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The Impact of Immigration on International Trade in Europe: The Case of the EU-Mediterranean-Eastern Europe Zone

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1. Introduction, research issue and literature review

Background

Immigration is at the forefront of the European Union's (EU) attention as the immigrant population in the EU is significantly large¹. At the end of the 1990s, 3.5% of the population (18 million) in the EU was of immigrant origin (Aubarell and Aragall, 2005). Those people were mainly from the Mediterranean and the Middle East and North Africa (MENA). In about a decade, this number has almost doubled. According to the *News Release* by EUROSTAT (2010) — the statistical office of the EU — at the end of 2008, there were 31.9 million foreign citizens living in the EU, of which 20 million were citizens of countries outside the EU. The share of the EU population that is foreign born is currently estimated at around 10 per cent; see EMPL (2011). Not surprisingly, the most populated five EU Member States (Germany, France, Italy, Spain, and the United Kingdom) — comprising approximately two-thirds of the total EU population — have the highest numbers of foreign-born persons, in absolute terms, the total number corresponding to over 75 per cent of the total immigrant population in the EU; see EUROSTAT (2011a). The South and East Mediterranean (SEM) countries today have an aggregate emigrant population of some 12.7 million, 64% (8.2 million) of which are just in the European Union (EU) (CARIM, 2009). Therefore, the empirical motivation of our paper is obvious as statistical evidence shows that the immigrant population in the EU is significantly large.

International Migration

The theoretical literature on international migration provides two main approaches, the neoclassical approach and the new economics of migration, that seek to explain the migration decision of people². According to the neoclassical approach, economic opportunities in a country (e.g., higher wages) lead an individual to migrate to that country so as to maximize his/her utility. The neoclassical approach assumes that individuals are rational and have perfect information and migration is costless. Also, there is full employment and no uncertainty about the future. The neoclassical theory of international

¹ FEMISE Research Report FEM32-06, for example, concludes that migration flows are to be a key determinant of the demographic evolution in the next decades, and such flows will originate in the South.

² Other approaches are variants of these two approaches as Vogler and Rotte (2000) states.

trade notes that, under some restrictive assumptions (e.g. perfectly functioning markets, absence of transaction costs regarding exchange of goods and services and mobility of resources, etc.), economic integration in the form of increased movements of goods and services and of production factors will lead to the equalization of factor prices. To this end, trade in goods and the movement of factors of production are substitutes if factor prices equalize following trade liberalization. There exist, however, market imperfections and transaction costs as well as impediments to the international mobility of factors of production. In addition, technology differs across countries, and large economies may pay higher wages due to scale economies. Provided that factor prices fail to equalize following trade, migration may be boosted by trade liberalization. Apparently neoclassical view approaches to immigrants as labor force and therefore focuses on the supply side of the economy whereas the new economics of migration, the second approach, focuses more on the demand side of the issue.

Remittances are at the core of the second approach, the new economics of migration, which considers households (not individuals) as the decision-makers. According to the new economics of migration, households diversify risks by sending a family member to a foreign country so as to reduce the family's dependence on the situation in a single market. In general, remittances from an emigrant are seen as the primary income of the household. This type of risk diversification is relevant in countries where public social security is inadequate and where private capital markets are not well functioning (Vogler and Rotte 2000). If trade liberalization is not accompanied by capital market liberalization, it appears that households may find this type of risk diversification more appropriate even in the long-term. Financially integrated markets are predicted to allow less advanced countries to utilize resources better and to access capital at lower cost especially through foreign direct investment (FDI as well as through other international capital flows such as remittances sent by migrants³. In the short- and medium-term, remittances are mainly used for consumption purposes. To channel remittances, however, into productive investments so as to finance the development of the

³ Some €7.1 billion is officially transferred each year from Europe to eight Mediterranean countries (between €12 and €14 billion including informal transfers). These remittances from Europe therefore far exceed total flows of net foreign direct investment (US\$6.4 billion a year, 2000-2003) and official development assistance (US\$4.3 billion a year, 2000-2003) received by these countries; see EIB: www.eib.org/publications.

recipient country's economy, well functioning financial intermediaries are necessary that may be achieved in the long-term by the deepening of financial markets.

From the above perspective we believe that an analysis of immigration where the immigrants are taken as only labor suppliers would yield misleading results in terms of the conclusions on economic impacts of immigration. In order to obtain more accurate results, one should take into consideration the fact that immigrants are economic agents that supply labor force in labor market and also demand good and services as consumers⁴.

International Trade

The traditional approach on how immigration affects trade was based on the effects of immigration on factor supplies in the home and host countries, whereby the change in factor supply due to immigration affects production and ultimately trade flows (Bandyopadhyay et. al (2008). Following Gould (1994), it has widely been accepted that the relationship between immigration and international trade is much more complex, and there are other mechanisms through which immigration can stimulate trade between the host and home countries.

It is postulated that the immigrant-trade relationship operates through two broad channels. First, migrants are expected to stimulate trade by lowering transaction costs. This is because immigrants have superior knowledge of home country markets, languages, business practices, laws and other matters related to trade. This channel has been referred to as the "information bridge hypothesis" (Dunlevy, 2006). The immigrants' knowledge basically overcomes information asymmetries associated with cultural differences. Also, immigrants may arrive with established connections to home country business networks. These networks can be conduits of information, and can deter opportunistic behavior. Second, immigrants might find that certain goods they are used to consuming in their home country are not available in the host country, and boost imports of such commodities from their home country to the host country. These immigrant preference effects have been referred to as "transplanted home bias" effect by White (2007).

⁴ Very recently Mazzolari and Neumark (2009) consider the "consumer side" of immigrants in order to evaluate the effect of immigration.

Research Issue

In this study, the impact of migration to the European Union on international trade patterns of the Union countries are analyzed. We focus on Southern Mediterranean and Eastern Europe countries as the migration originating regions. We approach to immigrants as consumers rather than sole labor force. We analyze how their demand affects current export and import patterns. We investigate trade by aggregate exports and imports separately and by industry-level exports and imports. In addition to these, explaining the current institutional structure in the EU that facilitates international trade with the Mediterranean and Eastern European countries is the other issue handled in this study. Based on the empirical findings and current institutional structure the sort of institutional reform needed to facilitate more trade is searched.

Although there has been a considerable amount of research about the economic effects of immigration, particularly on the labor market in the European Union (for example, Caroleo and Pastero (2010), Kahanec and Zimmermann (2010), and Kogan (2007)), the effect of immigration on trade has a little bit been ignored in the empirical analyses of the economic effects of immigration. A growing number of studies have examined the effects of immigration on trade flows for U.S. and other countries since the pioneering studies of Gould (1994) and Head and Ries (1998). All of these studies find a positive relationship between immigration and trade (exports or imports, or both) regardless of the different samples, specifications, and estimation methods they used. It is important that a similar empirical analysis is applied to the Euro-Mediterranean and Euro-Eastern Europe region to determine how immigration has affected trade among the countries in the region.

Therefore on the "trade" front, this study utilizes data on trade and immigrant population in the European Union nations to test the hypothesis that a greater stock of immigrants in the host country (the EU), from the home country diversified by region (MPC and Eastern Europe (EE) countries) leads to more trade (diversified by industry) between the two countries. The research also puts emphasis on how the current institutional structure in the EU facilitates international trade with the MPCs and EE countries.

Review of Empirical Literature

The gravity model of bilateral trade, first introduced by Tinbergen (1962) and Pöyhönen (1963), has withstood the test of time and remains the most popular model to explain

international trade patterns. It has been accepted as being “extremely successful empirically” in their ability to explain variance in bilateral trade volumes (Deardorff 1984) and as have “produced some of the clearest and most robust empirical findings in economics” (Leamer and Levinsohn 1995). Although the gravity model has had a huge empirical success for a long time, a theoretical foundation in economics was not provided until Anderson (1979) derived the gravity equation from a model that assumed product differentiation. Bergstrand (1985, 1989) then associated the gravity equation with simple monopolistic competition. Helpman and Krugman (1985) justified the gravity model in a differentiated product framework with increasing returns to scale. Deardoff (1998) has shown that the gravity model characterizes many models and can be justified from standard trade theories. Anderson and van Wincoop (2003) derived an operational gravity model from a CES expenditure system. Helpman et al. (2008) has recently generalized their model by accounting for firm heterogeneity and fixed trade costs, and also for asymmetries between the volume of exports from j to i and the volume of exports from i to j .

Empirical evidence from this literature, which mainly employs gravity-based estimation techniques, suggests that immigration has indeed a significant positive effect on both exports and imports, and the effect appears to be stronger for imports and for specialized/differentiated goods.⁵ This latter finding implies that immigrants may also change the number of varieties of goods available in the host country, especially through their demand/consumption patterns.⁶

There is a relatively large literature that considers the two-way interaction between international trade and international migration (reviewed in e.g. Poot and Strutt 2010, White 2010, and White and Tadesse 2011). Of the studies that focus on the impact of migration on trade, most suggest that migration increases bilateral trade. The trade facilitation literature makes it clear that the costs of international trade are not only determined by factors such as geographical distance and physical infrastructures, but that there are also other fixed costs, for example the cost of obtaining general skills in trading, specific knowledge of the foreign markets, foreign language ability, trust etc. The employment of immigrants may reduce such costs.

5 See Wagner *et al.* (2002), Peri and Requena-Silvente (2010), and Gaston and Nelson (2011), and references therein, for surveys and discussions of the main findings of this literature.

6 This preference effect is referred to as the *transplanted home bias* effect as migrants develop tastes before migrating to a country, and as such tastes affect their consumption patterns in the country they immigrate.

Migrants can also affect international trade through the consumption (imports) channel, because immigrants have preferences in favor of the products of their country of birth, and their incomes in the host country give them sufficient purchasing power to afford those goods. Moreover, the presence of foreign-born entrepreneurs may boost the availability of such goods (Bratti et al., 2011). However, migration may also create incentives for domestic firms to produce relevant substitutes (see e.g. Dunlevy and Hutchinson 1999, Girma and Yu 2002).

