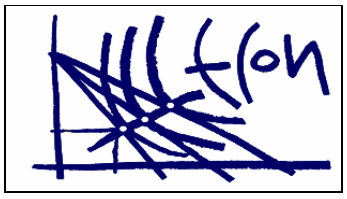

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JEL Classification numbers: F10, F14, F15, F22.
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Department of Economics

MIGRATION FLOWS AND INTRA-INDUSTRY TRADE ADJUSTMENTS

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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 the stock 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. Our results show a significant impact of the number of immigrants with work permits on intra-industry trade adjustment. However, this impact being positive or negative depends on whether foreign workers are employees or self-employed, the duration of the work permits and the type of job they occupy.

Keywords: migration, intra-industry trade, networks.
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I. INTRODUCTION

In the last few years, empirical evidence has been provided on the existence of a link between immigration and trade. According to this literature, the presence of an immigrant population has a positive effect on trade flows between the host and the home countries. The theory of international trade, most of all in a monopolistic competition framework, provides strong arguments for such a complementary relationship. Notwithstanding this, it has been in the network literature where most of the research on this topic has been done. Thus, higher bilateral trade between the receiving and the source country could be caused by the bias in immigrant's preferences towards home-country products or by reductions in transaction costs derived from higher knowledge about their native markets. The former implies more imports from the native country, whereas the latter could imply more imports, more exports or both. That means that depending on which mechanism has a bigger effect on trade flows, immigration can induce either inter-industry or intra-industry adjustment of host country production. The purpose of this paper is to analyse the effect on immigration on the type of trade adjustments taking place.

We analyse the case of Spain. Its recent role as final destination for immigrants together with its distribution of immigrant's home-countries and its intermediate development level between developing countries and the most developed countries makes it an ideal candidate for our purposes. We explain bilateral and industrial indexes of Spanish marginal intra-industry trade with non-EU countries by combining immigrant and product characteristics, and also include several variables to control for country characteristics.

The contribution of the paper is twofold. First, it provides new evidence about the determinants of intra-industry trade. Second, it focuses, for the first time in the literature to our knowledge, on the relationship between immigrants characteristics and intra-industry trade. It uses a new approach to analyse the mechanisms that explain the link between immigration and bilateral trade by relating immigration to the type of trade adjustment induced by it. The relationship between immigration and intra-industry trade

was first analysed by Blanes (2005) also using Spanish data. However, our paper makes additional contributions. First, we use not only bilateral but also industry level trade data. Second, we consider individual characteristics of immigrants related to the role they play in the Spanish labour market. This allows us to explain more fully not only the existence of a link between immigration and intra-industry trade but the mechanisms behind this link.

The paper is structured as follows. In section two we introduce some theoretical issues about the link between trade and migration. In section three we present the data and econometric model. Econometric results are presented in section four, Section five summarize the main findings and conclusions.

II. THE LINK BETWEEN TRADE AND MIGRATION: THEORETICAL ISSUES

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, as far as we are working under the Heckscher-Ohlin assumptions. Thus, as people move from the source to the host country, their relative factor endowments become more similar (provided there are no changes in capital stocks). This means that there will be no room for trade based upon comparative advantage. However, things can be rather different if the bilateral trade is intra-industry, and it depends on the existence of scale economies and product differentiation. In this context, trade could appear even when trade partners have exactly the same factor endowments. Therefore, we are likely to find a complementary relationship between international migration and trade.

One common feature to all the situations above is that migration means a change in labour supply in both the source and host country, without any reference to the

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

composition of labour supply. As workers are assumed to have the same preferences and there is perfect information in all cases, it does not make any difference whether the change in the number of workers happens because of migratory flows or because of variations in the birth rates. However, introducing market imperfections, such as information asymmetries or incomplete markets, provides a rationale for international trade being enhanced by immigration because the latter changes the national composition of labour supplies.

