Immigration, Trade Costs and Trade: Gravity Evidence for Greece

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Abstract

This paper investigates the influence of immigration into Greece on the volumes of Greeces bilateral trade using a gravity modelling approach. An augmented gravity model is estimated using a panel data set for the period 1981-1991. The results show that immigration had a positive impact on the volume of Greeces bilateral exports, but no effect on its bilateral imports. This is consistent with immigration reducing transactions or trading costs on Greeces exports.

- **JEL Classification: F10, F22**
- **Key words: Trade, migration, gravity models**

I. Introduction

In recent years, the world has experienced a large increase in the international migration of people. Free movement of labour has been one of the fundamental objectives of the European Union Single Market Programme (SMP). The SMP aims to increase trade between member countries by eliminating trade and other policy barriers. However there remain transportation and transaction costs that inhibit international trade activity. Immigrants can lower transaction costs by serving as trade intermediaries. By virtue of links to their home countries they may experience lower trade costs and thereby be more likely to trade than non-

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immigrants. In addition to better information about market opportunities, immigrants may also possess preferences for particular varieties of foreign products and thus may increase the demand for home-country imports. In this paper we examine whether there is evidence of a positive link between immigration and trade volumes, taking Greece as a case study. This issue is important in assessing the present and the future economic consequences of growing immigration and its policy implications, especially for Greece as the host country.

The plan of the paper is as follows. In section 2 below, we review the general developments in Greek immigration and trade. In section 3 the mechanisms of immigrant links to trade are described, as is the existing empirical literature using gravity models to model these links. In section 4 the model specification and the data used for the empirical application are described. In section 5 the results of regressions and the main findings are presented. Finally section 6 summarises and concludes.
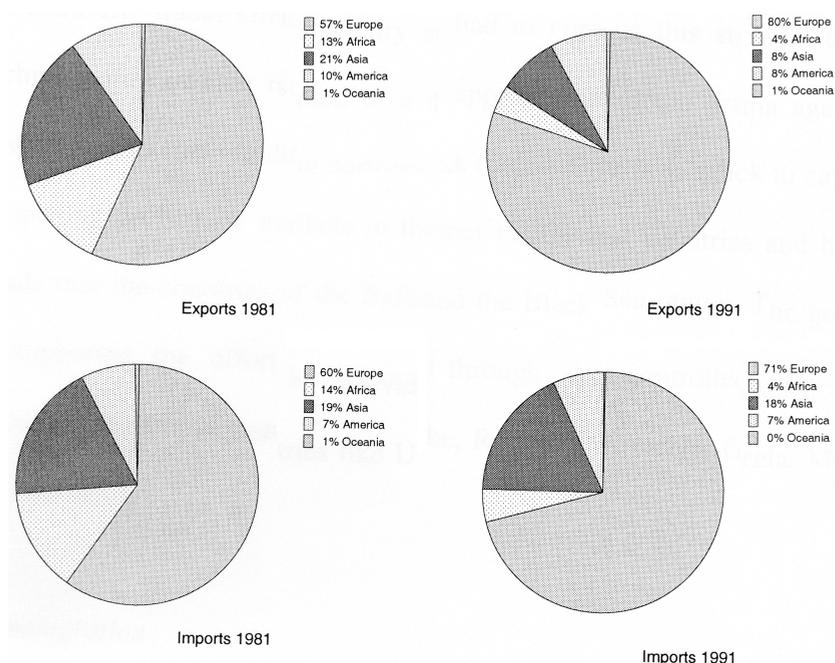
II. Greek immigration and trade

A. Greek trade

After accession to the European Community in 1981, import and export regimes moved in line with EU legislation. With the reduction of trade barriers, Greeces trade with the EU increased (see Figure 1), particularly with Germany, Italy, France, UK and the Netherlands. The government is now increasingly focusing its trade expansion policies on the central and eastern European countries.

Greece's main trading partners are currently other EU members, with about 65% of total Greek trade being with other EU states in 1997. Most of Greeces export markets were developed in 1960s and 1970s, a period when Greece was a relatively low-wage economy. However, as competition developed from countries where labour is cheap enough to maintain low prices even after payment of the common EU external tariff, Greek exports have faced stiff extra-regional competition. Firms have, therefore, sought to re-orientate their production towards goods of higher quality and higher added value.

