MIGRATION FLOWS AND TRADE ADJUSTMENTS: THE SPANISH CASE

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ABSTRACT

In this paper we analyse the link between trade and migration. Focusing in the experience of Spain, we relate a marginal index of intra-industry trade with different types of foreign workers - classified according to their country of origin and their situation in the Spanish labour market. We focus on the possibility that existing networks of foreign workers and their connections with their countries of origin could stimulate trade with the host country.

Keywords: migration, intra-industry trade, networks.

JEL codes: F10, F14, F15, F22.

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I. INTRODUCTION

Recent literature shows that there is a link between immigration and bilateral trade. Immigrant population has a statistically significant and positive effect on trade flows between host and home immigrant's countries. Two are the mechanisms underlying this link. Firstly, immigrants tend to bring with them a preference for home-country products. Secondly, immigrants bring with them contacts and foreign market information that can lower transaction costs. In this latter case, immigrants can bring with them individual-specific advantages, as their own skill level or individual abilities to exploit business opportunities or non-individual-specific advantages, as knowledge about socio-economic institutions, which is common to all immigrants from the same country.

The former mechanism, known as the preference hypothesis, applies only to host country imports, wheras the latter, the trade cost reduction hypothesis, applies to both imports and exports. That means that depending on which mechanism has a bigger effect on trade flows, immigration can induce either inter-industry o intra-industry adjustment of host country production. However, an increase on intra-industry trade indexes can be observed as a consequence of both mechanisms, depending on the initial sign of the trade balance. but this does not mean that we have an intra-industry adjustment. Therefore, the use of indexes of marginal intra-industry trade suits better the purpose of the paper.

The purpose of this paper is to analyse the effect on immigration on trade induced adjustment costs by changes on marginal intra-industry trade and to what extent this depends on country of origin and skill level of immigrants. Industry characteristics also may affect the link between immigration and trade flows, as there are products that are more sensitive to information availability, i.e., differentiated product, consumer goods, products not trade on organized markets will benefit more from additional information than homogeneous products, producer goods or products trade on organized exchanges.

As a first step, we analyse the case of Spain because its particular geographical distribution of immigrant's home-countries and its intermediate development level between developing countries and the most developed countries. We explain bilateral and industrial indexes of marginal intra-industry trade by combining immigrant and product characteristics. Besides, we also include several variables to control for country characteristics.

II. SOME THEORETICAL ISSUES ABOUT THE LINK BETWEEN TRADE AND MIGRATION

There is a debate concerning whether labour movements and trade are complements or substitutes[1]. The Factor Prize Equalization Theorem provides a strong inference that trade and immigration are substitutes. However, introducing market imperfections, such as information asymmetries or incomplete markets, provides a rationale for immigration to have an enhancing effect on international trade. From the existing literature, we can easily postulate two ways this enhancing effect might act through. First, the potential bias of the consumption preferences of the foreign workers towards their native country products could give raise to a demand effect. The obvious consequence would be an increase in the imports of the host country. The second (and more interesting) effect relates trade with the level and quality of information about foreign markets. Thus, immigrants are assumed to display a higher knowledge of their native markets which might reduce transaction costs of bilateral trade. Girma and Yu (2002) stand out two types of mechanisms: individual-specific and non individual-specific. The former implies an active performance of immigrants by means of business connections, whereas the latter originates from a more general knowledge of the social institutions of the home country. In both cases, a simultaneous increase in imports and exports of the host country could be expected.

In terms of the usual international trade terminology, we could express the effects above saying that the "demand" effect would translate into higher inter-industry trade, whereas the "network" effect would imply more intra-industry trade. This perspective allows to directly link the effects of immigration with the literature focused on intra-industry trade. Both fields can be related quite straightforwardly: on the one

[1] See, for example, Faini et al. (1999).

hand, both theoretical and empirical research has showed that intra-industry trade is mostly caused by the exchange of differentiated products; on the other hand, product differentiation is likely a key issue to allow migration effects on trade to appear. First, the "demand effect" seems to fit more naturally in those cases where there are different varieties of the same product, so that foreigners prefer their own country ones (in the lancasterian sense). Second, in regard of the "network effect", recent papers have shown that differentiated products are more sensible to reductions in transaction costs than homogeneous products (see Rauch, 1999).

