Migration and Networks

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Abstract This paper provides a brief overview of current research on networks in international migration. The paper begins with a short discussion of the relationship between networks and social capital. While controversial, this concept potentially provides a unifying thread linking both various aspects of economic research and, potentially more importantly, providing a bridge linking economic research to parallel research in demography and sociology. The core of the paper is a discussion of the role of networks in the decision to migrate, the role of networks in assimilation, and the effect of global migrant networks on the pattern of international trade. In all three of these areas, recent years have seen substantial new research, both theoretical and empirical, on the ways networks interact with more standard economic variables. In each of these cases, networks are seen to play an essential role in the migration experience.

1 Introduction

Migration is an economic and, more broadly, social phenomenon of profound importance. In quantitative terms, international migrants are about 3 % of current global population (about 214 million people).[1] Even as a proportion of the world's population, this is in the neighborhood of the largest migrations in the historical record. Even if we only focus only on wage differentials, the impact of migration on the migrants themselves is huge. The impact on the sending and receiving communities are matters of considerable dispute, but it seems reasonable to conclude that barriers to arbitrage of human capital between national labor markets

[1]This is the UN, Department of Economic and Social Affairs, Population Division, estimate of 2010 migration stock from their 2008 *Trends in International Migration Stock: The 2008 Revision*, Table 1.

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are considerably larger than those facing final commodities or capital (Hamilton and Whalley 1984; Walmsley et al. 2011).

The fact that international migration involves the movement of people (i.e. members of families and communities with distinctive cultural, social and political attributes along with their economic differences) means that migration has first-order implications extending far beyond those of international trade in commodities and international capital flows. One way of beginning to broaden our perspective on migration so as to incorporate these broader social considerations within our economic analyses is to draw on network analytic methods and results. Sociologists and demographers have long taken networks to be an essential aspect of the migration decision and sought to systematically incorporate them in their research. This is now true of research by economists as well. This chapter provides a brief overview of research on migration that explicitly focuses on networks as they bear on: the decision to migrate; the selection of host country; assimilation (in particular, labor market success); and the link between migration and international trade. Before turning to these issues, we begin with a short discussion of some concepts that will be deployed throughout this chapter.

2 Networks, Social Capital and Migration

One of the great virtues of a network analytic approach to the analysis of social interaction is that it permits both a focus on individual nodes (i.e. agents) and on the overall social context as reflected in the structure of the network in which the individual nodes are embedded. For example, it is useful to know how many links (i.e. relationships) an individual has (i.e. the node's "degree"), or whether those links involve other agents who are well-connected, or poorly connected, or how well connected a node is (i.e. how long are the shortest paths from a given node to any other node); but it is also interesting to know about aggregate properties like the degree distribution, the average path length between nodes, or the shortest or longest shortest path across all nodes.[2]

Even when individual agents are the object of study, network analysis is fundamentally about the web of social relations in which those agents are embedded. The issue is always the links. That is, understanding the content and meaning of the links is a central part of any network analysis. From a descriptive point of view, these links are often flows of various resources (information, money, etc.). Analytically, though, the links are intended to represent social relations of some

[2]Graph theory is the language of network theory. Unfortunately, there is no really standard language of graph theory. Nonetheless, there are some pretty standard usages. For example, the shortest path between two nodes is usually called the "distance" or "geodesic". The "eccentricity" is the largest distance for a given node. The "radius" is the smallest eccentricity among all nodes, while the "diameter" is the largest. Chapter 1 of Harris et al. (2008) is an excellent introduction to the basics of graph theory.

kind (kinship, friendship, authority, power, etc.), and the global structure of those links is seen as an object of study on its own. Thus, for example, one might analyze international migration flows using network analytic tools. That is, one could calculate the standard measures of network topology: degree distribution (from which one can test whether the network is scale free); average path length; centrality; and clustering; among others.[3] The patterns identified by this sort of analysis can then serve as an input to further analyses (as either dependent or independent variables).