From the existing literature, we can easily postulate two ways this enhancing effect might act through. First, the potential bias of consumption preferences of foreign workers towards their native country products could give raise to a demand effect. The obvious consequence would be an increase in 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) point 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 could (although not necessarily) imply more intra-industry trade. This perspective allows us to directly link the effects of immigration with the literature on intra-industry trade. Both fields can be related quite straightforwardly: on the one 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 have a preference (in the Lancasterian sense) for those varieties produced in their home

country. Second, with regard to the "network effect", recent papers have shown that differentiated products are more sensitive to reductions in transaction costs than homogeneous products (see Rauch, 1999).

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 home country linkages should also be taken into account. These characteristics are mostly referred to as the quality of the job and/or the human capital endowments of foreign workers: the higher they are, the more likely they will have (and exploit) connections in their home country.

III. ECONOMETRIC MODEL AND DATA

III.1 Measuring trade adjustment and its determinants

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))[2]. 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 one-direction, with a minimum of zero meaning no intra-industry trade at all. Under the assumption that migration flows lead to an increase in both exports and imports, 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

[2] The only exception is Blanes (2005) who finds evidence of a positive effect of immigration on Spanish intra-industry trade.

necessarily caused by more intra-industry trade (see Greenaway and Milner, 1986 and 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 index developed by Brülhart allows taking these issues into our analysis. Brülhart's A index for marginal ITT is analogous to the Grubel and Lloyd index of IIT but applies 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 and is given by:

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

The marginal index ranges between zero and one hundred. The former value indicates that only one type of flow has grown between *t* and *t-1*; in other words, 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.

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

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

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 are from the EUROSTAT database at the 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.[3] 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 represent the degree of product homogenisation.

DKL: differences in the ratio of capital per worker between Spain and partner country j.
DMS: differences in market size, measured as RGDP between Spain and partner country j.[4]
KLI: capital per worker ratio 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)

III.2 Foreign workers data

We use data on work permits granted by the Spanish authorities to foreign workers. These permits are granted to develop specific activities, so that immigrants can be classified by their country of origin, by the sector they are working in or by their job position. Furthermore, we can distinguish whether foreign workers are employees or self-employed. A quick look at the data gives a glimpse of the main traits of Spanish immigration during the nineties. Thus, the total number of permits steadily grew since

[3] See Hummels and Levinsohn (1995) or Greenaway, Milner and Elliot (1999).
[4] Both DKL and DMS are measured using the methodology of Balassa (1986) and using country level data form the PW Tables 6.1.

the late eighties, but it is an increase in employees, as the number of self-employed workers slightly descends during the whole period.

GRAPH 1

The country composition of the work permits shows that this increase in the number of permits has strongly concentrated in workers coming from the Magreb and, to a lesser degree, South America, as displayed in Graph 2. Even within these regions, a small number of countries are the source of most of the immigrant population: thus, 20% of foreigners working as employees came from Morocco in 1988, but the share increased to 43% in 1999, the next groups in importance are Equatorials (8%) and Peruvians (7%). In the case of self-employed workers, a small increase in the number of permits can be observed in the early nineties, although by 1993 a decreasing pattern is clear. Once again, this general trend mostly reflects the behaviour of Magreb and South American natives (see Graph 3). Although more research should be done on this, it seems as if the arrival of mass migration to the Spanish economy since the early-middle nineties is characterised by workers without capital endowments who are not able to run their own business and therefore must find jobs as employees.

