

THE NETWORK EFFECT IN INTERNATIONAL MIGRATION

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Introduction

Just like international trade and international capital flows, the international mobility of people is now part of the globalisation process. With downward pressure on tariffs and quotas and the implementation of trade agreements between countries, there has been an impressive increase in the international exchange of goods since the Second World War. The same trend has been seen in the international movement of capital for the last 30 years, triggered by the progressive eradication of various restrictions on capital mobility by most developed countries. For a long time, the international mobility of labour and people has been the missing link in globalisation. This has been identified as a major welfare loss by eminent economists like L. Pritchett and D. Rodrik from the Kennedy School at Harvard University. International migration has nevertheless experienced an unrecorded boom since the early 1990s. The total number of migrants between 1960 and 2010 has multiplied by roughly three, from about 77 million in 1960 to 214 million in 2010. Over 4.5 million people cross an international border to settle in a new country on an annual basis. A third of those migrants settle in an OECD country.

Stylised facts

Beyond the figures regarding the size of migration flows and stocks, there is also a clear trend towards an increase in the skill content of migrants. As reported by Docquier and Rapoport (2012), the number of highly educated migrants living in OECD member countries has increased by 70 percent since 1990, as opposed to 30 percent for low-skill migrants.

The so-called South-North migration dynamic obviously dominates the global migration action, representing over 50 percent of all migration flows recorded at the world level (Özden et al. 2011). South-South migration involves more unskilled migrants and includes different types of agents like international refugees.

Questions

The above mentioned trends raise at least two important questions. Firstly, what explains the recent rise in the size of migration flows? Secondly, among the determinants of international migration flows, what are the most important factors shaping the skill content of international migrants? In order to address those questions, a screening of the extensive literature devoted to the determinants of international migration is necessary. This literature has for a long time uncovered the traditional key variables. These include the wage differential between the origin and the destination country, the bilateral distance defined in a broad sense (geodesic distance, common borders, language proximity, the existence of colonial links). A prominent role is also played by so-called pull and push factors. Push factors include origin specific developments that induce people to emigrate like climatic factors (the so called environmental migration), political instability and the quality of institutions or demographic factors. Pull factors include destination specific factors such as labour shortages and immigration policies.



One of the key questions is whether all of the above mentioned variables are able to account for a substantial part of the variability in the observed international migration flows? The answer is negative. One of the missing links is the network effect. The network effect might be defined as the global influence exerted by migrants at destination on the flows of newcomers from their origin country. A quick and simple example can easily illustrate the importance of the network effect. It also illustrates how the analysis might be flawed if this effect is not accounted for. In 1990 there were 194 Turkish migrants in Luxembourg, of which 44 percent had a tertiary edu-

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cation level. By contrast, there were 1,270,000 Turks in Germany, of which only five percent were highly educated, and 1,040 Turkish migrants in Spain, of which 33 percent could be considered highly educated. The interesting feature is that Turkey has no colonial link and no common language with any of these three destination countries. The immigration restrictions were and remain roughly the same, while the wage differential between Luxembourg and Germany is more or less equal too. How can such a gap in the size and the proportion of the population of skilled migrants in the two countries be explained? The answer is the Turkish diaspora in Germany, which generates some chain migration and explains the surge in migration flows between the two countries. It also partly explains why bilateral migration is dominated by unskilled migrants, unlike in Luxembourg and Spain.

Size and estimated elasticity

One important question is to what extent the influence of networks is significant on top of the role of the traditional factors mentioned above. To answer that question, two pieces of information are needed: figures relative to the size of migrants' networks and the value(s) of the elasticity related to the network effect. Firstly, the macroeconomic size of these networks is huge. Table 1, based on the Docquier, Lowell and Marfouk (2007) dataset on bilateral migration stocks by education level and updated with the 2005 data provided by the OECD, shows the figures for the main diaspora for the year 2000 and 2005. It also gives the proportion of skilled migrants (for 2000 only). These figures show that some diasporas like the Mexican diaspora in the US are really important. Furthermore, those figures tend to underestimate the true size of such diasporas for at least for two reasons: most figures only include legal migrants and permanent migrants. In some countries like Canada, temporary foreign worker programmes have expanded fast and the official figures may miss part of the action. Finally, some migrants like children under a certain

