

MIGRANT NETWORKS IN SWISS TRADE

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Abstract- This paper studies the effect of immigrants on Swiss trade combining insights from the information-based models of international trade and models of trade and insecurity. I find that the pro-trade effect of migrants is a major determinant of its trade patterns. Moreover, I find that migrant networks can act as substitutes for efficient institutions. However, they do not seem to perform well as information providers.

Introduction

The power of immigrants to compensate for the lack of information and contract enforcement in international trade has been an area of empirical research since Greif (1993). Greif illustrated the importance of networks in providing the framework required for the operation of the market by influencing “*the cost if not the feasibility of trade and thereby the process of market integration.*” While he studied the Maghribi traders of the 11th century, Rauch and Trindade (2002) looked at the business network created by ethnic Chinese immigrants around the world. By showing that countries with a greater share of Chinese immigrants trade more with each other, they pointed up that ethnic Chinese networks facilitate international trade by “*helping to match buyers and sellers in characteristics space, in addition to their effect through enforcement of community sanctions that deter opportunistic behaviour.*”

In fact, it is not only the Chinese who create such migrant networks, as most immigrants keep ties to their home country. Much attention has been devoted to migrant networks in the United States. Gould (1994) showed that US immigrants’ “*knowledge of their home country markets, language, preferences and business contacts*” had been historically important in increasing bilateral trade flows. More recently, Herande and Saavedra (2005), Dunlevy (2006), Bandyopadhyay et. al. (2007) and White and Bedassa (2008) also used US data to confirm the importance of migrant networks in increasing US exports. These studies examine carefully the influence of various factors such as corruption, geographic and cultural proximity or language on the protrade effect of immigrants. As Gould (1994) noted, “*the development of trust through immigrant contacts can decrease the costs associated with negotiating trade contracts and ensuring their enforcement. While trade flows between developed countries may benefit modestly from these effects, trade between developed and developing countries would be influenced relatively more because formal trade contracting is not as well institutionalised in*

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developing countries as it is in developed countries.” Indeed, for “*international transactions involve multiple governance systems, the effectiveness of domestic institutions in securing and enforcing property rights in economic exchange is an important determinant of trade costs*” (De Groot et.al. 2004). This could explain why so little trade occurs with developing countries as institutions affect risk perceptions and preferences in international transactions. In fact, the impact of a higher perceived quality of governance on bilateral trade is positive and highly significant (Anderson 2000, Anderson and Marcouiller 2002, Dollar and Kray 2002). Anderson and Marcouiller (2002) emphasize that “predation [...] by corrupt officials generates a price mark-up equivalent to a hidden tax or tariff”. While tariffs and all formal trade barriers affect homogenously all potential traders, corruption should deter mostly those who don’t know the rules of the game (Crozet, Koenig and Rebeyrol 2008).

Search and insecurity in international trade

Few studies guide most of the empirical work that has been done in these areas. Rauch (1996) showed that missing information resulted in a search for the right differentiated products and hence increased trade costs and reduced trade. He then explained that ethnic networks as well as trading companies could provide information and trust among trading partners in such an unorganized market. Gould (1994) developed an analytical model based on the microeconomic foundations of the gravity equation to which he added endogenous transaction costs that decline with the introduction of foreign market information supplied by immigrants. Rauch and Watson (2004) built a general equilibrium model where agents with foreign contacts have multiple ways of using their information to promote trade. Many more add-ons could be incorporated to these theoretical models to analyse the precise means by which networks promote trade, however the main effect remains through information provision and contract enforcement.

As for the impact of insecurity on trade, Anderson and Marcouiller (2002) build a model assuming “*international exchange is insecure. Shipments may be hijacked. Bribes may be extorted. Contracts may not be enforced [and] that insecurity constrains trade by raising the price of traded goods*”. In their model, the probability of loss is reflected in a price mark-up equivalent to a hidden tax on trade.