GRAPH 2

GRAPH 3

Most work permits have been increasingly granted for job positions in service activities, as displayed in Graph 4.[5] Closely related to this is the fact that immigrants from different countries are not uniformly spread across the different activities and jobs available. Thus, most people from Magreb are concentrated in agricultural activities for the whole period considered in the sample, increasing their share from 62.53% in 1988 to represent most immigrants working in agriculture (81.45%) and a very high

[5] The job positions are classified as follows: *Managers and professionals* include "Professionals and technicians" and "Managers in public and private sectors", *Service workers* stand for "Sales representatives", "Tourism and personal services workers" and "Office workers", *Agriculture workers* include "Farmers, cattle farmers and fishermen" and *Industry and Construction workers* include "Mining, industry, construction and transport workers".

proportion in industry and construction (57.50%). On the other hand, service activities are mostly developed by people from Asia and South America. Interestingly enough, both regions have reversed their positions from the beginning of the period, as in 1988 Asians represented 42.48% of permits and South Americans 28.44%, whereas in 1999 they amounted for 19.85% and 45.12%, respectively, the former being even surpassed by Magrebians. This latter evidence is important for our purposes, provided that the possibility of exploiting network connections and higher knowledge of the native markets is stronger for immigrants developing non primary or secondary jobs. Thus, the strong share of workers from a small number of countries does not necessarily prevent immigrants from other native countries exploiting these connections.

For estimation purposes, three sets of variables have been built up to get the effect of immigrants on trade adjustment. First, the number of work permits classified by the country of origin of the foreign worker. We will distinguish whether these foreign workers are self-employed or employees.

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.
MCS: number of immigrants with work permit in Spain from partner country j for a stay shorter than one year.
MCL: number of immigrants with work permit in Spain from partner country j for a stay longer than one year.

Second, the number of work permits granted by industry. Service activities have been dropped as most of them are non tradable or there is no reliable trade data[6]. In this

[6] The sectors that encompass the sample are the following ones: Non-metallic minerals and mineral products, Ferrous and non-ferrous metals, Chemical products, Metal products, Agricultural and industrial machinery, Office and data processing machines, Electrical goods, Automobile and parts, Other transport equipment,, Food, beverages and tobacco, Textiles and clothing, Paper and printing products, Other manufacturing products.

case, data are aggregated by countries. Again, the distinction between self-employed and employees holds.

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.
MIS: number of immigrants in industry i with work permit in Spain for a stay shorter than one year.
MIL: number of immigrants in industry i with work permit in Spain for a stay longer than one year.

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

Mo1: *Professionals and technicians*.
Mo2: *Managers in public and private sectors*.
Mo3: *Office workers*.
Mo4: *Sales representatives*.
Mo5: *Tourism and personal services workers.*
Mo6: *Farmers, cattle farmers and fishermen*.
Mo7: *Mining, industry, construction and transport workers*.
Mo8: *Miscellaneous*.

This information is classified by the country of origin of immigrants, but without reference to the industry where the job is occupied.

Given the nature of our measurement of trade adjustment, which ranges from zero to 100, the standard Ordinary Least Squares (OLS) procedure does not ensure that the fitted values are within this interval. Therefore, we use a logit transformation of the

Brülhart index as dependent variable, so that OLS estimation is efficient. Our empirical model is:

$$\log\left(\frac{A_{ijt}}{1-A_{ijt}}\right) = \alpha_0 + \alpha_1 dkl_{jt} + \alpha_2 dms_{jt} + \alpha_3 dist_j + \alpha_4 kli_{it} + \alpha_5 difv_{it} + \\ + \delta\, imm_{ijt} + \left(\sum_i \beta_i DI_i + \sum_j \chi_j DC_j\right) + \mu_{ijt} \tag{3}$$

where DI_i and DC_j are industry and country fixed effects, respectively, and imm_{ijt} stands for the (set of) immigration variable(s) used in each specification.

IV. RESULTS

We first estimated a basic model of IIT where the stock of immigrants is introduced according to two different criteria: by country of origin (equations (1), (3) and (5) in Table 1) and by NACE-CLIO R25 sector where they work (equations (2), (4) and (6)). With regard to the outcome concerning traditional variables explaining intra-industry adjustment, most are standard in the empirical literature. As expected, bilateral factor endowments differences promote inter-industry trade flows, as they constitute a source for comparative advantage-induced exchanges, and therefore display a negative sign. The non significance of differences in market size in most of the regressions, on the other hand, could suggest that scale economies are not really important to explaining trade adjustment with the set of trade partners in our sample. At this point, it is worth remembering that intra-industry flows induced by scale economies are most likely to be found among similar countries in terms of income - this is not the case for most of our sample.