Greece's trade deficit began to grow sharply after its entry into the EU in 1981. Before EU entry, Greek industrial products were typically subject to over 40% effective protection by the use of tariffs, quotas and other restrictive measures. However by the early 1990s nearly all non tariff controls had been removed on

Figure 1. The pattern of Greek Trade, 1981 and 1991

Exports 1981

- 57% Europe
- 13% Africa
- 21% Asia
- 10% America
- 1% Oceania

Exports 1991

- 80% Europe
- 4% Africa
- 8% Asia
- 8% America
- 1% Oceania

Imports 1981

- 60% Europe
- 14% Africa
- 19% Asia
- 7% America
- 1% Oceania

Imports 1991

- 71% Europe
- 4% Africa
- 18% Asia
- 7% America
- 0% Oceania

intra and extra EU trade. Greek industry also had to cope at this stage with the hard drachma policy, which resulted in a real appreciation of the drachma against the currencies of its main trading partners. Greek traders have been quick to capitalise on the opening up of new markets in the former communist countries and have made inroads into the countries of the Balkans and the Black Sea region. The government has supported the effort by providing, through state-controlled banks, rolling commercial credits to countries like Ukraine, Romania, Armenia, Georgia, Moldova and Azerbaijan.

B. Immigration

Historically, Greece has been a country of emigration rather than immigration. Return migration first exceeded emigration in 1975 (King, Fielding and Black 1997, p3). Immigration to Greece was limited until the late 1980's, when political developments in neighbouring Balkan countries led to a dramatic increase in the
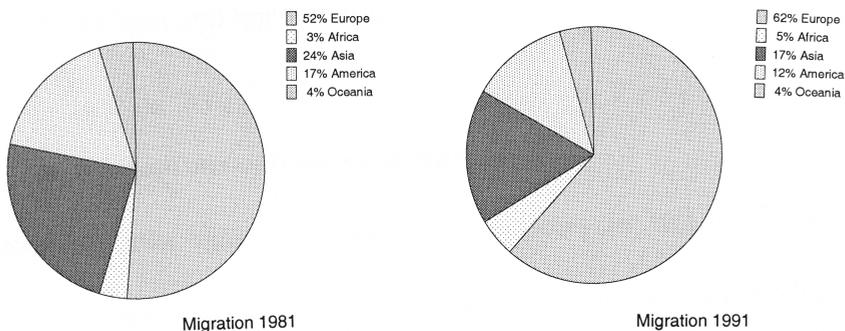
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[1]Interview with Eustathiadis, General Secretary of Public Order Ministry; Interview with Spanou, Chair of Labour Ministry Committee on Migration.

number of people willing and able to cross borders to settle in Greece. The availability of low paid manual jobs in the low productivity agricultural sector, and the permeability of Greek borders contributed further to the dramatic rise in the number of immigrants in Greece. Current estimates indicate that up to one million foreigners reside in Greece, a figure equivalent to 10% of the population. This had a transforming effect on a country that previously had a population that was linguistically, ethnically and religiously homogenous.

Also during the 1980s many Greeks who had emigrated in previous years started returning to the country. A large number of Greeks, who had fled to countries of the communist bloc during the Greek civil war, started returning to their homeland, following a favourable change in legislation. This included an increase in immigrants from Eastern Europe, with the collapse of the former communist bloc. In Figure 2 the increase in European immigrants from 1981 to 1991 was largely from Eastern Europe. Another change in the composition of migration was the decrease of immigrants from Asia. Generally we can conclude that Greece had a high dependence on Europe in both decades, one that was more pronounced in trade than in migration.

Some foreign workers in Greece are not reflected in our data. Data on illegal migration to Greece has recently become available from the Greek Employment Observatory. The majority of those identified are manual or unskilled workers seeking employment mainly in the agricultural sector or in urban areas in construction. There is a substantial differentiation between males and females in terms of age, education, marital status and profession (see Lianos, 2001). As well as illegal immigrants, there are migrants from EU member states for whom there are no reliable data as they move freely between borders. There is also likely to be

Figure 2. Origins of Greek Migrants, 1981 and 1991

52% Europe	62% Europe
3% Africa	5% Africa
24% Asia	17% Asia
17% America	12% America
4% Oceania	4% Oceania

Migration 1981   Migration 1991

inward movements from the EU of people with refugee status. Also, there are many tourists, particularly from EU countries, who stay some time in Greece and continue working for some time in the secondary and tertiary sectors.