The empirical work that has been done so far on trade networks does not accentuate the role of formal institutions. While it shows that migrants’ networks promote trade and could substitute for the bad quality of institutions in international trade by deterring violation of contracts through repeated transactions and mutual trust, it fails to show the substitution effect empirically. Moreover, the lack of good institutions accentuates the importance of information in exchanges as agents need to take fully informed decisions. Bad institutions should be a major deterrent especially for differentiated products.

The effect of immigrants on trade should be even higher the worse the institutions, where their role as information providers and contract enforcers become essential. This effect should also be higher when product information is less easily available. Also, immigrants may have the necessary knowledge to adapt the products to the demand of their adoptive country, for example, by respecting food safety standards. Finally, immigrants' knowledge of the business ways and the ways of dealing with government officials in their home country improves their ability to overcome trade barriers. Hence, immigrants may possess the necessary knowledge on both countries to facilitate, or even create, trade.

In this paper I study the impact of migrant networks on Swiss trade combining theoretical insights from the two branches of trade theory described above, the networks and trade branch of information based models developed by Rauch (2001) and the trade and insecurity branch developed by Anderson and Marcouiller (2002) among others. More precisely, I estimate how immigrants living in Switzerland can help trade with their home country.

The first hypothesis I will test is if the pro-trade effect of immigrants is more important the worse the institutions. The second hypothesis is whether it is more important the more differentiated the products traded. The purpose is to disentangle the mechanisms through which migrants help countries trade.

Empirical method

I study the case of Swiss trade as the data on immigrants and trade is highly precise and available for seven years over a 9 year period from 1996 to 2005.

I use an empirical log linear version of the gravity equation to which I add the log of the stock of migrants from the partner country (i) living in Switzerland in year (j). I use the value of exports (or imports) from Switzerland to 159 partners around the World. By looking at exports I measure the network effect for "*the export elasticity only reflects a network effect*" (Rauch 2001). When looking at imports I also estimate the demand for home products in the host country.

I estimate the following model:

$$\ln EXPORTS_{ij} \text{ (or } IMPORTS) = f(\ln MIGRANTS_{ij}, \ln GDP_{ij}, \ln GDPPC_{ij}, \ln DISTANCE_{ij}, \\ REMOTENESS_{ij}, INSTITUTIONS_{ij}, \ln MIGRANTS_{ij} * INSTITUTIONS, Z_{ij}),$$

where

$\ln EXPORTS_{ij}$ ($IMPORTS$) is the logarithm of the value of exports to country i in year j in 2000 US dollars,

$MIGRANTS_{ij}$ is the number of migrants from country i in year j

GDP_{ij} is country i 's Gross Domestic Product in 2000 US dollars in year j ,

$GDPPC_{ij}$ is country i 's Gross Domestic Product per capita in 2000 US dollars in year j ,

$DISTANCE_j$ is the distance in miles between Switzerland and country i 's principal city,

$REMOTENESS_{ij}$ is an indicator of how remote country i is from the rest of the economic world in year j ,

$INSTITUTIONS_{ij}$ is an indicator of the efficiency of country i 's institutions in year j ,

Z_{ij} includes other variables that characterise the relationship between country i and Switzerland, such as preferential trade agreements, insularity, landlockness, common language, and shared border.

Santos Silva and Tenreyro (2006) suggest that “the presence of heteroskedasticity can generate strikingly different estimates when the gravity equation is log-linearized, rather than estimated in levels [and that] inferences drawn on log-linearized regressions can produce misleading conclusions. Hence I use a Poisson estimation, as they suggest. As trade with certain countries is inexistent in some cases, I also use a Tobit and zero inflated Poisson as robustness checks.

