariff rates. All other variables are statistically significant in the static model and have displayed expected results. In the dynamic models, which control for the autoregressive behaviour of the corresponding trade variables, GDPD and TRF have statistically insignificant impact on exports, while DIS, CLT and TRF have statistically insignificant impact on imports. That the magnitudes of all coefficients are smaller in the dynamic model indicates that the corresponding variables have a stronger long run impact on trade variables.

Our main variable of interest is migrant stock. In the case of exports, this variable has a positive sign and is statistically significant in English speaking countries, but insignificant in non-English speaking countries. In the case of imports, this variable is statistically significant and negative for both English and non-English speaking countries. Thus, commonality of language appears to have a stronger

Table 4. Estimation results of the Augmented Gravity Model of trade

Variables	Static		Dynamic	
	EXP	IMP	EXP	IMP
EXP _{t-1} , IMP _{t-1}			0.81* (0.04)	0.72* (0.06)
M*ENG	0.13* (0.01)	-0.30* (0.03)	0.03* (0.03)	-0.09* (0.04)
M*NENG	-0.03 (0.01)	-0.41* (0.05)	-0.00 (0.01)	-0.14* (0.07)
GDP*GDP	0.87* (0.02)	1.06* (0.02)	0.17* (0.03)	0.29* (0.06)
GDPD	0.80* (0.17)	2.04* (0.60)	0.21 (0.18)	1.35* (0.42)
PGDP*PGDP	-0.50* (0.04)	-1.56* (0.18)	-0.13* (0.03)	-0.41* (0.16)
DIS	-2.17* (0.12)	-1.00* (0.27)	-0.40* (0.12)	-0.41 (0.24)
CLT	-0.93* (0.09)	0.36* (0.17)	0.21* (0.06)	0.01 (0.10)
TRF	0.21 (0.13)	0.73* (0.15)	0.12 (0.30)	-0.13 (0.55)
R ²	0.97	0.89	0.99	0.95
No. of observations	116	116	111	111

Notes: ENG and NENG are dummy variables for English and non-English speaking countries respectively. CLT refers to colonial ties. For other variables and the list of countries included in the sample, please see notes at the bottom of table 2. Equations were estimated by including a time trend variable to account for systematic changes in macroeconomic and trade environments.

* Statistically significant at 5 per cent level. Values in parentheses are White heteroskedasticity robust standard errors.

influence in increasing exports from Pakistan. With regard to imports, the negative impact is probably due to import substitution activities of the emigrants. It seems that after receiving the necessary technological training and acquiring capital in their host countries, emigrants tend to engage in production of those products and services within Pakistan, which Pakistan was previously importing.

Based on the results of the dynamic model, it may be inferred that (a) migrants' knowledge and business contacts work both in the short and long run, and (b) their import substitution effect is higher than their export enhancement effect in the long run.

Our descriptive statistics reported in table 3 showed that exports from Pakistan to English speaking OECD countries are growing three times faster than exports to non-English speaking countries, and that the level of migrant stock is about 8.5 times higher in English speaking countries. One reason for exports enhancing the effect of migrants living in those countries is the sheer size of the countries. However, our data also show that the average growth rate of emigrants in non-English speaking countries is almost double that of English speaking countries. Thus, it can be expected that as migrant stock goes above some threshold level in non-English speaking countries, their impact on the exports of Pakistan may rise.

We also calculate the monetary impact of each additional migrant on exports and imports between their countries of residence and Pakistan. These values, reported in table 5, are based on the estimated migrant elasticities of the two trade variables, and are evaluated at their average values and the average values of the migrant stock variable. Each additional migrant contributed \$1,800 to net exports in English speaking countries while this contribution was lower in non-English speaking countries.

Table 5. Impact of each additional migrant on Pakistan's international trade per year, 1990-2003 (\$)*

<i>Migrants residents of</i>	Export	Import	Net export
English speaking countries	700	-1 100	1 800
Non-English speaking countries	NA	-710	710

Notes: * Based on the estimated elasticity value of exports and imports with respect to migrant stocks and evaluated at mean values of exports, imports and migrant stock. NA (not applicable) is used where the impact is statistically insignificant in econometric model.