This impression is supported by the results achieved for the industry indicators, as both are statistically significant, with opposite signs: positive for DIFV and negative for KLI. Whereas the former is supposed to measure the degree of vertical differentiation in each sector, the second captures the effect of a higher degree of product homogenisation in the industry, which it is usually understood as a characteristic more strongly linked to inter-industry type of trade adjustment.

Let us now move on to the role played by immigrants. First, a significant and positive effect of the number of work permits on intra-industry trade adjustment is observed, regardless of whether they are classified by country of origin (equation (1) or by industry (equation (3)). According to our expectations, this result reinforces the *network effect*, as a higher number of immigrants is affecting simultaneously trade in both directions. The next question to be answered is whether the work situation of those foreign workers has any incidence on this positive effect. To test this, additional equations have been estimated taking into account the length of the work permits (equations (5) and (6)) and whether the foreign workers are self-employed or employees (equations (2) and (4)).

In this latter case, some differences appear. On the one hand, the number of employees has a positive and significant effect both when they are classified by country (MCTCA) and by industry (MITCA); on the other hand, the impact is negative in the case of the number of self-employed; besides, this impact is only significant in the "by country" estimation. According to our interpretation of the results, this implies that the "personal links" that form the core of the *network approach* are more feasible when foreign workers are working for native firms in the host country, whereas self-employed foreigners are more likely to promote only one-direction trade flows. This latter effect takes place more likely in wholesale activities, which explains the fact that the variable is significant in the "by country" case and non significant in the "by industry" estimation, as no service activities are taken into account in that case.

Finally, we have taken into account the duration of work permits: less than a year or more than a year. No differences in terms of sign or significance are achieved for short term and long term permits when immigrants are classified by country (MCS and MCL, respectively). However, only permits for periods longer than a year seem to be relevant when the classification "by industry" is considered (MIL).

We also explore whether the type of job occupied by immigrants enhances trade (Table 3). 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. Although in this latter case it is difficult to disentangle between the *demand effect* and *network effect*, the strong presence of foreign workers in primary activities suggests a likely *demand effect* operating there.

As stated in section II, for the specifics of the human capital of immigrants to allow for an increase in trade flows, there must be a lack of information about potential trade partners. Otherwise, there is (potentially) less room for a reduction in the transaction cost of trade flows to happen. The degree of knowledge is introduced in our econometric model through the volume of bilateral trade. More specifically, 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 the value 1 when the bilateral volume of trade is higher than the mean, and zero otherwise. This average is referred to the first year included in the sample, as it represents the market penetration at the beginning of the arrival of foreign workers. Therefore, the variables MCT1, MCCP1, MCCA1, MIT1, MICP1 and MICA1 are referred to countries whose trade with Spain is higher than average, and MCT2, MCCP2, MCCA2, MIT2, MICP2 and MICA2 are referred to countries where the bilateral trade volume is smaller than average. The results obtained are displayed in Tables 4 and 5.

In the "by country" estimations, the effect of immigrants coming from countries with high levels bilateral trade is not significant, whereas in the case of those coming from "unknown" markets, the effect is strongly significant and positive. The results of estimating equation (2) show that this positive effect is due to the number of employees, as the self-employed immigrants display a significant but negative effect. Thus, a threshold effect seems to exist.

By contrast, the results in the "by industry" estimation show mixed evidence. With no distinction between self-employed and employees (equation (3)), the only significant and positive effect is achieved in the case of "low volume" trade partners. When the distinction is made, positive and significant effects appear for employees in all cases, whereas only a negative sign is obtained for trade with "high volume" trade partners.