The range of estimates that were obtained from the primary studies suggests a great degree of heterogeneity across studies. While the vast majority of export and import elasticity measures are positive, for some countries some negative elasticity measures have been obtained. The most negative elasticity of exports is obtained for the US (-0.14). The largest positive elasticity can be found among estimates for Australia and the EU, 0.65 in both cases. For imports, the most negative elasticity is again obtained for the US, -0.18, and the largest positive one for Portugal, 0.56. The mean elasticity for the effect of immigration on exports is positive for all countries except in the study that uses US/Canada regional trade data (Helliwell, 1997). The largest mean immigration elasticity of exports is 0.43 (Australia). The mean elasticity of imports is also positive for all countries except Greece and Italy, with the largest in magnitude for Portugal namely, 0.35.

It should be noted that conventional neoclassical trade theory (like Heckscher-Ohlin) predicts that migration and trade are substitutes but the empirical evidence summarized here suggests that complementarities between migration and trade dominate (see also e.g. Nana and Poot 1996; Gaston and Nelson 2011; Bowen and Pédussel-Wu 2011). In any case, the growth in both trade and migration in recent decades suggests that the traditional theory of trade probably cannot accurately capture the complete relationship between migration and trade (Lewer and Van den Berg, 2009).

There is an extensive literature studying potential impacts of immigration in different contexts. One strand of this literature, for example, focuses on the labor-market consequences of immigration, such as whether immigration leads to higher unemployment among natives, especially by crowding out native workers, and whether immigration decreases wages/earnings of native workers. Although the vast majority of research has mainly analyzed the United States (US)⁷, there is a growing and recent literature studying different EU Member States.⁸ Much of

⁷ See Hanson (2009) for discussions of this literature.

this literature is indirectly related to our study as we particularly focus on the immigration-induced changes in diversity of consumption choices. It is, however, worth noting that, as far as the EU Member States are concerned, in most cases, immigrants do not crowd out native workers — since they mostly complement natives in the labor market — nor do they have a significant negative impact on native workers' wages/earnings, which may have indirectly affected consumption choices; see Kerr and Kerr (2011), Münz *et al.* (2007), ILO (2010), UNECE (2002), and references therein, for details. To the contrary, migrant workers contribute to job creation in several ways, ranging from entrepreneurship to increasing domestic demand for goods and services (ILO 2010: 60).

Immigrants generally create social networks in the country that they have settled (OECD 2007). Such networks enable immigrants to opt for self-employment, and so to establish micro, small, or even medium-sized enterprises,^{9,10} which are mostly found in the catering industry, services, and retail trade. Immigrant entrepreneurs that are active in such sectors often provide goods and services that are different from those provided by native entrepreneurs, implying that they may well contribute to the diversity of consumption choices (SEC 2006, EMN 2005, and ILO 2010). Immigrants may also play a crucial role in facilitating trade through a number of mechanisms as they are linked to both their home and host countries by networks; see Gaston and Nelson (2011), Globerman (1995), and Head and Ries (1998) for details. As argued by Head and Ries (1998), immigrants may have superior knowledge of market opportunities, and so in the presence of transaction costs, they may act as trade intermediaries, and may reduce costs, especially associated with foreign trade.¹¹ Such costs tend to be significantly high, especially when economic, cultural, and institutional differences across countries are significant, and when

8 A survey of the main findings of such studies can be found in UNECE (2002), the United Nations Economic Commission for Europe.

9 According to the European Commission (EC) publication, SEC (2006), in Italy, there are some 168,000 such enterprises. In Belgium, in the Brussels area alone, self-employed persons originating from ethnic minority communities are estimated at around 18,000, while for the Flemish region, the number is estimated at about 10,000. In Germany, in 2003, there were 142,000 self-employed non-EU citizens, and in Netherlands, in 2004, 58,000 ethnic entrepreneurs were recorded (p.17).

10 Among different motives, *immigrant entrepreneurship* is a way to circumvent unemployment, especially given their difficulties in finding paid-employment via formal routes; see e.g., van Delft *et al.* (2000), Constant *et al.* (2005), EMN (2005), and OECD (2007).

11 This is referred to as the *information bridge hypothesis*, according to which immigrants may have superior knowledge of both the home and host country markets, languages, business practices, laws, and special distribution channels, etc., that may help overcome uncertainty stemming from economic and cultural differences, and differences in political environments across countries. Also immigrants may help reduce economic inefficiencies, which may arise especially due to asymmetric information and incomplete enforcement of contracts; see Dunlevy (2006), and Gaston and Nelson (2011).

such countries trade specialized and/or differentiated goods. Therefore, immigrants may positively affect trading differentiated goods, which may lead to increased variety of consumption goods in the host country.

2. Institutional Aspects

European countries has needed certain level of qualified immigration especially starting from mid-1950s however approximately by mid-1990s, big amount of refugee immigration flow has created serious challenges on immigration policies resulting in restrictive policies at both national and EU level. This has created a “threat” for balancing intergovernmentalist and supranationalist logic of integration. Articulations between restriction and expansion, between inclusion and exclusion of migrants and between intergovernmentalism and supranationalism have characterized European immigration policies for over 30 years. Since the early cooperation on immigration until today, the underlining principles of European migration policy have been the liberalization of migration inside the Union through freedom of movement, and safeguarding of control over migration from outside the Union (Shafagatov and Mirzayeva, 2005, p.36).

As Chart 1 states that in time, Maastricht Treaty in 1992 and Amsterdam Treaty signed in 1997 but came in to force in 1999, and post-Amsterdam generated different institutional settings in the EU (The Commission, European Council, European Parliament (EP), European Court of Justice (ECJ)). While Maastricht Treaty provided dominant power for ECJ and limited power for The Commission, Amsterdam Treaty had a greater role for supranational institutions of Commission, EP and ECJ. Post-Amsterdam period increasingly associated with the activeness of EU institutions, especially Commissions in trying to take crucial role in shaping the preferences of member states, in constructing EU level policies (Shafagatov and Mirzayeva, 2005, p.33-34, 36).

In today’s Europe without internal borders, managing immigration in a coordinated manner is of utmost importance. Since 1999, the EU has been seeking to do this under the auspices of the Treaty establishing the European Community (now under the Treaty on the Functioning of the European Union)¹². However, the Commission deems that achievements to date have not been sufficient. A Europe-wide common policy is needed to provide a framework

¹² Femise report (2007-2008) written by Lorca and De Larce enables more detail background for immigration policies of the EU until 2008.

for coherent action. A vision for this policy was presented within the Commission communication “Towards a Common Immigration Policy” on 5 December 2007. Subsequently, the European Council confirmed the importance of developing a common policy and requested that the Commission submit proposals in 2008 (Europa Institute, May 2011, p.6). Thus, the final revised version of “the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of 17 June 2008 – A Common Immigration Policy for Europe: Principles, actions and tools (COM(2008) 359)” states that the common European immigration policy needs to provide a flexible framework that takes into account EU countries’ particular situations and is implemented in partnership between the EU countries and institutions.

Chart 1: Evaluation of Immigration Policy Competences of EU Institutions

| | Pre-Maastricht | Post-Maastricht Third Pillar | Post-Amsterdam First Pillar (Communitarized areas of former Third Pillar) | |
|--|--|--|---|---|
| | | | 1999-2004 | Post-2004 |
| Asylum, Immigration, External Borders | Domestic policy-making giving way to intergovernmental cooperation <i>outside</i> the Community framework | Third Pillar, Title VI, Article K of TEU | Article 73 of Amsterdam Treaty | |
| European Parliament | No role | Limited role | Consultation for the first five years after Amsterdam Treaty takes effect, co-decision afterwards | |
| European Court of Justice | No jurisdiction | No jurisdiction | Referral for an obligatory first ruling for national last-instance courts | |
| Decision-making | Intergovernmental negotiations Nonbinding decisions in the form of resolutions Binding decisions in the form of treaties | <i>Unanimity</i> rule on all issues | Council acts <i>unanimously</i> on proposals from Commission and member states <u>for the first five years</u> | Council will act unanimously on a move towards <i>qualified majority voting</i> (with no need for national ratification of this decision) |
| Commission's Right of Initiative | None Occasional observer status at intergovernmental meetings | <i>Shared</i> right of initiative for the Commission and Member States | Commission has shared right of initiative (member states have encouraged the Commission to assume an exclusive right for asylum issues) | Commission has <i>exclusive</i> right of initiative in Title IIIa |

Source: Ucarer, E. M. *From the Sidelines to Center Stage: Sidekick No More? The European Commission in Justice and Home Affairs* [http://eiop.or.at/eiop/texte/2001-005t.htm#\(I\)](http://eiop.or.at/eiop/texte/2001-005t.htm#(I))

Shafagatov and Mirzayeva, 2005, p.35.

This communication comprises 10 principles on which the common policy will be built upon and the necessary actions for implementing these principles. They aim at ensuring that legal immigration contributes to EU's socio-economic development, EU countries' acts are coordinated, cooperation with non-EU countries is developed further and illegal immigration and trafficking in human beings are tackled effectively (Europa Institute, May 2011, p.1).

This act aims prosperity by including clearing rules and a level of playing field; matching skills and needs; integration (i.e., social cohesion and approaching to diversity in the host countries). According to the act, solidarity is also important to enable a coordination between EU countries and cooperation with non-EU countries in terms of transparency, trust and cooperation;

efficient and coherent use of available means; partnership with non-EU countries, which is very important for supporting the development of non-EU countries' immigration and asylum systems, as well as legislative frameworks. Security for the EU is also another aspect of immigration via common visa policy, integrated border management (the Schengen area's integrity), stepping up the fight against illegal immigration and zero tolerance for trafficking in human beings, and last, effective and sustainable return policies which are integral to policies on immigration.

Migration is also a crucial dimension of EU-Mediterranean Partner Countries (MPC's) relations. However, the lack of a coherent European Migratory Policy makes it difficult to develop a consistent migratory policy towards MPC's with many reasons (Lorca and De Arce, July 2008, p.8). Givens and Luedtke (2003) stresses that with no internal border controls in the Schengen zone, any third-country nationals any "third-country nationals" admitted to any one of the member states can easily travel to other member states. However, actual harmonization of most aspects of EU immigration policy has not been forthcoming (p.2) due to inefficient immigration policies (like visas, political asylum, and illegal immigration etc.) and inefficient integration policies (like antidiscrimination and citizenship etc.) along with economic and institutional imperatives, political silence, partisanship, economies that may explain the present-day difficulties, and convergence/divergence in national immigration policy (p.24).