age (often 15) are sometimes excluded from the figures. The most conservative estimates for the Mexican diaspora, for example, total around 14 million migrants, a twofold increase compared to the official figures for 2000. Table 1 provides the most important diaspora observed in 2000 and 2005 along with the proportion of highly-educated migrants in that diaspora (available only for 2000).

The second piece of information is provided by the empirical macroeconomic literature and takes the form of econometric estimates of the network effect. While there are obviously econometric challenges to be overcome in order to correctly estimate that effect, the few existing papers based on structural gravity models (Beine et al. 2011; Bertoli and Fernandez-Huerta Moraga 2012; Beine and Parsons 2012) come up with quite consensual estimates. At the global level (i.e. mixing up all types of flows) the elasticity is about 0.4. This means that, on average, a ten percent increase in the bilateral migration stock leads to a four percent increase in the bilateral migration flow over the next ten years. This elasticity jumps to 0.7 when we restrict our attention to migration to OECD countries (and to 0.9 if we restrict it further to the US as the migrants' destination). Breaking the figure down by skill level, the elasticity is about 0.6 for skilled migrants versus 0.8 for their unskilled counterparts. Furthermore, the share of variability in bilateral migration flows explained by networks at destination is quite important. By way of illustration, the share of explained

Table 1

Selected large diasporas (2005) and proportion of educated migrants (2000)

Origin	Destination	Size (2000)	Size (2005)	Proportion skilled (2000)
Mexico	US	6,374,825	10,668,900	14.4%
Turkey	Germany	1,272,000	1,568,700	4.8%
Philippine	United States	1,163,555	1,677,200	71.7%
United Kingdom	Australia	969,004	998,800	39.3%
China	United States	841,699	1,255,500	51.6%
India	United States	836,780	1,469,200	79.4%
Vietnam	United States	807,305	1,086,400	42.9%
Cuba	United States	803,500	946,500	38.3%
Canada	United States	715,825	907,900	61.4%
El Salvador	United States	619,685	1,032,700	18.3%
Algeria	France	512,778	1,305,900	10.2%

Sources: OECD (2012); Docquier et al. (2007, release 2.1).

variability by structural gravity models tends to fall by between 50 and 70 percent. At least one third of that proportion can be ascribed to the network effect, especially for unskilled migrants. This means that failure to account for the network effect in the modelling of the long-run mobility of workers results in a misspecified approach, and can lead to biased estimates of other determinants of migration.

Migrant networks as a selection device

The different elasticities across skill groups suggest that networks are not only an important determinant of the size of migration flows, but also act as a selection device in terms of the skill content of migrants. In other words, networks of migrants tend to reduce the proportion of skilled migrants in future migration flows. This has the opposite effect to other determinants like geodesic distance and selective migration policies. The existence of a strong network effect partly explains cases of so-called negative or intermediate selection in international migration. Negative selection of migrants tends to occur when migrants are less educated than natives in the origin country. Intermediate selection refers to cases in which migrants display more or less the same average skill level as natives. Selection nevertheless only refers to the first moment of the skill distribution. This does not imply similar distribution between migrants and natives. The degree of dispersion in the skill levels of migrants can be higher or lower depending on the specific migration process. Without networks, there is a clear trend towards the positive selection of migrants, as reflected by North-North migration. In order to further understand the reason for this, one needs to understand the main economic channels through which networks affect the migration process.

Channels

The network effect can be broken down into two main economic channels. The first one is called the assimilation channel and more or less covers the various ways in which people in a destination country can help newcomers. They can help new migrants to find an accommodation, comply with the legal constraints of the destination country and learn the local language. They can provide implicit insurance and give them informal jobs during hard times. There is also evidence of migrant clustering in formal jobs.