Table 6 converts the above monetary values into percentage of contribution by additional migrants towards *net exports*. With non-English speaking countries, Pakistan experienced a trade deficit from 1990-2003 on average. However, a positive effect of each additional migrant on *net exports* (table 5) was their import substitution. Hence, the negative values in cases of non-English speaking countries, as reported in table 6, indicate the percentage by which trade deficits between those countries and Pakistan would have risen had there been no growth in migrant stock.

Table 6. Percentages of annual growth in net exports contributed by additional migrants, 1990-2003*

<i>Migrants resident of</i>	<i>Contribution to net export growth (%)</i>
English speaking countries	27
Non-English speaking countries	-46

Note: * Based on table 5 results and average annual growth of emigrants to the two types of countries. A negative value occurs because of Pakistan's trade deficit with non-English speaking countries and indicates the percentages by which annual growth in migrant stock reduced trade deficit.

VII. SOME CONCLUDING REMARKS AND POLICY IMPLICATIONS

Using panel data between Pakistan and the nine OECD countries for the period of 1990-2003, this study has found that expatriates from Pakistan have a positive effect on the country's exports to English speaking countries and negative effects on imports from both English and non-English speaking countries.

A positive impact on exports could be because most buyers of products made in Pakistan are emigrants from Pakistan, who may have strong preferences for their home country's products. The negative impact of these emigrants on their host countries' exports to Pakistan may be because they are engaged in import substitution in Pakistan, made possible through their exposure to foreign environments and access to the necessary capital required to establish import substitution industries.

The revelation that expatriates from Pakistan have export-enhancing and import substitution effects on Pakistan has an important implication for economic growth in developing countries. Using time-series data, Vohra (2001) shows a strong export-growth linkage in the Philippines, Malaysia, and Thailand.¹⁴ Her analysis can also be used to imply that in the case of Pakistan, this linkage will be strengthened as it has now moved from being a low-income country to a lower middle-income country. The author suggests that pursuing liberal market policies that encourage exports could have a positive impact on economic growth. The findings of the present study, which are in line with those of Bolivia and China, as reviewed earlier, suggest that trade policies in developing countries should also view expatriate networks as another

¹⁴ Literature, summarized by Vohra (2001), attributes export-growth linkages to: (a) increased specialization and the spillover effects of the export sector's growth, (b) greater capacity utilization, (c) diffusion of modern technology, and (d) economies of scale in production.

viable trade enhancing source. This source can be strengthened through proper institutional arrangements at government levels. Governments could provide support to their overseas residents and to those who decide to return in establishing businesses in their countries of origin in order to promote international trade. Establishment of counselling centres, mentorship programs to connect overseas residents with local businesspersons, and flexibility in movement of financial and physical capital can be important measures in this regard. China's government has already taken some important measures in this area. It encourages overseas entrepreneurs, including ethnic Chinese, to open high-tech firms in the country. As Zweig and Rosen (2003) note, those who relocate to Chinese cities where they may not have personal networks such as Beijing, Shenzhen or Shanghai, are encouraged to move into science parks, where local officials expedite the paperwork and limit the regulatory constraints they would normally face. Holders of foreign passports are given long-term residence permits, and in some cities the authorities and universities also help with their children's educational requirements as well as assist with any other problem that arises. In this regard, Pakistan lags behind China although some progress is being made through the formation of the Ministry of Labour, Manpower and Overseas Pakistanis. Expatriates of Pakistan are now able to apply for a National Identity Card for Overseas Pakistanis (NICOP) if they wish to acquire property, start a business, open a bank account, or seek employment. They can also open bank accounts in US dollars and repatriate their funds to their countries of residence. Holders of NICOP travelling on a foreign passport are also allowed a visa free entry into Pakistan.