In addition, the focus of policy-makers focuses clearly on control and return measures, rather than in active integration policies. Demographic dynamics and socio-economic conditions in Euro-Mediterranean region compared with those of the EU have created push affects for immigrants. Therefore, under these conditions, focusing exclusively in borders control and return measures are clearly sub-optimal as a policy formulation (Lorca and De Arce, July 2008). Both control and integration face important difficulties, but given that no border is impassable, and that migratory pressure is important for some countries, integration seems a more fruitful approach in the long run (Lorca and De Arce, July 2008, p.10). Under different scenarios, Lorca and De Arce study concludes that immigration flows from some MPC's (mainly Morocco and Turkey) will remain high in the long run (Lorca and De Arce, July 2008, p.8).

In North African countries and Turkey, higher population rate has led a fast increase in working-age population which is opposite case in the EU. According to Lorca and De Arce (2008), this situation can be complementary enough to counterbalance or not for labor market

demand/supply evolution, socio-economic progress, and barriers removed or built up at both sides of the “board game”. On the other hand, the EU’s concern is to fight against illegal immigration because of that (i) the existence of employments in the destination country for illegal immigrants; (ii) a contradiction between the percentage of irregular manpower and States’ permissiveness, because the possibilities of rigorous measures are limited; (iii) regularizations allows for a better management of immigrants but do not impede future illegal immigration; and (iv) bilateral readmission agreements, are not efficient instruments.

There are some inconsistencies of restrictive-biased immigration policies that following highlights create: (i) the difficulties to satisfy in a legal way EU’s labor demand; (ii) in spite of highly restrictive measures the entrance of immigrants keeps going; and (iii) emphasis is placed on control policies, fostering an inappropriate environment to integration. According to the study of Shafagatov and Mirzayeva, (2005), legal basis for the immigration issues was weak: it did not involve the binding regulations and directions (p.33). Thus, the presence of irregular immigrants is an unavoidable consequence of tight immigration policies and a reality of the migratory phenomenon. A more flexible position in the regulation of migratory flows, in which small corrections in the restrictiveness of immigration legislation, without arriving to full freedom, could lead to important efficiency gains (Lorca and De Arce, July 2008, p.10).

Lorca and De Arce (2008) provides some scenarios to decrease immigrants in the EU countries: (i) the slow economic convergence reduces slightly the number of immigrants, reflecting that a moderate convergence pattern in MPC’s economies does not imply a significant reduction of immigrants. (ii) The fast economic convergence is the one that projects the lower figures of MPC’s immigrants, but even in this case the numbers still very significant. (iii) The social policy, income inequality reduction projects lower immigration figures, but does not alter the trend of migration towards the EU. (iv) The low employment growth scenario generally shows lower immigration figures than the business as usual one, but numbers still high. (v) The high employment growth scenario projects a further reduction of MPC’s-EU migration, but a smaller one that the projected under the fast convergence or social policy scenarios. As a result of these scenarios, immigration flow remains significant and migratory pressure will continue due to inefficient Europeanized control and return policies. Besides, fast economic convergence between the EU and MPC’s, and the implementation of redistributive social policies in MPCs enable low immigration figures. However, these measures seems moderately reduce the number

of immigrants from MPCs. In the aspect of socio-economic-demographic, immigration will be a key driver of EU-MPC's relations and of internal EU demographic dynamics. In sub-conclusion, steps towards building a common EU approach to immigration do not, however, automatically meet the expectations and interests of national policies, which, in light of recent increases in immigration towards and across the EU countries, are often more concerned with limiting immigration and to putting limitations on who may enter and why than with adopting common solutions to common challenges (Bia, 2004).

3. Methodology

Migration-Trade

Our approach, like previous econometric tests of the effect of migration on trade is based on a gravity model of trade. Analyses are carried out by running aggregated and industry-level augmented gravity trade regressions and number of establishment and employment regressions by industry. The basic idea behind the gravity model comes from the gravity theory in physics. Newton's law of universal gravitation states the gravitational attraction between two bodies is proportional to the product of their masses and inversely proportional to the square of the distance between them. In trade models, the physical bodies are the exporting and importing countries, and their "mass" is their economic mass. In other words, the idea is that the bigger the sizes of the economies, the bigger the trade, and the greater the distance, the lower the trade. Thus, the basic gravity model can be written as in (1).

$$M_{ij} = G \left(\frac{E_i E_j}{D_{ij}^2} \right) \quad (1)$$

where M_{ij} is the level of trade (exports, imports, or total trade) between countries i and j , E_i is the economic mass of country i , D_{ij} is the distance between i and j , and G is the gravitational constant. This can be viewed in logarithmic form as in (2).

$$\ln M_{ij} = \beta_0 + \beta_1 \ln(E_i E_j) + \beta_3 \ln D_{ij}. \quad (2)$$

From an econometric point of view, this is a very simple specification where the parameter β_l is the elasticity of trade with respect to the mass of the countries. In empirical trade models, the economic mass is typically proxied by the GDP (or some function of it) of the countries. It is also most common to extend the basic equation by including a number of factors that potentially facilitate or inhibit trade, such as cultural, geographical, and political characteristics. Such extended models are referred to as the 'augmented' gravity models and specified as in (3).

$$\ln M_{ij} = \alpha_0 + \alpha_1 \ln I_{ij} + \alpha_2 \ln E_i + \alpha_3 \ln E_j + \alpha_4 \ln D_{ij} + \alpha_5 \ln Z_{ij} \quad (3)$$

In this equation, M_{ij} is the level of trade (exports or imports in constant prices) between countries i (host) and j (home), where I_{ij} is the number of immigrants of home country j living in

host country i , E_i and E_j are the GDP in constant prices (economic mass) respectively for host and home countries i and j , D_{ij} is the distance between i and j and Z_{ij} represents other explanatory variables such as language, colonial ties, borders and access to coastlines, etc.

The gravity models that are estimated in this research involve both ‘basic/fundamental’ and ‘augmented’ type models. Industrial breakdown is followed in both types and quantification of migration impacts as and regional breakdown on migration is introduced in the augmented form.

We assemble data for a panel of all EU countries for the years 1998-2008. The key variable in our study is one measuring the number of migrants from each trading partner (country j) in the country of interest (country i). This variable is interacted with a dummy variable for MPCs and for EE countries in order to separate out the effects of immigrants from MPCs and EE countries. Static and dynamic panel estimation techniques are used to estimate the effects of regressors on both bilateral exports and imports both at aggregated and industry level.

4. Data

The data used in econometric analyses are grouped under trade, migration, gravity variables, enterprise and employment components.

Trade

This data set is composed of annual bilateral total export and total import data between the EU (27) and the Mediterranean partner countries (MPC); and Eastern European countries (EE). EU includes 27 countries at disaggregated level; MPC includes Albania, Algeria, Bosnia and Herzegovina, Croatia, Egypt Arab Republic, Israel, Jordan, Lebanon, Morocco, Syrian Arab Republic, Tunisia and Turkey; EE includes Russia, Czech Republic, Poland, Hungary, Romania and Moldova, Croatia, Lithuania, Latvia, Estonia, Serbia, Montenegro, Bosnia, Herzegovina, Albania, Kosovo, and Macedonia. Time span covered is 1998-2010. Nominal values of trade data are converted into real values by using export and import prices indices (based on year 2000 prices) provided in the Eurostat. The source of data is COMEXT: Eurostat’s External Trade database, <http://ec.europa.eu/eurostat>.

Migration

This data covers number of immigrants in the EU whose home country belong to MPC and EE countries according to country of birth. The immigrants data is organized by sex and age group. However, the migration variable used in econometric estimation includes total number of immigrants. The source of data is <http://ec.europa.eu/eurostat>.

Gravity variables

Main dataset for variables in gravity equation are collected both for the EU and MPC from the CEPII Gravity Set which is available at <http://www.cepii.fr/anglaisgraph/bdd/gravity.htm>. This data set covers real GDP and real per capita GDP, population and bilateral distance. GDP data was updated by using World Development Indicators database of World Bank, available at <http://data.worldbank.org/>. This data set also covers various intercept dummy variables that show whether bilateral trade partners have common border, language, colonial relationship, currency, religion and are part of a bilateral and/or multilateral trade agreement. Regional trade agreement information is also obtained from WTO, available at <http://rtais.wto.org/UI/PublicMaintainRTAHome.aspx>.

5. Results

Migration-Trade

Trade equations were specified both for bilateral exports and imports and both in real and nominal terms. Aggregate trade equations were estimated in static and dynamic forms and static industry-level equations were estimated for 6 industries which were beverages; crude materials; food and live animals; machinery and transport equipment; manufactured goods classified chiefly and mineral fuels, lubricants. Fixed and random effect models were estimated and the decision among the two was given by using Hausman specification test.

Almost in all cases real trade models provided statistically better results when compared to nominal trade models and majority of the random effect models were rejected. Therefore in this report, findings of the fixed effect, real trade models are provided. But still, in some cases findings of the random effect models are also given.

One common problem observed while estimating the impact of migration on trade is the endogeneity which may result in biased and inconsistent results. Endogeneity bias can be due to three reasons (Felbermayr, 2012). First, is the “reverse causality” which assumes that some

positive shock on the value of bilateral trade between two countries leads migration to increase between the same countries. Second, is the omitted variables bias and Hanson (2010) argues the difficulty of putting causal relationship between trade and migration in the case of some omitted variables which immigration may be correlated with but which may affect trade as well (cultural similarities, preferential trade policies etc.). Third, is the measurement error.

To cope with endogeneity bias the most convincing way is to find some exogenous events that cause variation in bilateral migration stocks but have no direct effect on bilateral trade, which are quite rare (Felbermayr, 2012). Some studies propose instrumental variables but mostly panel data models are used to address the concern, particularly omitted variables bias. In some studies cost of obtaining passport to host countries is used as an instrument while in some others historical migration data and a country with similar characteristics to the host country are used as instrumental variables.

In our study, first due to lack of data and second due to large number of countries in the home and host country groups we could not use the instruments mentioned above. Instead we controlled the heterogeneity in the sample and omitted variable bias through inclusion of various dummy variables in both static and dynamic panel econometric models. In dynamic models we employed Arellano-Bond regressions that used GMM system estimators which deal with endogeneity and autocorrelation and in static models robust estimators were used. The dummy variables included in models cover the information whether the partner and reporter countries do have a colonial relationship, common language, common currency, contiguity; are partners in GATT and/or in free trade agreement and/or regional trade agreement and/or bilateral trade agreement. In addition time dummy variables are also introduced¹³.