Importantly, the magnitude of this assimilation channel significantly varies with education. It is much stronger for unskilled migrants, as shown by some microeconometric studies such as McKenzie and Rapoport (2010) in the case of Mexican migrants in the US. The second channel is immigration policy, and especially family reunification. In all developed countries, immigration policy gives new migrants the right to bring their relatives into the country. There is naturally a great deal of variation between types of migrants (temporary workers usually have limited rights), modalities (for example, the exact definition of relatives in the law) and destinations. Nevertheless, even in countries with explicit skill-biased immigration policies like Canada and Australia, the proportion of migrants arriving under kinship-based visas is not negligible. In 2010, family-based immigrants represented about 60 percent (resp. 58 percent) of the permanent immigrants in Canada (resp. Australia). Once again, this policy channel is stronger for unskilled migrants than skilled migrants. In a nutshell, highly-skilled migrants can easily migrate under an economic visa (H1B in the US for instance, through the point system in the UK) and do not need to rely on the family reunification scheme. For unskilled migrants from far away countries, a visa obtained through family ties is often the only alternative to illegal migration. All in all, these two channels explain why the network effect varies greatly across the skill levels of the prospective migrants.

Quantifying the relative importance of these channels is not an easy task given our poor measurement of immigration policies. Nevertheless, using an identification strategy based on the size of the various networks, Beine, Docquier and Özden (2012) show that the assimilation channel accounts for between 25 and 50 percent of the network effect. For unskilled migrants, this figure is close to 50 percent. For the US, there is also evidence that the importance of this policy channel has increased over time. This might be related to explicit changes in immigration policy, but also to episodes of legalisation of undocumented migrants.

Implications

The existence of a strong network effect has various important macroeconomic implications. Firstly and importantly, along with the presence of huge diaspora in a lot of countries, the existence of the network

effect implies a strong hysteresis in migration flows. The strong degree of chain migration means that the scope of action for migration policy in curbing some bilateral migration flows is rather limited. As an illustration of the strong dynamics imposed by networks, Table 2 presents a set of examples of pairs of countries for which both the bilateral migrant stock (in 2000) and the recent bilateral migration flow (in 2010) were the most important factors at destination.

In some countries, there is an implicit or explicit objective of diversity across the origin countries of the migrants. Governments are often concerned with the excessive concentration of migrants from the same country. They fear the formation of migrant enclaves and suspect that huge diasporas slow the integration of migrants in the society. The network effect counteracts the integration objective and contributes to the concentration of new migrants in a limited set of important diasporas. In other words, while the network effect might increase the heterogeneity of the destination country's total population, it can also lower the ethnic diversity of migrants. In the same vein, a high concentration of migrants of the same country is observed in the big cities of destination countries. This is especially the case in large countries. Chinese migrants tend to concentrate in Vancouver, while Haitian ones mostly head for Montreal. Of course, policy reforms can be implemented to mitigate such an effect, but full eradication of family reunification rights is utopic. This means that one should not expect the concentration process to stop in the future.

A second implication is the impact of colonial links on current international migration flows. Unlike trade flows, colonial links have a rather indirect impact on contemporaneous migration flows. In the past colonial links made it possible to bring huge flows of people from the colonies, who settled permanently in the metropole after independence. Nowadays, new migrants from former colonies also tend to choose the former coloniser as their preferred destination, not because of previous colonial links (which often do not mean much to them), but because they receive support and are hosted by people of their origin country.

Table 2

Examples of country pairs with largest migration stock and largest recent flow at destination

Origin	Destination	Diaspora (2000)	Annual flow (2010)-documented migrants only
Mexico	United States	8,250,000	139,120
Turkey	Germany	1,188,000	57,564
Algeria	France	1,210,600	19,135
Morocco	France	686,300	17,976
El Salvador	United States	750,000	18,806
Pakistan	United States	301,900	30,000
Tonga	New Zealand	165,00	751

Source: OECD (2012).