III. Trade migration relationship

Although many factors may have contributed to contemporaneous movements in trade and immigration, there is evidence from previous studies that immigrants may play a role in influencing bilateral trade flows. In particular, it is postulated that immigrant links to the home country can have an important impact on bilateral trade flows between the host and home countries.

A. The mechanisms of immigrant-trade links

Immigrant links may influence bilateral trade flows in two basic ways: Firstly, immigrants tend to bring with them a preference for home-country products. This will result in a direct increase in the host countrys imports of these goods; Secondly, immigrants bring with them foreign market information and contacts that can lower transactions costs of trade. This second mechanism suggests a broader influence and predicts a direct increase in both export and import flows between the host and home countries resulting from lower transactions or trade costs.

Immigrant links can decrease the transaction or trade costs to trade in several ways. Firstly, the native language of the immigrants can become known, or used more widely by the host country residents. Consequently, there would be a larger group of individuals in the host country, immigrants and non-immigrants, who are familiar with or competent in the languages of the host and home countries. This reduces trading costs associated with communication barriers. Secondly, if products are differentiated across countries and immigrants bring information about their home-country products and preferences, the costs of obtaining foreign market information in the host country will decrease. Finally, because trade often depends on contacts for delivery and payment, the development of trust through immigrant links can decrease the costs associated with negotiating trade contracts and ensuring their enforcement. While trade flows between developed countries may benefit modestly from these effects, trade between developed and developing countries may be expected to be influenced relatively more because formal trade contracting is often not as deeply routed and institutionalised in developing

countries as it is in developed countries.

The importance of these information effects, of course, will depend on the initial amount of foreign market information in the host country and the ability of immigrants to relay information and to integrate their communities into the host country. The initial amount of information and the ability to relay information, in turn, may depend on the educational level of immigrants, the length of their stay in the host country, and the size of the immigrant community.

B. Gravity models and migration

Before defining the general specification of the model to be estimated we review some of previous empirical studies which use gravity models and test the effects of migration on trade.

The relationship between immigration and trade has only recently been investigated. Gould (1994), using a gravity model and a panel data set of forty-seven U.S. partners, finds that trade is positively influenced by immigration, with greatest effects on exports. Head and Ries (1998), using Canadian trade data with 136 partners, also find that immigration has a significant positive relation to bilateral trade; with a 10 per cent increase in immigrants leading to a 1 per cent increase in exports and to a 3 per cent increase in imports. Dunlevy and Hutchinson (1999) also uncover evidence of a pro-trade impact of immigration on U.S. imports in the late nineteenth and early twentieth centuries. Girma and Yu (2002), using an augmented gravity model, study bilateral trade between the UK and 48 trading partners. They find that immigration from non-Commonwealth countries has a significant export-enhancing effect. By contrast, immigration from Commonwealth countries is found to have no substantial impact on exports. They propose that, since social and political institutions in Commonwealth countries are similar to those of the UK given the earlier colonial connections, immigrants from former colonies do not bring information that substantially reduces the transaction cost of bilateral trade. Recent work by Dunlevy and Hutchinson (2001) tests the hypothesis that immigrants generate beneficial externalities in their host countries to expand foreign trade. Their data examines U.S exports to 17 European countries at 5-year intervals. Migrant stock effects were found to be positive and significant for trade as a whole but proportionately greater for particular regional groupings of countries that reflect the historical pattern of immigration to the US. Moreover, the impact of the stock of immigrants on exports dissipated earlier than it did on imports.