In this section tables regarding static aggregate exports/imports estimation and static industry-level exports and imports which exclude interaction dummy variables that are built by using migration by region of origin are presented. Tables, regarding dynamic aggregate exports/imports estimation and static industry-level exports and imports (with interaction dummy variables) are provided in the Appendix.

Comparison-Total Exports

¹³ Unfortunately, "multilateral resistance index" that has been referred to as average trade barrier by Anderson and Wincoop (2003) could not be included in our empirical models and left for future work.

Table 1 provides findings from both fixed and random effect estimation of static aggregate bilateral exports from the EU to MPC and EE countries with and without interaction dummy variables in a comparative way. First two columns stand for fixed and random effect estimation without interaction dummies respectively, while the last two stand for the ones with interaction dummy variables. Definitions of the variables are:

| | |
|----------|--|
| mig: | migration |
| dist: | distance between two capitals |
| gdpcons: | gdp in constant prices (year 2000) |
| _o: | reporter country |
| _d: | partner country |
| contig: | intercept dummy for contiguity |
| colony: | intercept dummy for colonial relationship |
| comlang: | intercept dummy for common language |
| gatt: | intercept dummy for GATT agreement |
| rta: | intercept dummy for regional trade agreement |
| comcur: | intercept dummy for common currency |
| migmpc: | interaction dummy if migration originating country is from MPC |
| migeec: | interaction dummy if migration originating country is from EE |
| migasea: | interaction dummy if migration originating country is from Asia & Southeast Asia |

Standard gravity specification includes distance and gross domestic product of both destination and origin countries. Distance variable is omitted in all estimations, whether the model includes interaction dummy variables or not, as it does not change by year. It could be included as separate intercept dummy variables for each bilateral relationship however this caused singular matrix problem. The coefficients on gross domestic product both in origin and destination countries were found to be statistically significant in all estimations which showed that rising demand/income in both groups had positive impact on exports from the EU. First augmentation to the standard model was done by including various intercept dummy variables including time dummies for each year¹⁴. In fixed effect models, all the time dummies were found to have negative impact on autonomous exports from the EU and the effect increases as time passes.

Table 1: Comparison of Fixed and Random Effect Estimation Results with and without Interaction Dummy Variables-Aggregate Exports

¹⁴ In the above summary tables statistics regarding time dummy variables are deleted.

| Variable | ferob | rerob | ferobinter | rerobinter |
|--------------|------------|------------|------------|------------|
| lmig | 0.06 * | 0.12 *** | -0.03 | 0.08 *** |
| ldist | (omitted) | -1.20 *** | (omitted) | -1.31 *** |
| lgdpcons_o | 1.60 *** | 1.00 *** | 1.71 *** | 1.01 *** |
| lgdpcons_d | 1.81 *** | 0.86 *** | 1.74 *** | 0.89 *** |
| contig | (omitted) | 0.58 *** | (omitted) | 0.40 ** |
| colony | (omitted) | -0.10 | (omitted) | -0.08 |
| comlang_et~o | (omitted) | 0.15 | (omitted) | 0.26 |
| gatt_d | 0.09 | 0.18 * | 0.08 | 0.16 * |
| rta | 0.04 | 0.08 | 0.02 | 0.11 * |
| comcur | -0.20 | -0.19 ** | -0.18 | -0.12 |
| lmigmpc | | | 0.06 | -0.02 |
| lmigeec | | | 0.12 | 0.04 ** |
| lmigasea | | | -0.05 | 0.11 *** |
| _cons | -67.46 *** | -20.07 *** | -68.36 *** | -20.22 *** |

legend: * p<0.05; ** p<0.01; *** p<0.001

Among the other intercept dummy variables (sharing common border, having former colonial relationship, speaking common language, being in a regional trade agreement, being a member of GATT, having common currency) no consistent outcome was found across the models. Second augmentation to the standard model was done by including migration variable first as total and second by region of origin. Total migration to the EU was found to be positively correlated with exports from the EU however no statistically significant effect was found regarding the immigrants specifically from the Mediterranean and from the Eastern European countries.

Comparison-Total Imports

In the estimations regarding bilateral imports (Table 2), coefficients of the gross domestic product both in origin and destination countries were found to be statistically significant, as was the case in exports, showing that rising demand/income in these countries has an increasing impact on imports of the EU. Opposite to the case of exports, time dummy variables were found to have no significant impact on autonomous imports however being a member in a regional trade agreement had a statistically significant positive impact. The estimated coefficient on total migration to the EU is positive and significant showing that the increase in imports of the EU might be a result of the rise in number of immigrants. Findings regarding migration by originating regions provide interesting outcomes as the effect differs with respect to the region.

While immigrants of the Eastern European countries have a positive correlation with the EU's imports from these countries, immigrants of the Mediterranean countries have no significant impact on imports.

In both dynamic export and import estimations (Table A3-A6) findings partly support that of static equations. First similarity is that total migration to the EU was found to be positively correlated with exports and imports. Second, intercept time dummies were found to be statistically insignificant in dynamic imports equation as it was in static version. In case of exports the findings regarding time dummies were contradictory to findings in static version. Another mixed outcome was observed for coefficient of gross domestic product. While GDP in originating countries was statistically insignificant in exports equation, it was so in imports equation for destination countries. Being a member of regional trade agreement was found to have no significant impact both in exports and imports equations. Finally in both equations adjustment lags (2 year) were observed to have significant impact on trade.

Impacts of migration on both exports and imports are quite inelastic both in static and dynamic versions. Main impact on trade arises through the change in GDP even when compared to coefficients of adjustment lags.

Table 2: Comparison of Fixed and Random Effect Estimation Results with and without Interaction Dummy Variables-Aggregate Imports

| Variable | ferobimp | rerobimp | ferobinterimp | rerobinterimp |
|--------------|-----------|------------|---------------|---------------|
| lmig | 0.09 * | 0.12 *** | -0.05 | 0.10 *** |
| ldist | (omitted) | -0.89 *** | (omitted) | -1.03 *** |
| lgdpcons_o | 1.20 *** | 0.88 *** | 1.42 *** | 0.91 *** |
| lgdpcons_d | 0.54 * | 1.09 *** | 0.50 * | 1.09 *** |
| contig | (omitted) | 1.12 *** | (omitted) | 0.59 *** |
| colony | (omitted) | 0.44 * | (omitted) | 0.59 ** |
| comlang_et~o | (omitted) | -0.04 | (omitted) | 0.37 |
| gatt_d | -0.03 | 0.13 | -0.05 | 0.07 |
| rta | 0.29 ** | 0.20 * | 0.24 ** | 0.29 *** |
| comcur | 0.06 | -0.16 | 0.08 | -0.22 * |
| lmigmpc | | | 0.16 | -0.17 *** |
| lmigeec | | | 0.19 * | 0.06 *** |
| lmigasea | | | -0.32 * | 0.13 *** |
| _cons | -26.66 ** | -25.47 *** | -30.55 *** | -25.04 *** |

legend: * p<0.05; ** p<0.01; *** p<0.001

Industry-level Exports

The gravity model was also used to estimate the impact of migration to the EU on the industry-level exports of EU. This equation was specified for 6 industries for which the names were given before. Standard variables of the gravity specification are bilateral distance and gross domestic product of both origin and destination countries. As it was the case in aggregate exports distance variables were omitted from export equation. Gross domestic product of all countries was found to have statistically significant impact on the EU's exports of all industries, which supports the finding in case of aggregate exports. Among various intercept dummy variables the only one which has a common positive impact on autonomous exports of all industries (except for crude mat. and food) is common currency. While being a member in GATT increases the autonomous exports in beverages compared to non-members; being a partner in a regional trade agreement was found to have a positive effect on autonomous exports of crude material and food compared to the case when partners are not a part of regional trade agreement. Again as it is in total exports, almost in all industries (except for mineral fuels and lubricants) autonomous exports do fall as years pass. Finally, migration to the EU was found to have a positive impact on exports of beverages, food and live animals and machinery and transport equipment. Its impact on exports of crude materials, manufacturing industries and mineral fuels and lubricants was found to be statistically insignificant (Table 3).

Same equations were also estimated by creating interaction dummy variables according to the origin of the migration (Tables A7-A8). Only in two cases, crude materials and chiefly classified manufacturing, migration from Eastern European countries were found to have a positive impact on exports of the EU. Migration from the Mediterranean countries had a positive impact only on exports in crude materials.