The data

The trade data is from the UN Comtrade database. I divided goods into three groups according to the Rauch and Trindade (2002) classification: (1) “homogenous” goods, meaning their prices are quoted on organized exchanges, such as coffee or rice, or (2) “reference priced” goods, meaning that their prices are quoted in trade publications. Examples of such goods in my sample are hydrogenated animal or vegetable oils or woods and resin-based chemical products. The other goods are classified as (3) “differentiated”, meaning they are differentiated and hence thicker information is required for trade to occur. As Rauch and Trindade (2002) suggested, the pro-trade effect of immigrants on goods that have “reference prices” could be used to measure their effect on deterrence of contract violations while their effect on differentiated products also includes the mechanism of market information. For observations for which trade was inexistent I kept zeros while I took the logarithm of positive values. This also applies to the migrant stock data which is from the Swiss Federal Statistics Office. For standard gravity equations' geographic variables, I use a set constructed by Andrew Rose and found on his website. For preferential trade agreements, I created a dummy (PTA), which takes the value of 1 if the countries have a trade agreement, using information found on www.bilaterals.org. For GDP and GDP per capita I use the World Bank's World Development Indicators database. The Institutional quality indicator is taken from the Worldwide Governance Indicators of the World Bank and it measures the

extent to which agents have confidence in and abide by the rules of society, in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence. I also use Transparency International's corruption perception index for a robustness check. To measure remoteness I use the proxy used by Carrère (2006) where remoteness, also described as multilateral

trade resistance is equal to $\left[\sum_{k=1, k \neq i}^N GDP_k (Dist_{ik})^{1-\sigma} \right]^{1/1-\sigma}$ where σ is the elasticity of substitution between

goods and is calibrated at 4 which corresponds to estimates proposed in empirical literature (e.g. Obstfeld and Rogoff, 2001). To address the effect of institutions on the pro-trade effect of immigrants, which we expect to be more important the worse the institutions, I interact the trade institutions indicator with the logarithm of the stock of migrants. Its associated coefficient will determine if migrants and institutions are substitutes or complements. I also include year and continent dummies.

Empirical findings

I report the estimated marginal effect coefficients obtained from a Poisson estimation of the augmented gravity model in Table 1. The standard gravity variables are more or less significant and of the expected sign. Distance has a strong effect, landlocked countries trade less. The coefficient for Preferential Trade Agreements is significant but not for differentiated products. The coefficient for GDP per capita is sometimes significant but switches signs for different types of products. Remoteness is highly significant but only for imports, suggesting Switzerland imports from less multilaterally remote countries. Inefficient institutions reduce trade significantly for all products. The coefficient on migrants is significant in all regressions.

Migrant Networks and Institutions – Substitutes or Complements?

The interaction between institutions and migrants is significant in all regressions, suggesting migrants and institutions act as substitutes, as predicted by the theory. This confirms that in an insecure world, migrants allow for trade to occur.

Migrants as information providers or only contract enforcers?

The other prediction of the theory is that the pro-trade effect of migrants should be bigger for differentiated products. As Rauch and Trindade (2002) suggested, the pro-trade effect of immigrants on homogenous goods could be used to measure their effect on deterrence of contract violations while their effect on differentiated products also includes the mechanism of market information, hence it should be bigger. I fail to find this in the data. The elasticity of migrants is higher for referenced priced products than for differentiated products for imports as well as imports. I also tested for the joint