With regard to data by occupation, the "threshold exercise" shows the same pattern as the "by country" estimations. The variables which were statistically significant in the estimation in Table 3 are now significant only in the case of natives from countries with low levels of bilateral trade, the only exception being mo5 (Tourism and personal services workers).

V. CONCLUDING REMARKS

In this paper we analyse the effect of higher immigration on bilateral trade between the host and the native country of immigrants, focusing on the Spanish case in relation to non-EU foreign workers. Our 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. However, the different criteria employed to classify available information on work permits allows us to add precision to this evidence. First, the conditions of foreign workers being employees or self-employed turns out to be a determinant in our analysis, as the latter only contribute to one-direction trade flows whereas it is the former who are mostly involved in greater two-way trade. The kind of job also plays a key role: the *network* effect as defined is related to the number of people working as managers or in service activities, whereas sales representatives and immigrants in primary activities mostly contribute to stronger one-way trade. In most cases, this enhancing effect on bilateral trade (both one-way and

two-way) only is significant with regard to countries where the volumes of trade at the beginning of the period were relatively low. Data on work permits classified by industry show mixed evidence, although the alternative roles played by employees and self-employed are robust to different specifications. But the threshold effect defined by the initial volume of trade is less evident in this case and deserves further research.

REFERENCES

Balassa, B. (1986). "The determinants of intra-industry specialization in United States trade". *Oxford Economic Papers*, vol. 38, pp. 220-233.

Blanes, J.V. (2005). "Does immigration help to explain intra-industry trade? Evidence for Spain". *Review of World Economics*, vol. 141 (2), pp. 244-270.

Brülhart, M. (1994). "Marginal intra-industry trade: Measurement and Relevance for the Pattern of Industrial Adjustment". *Weltwirtschaftliches Archiv*, vol. 130, pp. 600-613.

Faini, R. , J. de Melo and K.F. Zimmermann (ed.) (1999): Migration. The controversies and the evidence. Cambridge University Press, Cambridge (UK).

Girma, S. and Z. Yu (2002). "The link between immigration and trade: evidence from the United Kingdom", *Weltwirtschaftliches Archiv*, vol. 138, pp. 115-130.

Greenaway, D.and C. Milner (1986). The Economics of Intra-Industry Trade, Blackwell, Oxford.

Greenaway, D., C. Milner and R. Elliott (1999). "UK Intra-industry Trade with the EU North and South", *Oxford Bulletin of Economics & Statistics*, vol.61 (3), pp. 365-84.

Gould, D.M. (1994). "Immigrant links to the home country: empirical implications for U.S. bilateral trade flows". Review of Economics and Statistics, vol. 76; pp. 302-316.

Head, K. and J. Ries (1998): "Immigration and trade creation: Econometric evidence

from Canada", *Canadian Journal of Economics*, vol. 31, pp.47-62.

Hummels, D. and J. Levinsohn (1995). "Monopolistic competition and international trade: reconsidering the evidence", *The Quarterly Journal of Economics*, vol. 110(4), pp. 799-386.

Minondo, A. (1999): "The Labour Market Impact of Trade in Middle Income Countries: A Factor Content Analysis of Spain", *The World Economy*, vol 22, pp. 1095-1117.