The relation between intra-industry trade and migration, however, becomes less clear in the context of alternative theoretical frameworks. Trade models based in monopolistic competition explain the existence of intra-industry exchanges as a consequence of product differentiation and the presence of scale economies. Bilateral trade should therefore be higher the closer their income and factor endowments are. The former relates trade with similarities in tastes (Linder's hypothesis) whereas the latter refers to similarities in the product structure in both trade partners. In other words, intra-industry trade should increase the more similar the trade partners become. However, similarities in income between two countries does not really fit with the existence of migration movements. In consequence, although we could find a relationship between intra-industry trade and immigration, its direction might differ depending on the context.

Most of the empirical literature relating immigration and trade focuses in the bilateral volume of trade as the variable to be explained (see Gould (1994), Head and Ries (1998) or Girma and Yu (2002)). However, intra-industry trade is measured by means of the Grubel-Lloyd index as a share over total trade. Thus, higher values of the index (up to a maximum of 100) mean that volumes of bilateral exports and imports are similar, whereas lower values imply that trade is mostly industry trade at all. Under the assumption that migration flows lead to an increase in bilateral one-direction, with a minimum of zero meaning no intra- trade, does this means that we could, therefore, expect an increase in intra-industry trade as the logical consequence? Changes in the Grubel-Lloyd index through time are difficult to interpret, as higher values are not necessarily caused by more intra-industry trade (see Brülhart, 1994).

However, it is precisely changes in those values that we are mostly interested. Although trade between the host and the source countries might grow by means of both migration effects mentioned above, the way it increases will depend on the prevailing one, as we have seen. The marginal intra-industry trade developed by Brülhart allows to take these issues into our analysis.

The marginal index ranges between zero and one hundred. The former value indicates that only on type of flows has grown between *t* and *t-1*; in other words, if the increase in bilateral trade is inter-industry in nature. If imports and exports grow simultaneously, the index takes higher values up to its maximum, where both flows have increased exactly the same or, in other words, all the new trade is intra-industry.

Several issues must be taken into account regarding the likely effect of migration on trade, concerning both country and migrant's characteristics. First, the influence of newcomers on the connections with the source country will be less noticeable as long as there are already strong commercial connections. In other words, the volume of trade between both countries should reduce the effect of the arrival of immigrants. Secondly, those migrants characteristics which could affect their effectiveness in exploiting their home country linkages should also be taken into account. These characteristics are mostly referred to the qualification of foreign workers: the higher their educational level, the more likely they will have (and exploit) connections in their home country.

III. THE ECONOMETRIC MODEL AND DATA

Our econometric model follows a long-time tradition in the empirical studies of intra-industry trade. We use a logit transformation of the Brülhart index as dependent variable, so that the standard OLS procedure brings out efficient estimations.

The Brülhart's A index por marginal ITT goes in the way of the Grubel and Lloyd index of 'static' IIT but apply to trade changes. It uses a ratio between a matched growth or contraction of imports and exports in relation to total trade and for a particular industry it is given by:

$$A_i = \left(1 - \frac{|\Delta X - \Delta M|}{|\Delta X| + |\Delta M|}\right) \times 100 \qquad (1)$$

This index varies between 0 and 100, where 0 indicates marginal trade in the particular industry to be completely of the inter-industry type and 100 to represent marginal trade to be entirely of the intra-industry type.

The A index can be summed across industries of the same level of statistical disaggregation by applying the following formula for a weighted average:

$$A_{tot} = \sum_{i=1}^{k} w_i A_i \qquad \text{where} \qquad w_i = \frac{|\Delta X|_i + |\Delta M|_i}{\sum_{i=1}^{k}\left(|\Delta X|_i + |\Delta M|_i\right)} \qquad (2)$$

The marginal intra-industry trade has been built up for bilateral trade between Spain and 48 non-EU trade partners during the period 1988-1999. Trade data come from the EUROSTAT database at 5 digit level of the SITC and encompass 14 industries of the NACE-CLIO R25 classification.

With regard to the explanatory variables, the econometric model combines, on the one hand, bilateral and industry indicators postulated by monopolistic competition models of intra-industry trade and indicators for immigrants characteristics on the other. The former set encompasses differences in factor endowments and market size (DKL and DMS, respectively) as bilateral indicators, and capital per worker and I&D expenditure over sales (KLI and DIFV respectively) as industry indicators. According to models *à la Helpman-Krugman*, the higher the differences between countries, the less important intra-industry trade, so that we should expect a negative relationship between DKL and DMS and the Brülhart index. Higher product differentiation means more scope for intra-industry exchanges, which implies a positive sign for DIFV but an ambiguous one for KLI, as it could be representing the degree of product homogenisation.