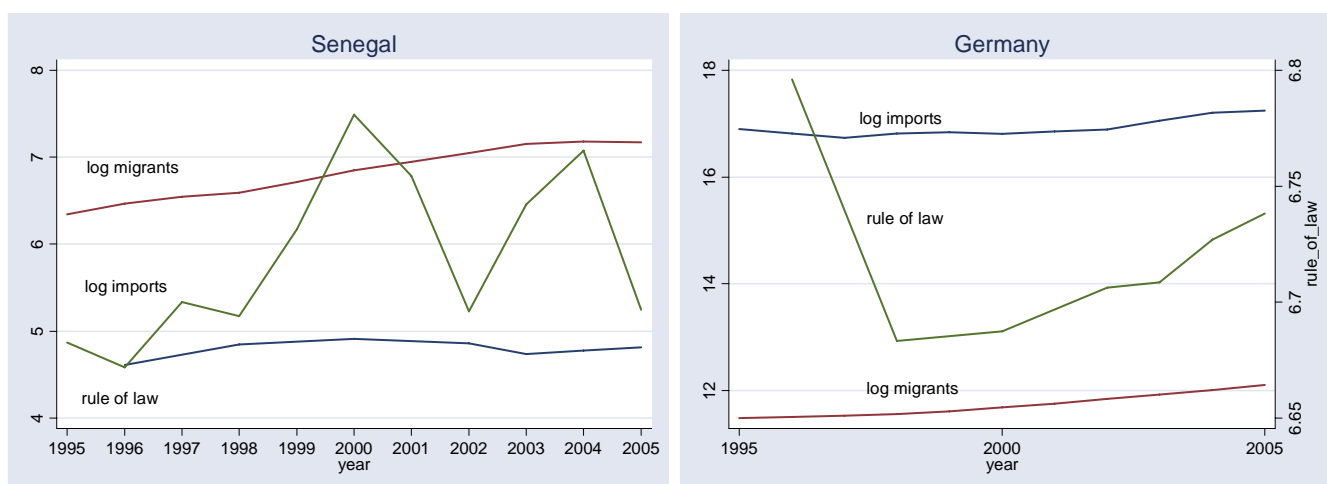
significance of the migrants and institutions variables and their interaction using a standard F-test. While they are significant in all cases, I find that these three variables explain more of the variation in exports of homogenous goods, while for imports their effect is as large for referenced priced products as for differentiated ones, while way lower for homogenous goods imports.

Robustness checks

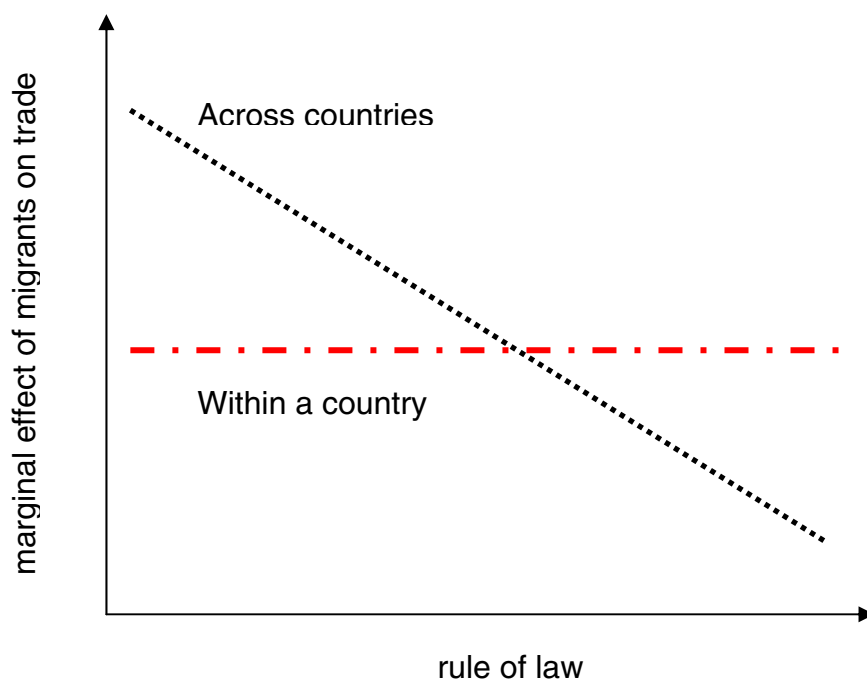
In my first robustness check, I replace my institutions indicator by Transparency International's corruption perception index. Results are in Table 2. I get exactly the same results. Corruption deters trade in almost all types of products and migrants promote trade the most for corrupt countries. I find that the effect of migrants and corruption is inexistent for the imports of homogenous goods and the export of differentiated products. The sample size is reduced by half since the corruption indicator is not available for as many years and countries. I do not find any information effect neither with this specification.

A second robustness check is to estimate the same model using a zero inflated Poisson estimation. Results are in Table 3. The results are the same as in the non inflated Poisson. I also use a Tobit model as a further check. Results shown in Table 4 are very similar to what was obtained with the Poisson model.