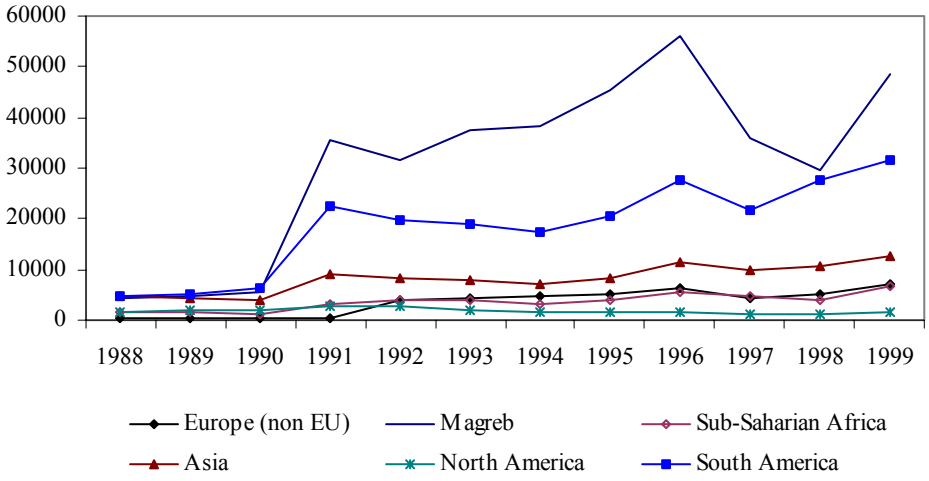
Rauch, J. (1999). "Networks versus markets in international trade", *Journal of International Economics*, vol. 48, pp. 7-35.

Graph 1. Number of permits. Classified by the work dependence of immigrants

Source: Ministry of Labour of Spain

Graph 2. Number of permits. Employees

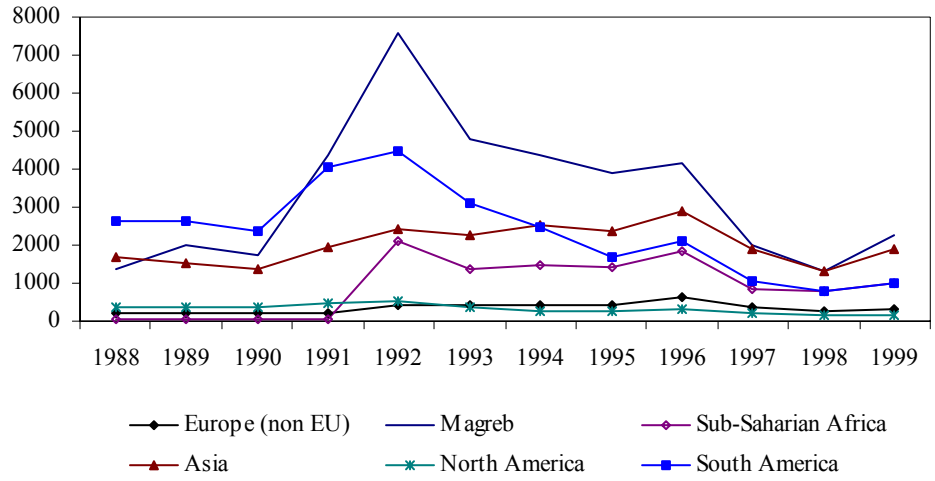
Classified by region of origin of immigrants



Source: Ministry of Labour of Spain

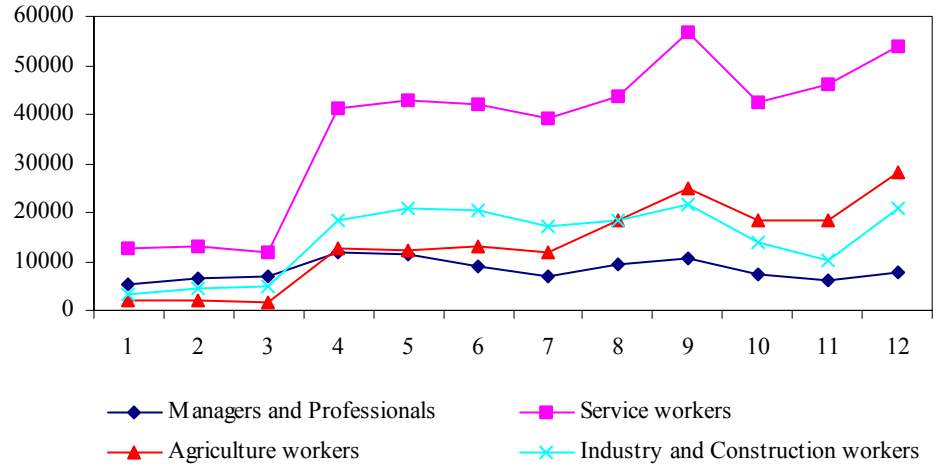
Graph 3. Number of permits. Self-employed

Classified by region of origin of immigrants



Source: Ministry of Labour of Spain

Graph 4. Number of permits. Classified by type of job



Source: Ministry of Labour of Spain

Table 1: Share of permits by world region and activities.