Probably the most common theoretical framework for linking the analysis of networks to migration is social capital theory. Broadly speaking, social capital refers to the resources available to individuals by virtue of their membership in a well-defined group.[4] Especially in environments where resources cannot be effectively distributed by arms-length methods (e.g. markets), relatively dense social networks that rely on trust and community enforcement can support collectively and individually better outcomes than would be available in the absence of such relations. As argued by Burt (2005), location in a network is likely to be as important to an individual as simple membership. Specifically, Burt develops an analysis in terms of "brokerage" and "closure". The latter refers to the presence of a relatively dense network of strong connections that support trust, reciprocity and alignment of interests. By contrast, the former refers to a specific type of structural position in a network—one that spans "structural holes" (Burt 1992, 2002). That is, the individual is able to mediate relations between members of the group that are not intensively linked with one another. Much of Burt's work attempts to demonstrate the particular value of brokerage in certain types of organizational structure (i.e. business firms). That is, human capital differs for individual members of the same network depending on their position in that network. However, Burt (2001, 2009) also argues that closure plays an essential role in the operation of networks. In particular, closure underwrites trust among members in the network. Similar considerations play a role in the macro analysis of social capital. For example, as we shall see, the presence of a relatively dense network spanning more than one market is able to replace missing markets. The key in such a case is that the agents carrying out the brokerage must be sufficiently embedded in a network characterized by a sufficiently high degree of closure that it supports transactions requiring a high degree of trust.

[3] Interestingly, while there are many papers examining international trade flows in this fashion, and global migration has long been analyzed as interacting systems (Kritz et al. 1992), I know of no studies of the network topology of global migration.

[4] There are a number of problems with social capital as a concept, perhaps more importantly, it is not clear that its creation has the instrumental properties of the other forms of capital (Solow 2000). That is, most of the groups considered in research on social capital (e.g. ethnic communities) are not created for the purpose of generating social capital. Analytically, this makes social capital an endowment, like capital in static economic analysis. On the other hand, social capital is produced and reproduced via the actions of members of the group (even though many of these actions may not be instrumental from the point of view of the members in any obvious way).

Unlike physical, financial and human capital, social capital is inherently a property/product of groups, rendering straightforward identification difficult. In this regard, the link to networks has proved useful. Lin (2001) even defines social capital as "resources embedded in social networks accessed and used by actors for actions". This raises the possibility that we can use the observable network properties of a group of people as a way of getting at social capital. Unfortunately, even this seems tricky—which properties are to be associated with social capital? Part of the problem has to do with whether we want to view social capital as fundamentally an attribute of individuals or of groups. From the point of view of individuals, we have already noted, following Burt, that structural heterogeneity is essential. However, from the point of view of the group, it seems clear that aggregate properties will be the main focus of analysis.

3 Networks and the Migration Decision

The decision to migrate, including the selection of destination, is probably the most studied topic in research on migration. Much of the early work involved listing of "pull" and "push" factors as a prelude to essentially *ad hoc* analysis of individual or aggregate data. For economists, the usual approach was, and is, to see migration as labor arbitrage (e.g. Hicks 1932). This basic idea was substantially extended in Sjaastad's (1962) now classic application of human capital theory to the migration decision. The idea is to see migration as an investment decision—i.e. an agent considers two "assets": the net present value of labor earnings net of costs of staying in the source country; and the net present values of labor earnings net of costs of working in a foreign country. Sjaastad was primarily interested in examining the various elements of costs and benefits that enter the calculation and, thus, presented the analysis primarily in terms of a single agent and the implications for aggregate (especially gross) migration flows. This logic has been developed in a number of directions.

For our purposes, the most immediately relevant development was a shift in perspective from the individual migrant to the family as the basic decision-making unit. Mincer (1978) took a new household economics perspective and analyzed the decision of whether or not to move the entire family. Stark and Levhari (1982) recognize that by treating the decision-making unit as the family (instead of the individual), allocation of family members between markets whose economies face imperfectly correlated shocks (or business cycles) can be seen as a more-or-less standard portfolio allocation problem. Empirical work on remittance flows is strongly consistent with this logic (e.g. Yang and Choi 2007; Yang 2008). As we shall see, the family plays a major role in the network analytic approach to migration.