One last point concerns the possibility of endogeneity bias. While reverse causality seems improbable, the presence of an omitted factor bias is likely to cause a problem in my regressions. I chose not to include country fixed effects as I wanted to look at the effect of migrants across countries, not within countries. The short time period does not allow enough variation in institutional quality or migration flows to estimate precisely their impact on trade. The within estimator would not make much sense in this case anyway. It would show, for example, that the effect of Senegalese immigrants on Swiss trade with Senegal is greater in years when rule of law was lower. As can be seen in the figures below, the co-evolution of migrants and imports does not depend on institutions within countries, at least in the short run.



The relationship I measured is one across countries where migrants from countries with bad institutions help trade more since they have a bigger role to play. A small deterioration of their institutional framework from one year to the next should not correspond to any movement in trade or migrants. However, across countries, the marginal effect of migrants on trade does depend on the rule of law, as illustrated in the figure below.



To confirm this reasoning, I included the averages of the explaining variables as explaining variables and ran a random effect Poisson regression, inspired by the Mundlak procedure (1978). Results in Table 5 show that it is indeed the coefficients on the averaged coefficients that capture the substitution effect between institutions and migrants, and not the variables' deviations from their average. The averaged variables potentially suffer from an endogeneity; the results can only be interpreted as one that stands only when controlling for what is included in my regressions. I also tried to use migrants in France, global migrants and a EU-AELE dummy (it is easier for them to migrate to Switzerland) as instrumental variables for migrants and hence show that my results were not due to an endogeneity bias. However, none of these regressions provide the required results due to the poor performance of the instruments.

Conclusion

My results confirm that the protrade effect of immigrants in Switzerland is a major determinant of its trade partner. Moreover, I find that migrant networks can act as substitutes for efficient institutions. In Switzerland, migrants' role in promoting trade appears to be in knowing the rules of the game and in contract enforcement, and not in providing information as the ethnic Chinese networks do around the

world according to the Rauch and Trindade (2002) result. However, they had not controlled for institutional quality and hence their result could be biased. Finally, preferential market access schemes do not help as much as more migrants in promoting Swiss trade. Trade is still dependant on secure institutions and clearer information.

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Data Sources

Andrew Rose's dataset: <http://faculty.haas.berkeley.edu/arose/StabData.zip>

Preferential Trade Agreements details found at www.bilaterals.org

UN comtrade, United Nations Commodity Trade Statistics Database, <http://comtrade.un.org/db/>

Migrant data found on the Office fédéral de la statistique (Switzerland) website

<http://www.bfs.admin.ch/bfs/portal/fr/index/themen/01/07/blank/data/01.html>

World Development Indicators and Worldwide Governance Indicators, The World Bank Group,

<http://www.worldbank.org/>

Transparency International, www.transparency.org

Table 1 - THE PRO-TRADE EFFECT OF MIGRANTS ON SWISS TRADE

	Dependant Variable: Logarithm of exports			Dependant Variable: Logarithm of imports		
	Export products' type			Import products' type		
	Homogenous	Reference priced	Differentiated	Homogenous	Reference priced	Differentiated
ln migrants	1.841***	2.071***	0.837***	1.216***	2.015***	1.975***
ln GDP	0.555***	1.657***	1.719***	0.546*	0.823***	0.820**
ln GDP per capita	0.208	-1.425***	-1.151**	-0.182	0.280	-0.209
ln distance	-0.548***	-0.949***	-0.496**	-0.480***	-0.707***	-0.315*
island	-0.037	-0.028	0.059	1.128***	0.357	-0.200
landlocked	-0.313*	-0.166	-0.177	1.318***	-0.578**	0.256
PTA	-0.035	0.069	-0.091	1.040**	-0.064	-0.373
adjacent	-0.049	-0.539	0.136	-0.464	-1.038**	0.138
common language	-0.155	-0.450	-0.484	-0.427*	0.754**	-0.309
remoteness	2.177	3.058	-2.072	-9.919***	-4.649*	-5.585*
rule of law	2.943***	3.130***	1.241**	1.651***	3.338***	3.160***
rule of law * ln migrants	-0.319***	-0.333***	-0.129*	-0.194***	-0.344***	-0.303***
Year dummies	yes	yes	yes	yes	yes	yes
Continent dummies	yes	yes	yes	yes	yes	yes
Number of observations	1086	1086	1086	1086	1086	1086