DKL: difference between Spain and partner country j in the ratio capital per worker.

DMS: difference between Spain and partner country j in market size, measured as RGDP.[2]
KLI: ratio capital per worker in industry i (industry level capital data comes from the BBVA Fundación and worker data from INE)
DIFV: vertical product differentiation in industry I, measured as the ratio between I+D worker and total workers (INE)

Two additional indicators have been included as control variables. Distance (DIST) is supposed to act against trade, whereas the volume of trade between trade partners (TV) means less scope for immigrants reduce transaction costs.

TV: trade volume between Spain and partner country j (COMEXT, EUROSTAT).
DIST: geographical distance between Spain and partner country j (PCGLOBE).

The role played by immigrants has been considered in different ways in our econometric model. We use data relative to work permits provided by the Spanish Ministry of Labour. These permits distinguish whether are hired workers or work for themselves. Data by industries or by country of origin are available; however, we do not have crossed information.

MCT: total number of immigrants with work permit in Spain from partner country j.
MCCA: number of immigrants with work permit in Spain from partner country j; employees.
MCCP: number of immigrants with work permit in Spain from partner country j; self-employed.
MIT: number of immigrants in industry i with work permit in Spain from any partner country.
MICA: number of immigrants in industry i with work permit in Spain from any partner country; employees.
MICP: number of immigrants in industry i with work permit in Spain from any partner country; self-employed.

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[2] Both DKL and DMS are measured using the methodology of Balassa (1986) and using country level data form the PW Tables 6.1,.

Additionally, data regarding the type of job developed by the foreign workers is available. They are classified as follows:

Mo1: PROFESIONALES, TÉCNICOS Y SIMILARES.
Mo2: PERSONAL DIRECTIVO AAPP Y EMPRESAS.
Mo3: PERSONAL SERV. ADM Y SIM.
Mo4: COMERCIANTES, VEND Y SIM.
Mo5: PERSONAL SERV HOST,PERS, SEG.
Mo6: PERS AGR, GAN, PESCA.
Mo7: PERSONAL MINERIA, IND, CONST, TRANS.
Mo8: Non classified.

So, our empirical model is:

$$\log\left(\frac{A_{ijt}}{1-A_{ijt}}\right) = \alpha_0 + \alpha_1 dkl_{jt} + \alpha_2 dms_{jt} + \alpha_3 tv_{jt} + \alpha_4 dist_j + \\ + \alpha_5 kli_{it} + \alpha_6 difv_{it} + \sum_t \beta_t D_t + \gamma imm_{ijt} + \mu_{ijt} \qquad (3)$$

where D_t is a set of time dummy variables and imm_{ijt} stands for any of the immigration variable / s used in each specification.

IV. RESULTS

We have first estimated a basic model of IIT (specification (1) in Table 1) and later introduced immigrants stock variables, which capture different migrants characteristics related to their labour involvement on Spanish working force. With regard to the former, we have achieved standard results in the empirical literature about intra-industry trade (see Table 1). Differences in factor endowments and market size stimulate inter-industry trade, reducing therefore the marginal index for intra-industry trade. The only surprise comes from the unexpected positive sign achieved for the distance indicator (DIST); however, the expected outcome is achieved when fixed effects for countries and industries are included in the estimation (see equation (3) and (4)). With regard to the industry indicators, DIFV displays a positive effect, as expected, whereas KLI has a negative influence on the index. This might happen because this variable could be capturing the effect of a higher degree of product homogenisation in the industry.

Let us now move on to the role played by immigrants. Our first results, as displayed in table 1, are obtained by introducing the number of work permits distinguishing by the country of origin of the foreign workers (specifications (2) and (4)), and by the industry (NACE-CLIO R25) where they are working (specifications (3) and (5)). The effect of the indicator is positive in all cases, which according to our expectations should be related to the "network effect·" hypothesis.

In Table II we distinguish if the work permits are for employees of self-employed, both by country and by industry. In this case, the effect of employees is stronger when data are classified by the country of origin, but smaller when data are classified by industry. Besides, the inclusion of fixed effects makes the effect of self-employed become statistically insignificant. In Table 3, we include a threshold effect depending on the bilateral volume of trade between Spain and the country of origin of foreign workers. In order to specify the effect, we built up a dummy variable which takes value 1 when the bilateral volume of trade is higher than the mean, and zero otherwise. Therefore, the variables MCCP1, MCCA1, MICP1 and MICA1 are referred to countries whose trade with Spain is higher than average, and MCCP2, MCCA2, MICP2 and MICA2 are referred to countries where the bilateral trade volume is smaller than average.