Anecdotal evidence suggests that some expatriates of Pakistan are already operating businesses in Pakistan by obtaining franchises, enabling them to produce foreign products within Pakistan. The opening of Kentucky Fried Chicken (KFC) and McDonalds restaurants in various cities of Pakistan as well as the Reebok plant in Sialkot is an example. Some emigrants of Pakistan, who have returned to Pakistan from developed countries, now have the necessary skills, training and capital, and have established businesses in Pakistan. Omer Jibran Engineering Industries, Ghazi Fabrics, Bestway Cement and Food Industry are some such examples. These businesses will not only help reduce import reliance but will also help reduce unemployment.

Pakistan is among the countries that are major immigrant sources to many countries of the western world. By providing quantitative estimates of the impact of Pakistani emigrants on the exports and imports of their country of origin, the present study has provided some input to the debate on the economic impact of emigration in a developing country, whose results can be confirmed or denied in other topic based survey studies in future.

As is the case with other studies relating to developing countries, the present study also has a few caveats that mostly relate to the availability of data. One such caveat is our inability to analyze the impact of different immigrant entry classes (refugees, family class and independents) on international trade. As has been noted by Head and Reis (1998), independent class immigrants are likely to have a stronger impact on trade, followed by the family class, with refugees likely to have no significant impact. This is because independent and family class immigrants are more likely to be active in business and keep in contact with their home country while refugees are less likely to have such contacts with their home country. Another caveat is our inability to perform separate analysis of the trade impacts of expatriates on homogeneous and differentiated goods. Rauch and Trindade (2002) suggest that the information requirements for trade are greater in cases of differentiated goods than in cases of homogeneous goods. With regard to ethnic Chinese networks, these authors have found that migrants have more impact in the case of differentiated goods rather than homogeneous goods. Our data restrictions prevent us from pursuing these analyses in the present paper.

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APPENDIX

Annex table A.1. Correlation coefficients among variables

	Migrants stock	GDP deflators ratio	GDP*GDP	PGDP* PGDP	Tariff rate
Migrants stock	1.00	-0.15	0.72	0.00	-0.11
GDP deflators ratio	-0.15	1.00	-0.21	-0.57	0.66
GDP*GDP	0.72	-0.21	1.00	0.03	-0.14
PGDP*PGDP	0.00	-0.57	0.03	1.00	-0.34
Tariff rate	-0.11	0.66	-0.14	-0.34	1.00

As annex table A.1 shows, the highest correlation coefficient is found between GDP*GDP and migrant stock variables at 0.72, which is below the 0.8 threshold value suggested by Gujarati (1995) for considering multicollinearity to be affecting the t-values of regression results.¹⁵ We can thus consider our t-tests regarding the significance of coefficients to be accurate.

Annex table A.2. Levin Lin and Chu (LLC) test results for stationarity of variables used in Augmented Gravity Model of trade

Variable	Test statistic	Probability
EXP	-2.86	0.00
IMP	-2.36	0.00
M	-11.16	0.00
GDPD	-2.63	0.00
GDP*GDP	-4.02	0.00
PGDP*PGDP	-4.06	0.00
TRF	-27.91	0.00

Note: The equation estimated for the unit root tests included intercept and trend. Data are used in logarithmic form. For variable legend, please see the notes under table 2.

¹⁵ Multicollinearity was also found to be low based on the Klein's rule of thumb, as suggested by Gujarati (1995: 337).

Annex table A.3. Coefficients of country specific dummies

Country ^a	Exports	t-values	Imports	t-values
Australia	-96.33209	-1.689917	153.7935	1.314138
Canada	-97.98064	-1.700786	152.8847	1.292653
Denmark	-92.79422	-1.654104	156.2163	1.356366
Germany	-98.26155	-1.619888	171.3641	1.376036
Italy	-97.59448	-1.625367	169.2602	1.373060
Norway	-92.72261	-1.661567	154.3113	1.346909
Sweden	-93.39684	-1.640808	159.2306	1.362576
United Kingdom	-99.18262	-1.694077	155.6047	1.294580
United States	-102.6632	-1.679388	163.4259	1.302164

Note: ^a Estimations are carried out while dropping the distance variable, which results in perfect multicollinearity with country specific dummies.