Elasticities obtained from a maximum likelihood estimation of a poisson model. Significant at 10%(*) 5%(**) 1%(***)

Table 2 - THE PRO-TRADE EFFECT OF MIGRANTS ON SWISS TRADE

	Dependant Variable: Logarithm of exports			Dependant Variable: Logarithm of imports		
	Export products' type			Import products' type		
	Homogenous	Reference priced	Differentiated	Homogenous	Reference priced	Differentiated
ln migrants	0.787***	0.812***	0.390	0.340	0.904***	0.898***
ln GDP	0.199	1.432***	1.172***	0.577	-0.127	0.427
ln GDP per capita	1.504***	-0.419	-0.002	0.123	1.996***	1.419*
ln population	0.809**	-0.420	-0.262	0.435	1.010**	0.520
ln distance	-1.128***	-0.668**	-0.410	0.338	-0.477**	-0.422*
island	0.457	0.119	0.036	-0.350	-0.181	-0.023
landlocked	-0.634*	-0.243	-0.076	0.865*	-1.048**	0.126
PTA	0.117	0.144	-0.076	0.609	-0.114	-0.420
adjacent	-0.677*	-0.323	0.545	1.166	-0.733	-0.011
common language	-0.044	-0.454	-0.510	-0.551	0.862*	-0.327
remoteness	4.064	2.149	-0.190	-4.245	-0.811	-1.172
corruption	1.310***	0.910**	0.505	0.389	1.252***	0.953**
corruption * ln migrants	-0.137***	-0.095**	-0.053	-0.036	-0.124***	-0.101**
Year dummies	yes	yes	yes	yes	yes	yes
Continent dummies	yes	yes	yes	yes	yes	yes
Number of observations	622	622	622	622	622	622

Elasticities obtained from a maximum likelihood estimation of a poisson model. Significant at 10%(*) 5%(**) 1%(***)

Table 3 - THE PRO-TRADE EFFECT OF MIGRANTS ON SWISS TRADE

Dependant Variable: Logarithm of exports Dependant Variable: Logarithm of imports

	Export products' type			Import products' type		
	Homogenous	Reference priced	Differentiated	Homogenous	Reference priced	Differentiated
ln migrants	1.711***	1.712***	1.201***	1.025***	1.651***	1.835***
ln GDP	0.113	1.112***	1.510***	-0.454	0.452	0.418
ln GDP per capita	1.042**	-0.475	-0.726	1.420***	0.816*	0.459
ln population	-0.596**	-0.126	-0.492	1.354***	0.446	0.474
ln distance	-0.690***	-0.827***	-0.581**	-0.121	-0.525***	-0.366*
island	0.295	-0.055	-0.181	0.203	-0.014	-0.212
landlocked	-0.287	-0.007	0.094	0.706**	-0.222	0.340
PTA	0.187	-0.139	0.203	0.932*	0.098	-0.292
adjacent	-0.338	-0.489	-0.008	2.111**	-0.742	0.075
common language	0.254	-0.181	-0.271	-1.113***	0.705**	-0.212
remoteness	3.405	2.461	-1.940	-4.222	-2.786	-3.717
rule of law	2.138***	2.677***	1.878***	1.423**	2.801***	3.016***
rule of law * ln migrants	-0.208***	-0.284***	-0.217***	-0.192**	-0.275***	-0.289***
Year dummies	yes	yes	yes	yes	yes	yes
Continent dummies	yes	yes	yes	yes	yes	yes
Number of observations	1086	1086	1086	1086	1086	1086

Elasticities obtained from a maximum likelihood estimation of a zero inflated poisson (ZIP) model. Significant at 10%(*) 5%(**) 1%(***)