Networks primarily enter the economic analysis of the migration decision on the cost side of the household's calculation.[5] The two most prominent ways that networks affect costs are through provision of information and provision of financial resources. With respect to the latter, there is substantial research showing the large magnitude of such flows in the form of remittances (Yang 2011).[6] Those resources can be used in myriad ways, but one potential use is funding of additional migration by family (or more broadly community) members. Similarly, reliable information about migration channels, labor market conditions, housing, and the like, can reduce uncertainty dramatically. While the finance channel is surely important, most research on networks and migration emphasize the information channel (e.g. Teteryatnikova 2013). Not surprisingly, historical narratives stress both of these as sources of what has long been called "chain migration" (Jones 1992; Wegge 1998). While the provision of information and finance has long been understood as a fundamental part of migration systems, only recently have researchers begun to systematically study these in the context of models linked to an explicit notion of networks. In recent years, a number of theoretical papers have sought to model the link between networks (usually defined in terms of flows of family or community members), the cost of migration and migration dynamics. While focused on interregional migration, Carrington et al. (1996) is an important, early example of this literature.[7] In that paper, the authors build a (discrete time) dynamic model of the sort implied by Sjaastad, with the additional feature that the cost of migration is decreasing in the number of migrants already in the host country. As in all of the later papers of this type, one of the keys to understanding the model is the recognition that the cost reduction due to additional migration is an externality. Not surprisingly, this model permits a variety of steady states, including: complete migration; positive, but less than complete, migration; multiple equilibria involving both low and high migration. More importantly for interpreting empirical results, this model also involves continuing migration even as wages equalize.

Even before systematic models of migration decision-making with network effects were developed, empirical work on migration choice had identified networks as a key factor in the migration decision. Empirical work on migration falls, loosely speaking, into two groups based on the nature of the data used: microeconomic

[5]In a broader sense, of course, networks can easily be seen to work on the benefit side as well. Most obviously, people might choose to migrate to a place where there are family or community members because they want to be near those particular people.

[6]Stark and Jakubek (2013) present a theoretical analysis of the role of migration networks in the financial support of migration and analyze the implications for optimal network size. Interestingly, there is survey based evidence that the more densely embedded in a network of co-ethnics is an agent, the more likely they are to remit earnings (Chort et al. 2012).

[7]Chau (1997) presents a similar analysis. Teteryatnikova (2013) builds on Calvo-Armengol and Jackson's (2004) model of job search to provide explicit network microfoundations for models of the Carrington, et al. sort in terms of information provision. Spilimbergo and Ubeda (2004) present an analysis emphasizing family relations, but their causal structure runs through the utility function (a preference to be with "friends and family") rather than through network effects.

data derived from household surveys; and macroeconomic data based (usually) on government collected data on aggregate stocks and flows of migrants. With respect to microeconomic data, the most common source of data, and inspiration, is Jorge Durand and Douglas Massey's Mexican Migration Project (MMP). Since the early 1980s, this project has carried out household surveys in Mexican villages (Massey et al. 1987).[8] From the beginning this project has studied the effect of networks on migration decisions (Taylor 1986; Massey 1990; Massey and Espinosa 1997; Zahniser 1999; Phillips and Massey 2000; Deléchat 2001; Palloni et al. 2001; Durand and Massey 2004; Fussell and Massey 2004; Fussell 2004; Orrenius and Zavodny 2005; Bauer et al. 2007; Dolfin and Genicot 2010; Flores-Yeffal and Aysa-Lastra 2011; Massey et al. 2011; Flores-Yeffal 2013). This work consistently finds that network effects are a statistically and economically significant factor in both the decision to migrate and the selection of a migration location. Similar results are found using survey data from alternative Mexican sources (Winters et al. 2001; Davis et al. 2002; McKenzie and Rapoport 2007, 2010), Ecuador (Bertoli 2010), Germany (Bauer and Zimmermann 1997; Haug 2008; Kanas et al. 2012), Denmark (Nannestad et al. 2008), and Hong Kong (Wong and Salaff 1998). In addition, similar results have been found for intra-country studies in, among others the US (Choldin 1973), India (Banerjee 1983), China (Zhao 2003) and Thailand (Garip 2008). This work provides strong support for theoretical models of the sort discussed in the previous paragraph. In particular, it is clear that early migrants appear to lower the cost of later migrants, leading to chain migration (also often called cumulative causation of migration). Interestingly, it also appears that, as the level of migration from a given community rises, community networks substitute for family networks (that is, past some threshold, family links add no additional explanatory power to the presence of community links).