	Professionals and Managers	Service Activities	Agriculture	Industry and Construction
1988				
Europe (non EU)	3.57	3.16	0.75	0.98
Magreb	3.59	18.61	62.53	41.37
Sub-Saharian Africa	0.48	2.93	20.07	15.07
Asia	14.32	42.48	3.22	8.62
North America	25.45	4.37	0.70	1.42
South America	52.59	28.44	3.72	32.56
TOTAL	*100.00*	*100.00*	*100.00*	*100.00*
1999				
Europe (non EU)	12.12	5.80	3.12	10.18
Magreb	11.38	24.27	81.45	57.50
Sub-Saharian Africa	2.46	4.32	9.23	9.71
Asia	26.79	19.85	1.68	5.02
North America	14.02	0.64	0.02	0.47
South America	33.24	45.12	4.50	17.12
TOTAL	*100.00*	*100.00*	*100.00*	*100.00*

Source: Ministry of Labour of Spain

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

OLS on logistic transformation of Brülhart's MIIT A index

	Permits by country		Permits by industry		Permits by length	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-11.922	-11.862	-12.051	-12.078	-11.911	-12.045
	(0.905)	(0.906)	(0.908)	(0.909)	(0.906)	(0.907)
DKL	-2.147 [a]	-3.640 [a]	-2.193 [a]	-2.183 [a]	-2.164 [a]	-2.063 [a]
	(0.639)	(0.640)	(0.640)	(0.641)	(0.640)	(0.639)
DMS	0.351	0.327	0.368	0.346	0.370	0.229
	(0.792)	(0.793)	(0.792)	(0.793)	(0.793)	(0.788)
KLI	-0.939 [a]	-0.945 [a]	-0.960 [a]	-0.963 [a]	-0.940 [a]	-0.957 [a]
	(0.184)	(0.183)	(0.184)	(0.185)	(0.183)	(0.184)
DIFV	5.274 [a]	5.220 [a]	5.561 [a]	5.587 [a]	5.254 [a]	5.256 [a]
	(0.507)	(0.507)	(0.522)	(0.525)	(0.507)	(0.522)
MCT	0.470 [a]	-	-	-	-	-
	(0.105)					
MCTCA	-	0.603 [a]	-	-	-	-
		(0.148)				
MCTCP	-	-0.282 [b]	-	-	-	-
		(0.104)				
MIT	-	-	0.282 [b]	-	-	-
			(0.137)			
MITCA	-	-	-	0.288 [b]	-	-
				(0.137)		
MITCP	-	-	-	-0.026	-	-
				(0.116)		
MCS	-	-	-	-	0.299 [a]	-
					(0.089)	
MCL	-	-	-	-	0.264 [a]	-
					(0.057)	
MIS					-	0.020
						(0.116)
MIL					-	0.506 [a]
						(0.098)
R^2	0.598	0.598	0.597	0.597	0.598	0.599
N. observ.	6958	6958	6958	6958	6958	6958

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).

OLS on logistic transformation of Brülhart's MIIT A index.