Table 4 - THE PRO-TRADE EFFECT OF MIGRANTS ON SWISS TRADE

Dependant Variable: Logarithm of exports Dependant Variable: Logarithm of imports

	Export products' type			Import products' type		
	Homogenous	Reference priced	Differentiated	Homogenous	Reference priced	Differentiated
ln migrants	1.338***	1.126***	0.527***	-0.002	0.754***	0.737***
ln GDP	0.711***	1.176***	1.260***	0.883**	0.544**	0.348*
ln GDP per capita	0.741**	-0.524*	-0.491**	-0.210	0.980***	0.678**
ln population	0.502*	0.000	-0.234	0.778*	0.781***	0.714***
ln distance	-0.898***	-1.001***	-0.453***	-0.524**	-0.754***	-0.285*
island	0.170	0.331	0.212	1.998***	0.747**	0.134
landlocked	-0.457*	-0.532***	-0.390***	1.168***	-0.821***	-0.099
PTA	0.559	0.661*	0.193	1.267**	0.521	-0.071
adjacent	0.391	-0.109	0.693*	-0.138	-0.779	0.689
common language	-0.075	-0.442*	-0.444***	-0.350	0.859***	-0.141
remoteness	0.484	4.102*	-2.049	-8.162**	-6.679**	-6.360***
rule of law	2.277***	1.563***	0.678***	0.139	1.605***	1.368***
rule of law * ln migrants	-0.228***	-0.162***	-0.083***	0.049	-0.106**	-0.074*
Year dummies	yes	yes	yes	yes	yes	yes
Continent dummies	yes	yes	yes	yes	yes	yes
Number of observations	1086	1086	1086	1086	1086	1086

Elasticities obtained from a maximum likelihood estimation of a tobit model. Significant at 10%(*) 5%(**) 1%(***)

Table 5 - THE PRO-TRADE EFFECT OF MIGRANTS ON SWISS TRADE

Dependant Variable: Logarithm of exports Dependant Variable: Logarithm of imports

	Export products' type			Import products' type		
	Homogenous	Reference priced	Differentiated	Homogenous	Reference priced	Differentiated
ln migrants	0.339	-0.020	-0.084	-0.104	-0.202	-0.059
ln GDP	0.132	0.102	0.099*	-0.083	0.011	0.067
ln GDP per capita	0.081	-0.196	-0.037	0.192	0.043	-0.006
ln distance	-0.338***	-0.224***	-0.070***	-0.153	-0.254***	-0.083*
island	-0.042	-0.022	0.025	0.388	0.225	0.004
landlocked	-0.101	0.000	-0.019	0.295	-0.116	0.069
PTA	-0.029	-0.008	0.009	0.107	-0.005	-0.040
adjacent	-0.315	-0.232	0.023	-0.307*	-0.569*	-0.037
common language	0.004	-0.071	-0.037	0.044*	0.306**	-0.011
remoteness	0.764	1.845	1.347	6.574	3.313	0.027
rule of law	0.431	0.029	-0.202	-0.103	-0.290	-0.194
rule of law * ln migrants	-0.022	0.016	0.038	0.024	0.045	0.029
average ln migrants	0.539*	0.461*	0.196*	0.253**	0.655**	0.428**
average ln gdp	0.213	0.141	0.020	0.060**	0.224	0.040
average ln gdp per capita	0.000	0.000	-0.000	0.000	0.000	0.000
average rule of law	0.942*	0.574*	0.396**	0.334**	1.076***	0.794***
average rule of law * ln migrants	-0.135*	-0.088*	-0.059**	-0.051***	-0.125**	-0.090**
average remoteness	0.256	-0.553	-1.639	-8.425	-4.715	-0.905
Year dummies	yes	yes	yes	yes	yes	yes
Continent dummies	yes	yes	yes	yes	yes	yes
Number of observations	1086	1086	1086	1086	1086	1086

Elasticities obtained from a maximum likelihood estimation of random effects poisson model. Significant at 10%(*) 5%(**) 1%(***)