Table 3: Industry Level Exports

| | Beverages | | | | Crude materials | | | | Food and live animals | | | |
|--------------|---|-----------|-------|------|---|-----------|-------|------|---|-----------|-------|------|
| | Fixed-effects (within) regression obs. = 5178 | | | | Fixed-effects (within) regression obs. = 5624 | | | | Fixed-effects (within) regression obs. = 5606 | | | |
| | Group variable: newpairid grps. = 979 | | | | Group variable: newpairid grps. = 1016 | | | | Group variable: newpairid grps. = 1032 | | | |
| | R-sq: within = 0.0935 obs. / grps. min = 1 | | | | R-sq: within = 0.1373 obs. / grps. min = 1 | | | | R-sq: within = 0.1375 obs. / grps. min = 1 | | | |
| | between = 0.4151 avg = 5.3 | | | | between = 0.4455 avg = 5.5 | | | | between = 0.3510 avg = 5.4 | | | |
| | overall = 0.3690 max = 13 | | | | overall = 0.4400 max = 13 | | | | overall = 0.3403 max = 13 | | | |
| | F(18,978) = 10.31 | | | | F(18,1015) = 19.27 | | | | F(18,1031) = 14.95 | | | |
| | corr(u_i, Xb) = -0.5131 Prob > F = 0 | | | | corr(u_i, Xb) = -0.5705 Prob > F = 0 | | | | corr(u_i, Xb) = -0.6476 Prob > F = 0 | | | |
| | Robust | | | | Robust | | | | Robust | | | |
| | Coef. | Std. Err. | t | P> t | Coef. | Std. Err. | t | P> t | Coef. | Std. Err. | t | P> t |
| lmig | 0.29 | 0.08 | 3.71 | 0.00 | 0.07 | 0.05 | 1.31 | 0.19 | 0.20 | 0.05 | 3.84 | 0.00 |
| ldist | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| lgdpcons_o | 1.96 | 0.94 | 2.07 | 0.04 | 1.23 | 0.46 | 2.69 | 0.01 | 2.49 | 0.47 | 5.26 | 0.00 |
| lgdpcons_d | 0.94 | 0.45 | 2.09 | 0.04 | 1.86 | 0.38 | 4.88 | 0.00 | 0.42 | 0.30 | 1.40 | 0.16 |
| contig | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| colony | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| comlang_et~o | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| gatt_d | 0.49 | 0.25 | 1.95 | 0.05 | 0.02 | 0.17 | 0.11 | 0.91 | -0.09 | 0.17 | -0.54 | 0.59 |
| rta | 0.08 | 0.15 | 0.51 | 0.61 | 0.35 | 0.15 | 2.25 | 0.03 | -0.23 | 0.10 | -2.21 | 0.03 |
| comcur | -0.55 | 0.16 | -3.46 | 0.00 | -0.09 | 0.07 | -1.28 | 0.20 | -0.02 | 0.14 | -0.13 | 0.89 |
| _cons | -62.70 | 25.91 | -2.42 | 0.02 | -63.15 | 15.75 | -4.01 | 0.00 | -5.94 | 1.38 | -4.30 | 0.00 |
| sigma_u | 3.07 | | | | 2.74 | | | | 3.33 | | | |
| sigma_e | 1.18 | | | | 0.88 | | | | 0.84 | | | |
| rho | 0.87 | | | | 0.91 | | | | 0.94 | | | |
| | Machinery and transport equipment | | | | Manufactured goods classified chiefly | | | | Mineral fuels, lubricants | | | |
| | Fixed-effects (within) regression obs. = 5921 | | | | Fixed-effects (within) regression obs. = 5898 | | | | Fixed-effects (within) regression obs. = 5158 | | | |
| | Group variable: newpairid grps. = 1059 | | | | Group variable: newpairid grps. = 1057 | | | | Group variable: newpairid grps. = 932 | | | |
| | R-sq: within = 0.2397 obs. / grps. min = 1 | | | | R-sq: within = 0.1475 obs. / grps. min = 1 | | | | R-sq: within = 0.1016 obs. / grps. min = 1 | | | |
| | between = 0.6135 avg = 5.6 | | | | between = 0.4392 avg = 5.6 | | | | between = 0.2001 avg = 5.5 | | | |
| | overall = 0.6134 max = 13 | | | | overall = 0.4918 max = 13 | | | | overall = 0.2054 max = 13 | | | |
| | F(18,1058) = 31.61 | | | | F(18,1056) = 22.07 | | | | F(18,931) = 11.32 | | | |
| | corr(u_i, Xb) = -0.8552 Prob > F = 0 | | | | corr(u_i, Xb) = -0.3649 Prob > F = 0 | | | | corr(u_i, Xb) = -0.5364 Prob > F = 0 | | | |
| | Robust | | | | Robust | | | | Robust | | | |
| | Coef. | Std. Err. | t | P> t | Coef. | Std. Err. | t | P> t | Coef. | Std. Err. | t | P> t |
| lmig | 0.11 | 0.04 | 2.75 | 0.01 | 0.03 | 0.04 | 0.82 | 0.41 | -0.04 | 0.08 | -0.48 | 0.63 |
| ldist | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| lgdpcons_o | 2.24 | 0.35 | 6.40 | 0.00 | 0.88 | 0.28 | 3.11 | 0.00 | 2.25 | 0.78 | 2.89 | 0.00 |
| lgdpcons_d | 2.34 | 0.22 | 10.52 | 0.00 | 1.45 | 0.21 | 6.96 | 0.00 | 1.70 | 0.54 | 3.16 | 0.00 |
| contig | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| colony | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| comlang_et~o | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| gatt_d | 0.12 | 0.12 | 1.01 | 0.31 | -0.08 | 0.09 | -0.91 | 0.36 | -0.10 | 0.22 | -0.47 | 0.64 |
| rta | 0.12 | 0.09 | 1.32 | 0.19 | 0.05 | 0.07 | 0.82 | 0.41 | -0.17 | 0.17 | -1.06 | 0.29 |
| comcur | -0.47 | 0.21 | -2.23 | 0.03 | -0.16 | 0.07 | -2.36 | 0.02 | -0.70 | 0.24 | -2.93 | 0.00 |
| _cons | -9.84 | 1.04 | -9.45 | 0.00 | -419.69 | 8.16 | -5.14 | 0.00 | -0.87 | 2.25 | -3.86 | 0.00 |
| sigma_u | 3.35 | | | | 2.36 | | | | 4.19 | | | |
| sigma_e | 0.6 | | | | 0.53 | | | | 1.46 | | | |
| rho | 0.97 | | | | 0.95 | | | | 0.89 | | | |

Industry-level Imports

The empirical findings from the estimated industry-level imports equations are quite mixed compared to exports. Gross domestic product in destination countries was found statistically significant only in machinery and transport equipment industry equation. Therefore income level in the EU was found to have no impact on imports of machinery and transport equipment. However, gross domestic product in migration originating countries was found to have positive impact on imports of the EU in all industries except in food and manufacturing. As years pass the autonomous imports in beverages decrease while it increases in food industries. In rest of the industries no significant impact of years on autonomous imports was observed. Regional trade agreement seemed to ease imports of the EU in crude materials and manufacturing only. In addition, common currency seemed to ease imports in machinery and transport equipment and manufacturing. Finally, migration had only significant positive impact on imports of food and live animals and machinery and transport equipment (Table 4).

In Tables (A8) findings regarding industry-level import equations that included interaction dummy variables according to the origin of the migration are presented. While migration from Eastern European countries was found to have a positive impact on imports of beverages, machinery and transport equipment and manufacturing industries, it had a negative impact on imports of food and live animals. Migration from the Mediterranean countries had a positive impact on imports in food and live animals while it had a negative impact on beverages.

Table 4: Industry Level Imports

| | Beverages | | | | Crude Materials | | | | Food and Live Animals | | | |
|--------------|---|-----------|-------|------|---|-----------|-------|------|---|-----------|-------|------|
| | Fixed-effects (within) regression obs. = 4929 | | | | Fixed-effects (within) regression obs. = 5534 | | | | Fixed-effects (within) regression obs. = 5622 | | | |
| | Group variable: newpairid grps. = 948 | | | | Group variable: newpairid grps. = 1033 | | | | Group variable: newpairid grps. = 1032 | | | |
| | R-sq: within = 0.0603 min = 1 | | | | R-sq: within = 0.0794 min = 1 | | | | R-sq: within = 0.1212 min = 1 | | | |
| | between = 0.0831 avg = 5.2 | | | | between = 0.1996 avg = 5.4 | | | | between = 0.3202 avg = 5.4 | | | |
| | overall = 0.0769 max = 13 | | | | overall = 0.1791 max = 13 | | | | overall = 0.3101 max = 13 | | | |
| | F(18,947) = 5.09 | | | | F(18,1032) = 11.14 | | | | F(18,1031) = 13.97 | | | |
| | corr(u_i, Xb) = -0.7121 Prob > F = 0 | | | | corr(u_i, Xb) = -0.2543 Prob > F = 0 | | | | corr(u_i, Xb) = 0.2297 Prob > F = 0 | | | |
| | Robust | | | | Robust | | | | Robust | | | |
| | Coef. | Std. Err. | t | P> t | Coef. | Std. Err. | t | P> t | Coef. | Std. Err. | t | P> t |
| lmig | 0.03 | 0.10 | 0.32 | 0.75 | -0.02 | 0.07 | -0.35 | 0.73 | 0.36 | 0.07 | 4.93 | 0.00 |
| ldist | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| lgdpcons_o | 3.12 | 0.71 | 4.39 | 0.00 | 1.49 | 0.49 | 3.02 | 0.00 | 0.21 | 0.39 | 0.54 | 0.59 |
| lgdpcons_d | 0.48 | 0.60 | 0.80 | 0.43 | 0.11 | 0.37 | 0.31 | 0.76 | 0.02 | 0.32 | 0.05 | 0.96 |
| contig | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| colony | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| comlang_et~o | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| gatt_d | 0.44 | 0.35 | 1.25 | 0.21 | 0.01 | 0.23 | 0.04 | 0.97 | -0.28 | 0.17 | -1.64 | 0.10 |
| rta | -0.03 | 0.25 | -0.11 | 0.91 | 0.27 | 0.14 | 1.89 | 0.06 | 0.12 | 0.15 | 0.80 | 0.43 |
| comcur | -0.20 | 0.14 | -1.44 | 0.15 | -0.12 | 0.20 | -0.60 | 0.55 | -0.10 | 0.10 | -1.02 | 0.31 |
| _cons | -79.17 | 22.91 | -3.46 | 0.00 | -2.56 | 1.60 | -1.61 | 0.11 | 7.12 | 1.24 | 0.57 | 0.57 |
| sigma_u | 5.05 | | | | 3.01 | | | | 2.75 | | | |
| sigma_e | 1.32 | | | | 0.91 | | | | 0.83 | | | |
| rho | 0.94 | | | | 0.92 | | | | 0.92 | | | |
| | Machinery and Transport Equipment | | | | Manufactured Goods Chiefly Classified | | | | Mineral Fuels and Lubricants | | | |
| | Fixed-effects (within) regression obs. = 5790 | | | | Fixed-effects (within) regression obs. = 5799 | | | | Fixed-effects (within) regression obs. = 4032 | | | |
| | Group variable: newpairid grps. = 1061 | | | | Group variable: newpairid grps. = 1054 | | | | Group variable: newpairid grps. = 832 | | | |
| | R-sq: within = 0.1092 min = 1 | | | | R-sq: within = 0.0794 min = 1 | | | | R-sq: within = 0.0388 min = 1 | | | |
| | between = 0.4698 avg = 5.5 | | | | between = 0.3977 avg = 5.5 | | | | between = 0.0294 avg = 4.8 | | | |
| | overall = 0.4496 max = 13 | | | | overall = 0.3998 max = 13 | | | | overall = 0.0210 max = 13 | | | |
| | F(18,1060) = 15.71 | | | | F(18,1053) = 16.11 | | | | F(18,831) = 8.07 | | | |
| | corr(u_i, Xb) = -0.2328 Prob > F = 0 | | | | corr(u_i, Xb) = 0.4674 Prob > F = 0 | | | | corr(u_i, Xb) = -0.4613 Prob > F = 0 | | | |
| | Robust | | | | Robust | | | | Robust | | | |
| | Coef. | Std. Err. | t | P> t | Coef. | Std. Err. | t | P> t | Coef. | Std. Err. | t | P> t |
| lmig | 0.13 | 0.06 | 2.38 | 0.02 | -0.03 | 0.04 | -0.70 | 0.48 | 0.06 | 0.11 | 0.52 | 0.60 |
| ldist | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| lgdpcons_o | 1.54 | 0.42 | 3.66 | 0.00 | 0.44 | 0.37 | 1.19 | 0.24 | 1.87 | 0.89 | 2.10 | 0.04 |
| lgdpcons_d | 1.23 | 0.34 | 3.66 | 0.00 | 0.33 | 0.27 | 1.19 | 0.23 | -0.42 | 0.74 | -0.57 | 0.57 |
| contig | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| colony | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| comlang_et~o | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| gatt_d | -0.01 | 0.20 | -0.03 | 0.98 | -0.12 | 0.14 | -0.88 | 0.38 | -0.07 | 0.44 | -0.16 | 0.87 |
| rta | 0.12 | 0.14 | 0.82 | 0.41 | 0.35 | 0.16 | 2.15 | 0.03 | 0.02 | 0.32 | 0.05 | 0.96 |
| comcur | 0.62 | 0.23 | 2.68 | 0.01 | 0.25 | 0.09 | 2.78 | 0.01 | 0.09 | 0.71 | 0.12 | 0.90 |
| _cons | -5.48 | 1.41 | -3.88 | 0.00 | -3.07 | 1.20 | -2.26 | 0.80 | -2.29 | 2.95 | -0.77 | 0.44 |
| sigma_u | 2.89 | | | | 3.07 | | | | 4.95 | | | |
| sigma_e | 0.87 | | | | 0.77 | | | | 1.83 | | | |
| rho | 0.92 | | | | 0.94 | | | | 0.88 | | | |