Finally, we explore whether the type of job occupied by immigrants enhances trade (Table 4). According to our expectations, a higher number of foreigners working in tertiary activities -ranging from directive staff (Mo2) to tourism services (Mo5) and including administration personnel and merchants- increases in most cases both exports and imports between the host and their native countries. However, immigrants working in primary activities or industry do reduce the value of the index, which means a relative increase only in one type of trade flows.

V. CONCLUDING REMARKS

In this paper we analyse the effect of higher immigration on bilateral trade between the host country and the native country of immigrants, focusing on the Spanish case in relation to non-EU foreign workers. Our preliminary results show that the presence of immigrants tends to stimulate bilateral trade (increasing both exports and imports) when they have the opportunity to use their connections with their countries of origin and their knowledge concerning their institutions. Thus, immigrants which are self-employed and occupying tertiary jobs seem to have an enhancing effect on trade.

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Table 1: Extra UE Immigrants effect on Spanish MIIT (1988-1999)

Work permits by country and by industry

	No fixed effects			Country and Industry fixed effects	
	(1)	(2)	(3)	(4)	(5)
Constant	-1.069	-1.811	-2.036	-4.476	-6.685
	(0.352)	(0.362)	(0.388)	(1.313)	(1.378)
DKL	-5.361 [a]	-4.567 [a]	-5.362 [a]	-3.691[a]	-3.235[a]
	(0.149)	(0.164)	(0.149)	(0.608)	(0.607)
DMS	-3.293 [a]	-3.459 [a]	-3.293 [a]	-3.771[a]	-1.627
	(0.146)	(0.153)	(0.146)	(1.325)	(1.379)
KLI	-3.443 [a]	-3.759 [a]	-3.320 [a]	-0.894[a]	-1.276[a]
	(0.111)	(0.119)	(0.112)	(0.258)	(0.250)
DIFV	0.378 [a]	0.361 [a]	0.514 [a]	6.816[a]	7.371[a]
	(0.111)	(0.115)	(0.114)	(0.694)	(0.698)
DIST	0.371 [a]	0.485 [a]	0.372 [a]	-0.184	-1.781[c]
	(0.119)	(0.121)	(0.119)	(0.958)	(0.990)
MCT	-	1.373 [a]	-	0.352[a]	-
		(0.645)		(0.117)	
MIT	-	-	0.722 [a]	-	0.366[b]
			(0.116)		(0.183)
R^2	0.424	0.408	0.427	0.585	0.597
N. observ.	7112	6034	7112	6034	7112

OLS on logistic transformation of Brülhart's MIIT A index
All estimations include time-dummy variables.
Except for *constant*, [a], [b], [c], indicates significance at the 1%, 5% and 10% level respectively. *t-ratios* based on heteroscedasticity robust standard errors, are given in parentheses.

Table 2: Extra UE Immigrants effect on Spanish MIIT (1988-1999)

Work permits for employees and self-employed

	No fixed effects		Country and Industry fixed effects	
	(1)	(2)	(3)	(4)
Constant	-2.317	-1.898	-9.570	-6.731
	(0.391)	(0.393)	(1.574)	(1.379)
DKL	-4.431[a]	-5.361[a]	0.251	-3.235[a]
	(0.171)	(0.149)	(0.965)	(0.607)
DMS	-3.475[a]	-3.293[a]	-4.010[a]	-1.627
	(0.154)	(0.146)	(1.362)	(1.379)
KLI	-3.703[a]	-3.320[a]	-0.928[a]	-1.279[a]
	(0.121)	(0.112)	(0.263)	(0.250)
DIFV	0.364[a]	0.530[a]	6.965[a]	7.402[a]
	(0.118)	(0.114)	(0.715)	(0.701)
DIST	0.593[a]	0.372[a]	-0.998	-1.782[c]
	(0.127)	(0.119)	(0.976)	(0.990)
MCCP	0.466[a]	-	-0.156	-
	(0.152)		(0.119)	
MCCA	1.208[a]	-	0.493[a]	-
	(0.126)		(0.141)	
MICP	-	0.523[a]	-	-0.029
		(0.119)		(0.157)
MICA	-	0.378[a]		0.372[a]
		(0.137)		(0.183)
R^2	0.402	0.428	0.584	0.597
N. observ.	5866	7112	5866	7112

OLS on logistic transformation of Brülhart's MIIT A index
All estimations include time-dummy variables.
Except for *constant*, [a], [b], [c], indicates significance at the 1%, 5% and 10% level respectively. *t-ratios* based on heteroscedasticity robust standard errors, are given in parentheses.