IV. Model specification and data

To analyse the link between immigration and trade, we use a gravity equation, augmented with migration variables. The gravity model is a model of the flows of bilateral trade based on analogy with the law of gravity in physics[2]. The model assumes that a flow from origin i to destination j can be explained by economic forces at the flows origin, economic forces at the flows destination, and economic forces either aiding or resisting the flows movement from origin to destination. The specific functional adopted is[3]:

$$y_{it} = \gamma_0 M_{it} + \beta_0 GDP_{it} + \beta_1 GDPC_{it} + \beta_1 Dist_{it} + D_t + \varepsilon_{it} \qquad [1]$$

where,

y_{it} = Greeces exports to (or imports from) country i at time t

y_{it} = Immigrant stock originating from country i at time t

GDP_{it} = GDP of country i at time t

$GDPC_{it}$ = GDP per capita of country i at time t

$Dist_{it}$ = Great Circle distance from capital of country i to Athens

GDP is a measure of the partner country's 'economic mass'; per capita accounts for the wealth effect of the trading partner, with wealthier countries being hypothesized to be more open to international trade; distance to proxies frictions to trade associated with geographical distance between trading partners. Time dummies (D_t) capture other macroeconomic and trade policy factors that impact on trade.

Trade data is taken for the period 1981-1991 from the OECD International Trade by Commodities Statistics, with population and GDP taken the World Development Indicators. The distance measures are Great Circle distance between Athens and the capital city of the partner country.

Information on the stock of immigrant by country of origin is obtained from the 1981 and 1991 Population Censuses from National Statistical Service of Greece. The flow data are from Eurostat. We estimate the annual stocks of immigration (M_{it}) from country i at time t by using the following stock-flow rule:

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[2]The gravity equation has been long recognised for its consistent empirical success in explaining many different types of flows, such as migration, commuting, tourism, and commodity shipping.

[3]All variables are in real terms and in natural logarithms.

$$M_{it} = (1 - \delta)M_{it-1} + F_{it} \qquad [2]$$

Where F_{it} is the inflow of immigrants and δ is the attrition rate of the stock as a result of death or departure from Greece.

A particular problem faced with the Greek data is an absence of flow data prior to 1985. In order interpolate the missing years we adopt three different methods: firstly, using the same flows as in 1985 for all the earlier years; secondly, filling the missing years with the mean of the flows of the available years; thirdly, using the trend to construct the flows for the missing years.

Initially we assume that δ is constant across time and countries. Using the stocks from 1981 and 1991 Censuses and the annual flow data for the countries we estimated the three different δ via the following non-linear equation[4]:

$$M_{i, 1991} = (1 - \delta)^{10}M_{i, 1981} + \sum_{i=1}^{10} (1 - \delta)^{i-1}F_{1991-i} + \varepsilon_{it} \qquad [3]$$

Solving the equation we obtain the results for δ in Table 1, column 1. This indicates and annual attrition of between 17 and 20%.

Six countries with unusually low immigrant outflows (Cyprus, Former Soviet Union, Turkey, Canada, Australia, United States) are not well modelled by this specification. We therefore split the countries into two groups and re-estimate δ for each subgroup. Specifying the model in this way provides a better fit for the data. The six countries documented above have attrition rates of 8-8.5% compared with 27.5-29% for the rest of the sample. As is evident form Table 1, similar results are obtained by all three methods. In what follows we use stocks generated using method 1.

Table 1. Estimates of migrant stock attrition rates 1981-91

Method	1	2	
		Group1	Group2
1	0.1773437 (11.98)	0.2767371 (30.61)	0.0853441 (5.31)
2	0.169968 (11.57)	0.2754356 (27.10)	0.0813174 (5.34)
3	0.1989637 (11.81)	0.2897642 (31.91)	0.0856692 (5.06)

Notes: Group2 consists of Cyprus, Former Soviet Union, Turkey, Canada, Australia and the United States

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[4]This is conducted using the NL command in STATA.