6. Policy implications and conclusions

The empirical evidence provides the information that both productive and absorptive capacities in the host and origin countries have significant impact on total exports and imports from and to the EU. This consistent finding across aggregate export and import equations regarding the effect of main variable in the gravity model might be an evidence of a promising econometric model. Another consistent finding with the literature is that, even if not big in size, migration into the EU is positively correlated with total exports and imports from and to the EU. This finding is supported by the outcomes both in static and dynamic settings.

To this end, it may be concluded that dealing with immigrants only as labor force and considering trade in goods and movement of labor as substitutes to each other can be rejected at least at aggregate level. This might be due to market imperfectness and/or existence of transaction costs in the bilateral relationships between the EU and trade partners which causes factor price in host and origin countries to diverge.

The positive correlation between immigration and trade is an outcome which supports the expectations embodied in “information bridge hypothesis”, arguing the disappearance of certain transaction costs due to migration. Besides, the same positive relationship can also be considered as an evidence for the existence of “transplanted home bias” which boosts imports from the origin countries.

Obviously these concluding remarks are related to overall trade and more disaggregated analyses are required to derive more specific conclusions at least to diagnose where there are transactions costs and market imperfectness, for which industries there exists transplanted home bias.

The positive impact of migration on exports disappears if separate effects of immigrants are analyzed with respect to origin of them as Mediterranean and Eastern European countries. However, immigrants specifically from the Eastern Europe have a positive impact on imports to the EU. Therefore, it is more total number of people/immigrants that increases exports rather than a specific group of people from a certain region; and it is more immigrants from the Eastern Europe who creates a transplanted home bias and causes a fall in transactions costs in trade with the EU rather than the Mediterranean countries. However, we still have to be careful in these interpretations because there is some evidence in the empirical literature showing that the migration/trade elasticity measured for lower levels of migration is higher compared to higher

levels of migration. So, satiation could have been reached especially for immigrants from certain countries.

The rise in exports from the EU may be an issue of productive capacity and scale economies but the rise in imports to the EU is more the absorptive capacity of a certain group of immigrants compared to the others. This fact also calls for the necessity of more disaggregated analyses in order to derive more specific conclusions.

Effect of productive and absorptive capacities on exports of the EU is significant in all industries examined in the analyses. While total migration to the EU is positively correlated with exports of beverages, food and live animals and machinery and transport equipment; its impact on exports of crude materials, manufacturing industries and mineral fuels and lubricants was found to be statistically insignificant. We may conclude that labor force created by the migrants satisfy the labor demand and boost production and exports in beverages, food and live animals and machinery and transport equipment industries, and/or migrants lower the transaction costs involved in exports of these industries to trade partners, or both at the same time. Immigrants of Eastern European countries observed to boost exports in crude materials and chiefly classified manufacturing only, which are not boosted by total migration. Therefore, it is only immigrants/labor force of Eastern European countries that might yield an increase in exports of those two industries not the other immigrants. However, there is a challenging empirical outcome, which is not easy to interpret, showing the positive correlation between immigration specifically from the Mediterranean countries and exports in crude materials. Crude material exports rise due to both immigrants from Eastern European and Mediterranean countries but not to total immigration, which is quite difficult to explain.

Results related to industry-level imports are mixed. Absorptive capacity in the EU seems to have significant impact only on EU's imports in machinery and transport equipment industry. Productive capacity in migration originating countries has a positive impact on the EU's imports of all industries except for food and manufacturing industries. There is positive correlation between migration to the EU and imports of food and live animals and machinery and transport equipment. The rise in imports of food and live animals might be particularly due to rising demand of the immigrants from their home countries. The rise in imports of the machinery and transport equipment might be due to unqualified immigrant labor force (in most cases) that is unable to find employment opportunity in these industries in the EU. The statistically

insignificant impact/finding regarding Eastern European immigrants on imports of food and live animals and the opposite impact regarding immigrants from Mediterranean countries also support the above argument. In a similar way, immigrants from Eastern European/Mediterranean countries have positive/negative effect on imports of beverages. Finally, migration from Eastern European countries is positively correlated with imports of machinery and transport equipment and manufacturing industries.

Apparently, all the above findings may justify for the existence of market imperfections, transactions costs, technology differences across countries etc. so that factor prices in trade partners do not equalize and migration take place. In other words, these findings may be the evidence of complementary relationship between migration and trade, rather than substitutes.

Empirical findings regarding number of enterprise and employment equations provide the information that there is positive correlation between migration from Mediterranean countries and number of enterprises in light manufacturing and employment both in light and heavy manufacturing industries. Migration from Eastern European countries is negatively correlated with enterprise numbers in electricity, gas and water supply industry and positively correlated with employment in food products, beverages and tobacco industries. These outcomes are somehow consistent with the outcomes of the trade analyses although the industry classification does not one-to-one match across trade and product diversity analyses. While migration might be a cause in rise of enterprise/employment in light-heavy manufacturing, food and beverages; it might be a cause in rise of both exports and imports in machinery and transport equipment, and a cause in rise of exports of food and live animals. The total impact on food, beverages and live animals seem to be as a result of employment opportunity for low qualified immigrant labor in this industry. However at this disaggregation level it is not possible to observe whether immigrants cause a rise in food imports from their home countries. This is also supported by the finding that change in share of native population has a negative impact on employment change in food, beverages, tobacco and light manufacturing industries. On the other hand, not much increase in immigrant labor is expected in machinery and transport equipment industries, since both exports and imports are effected by immigration but more labor is observed to be employed in light-heavy manufacturing. One last point is that the rise in share of immigrants from Mediterranean countries has a positive impact on employment change in construction industry which is quite expected due to low skill level of immigrants.

From theoretical point of view more liberalized international trade is expected to improve the welfare of both parties involved in that trade, therefore any factor that creates a rise in exports and/or imports can be considered as an opportunity in terms of increasing the welfare. The empirical evidence provided in this study finds migration as a trade boosting factor at least at aggregate levels. However, when migration is at the forefront the issues have to be approached from various angles.

The different development levels (heterogeneity of countries) of the two parties involved in international trade may play a crucial role in distribution of the welfare created by created international trade. The industrial specialization in the countries, the value added involved in those industries, level of skills required to produce in those industries are all significant factors that affect the distribution of welfare created by extra trade. Rising international trade may not be always a direct outcome of migration. The skill levels of the immigrants should match with what is required by the host country. This is actually about the question whether the extra labor force supplied by the immigrants satisfies the labor force demanded by the host countries.

Considering immigrants as only labor force is quite a shortsighted approach as they also play a significant role as consumers who may affect the consumption patterns in the host country. In addition, remittance effects in the home country should also be a part of the package that should be addressed by policies. Therefore, migration should not be perceived as a tool to create short-term positive welfare impacts through rising trade but it should also be considered as a long-term tool to build social capital.

In any case, to address all these issues in a policy package a more disaggregated empirical approach is required than what is employed in this research. Of course this depends on data availability. At least the research should be able to classify industries as mobile and non-mobile to test for the theoretical consistency of the empirical findings. The industrial classification used both in trade and product diversity components stays still quite broad and is little bit far from providing industry level policy conclusions. Besides the disaggregated industrial classification, information regarding the size, structure and type of establishments in these industries are quite important in carrying out product diversity analyses and in deriving better and more to the point policy conclusions. Though, we are not sure whether those will be available soon in the context of Mediterranean countries.

On the other hand, international trade data which is relatively easy to find at disaggregated level, is also important especially in revealing the complementary/substitutability relationship among migration and trade. At the aggregate level the literature argues migration and trade to be complements but there should be some space for substitutability for certain industries and without any hesitation we can say that policy packages can be shaped to be more specific depending on this industry-wise substitutability/complementarity relationship.