Table 3: Extra UE Immigrants effect on Spanish MIIT (1988-1999). Work permits for employees and self-employed. Threshold effects

	No fixed effects		Country and Industry fixed effects	
	(1)	(2)	(3)	(4)
Constant	-2.234	-1.828	-9.488	-6.700
	(0.407)	(0.401)	(1.577)	(1.382)
DKL	-4.431[a]	-5.298[a]	0.283	-3.231[a]
	(0.172)	(0.149)	(0.968)	(0.607)
DMS	-3.480[a]	-3.300[a]	-4.115[a]	-1.661
	(0.143)	(0.135)	(1.371)	(1.380)
KLI	-3.691[a]	-3.332[a]	-0.926[a]	-1.277[a]
	(0.119)	(0.115)	(0.263)	(0.250)
DIFV	0.361[a]	0.519[a]	6.949[a]	7.386[a]
	(0.122)	(0.116)	(0.716)	(0.702)
DIST	0.540[a]	0.318[b]	-0.950	-1.753[c]
	(0.134)	(0.124)	(0.977)	(0.992)
MCCP1	2.617[a]		0.140	-
	(0.588)		(0.198)	
MCCP2	0.240		-0.180	-
	(0.201)		(0.129)	
MCCA1	0.221		0.358[b]	-
	(0.234)		(0.171)	
MCCA2	1.323[a]		0.497[a]	-
	(0.198)		(0.148)	
MICP1	-	0.759[c]	-	-0.101
		(0.448)		(0.198)
MICP2	-	0.492[a]	-	-0.022
		(0.137)		(0.163)
MICA1	-	1.352[a]	-	0.544[b]
		(0.334)		(0.232)
MICA2	-	0.275[b]	-	0.355[c]
		(0.137)		(0.186)
R^2	0.402	0.428	0.584	0.597
N. Observ.	5866	7112	5866	7112

OLS on logistic transformation of Brülhart's MIIT A index
All estimations include time-dummy variables.
Except for *constant*, [a], [b], [c], indicates significance at the 1%, 5% and 10% level respectively. *t-ratios* based on heteroscedasticity robust standard errors, are given in parentheses.

Table 4: Extra UE Immigrants effect on Spanish MIIT (1988-1999). Work permits by type of occupation

	No fixed effects		Country and industry fixed effects	
	(1)	(2)	(3)	(4)
Constant	-2.943[a]	-2.337	-11.528	-9-908
	(0.389)	(0.405)	(1.601)	(1.700)
DKL	-5.267[a]	-5.539[a]	0.937	1.397
	(0.157)	(0.161)	(0.948)	(1.022)
DMS	-3.109[a]	-2.850[a]	-2.350c	-4.162b
	(0.147)	(0.146)	(1.398)	(1.643)
KLI	-3.412[a]	-3.436[a]	-1.273a	-1.318a
	(0.115)	(0.117)	(0.251)	(0.250)
DIFV	0.373[a]	0.362[a]	7.156a	6.868a
	(0.110)	(0.108)	(0.692)	(0.697)
DIST	0.815[a]	0.662	-2.293b	-1.511
	(0.127)	(0.140)	(1.002)	(1.080)
MOT	1.690[a]	-	0.430a	-
	(0.072)		(0.134)	
MO1	-	-0.595[b]	-	0.375
		(0.250)		(0.293)
MO2	-	1.005[a]	-	0.402a
		(0.080)		(0.117)
MO3	-	0.573[c]	-	-0.211
		(0.327)		(0.377)
MO4	-	1.867[a]	-	-1.470[a]
		(0.282)		(0.473)
MO5	-	2.050[a]	-	1.172[a]
		(0.176)		(0.297)
MO6	-	-0.340[a]	-	-0.922[a]
		(0.127)		(0.187)
MO7	-	-1.973[a]	-	0.896b
		(0.348)		(0.430)
MO8	-	-0.065	-	0.001
		(0.081)		(0.990)
R^2	0.434	0.454	0.595	0.597
N. observ.	6958	6958	6958	6958