V. Regression analysis and key findings

The results of the basic gravity equation for imports and exports, for the period 1981-91, are given in Table 2, columns 1 and 2[5]. The coefficient on GDP and GDP

Table 2. Gravity Model Estimates of Imports and Exports for Greece 1981-1991

	1	2	3	4	5	6	7	8
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
y_{t-1}					0.695	0.749	0.668	0.719
					(10.56)**	(17.21)**	(9.42)**	(15.73)**
								(15.73)**
GDP	0.623	0.568	0.819	0.519	0.205	0.137	0.279	0.142
	(12.37)**	(9.92)**	(16.07)**	(13.76)**	(3.45)**	(3.12)**	(3.61)**	(4.23)
GDPC	0.536	0.421	0.528	0.280	0.154	0.133	0.165	0.122
	(10.06)**	(7.49)**	(8.39)**	(5.61)**	(3.33)**	(3.81)**	(3.37)**	(4.28)**
Dist	-0.745	-1.502	-0.991	-1.086	-0.235	-0.354	-0.320	-0.314
	(11.17)**	(19.27)**	(11.20)**	(18.88)**	(3.45)**	(4.57)**	(3.92)**	(4.70)**
M	-0.038	0.201	-0.034	0.283	-0.028	0.049	-0.034	0.080
	(0.99)**	(4.58)**	(0.80)	(6.64)**	(1.02)	(1.90)	(1.10)	(3.57)
PF			17.395	-2.066			5.059	-1.519
			(5.85)**	(0.39)			(2.07)*	(0.33)
PF*GDP			-0.564	0.082			-0.165	0.019
			(5.09)**	(0.51)			(1.77)	(0.16)
PF*GDPC			0.078	0.027			0.025	-0.094
			(0.40)	(0.11)			(0.15)	(0.48)
PF*Dist			-0.408	0.217			-0.135	0.267
			(0.89)	(0.30)			(0.41)	(0.51)
PF*M			0.024	-0.639			0.030	-0.179
			(0.27)	(4.01)**			(0.43)	(2.00)*
Constant	-3.065	2.923	-6.122	1.727	-0.935	0.322	-1.876	0.121
	(3.12)**	(3.25)**	(6.69)**	(2.88)**	(1.65)	(0.50)	(2.54)**	(0.39)
Observations	653	652	653	652	590	588	590	588
R-squared	0.60	0.72	0.65	0.75	0.82	0.88	0.83	0.88

Notes:
1. Robust t-statistics in parentheses
2. * significant at 5%; ** significant at 1%

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[5]To check the robustness of our results, comparable regressions were also estimated for the period 1985-1991, for which no construction of migration flow data was required. The results were very similar to those reported in Table 2, and are available from the authors.

per capita has the expected positive sign and is statistically significant at the 1% level, with the coefficient on distance being negative and highly significant.[6]

The coefficients on migration, the variable of primary interest, is statistically significant for exports only. The results show that a 10% increase in the immigrant stock in 1991 had an effect of increasing Greek exports by about 2%. These results give support to the hypothesis that the tradeimmigration linkage is driven by the new information brought by immigrants about their home countries market which reduces the transaction or trade costs of bilateral trade. The insignificant coefficients in the import equation indicate the lack of a strong preference of immigrants for their home country products. These results are consistent with Gould (1994) who finds that the effects of immigrant information appear to be stronger on exports than imports, and Girma & Yu (2002) who find that immigration from non-Commonwealth countries has a significant export-enhancing effect. This finding has important implications for Greece given its growing stocks of immigrants.

We tested, by including intercept and slope dummies, whether immigrants from particular subgroups of countries have differential impacts on trade. In this respect we examined EU countries, European countries more widely[7], developing countries[8] and English and French speaking countries[9]. There were several reasons for investigating specific effects for such groupings. Firstly, we reported earlier the dominance of European countries in Greek trade, and the impact of EU integration and the Single Market Programme on intra-regional trade and movement of people. Secondly, English and French are the most commonly spoken foreign

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[6]At the suggestion of a referee we also experimented with specification which included countries' openness ratios (trade/GDP) in order to capture the influence of general policy frictons (trade barriers etc) on bilateral trade flows. However, since the variable introduces possible endogeneity problems, and since the results on the main variables were not qualitatively different, we report only the results for the standard gravity model.

[7]European countries: EU members plus Albania, Bulgaria, Cyprus, Czechoslovakia, Soviet Union, Hungary, Malta, Norway, Poland, Romania, Switzerland, Yugoslavia.