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Appendix

Migration-Trade

Static specification-Total exports

Table A1. Exports-without and with interaction dummy variables

| Real exports Fixed | | | | |
|-----------------------------------|------------|--------------|-------|------|
| Fixed-effects (within) regression | | obs. = | 6168 | |
| Group variable: newpairid | | grps. = | 1112 | |
| R-sq: within = 0.3291 | obs./grps. | min = | 1 | |
| between = 0.5842 | | avg = | 5.5 | |
| overall = 0.6003 | | max = | 13 | |
| | | F(18,1111) = | 42.60 | |
| corr(u_i, Xb) = -0.7377 | | Prob > F = | 0 | |
| Robust | | | | |
| | Coef. | Std. Err. | t | P> t |
| lmig | 0.06 | 0.03 | 1.99 | 0.05 |
| ldist | (omitted) | | | |
| lgdpcons_o | 1.60 | 0.24 | 6.72 | 0.00 |
| lgdpcons_d | 1.81 | 0.16 | 11.19 | 0.00 |
| contig | (omitted) | | | |
| colony | (omitted) | | | |
| comlang_et~o | (omitted) | | | |
| gatt_d | 0.09 | 0.08 | 1.15 | 0.25 |
| rta | 0.04 | 0.05 | 0.69 | 0.49 |
| comcur | -0.20 | 0.13 | -1.59 | 0.11 |
| _cons | -67.46 | 7.61 | -8.86 | 0.00 |
| sigma_u | 2.47 | | | |
| sigma_e | 0.41 | | | |
| rho | 0.97 | | | |

| Real exports Fixed with migration interaction dummy variables | | | | |
|---|------------|--------------|-------|------|
| Fixed-effects (within) regression | | obs. = | 6168 | |
| Group variable: newpairid | | grps. = | 1112 | |
| R-sq: within = 0.3320 | obs./grps. | min = | 1 | |
| between = 0.6064 | | avg = | 5.5 | |
| overall = 0.6233 | | max = | 13 | |
| | | F(21,1111) = | 41.00 | |
| corr(u_i, Xb) = -0.6842 | | Prob > F = | 0 | |
| Robust | | | | |
| | Coef. | Std. Err. | t | P> t |
| lmig | -0.03 | 0.06 | -0.55 | 0.59 |
| ldist | (omitted) | | | |
| lgdpcons_o | 1.71 | 0.24 | 7.19 | 0.00 |
| lgdpcons_d | 1.74 | 0.16 | 10.75 | 0.00 |
| contig | (omitted) | | | |
| colony | (omitted) | | | |
| comlang_et~o | (omitted) | | | |
| gatt_d | 0.08 | 0.08 | 0.93 | 0.35 |
| rta | 0.02 | 0.05 | 0.43 | 0.67 |
| comcur | -0.18 | 0.13 | -1.36 | 0.18 |
| lmigmpc | 0.06 | 0.10 | 0.62 | 0.54 |
| lmigeec | 0.12 | 0.06 | 1.91 | 0.06 |
| lmigasea | -0.05 | 0.13 | -0.40 | 0.69 |
| _cons | -68.36 | 7.40 | -9.24 | 0.00 |
| sigma_u | 2.26 | | | |
| sigma_e | 0.40 | | | |
| rho | 0.97 | | | |

Static specification-Total imports

Table A2. Imports-without and with interaction dummy variables

| Real imports Fixed | | | | |
|---------------------------|------------|--------------|---------|-------|
| . | | | obs. = | 6153 |
| Group variable: newpairid | | | grps. = | 1111 |
| R-sq: within = 0.1738 | obs./grps. | min = | | 1 |
| between = 0.4959 | | avg = | | 5.5 |
| overall = 0.4946 | | max = | | 13 |
| | | F(18,1110) = | | 28.11 |
| corr(u_i, Xb) = 0.0275 | | Prob > F = | | 0 |
| Robust | | | | |
| | Coef. | Std. Err. | t | P> t |
| lmig | 0.09 | 0.04 | 2.41 | 0.02 |
| ldist | (omitted) | | | |
| lgdpcons_o | 1.20 | 0.27 | 4.43 | 0.00 |
| lgdpcons_d | 0.54 | 0.23 | 2.39 | 0.02 |
| contig | (omitted) | | | |
| colony | (omitted) | | | |
| comlang_et~o | (omitted) | | | |
| gatt_d | -0.03 | 0.10 | -0.28 | 0.78 |
| rta | 0.29 | 0.09 | 3.29 | 0.00 |
| comcur | 0.06 | 0.07 | 0.84 | 0.40 |
| _cons | -26.66 | 9.42 | -2.83 | 0.01 |
| sigma_u | 2.16 | | | |
| sigma_e | 0.56 | | | |
| rho | 0.94 | | | |

| Real imports Fixed with migration interaction dummy variables | | | | |
|---|------------|--------------|---------|-------|
| Fixed-effects (within) regression | | | obs. = | 6153 |
| Group variable: newpairid | | | grps. = | 1111 |
| R-sq: within = 0.1841 | obs./grps. | min = | | 1 |
| between = 0.2960 | | avg = | | 5.5 |
| overall = 0.2652 | | max = | | 13 |
| | | F(21,1110) = | | 26.39 |
| corr(u_i, Xb) = -0.2639 | | Prob > F = | | 0 |
| Robust | | | | |
| | Coef. | Std. Err. | t | P> t |
| lmig | -0.05 | 0.06 | -0.79 | 0.43 |
| ldist | (omitted) | | | |
| lgdpcons_o | 1.42 | 0.28 | 5.11 | 0.00 |
| lgdpcons_d | 0.50 | 0.22 | 2.26 | 0.02 |
| contig | (omitted) | | | |
| colony | (omitted) | | | |
| comlang_et~o | (omitted) | | | |
| gatt_d | -0.05 | 0.10 | -0.52 | 0.60 |
| rta | 0.24 | 0.09 | 2.80 | 0.01 |
| comcur | 0.08 | 0.07 | 1.20 | 0.23 |
| lmigmpc | 0.16 | 0.14 | 1.15 | 0.25 |
| lmigeec | 0.19 | 0.07 | 2.58 | 0.01 |
| lmigasea | -0.32 | 0.13 | -2.40 | 0.02 |
| _cons | -30.55 | 9.12 | -3.35 | 0.00 |
| sigma_u | 2.65 | | | |
| sigma_e | 0.55 | | | |
| rho | 0.96 | | | |

Static specification, Industry-level Exports (with interaction dummy variables)

Table A7: Exports

| | Beverages | | | | Crude Materials | | | | Food and Live Animals | | | |
|--------------|--|-------|--------|------|--|-------|-------|------|--|-------|-------|------|
| | Fixed-effects (within) regression obs. = 5178 Group variable: newpairid grps. = 979 R-sq: within = 0.0960 obs./grps. min = 1 between = 0.4658 avg = 5.3 overall = 0.4328 max = 13 | | | | Fixed-effects (within) regression obs. = 5624 Group variable: newpairid grps. = 1016 R-sq: within = 0.1424 obs./grps. min = 1 between = 0.3237 avg = 5.5 overall = 0.3122 max = 13 | | | | Fixed-effects (within) regression obs. = 5606 Group variable: newpairid grps. = 1032 R-sq: within = 0.1379 obs./grps. min = 1 between = 0.3200 avg = 5.4 overall = 0.3065 max = 13 | | | |
| | corr(u _i , X _b) = -0.6150 F(21,978) = 9.29 Prob > F = 0 | | | | corr(u _i , X _b) = -0.5571 F(21,1015) = 13.39 Prob > F = 0 | | | | corr(u _i , X _b) = -0.6587 F(21,1031) = 15.73 Prob > F = 0 | | | |
| | Robust Coef. Std. Err. t P> t | | | | Robust Coef. Std. Err. t P> t | | | | Robust Coef. Std. Err. t P> t | | | |
| lmig | 0.37 | 0.18 | 2.02 | 0.04 | -0.13 | 0.10 | -1.28 | 0.20 | 0.17 | 0.11 | 1.60 | 0.11 |
| ldist | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| lgdpcons_o | 1.96 | 0.95 | 2.05 | 0.04 | 1.38 | 0.48 | 2.90 | 0.00 | 2.51 | 0.48 | 5.21 | 0.00 |
| lgdpcons_d | 1.21 | 0.47 | 2.57 | 0.01 | 1.59 | 0.40 | 3.97 | 0.00 | 0.35 | 0.34 | 1.04 | 0.30 |
| contig | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| colony | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| comlang_et~o | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| gatt_d | 0.45 | 0.25 | 1.81 | 0.07 | 0.02 | 0.16 | 0.10 | 0.92 | -0.09 | 0.16 | -0.56 | 0.58 |
| rta | 0.07 | 0.15 | 0.50 | 0.62 | 0.30 | 0.14 | 2.07 | 0.04 | -0.22 | 0.11 | -1.99 | 0.05 |
| comcur | -0.61 | 0.16 | -3.77 | 0.00 | -0.03 | 0.09 | -0.37 | 0.71 | -0.01 | 0.13 | -0.04 | 0.97 |
| lmigmpc | -0.42 | 0.50 | -0.84 | 0.40 | 0.68 | 0.27 | 2.50 | 0.01 | -0.03 | 0.28 | -0.09 | 0.93 |
| lmigeec | -0.07 | 0.19 | -0.39 | 0.70 | 0.23 | 0.11 | 2.00 | 0.05 | 0.04 | 0.11 | 0.33 | 0.74 |
| lmigasea | -0.75 | 0.41 | -1.82 | 0.07 | 0.00 | 0.37 | -0.01 | 1.00 | 0.20 | 0.59 | 0.34 | 0.73 |
| _cons | -69.01 | 25.87 | -2.67 | 0.01 | -60.35 | 15.62 | -3.86 | 0.00 | -58.09 | 13.52 | -4.30 | 0.00 |
| sigma_u | 3.06 | | | | 3.00 | | | | 3.46 | | | |
| sigma_e | 1.18 | | | | 0.88 | | | | 0.83 | | | |
| rho | 0.87 | | | | 0.92 | | | | 0.94 | | | |
| | Machinery and Transport Equipment | | | | Manufactured Goods Chiefly classified | | | | Mineral Fuels and Lubricants | | | |
| | Fixed-effects (within) regression obs. = 5921 Group variable: newpairid grps. = 1059 R-sq: within = 0.2445 obs./grps. min = 1 between = 0.6260 avg = 5.6 overall = 0.6300 max = 13 | | | | Fixed-effects (within) regression obs. = 5898 Group variable: newpairid grps. = 1057 R-sq: within = 0.1530 obs./grps. min = 1 between = 0.4630 avg = 5.6 overall = 0.4930 max = 13 | | | | Fixed-effects (within) regression obs. = 5158 Group variable: newpairid grps. = 932 R-sq: within = 0.1041 obs./grps. min = 1 between = 0.2640 avg = 5.5 overall = 0.2744 max = 13 | | | |
| | corr(u _i , X _b) = -0.8683 F(21,1058) = 29.65 Prob > F = 0 | | | | corr(u _i , X _b) = -0.1454 F(21,1056) = 20.61 Prob > F = 0 | | | | corr(u _i , X _b) = -0.6439 F(21,931) = 10.05 Prob > F = 0 | | | |
| | Robust Coef. Std. Err. t P> t | | | | Robust Coef. Std. Err. t P> t | | | | Robust Coef. Std. Err. t P> t | | | |
| lmig | 0.10 | 0.09 | 1.17 | 0.24 | -0.13 | 0.08 | -1.58 | 0.11 | 0.06 | 0.19 | 0.31 | 0.75 |
| ldist | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| lgdpcons_o | 2.31 | 0.36 | 6.48 | 0.00 | 1.07 | 0.30 | 3.58 | 0.00 | 2.23 | 0.78 | 2.84 | 0.01 |
| lgdpcons_d | 2.43 | 0.23 | 10.45 | 0.00 | 1.28 | 0.21 | 5.98 | 0.00 | 2.04 | 0.61 | 3.33 | 0.00 |
| contig | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| colony | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| comlang_et~o | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| gatt_d | 0.08 | 0.12 | 0.71 | 0.48 | -0.13 | 0.08 | -1.48 | 0.14 | -0.14 | 0.22 | -0.67 | 0.51 |
| rta | 0.10 | 0.09 | 1.06 | 0.29 | 0.04 | 0.06 | 0.60 | 0.55 | -0.17 | 0.16 | -1.04 | 0.30 |
| comcur | -0.49 | 0.22 | -2.27 | 0.02 | -0.12 | 0.08 | -1.56 | 0.12 | -0.76 | 0.26 | -2.97 | 0.00 |
| lmigmpc | 0.02 | 0.20 | 0.12 | 0.91 | 0.20 | 0.19 | 1.09 | 0.28 | -0.52 | 0.38 | -1.36 | 0.18 |
| lmigeec | 0.03 | 0.10 | 0.26 | 0.80 | 0.22 | 0.09 | 2.48 | 0.01 | -0.10 | 0.20 | -0.51 | 0.61 |
| lmigasea | -0.46 | 0.18 | -2.55 | 0.01 | -0.06 | 0.16 | -0.38 | 0.71 | -1.07 | 0.53 | -2.03 | 0.04 |
| _cons | -10.24 | 1.02 | -10.03 | 0.00 | -42.13 | 7.96 | -5.29 | 0.00 | -94.14 | 2.32 | -4.06 | 0.00 |
| sigma_u | 3.40 | | | | 2.16 | | | | 4.33 | | | |
| sigma_e | 0.60 | | | | 0.53 | | | | 1.46 | | | |
| rho | 0.97 | | | | 0.95 | | | | 0.9 | | | |