	Permits by occupation
	(1)
Constant	-12.128
	(0.933)
DKL	-2.544 [a]
	(0.649)
DMS	1.124
	(0.828)
KLI	-0.966 [a]
	(0.183)
DIFV	5.051 [a]
	(0.510)
MO1 Professionals and technicians	0.026
	(0.209)
MO2 Managers in public and private sectors	0.158 [b]
	(0.072)
MO3 Office workers	0.141
	(0.271)
MO4 Sales representatives	-1.195 [a]
	(0.347)
MO5 Tourism and personal services workers	0.985 [a]
	(0.218)
MO6 Farmers, cattle farmers and fishermen	-0.538 [a]
	(0.139)
MO7 Mining, industry, construction and transport workers	0.613 [c]
	(0.315)
MO8 Miscellaneous	0.005
	(0.052)
R^2	0.601
N. observ.	6958

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).

OLS on logistic transformation of Brülhart's MIIT A index.

	Threshold effects			
	(1)	(2)	(3)	(4)
Constant	-11.923	-11.862	-12.051	-12.074
	(0.905)	(0.906)	(0.908)	(0.910)
DKL	-2.146 [a]	-2.168 [a]	-2.192 [a]	-2.181 [a]
	(0.639)	(0.640)	(0.640)	(0.641)
DMS	0.349	0.326	0.363	0.336
	(0.793)	(0.794)	(0.793)	(0.794)
KLI	-0.939 [a]	-0.945 [a]	-0.960 [a]	-0.963 [a]
	(0.184)	(0.183)	(0.185)	(0.185)
DIFV	5.275 [a]	5.222 [a]	5.570 [a]	5.601 [a]
	(0.507)	(0.508)	(0.525)	(0.528)
MCT1	0.799	-	-	-
	(0.958)			
MCT2	0.472 [a]	-	-	-
	(0.106)			
MCCP1	-	-0.375	-	-
		(0.948)		
MCCP2	-	-0.282 [a]	-	-
		(0.104)		
MCCA1	-	1.307	-	-
		(2.554)		
MCCA2	-	0.605 [a]	-	-
		(0.114)		
MIT1	-	-	0.608	-
			(0.470)	
MIT2	-	-	0.285 [b]	-
			(0.138)	
MICP1	-	-	-	-1.106 [a]
				(0.396)
MICP2	-	-	-	-0.027
				(0.117)
MICA1	-	-	-	1.024 [b]
				(0.491)
MICA2	-	-	-	0.290 [a]
				(0.139)
R^2	0.598	0.598	0.598	0.598
N. Observ.	6958	6958	6958	6958

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 5: Extra UE Immigrants effect on Spanish MIIT (1988-1999).

OLS on logistic transformation of Brülhart's MIIT A index.

	Permits by occupation
	(1)
Constant	-12.110
	(0.934)
DKL	-2.547 [a]
	(0.650)
DMS	1.111
	(0.829)
KLI	-0.967 [a]
	(0.183)
DIFV	5.055 [a]
	(0.511)
Foreign workers from countries with high bilateral trade	
MO1 Professionals and technicians	0.686
	(1.092)
MO2 Managers in public and private sectors	-0.654
	(2.051)
MO3 Office workers	0.166
	(1.104)
MO4 Sales representatives	0.851
	(8.441)
MO5 Tourism and personal services workers	5.108 [a]
	(1.648)
MO6 Farmers, cattle farmers and fishermen	13.746
	(10.321)
MO7 Mining, industry, construction and transport workers	6.341
	(24.575)
MO8 Miscellaneous	-286.663
	(223.552)
Foreign workers from countries with low bilateral trade	
MO1 Professionals and technicians	0.028
	(0.211)
MO2 Managers in public and private sectors	0.161 [a]
	(0.072)
MO3 Office workers	0.138
	(0.274)
MO4 Sales representatives	-1.193 [a]
	(0.347)
MO5 Tourism and personal services workers	0.987 [a]
	(0.219)
MO6 Farmers, cattle farmers and fishermen	-0.538 [a]
	(0.139)
MO7 Mining, industry, construction and transport workers	0.613 [c]
	(0.316)
MO8 Miscellaneous	0.004
	(0.052)
R^2	0.600
N. observ.	6958

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.