Sources of the network effect

Former colonial links are obviously one major source of the constitution of important diaspora in many destination countries. Algerians in France, Pakistanis and Indians in the UK, and Indonesian people in the Netherlands are perfect illustrations of the former colony phenomenon. However, colonial links are not the only source, as illustrated by huge networks like the Mexicans in the US, the Turks in Germany or the Portuguese in Luxembourg. A first alternative source is the past implementation of special bilateral agreements favouring worker's mobility between origin and destination countries. A perfect illustration is the broad category of guest worker programmes that were implemented in several European countries and the US after the Second World War to bring in workers in a set of specific industries suffering from labour shortages. The implementation of guest worker programmes were at the origin of diaspora like that of the Italians to Belgium or the Turks to Germany. Once again, when those programmes came to an end in the late 1960s and the early 1970s due to rising unemployment, those people had settled down and were already part of the population at destination. The existence of those guest worker programmes can be used as an exogenous source of variation of the network for the purpose of econometric identification and estimation of the network effect. This might be necessary because networks and current flows might be spuriously correlated due to their correlation with bilateral, persistent and unobserved factors such as cultural proximity. Another source of the huge diaspora lies in a perfect combination of skills at origin and needs at destination. Timing is also the key to gener-

ating such an effect. A good illustration is the Portuguese diaspora in Luxembourg. The boom in the construction sector in the late 1980s and in the 1990s in Luxembourg created a huge demand for those workers. A major part of that excess demand was satisfied by the arrival of Portuguese workers. This was also triggered by the detrimental business conditions in Portugal at that time, the relatively high reservoir of experienced construction workers and the fact that labour mobility was much easier between country members of the European Union. Today, the Portuguese diaspora in Luxembourg is by far the largest of its kind and represents about 16 percent of the Luxembourg's residents and 37 percent of all foreigners living in the country.

with them afterwards. This is only part of the picture. Filipino nurses migrating in large numbers to the US and leaving children and husbands at home provide an important counter-example to that view (Filipino women represent about 60 percent of the Filipino migrants in the US). Secondly, different sensitivities to networks tend to disappear when they are made conditional to the education level of the migrants. In other words, skilled women and skilled men are equally sensitive to networks. One explanation is that women tend to be less educated than men on global average. While this is no longer the case in developed countries, it still applies in developing countries; and global migration is dominated by South–North flows, i.e. from developing to developed countries.

Implications for students and women

So far we have considered mainly economic migrants. Network effects are also relevant for sub-categories of migrants such as students at the highest education level, as well as for women. It has been observed that foreign students of the same country tend to agglomerate not only in some specific destinations, but also in some universities. Quality of education, fees, language proximity and immigration policy all play important roles in that agglomeration process. However, networks are also part of the explanation. Networks operate at two different levels: firstly, student networks clearly provide useful information to newcomers regarding education programmes, education quality and future job prospects in the destination country. Secondly, diaspora can provide some useful hosting capacity in the form of accommodation. It is very valuable for students coming from developing countries with limited financial resources. For destination countries, this has important implications. In a globalising world there is sometimes fierce competition between countries to attract talents and skills, and attracting good foreign students is a successful strategy in this respect. Student migration is one indirect way to attract brainpower, with the additional advantage that the acquired skills are a better match to the needs of the local labour market. As far as women are concerned, new data on migration broken down by gender make it possible to characterise the migration processes involving men and women. Early studies showed that women are more sensitive to networks than men. This might, at first glance, be explained by biological differences. The common model is that of men taking foreign jobs and bringing their family