Static specification, Industry-level Imports (with interaction dummy variables)

Table A8: Imports

| | Beverages | | | | Crude Materials | | | | Food and Live Animals | | | |
|--------------|--|------------------|-------|------|--|------------------|-------|------|--|------------------|-------|------|
| | Fixed-effects (within) regression obs. = 4929 Group variable: newpairid grps. = 948 R-sq: within = 0.0699 obs./grps. min = 1 between = 0.0571 avg = 5.2 overall = 0.0553 max = 13 F(21,947) = 5.08 corr(u_i, Xb) = -0.8101 Prob > F = 0 | | | | Fixed-effects (within) regression obs. = 5534 Group variable: newpairid grps. = 1033 R-sq: within = 0.0841 obs./grps. min = 1 between = 0.3000 avg = 5.4 overall = 0.2733 max = 13 F(21,1032) = 10.58 corr(u_i, Xb) = -0.3104 Prob > F = 0 | | | | Fixed-effects (within) regression obs. = 5622 Group variable: newpairid grps. = 1032 R-sq: within = 0.1448 obs./grps. min = 1 between = 0.0000 avg = 5.4 overall = 0.0023 max = 13 F(21,1031) = 13.94 corr(u_i, Xb) = -0.7009 Prob > F = 0 | | | |
| | Coef. | Robust Std. Err. | t | P> t | Coef. | Robust Std. Err. | t | P> t | Coef. | Robust Std. Err. | t | P> t |
| lmg | -0.24 | 0.16 | -1.57 | 0.12 | 0.03 | 0.11 | 0.26 | 0.79 | -0.02 | 0.09 | -0.18 | 0.85 |
| ldist | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| lgdpcons_o | 3.59 | 0.73 | 4.93 | 0.00 | 1.58 | 0.51 | 3.08 | 0.00 | 0.80 | 0.39 | 2.03 | 0.04 |
| lgdpcons_d | 0.27 | 0.66 | 0.41 | 0.68 | 0.34 | 0.39 | 0.87 | 0.39 | -0.25 | 0.34 | -0.72 | 0.47 |
| contig | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| colony | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| comlang_et~o | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| gatt_d | 0.28 | 0.35 | 0.80 | 0.42 | -0.04 | 0.23 | -0.15 | 0.88 | -0.46 | 0.16 | -2.80 | 0.01 |
| rta | 0.07 | 0.25 | 0.29 | 0.77 | 0.26 | 0.14 | 1.83 | 0.07 | 0.11 | 0.14 | 0.75 | 0.46 |
| comcur | -0.15 | 0.15 | -0.95 | 0.34 | -0.16 | 0.21 | -0.78 | 0.43 | -0.04 | 0.10 | -0.38 | 0.71 |
| lmigmpc | -0.99 | 0.44 | -2.24 | 0.03 | -0.22 | 0.29 | -0.78 | 0.44 | 0.09 | 0.20 | 0.46 | 0.65 |
| lmigeec | 0.44 | 0.21 | 2.06 | 0.04 | -0.04 | 0.13 | -0.31 | 0.75 | 0.54 | 0.12 | 4.42 | 0.00 |
| lmigasea | -0.03 | 0.57 | -0.05 | 0.96 | -0.68 | 0.28 | -2.40 | 0.02 | -0.56 | 0.15 | -3.70 | 0.00 |
| _cons | -83.87 | 23.38 | -3.59 | 0.00 | -33.12 | 1.60 | -2.07 | 0.04 | 5.10 | 1.24 | 4.11 | 0.97 |
| sigma_u | 5.96 | | | | 2.82 | | | | 4.31 | | | |
| sigma_e | 1.31 | | | | 0.91 | | | | 0.82 | | | |
| rho | 0.95 | | | | 0.91 | | | | 0.96 | | | |
| | Machinery and Transport Equipment | | | | Manufactured Goods Chiefly classified | | | | Mineral Fuels and Lubricants | | | |
| | Fixed-effects (within) regression obs. = 5790 Group variable: newpairid grps. = 1061 R-sq: within = 0.1216 obs./grps. min = 1 between = 0.2055 avg = 5.5 overall = 0.1570 max = 13 F(21,1060) = 15.01 corr(u_i, Xb) = -0.4571 Prob > F = 0 | | | | Fixed-effects (within) regression obs. = 5799 Group variable: newpairid grps. = 1054 R-sq: within = 0.0830 obs./grps. min = 1 between = 0.2368 avg = 5.5 overall = 0.2329 max = 13 F(21,1053) = 15.65 corr(u_i, Xb) = 0.1732 Prob > F = 0 | | | | Fixed-effects (within) regression obs. = 4032 Group variable: newpairid grps. = 832 R-sq: within = 0.0424 obs./grps. min = 1 between = 0.0025 avg = 4.8 overall = 0.0009 max = 13 F(21,831) = 7.91 corr(u_i, Xb) = -0.6926 Prob > F = 0 | | | |
| | Coef. | Robust Std. Err. | t | P> t | Coef. | Robust Std. Err. | t | P> t | Coef. | Robust Std. Err. | t | P> t |
| lmg | -0.15 | 0.06 | -2.25 | 0.03 | -0.13 | 0.06 | -2.27 | 0.02 | 0.28 | 0.15 | 1.80 | 0.07 |
| ldist | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| lgdpcons_o | 1.95 | 0.43 | 4.58 | 0.00 | 0.60 | 0.37 | 1.63 | 0.10 | 1.52 | 0.92 | 1.65 | 0.10 |
| lgdpcons_d | 1.01 | 0.36 | 2.82 | 0.01 | 0.23 | 0.29 | 0.80 | 0.43 | -0.40 | 0.82 | -0.49 | 0.63 |
| contig | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| colony | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| comlang_et~o | (omitted) | | | | (omitted) | | | | (omitted) | | | |
| gatt_d | -0.11 | 0.20 | -0.55 | 0.59 | -0.18 | 0.14 | -1.30 | 0.19 | 0.06 | 0.45 | 0.13 | 0.90 |
| rta | 0.07 | 0.14 | 0.50 | 0.62 | 0.38 | 0.17 | 2.30 | 0.02 | 0.01 | 0.32 | 0.03 | 0.98 |
| comcur | 0.68 | 0.26 | 2.61 | 0.01 | 0.27 | 0.08 | 3.32 | 0.00 | 0.07 | 0.71 | 0.09 | 0.93 |
| lmigmpc | 0.37 | 0.26 | 1.42 | 0.16 | -0.24 | 0.19 | -1.25 | 0.21 | 0.42 | 0.37 | 1.14 | 0.25 |
| lmigeec | 0.39 | 0.08 | 4.54 | 0.00 | 0.16 | 0.08 | 2.09 | 0.04 | -0.29 | 0.20 | -1.43 | 0.15 |
| lmigasea | -0.50 | 0.18 | -2.80 | 0.01 | -0.01 | 0.19 | -0.07 | 0.95 | 1.23 | 1.25 | 0.98 | 0.33 |
| _cons | -58.76 | 13.94 | -4.22 | 0.00 | -41.38 | 117.14 | -0.35 | 0.72 | -1.64 | 2.94 | -0.56 | 0.58 |
| sigma_u | 3.81 | | | | 3.14 | | | | 6.01 | | | |
| sigma_e | 0.86 | | | | 0.77 | | | | 1.83 | | | |
| rho | 0.95 | | | | 0.94 | | | | 0.92 | | | |