[8]Developing countries: Algeria, Argentina, Brazil, Bulgaria, Chile, Colombia, Congo, Czechoslovakia, Egypt, Hungary, Indonesia, Iran, Iraq, Jordan, Kenya, Lebanon, Libya, Mexico, Morocco, Nigeria, Pakistan, Panama, Philippines, Poland, Romania, Saudi Arabia, South Africa, South Korea, Soviet Union, Sudan, Syria, Thailand, Tunisia, Turkey, Uganda, Venezuela, Vietnam, Yugoslavia, Zambia, Zimbabwe.

[9]English and French speaking countries: Belgium, France, Luxemburg, United Kingdom, Congo, South Africa, Zimbabwe, Canada, United States, Australia, New Zealand.

languages in Greece, and this may reduce the transaction costs of trade with countries speaking these languages. Finally, developing countries are likely to be more competitive in labour-intensive products and some of them they have preferential access to the European Union. The results for all the above subgroups were in fact insignificant. However, further experimentation showed that immigrants from countries which were both poor and distant have a distinct, specific influence. In this context, 'poor' countries are defined as those with a GDP less than the median, and distant countries as those further than the median. This group consisted mainly of Latin American countries and some 'distant' Asian and African countries. This group has no general, special connection with the rich EU or North American countries, nor with Eastern European countries that are close to Greece.

The dummy Poor-far (*PE*) is significant and positive for imports, which means that there imports are higher than expected if the country is both poor and distant from Greece. This result is confirmed in the dynamic version of the model, but with a smaller coefficient. Further, we find a significant negative coefficient on the interaction of *PF* with GDP (*PF*GDF*). This import-side effect indicates that for a distant country, if its GDP falls by 1%, Greek imports from that country are 0.56% higher than for other countries with the same GDP. There are a number of possible reasons for this effect. One of them could be that the type and the price of products that poor and distant countries export are particularly competitive with Greek products. Another reason may be preferential access to EU for imports from low income countries.

Some caution is required in interpreting the *PF* dummy however, since our specification may not be capturing precisely the impact of distance on bilateral trade. Studies such as Egger (2002) argue that fixed cost elements in transportation costs and other non-linearities in per unit transport costs may mean that distance does not proxy transport cost effects on trade very accurately. Nonetheless, we find a potentially interesting negative (and significant) coefficient on the interaction term of immigration and the *PF* term (*PF*M*) in the exports equation. This indicates that the export effect of immigration is lower for poor-far countries than other countries. Indeed the combined direct migration effect and this interaction effect for *PF* countries is negative in both column (4) and (8). It is difficult to understand why immigration in this context should actually have a negative effect on bilateral exports, but it is reasonable to believe that there are specific country contexts in which migration effects on trade would be absent. The

poor-far group includes those from Latin America where Greece has very limited commercial links. For many years there were only very few embassies and official visits were rare. Many of the African and Asian countries had political problems or war over the period. Immigrants from these countries generally have low educational qualifications and work mostly in the service sector. These migrants are unlikely to engage with the formal trade sector, and to offer any additional information which can facilitate trade with their home countries.

VI. Conclusions

In this study we have examined whether immigrant links to home or origin countries affect the volume of Greece's bilateral trade flows. This issue is important in assessing the present and the future economic consequences of growing immigration in Greece. By augmenting a gravity model with immigration variables we confirm previous studies about the positive link between immigration and trade, but only for exports. Immigrant information and links to home countries appear to have a significant export-enhancing effect but to have no effect on imports. These results give support to the hypothesis that the trade immigration linkage is driven by the new information brought by immigrants about their home countries' market which reduces the transaction or trade costs of bilateral trade and increase export opportunities. At the same time it seems that any special preferences of immigrants for home country products is not strong enough to influence aggregate imports.

The study did not find evidence of formal regional trade policy effects on the trade-migration relationship. Rather it found that the relationship with a specific group of countries, namely those more distant and poorer, was distinctive. These are countries that tend to export more to Greece than was expected on the basis of normal gravitational effects, but they are also ones for which the positive migration effect on Greece's exports is missing. The characteristics of the immigrants from these countries may not be conducive to the development of commercial links. Similarly, Greece may have deliberately focused its export promotion activity on other countries.

There are still several dimensions of further work to be explored. One obvious issue is whether Greek emigrants in foreign countries positively affect trade with those countries. If data permitted it would also be interesting to explore whether non-Greek or Greek-returning immigrants have differential impacts on Greek export performance.

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