Limitations (and advantages) of macro-economic approaches

So far, we have been concerned by the macroeconomic approach to the network effect in international migration. This is definitely not the only dimension and intellectual honesty leads the author to concede that this choice partly reflects some personal bias. Cross-country analyses deliver some clear advantages with respect to analyses focusing on single migration corridors. One of these advantages is that immigration policies can sometimes be accounted for explicitly. Moreover, the use of different origins and destinations makes it possible to increase the variability in some desirable dimensions such as education or gender. But cross-country macroeconomic analyses display obvious limitations that can be (partly) overcome by microeconomic approaches. Of course, as customary in the micro-macro debate, microeconomic data allow to control for the personal characteristics of agents. However, this is not the only key aspect here. Firstly, cross-country approaches implicitly assume that the relevant network is the total stock of migrants in the destination country. This is naturally an implausible assumption, especially in large destination countries. If you arrive in St Johns, New Foundland, Canada, it is very unlikely that your friends in Vancouver will be of valuable help. This implies that one needs to identify the size of the relevant network. Microeconomic data collected through surveys can be useful in that respect. The size of the relevant network operating through the assimilation channel may also differ depending on the exact type of effect that we are interested in. Assistance in providing accommodation is not simi-

lar to help in providing useful information. The use of microeconomic data makes it possible to reflect the topology of the network. The microeconomic literature of networks has expanded quickly during the last decade, both on the theoretical and empirical sides (see for instance Calvo-Armengol, Patacchini and Zenou 2009 on social networks and education outcomes and Zenou, 2012 for more general coverage of the literature on networks).

Bilateral links can be identified and can be used to measure the degree of connection of each individual in the network. This can be useful in estimating the relevant network elasticities in a more precise way. Furthermore, when properly collected, the use of microeconomic data makes it possible to circumvent tricky econometric challenges such as the reflection problem initially identified by Manski (1993).

Avenues of future research

In spite of a big surge in the number of economic analyses of the network effect in international migration, there is definitely some scope for further investigation in this area. The possibilities are very numerous and I will only focus on a couple. A first aspect that has been disregarded by the literature on this topic to date concerns the vintage issue of the network. Networks do not have the same age, and this affects their capacity to provide assistance to newcomers from their origin country. For the sake of illustration, the Italian diaspora in France, Belgium and Luxembourg is a relatively old one. Very often, inhabitants of Italian origin are fully assimilated in the population, often hold dual nationality and tend to have quite loose ties with their origin country. A significant number of these people hardly ever speak Italian and no longer have close family in Italy. This forms a stark contrast to the more recent Portuguese diaspora in Luxembourg. In this context, the network effect associated with those diaspora is likely to be different, both in terms of magnitude and in terms of the assimilation effects. The identification of the variability of those effects across different generations of network is a desirable avenue of research for the future. The identification of the peak in the time pattern of the network effect would be an interesting by-product of such an analysis.

Another avenue of research is the identification of global networks. Country-related definitions of networks can be too large, as mentioned above, but they

can also be too narrow sometimes. People from different countries who speak the same language can provide some useful hosting capacity at destination. This is obvious in migration involving South American migrants. People from Ecuador can be of valuable help to newcomers from Columbia (and conversely, of course). The identification of the variables allowing for a more general definition of the relevant network is also a challenge for the next steps in the research in that field.

Last but not least, the microeconomic identification of key players in migration networks would also be an interesting avenue of research. Such research has recently been conducted in criminal networks and opens the door to further analysis in the field of international migration. The identification of the salient features of the agents playing an important role in the hosting of new migrants could definitely be of policy interest for governments. One policy implication of such a research agenda would be to identify the features that make a network successful (by helping new migrants, but also by favouring their integration within the destination country).

Conclusion

Academic research into the network effect in international migration has undergone major progress in recent times. This has been allowed by the creation of new data capturing the cross-country variation in bilateral migration stocks and flows. There have also been significant advances on the front of the relevant methodology to assess the importance of the network effect. Some valuable progress has been made in the development of micro-founded gravity models that allow for the identification of the theory-consistent determinants of the flows. Important concepts identified in the trade literature such as the multilateral resistance to migration have also been explicitly accounted for. However, this in no way rules out the need for further research. A first stone in the wall has been put in place in the form of consensual macroeconomic estimates of the network effect. These estimates need to be refined on several fronts, as proposed in the last part of this article.

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