Where survey based research can ask very detailed questions about the nature of network (e.g. family, community, etc.) and about individual decision context (e.g. family size, assets, relative wealth, etc.), it is, in its nature, very specific. Research based on aggregate data lacks this detail, but permits much broader application in terms of source and host countries. There is a sizable literature that simply introduces a migration stock variable into a gravity (or gravity-like) regression (Levy and Wadycki 1973; Bao et al. 2009; Jayet et al. 2010; Marques 2010). This, essentially *ad hoc* work, consistently finds that networks (proxied by stocks of migrants from the sending country) are a significant explanatory variable.[9] The

[8] According to their webpage, the MMP "comprises 143 communities with 22,894 households surveyed in Mexico and 957 households surveyed in the United States. It provides individual level data on 75,066 males and 76,714 females, for a total of 151,785 persons". More recently this methodology has been extended to a number of Caribbean, Central and South American countries under the Latin American Migration Project (LAMP).

[9] The gravity model has long been the workhorse empirical framework for empirical work on migration using aggregate data. As with networks, it is quite standard to simply include a variable *ad hoc* to evaluate its significance in explaining migration flows (e.g. welfare generosity, more or less strict immigration laws, etc.). The same is also true in the case of empirical trade research. The

big advance in aggregate empirical work on migration came with Borjas' (1987) paper on agent heterogeneity and the implications of selection for research and policy. Rather than the broad implication that net migration between two countries should be positive if the wage differential (net present value of income differentials) favors the source country, Borjas shows that, in addition to the difference in mean wages (adjusted for costs of migration), the variance of wages (relative inequality) in each country matters. Borjas' paper (see also Tunali 2000, written about the same time) built directly on Heckman's (1979) fundamental analysis of the selection problem, making clear the implication for aggregate empirical work (as well as the appropriate econometric response).[10] Pedersen et al. (2008) incorporate both selection and network effects in a straightforward gravity model, finding that network effect dominate selection effects in that setup. McKenzie and Rapoport (2010) develop an explicit analysis of network effects in the context of the Roy-Borjas model. Their key result is that, for small networks migrants are somewhat positively selected, but as networks grow (reducing costs), relatively poor migrants are increasingly able to afford migration, resulting in negative selection. Overall, network effects seem to play a very significant role in determining whether or not to migrate, and seem to play a dominant role in determining migration target.

4 Neighborhoods, Networks and Assimilation

From a broad social point of view, assimilation is perhaps the single most important issue in thinking about migration. Loosely speaking, "assimilation" refers to the process of immigrants becoming more like natives (or the state of being more like natives). However, operationally it is a nearly hopelessly broad concept, including language acquisition, adoption of broad cultural norms, similar educational attainment to natives, and the like. All of these have been studied at length (mostly by sociologists). When economists talk about assimilation, we mostly refer to labor market norms: wages, unemployment, etc. Whatever the form of assimilation, research on this topic is highly contested.[11] This is not the place to review the broad literature on assimilation. Instead, we briefly discuss research on the role of networks in supporting/resisting assimilation.

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point is not that gravity models themselves are *ad hoc*, but, rather, that whatever foundations one is using, the empirical performance is so good that one is tempted to include a variety of *ad hoc* variables that seem potentially important.

[10]It is also well worth looking at Heckman and Honore's (1990) analysis of the Roy model in this context.

[11]Even the question of whether assimilation is, or is not, a "good thing" is contested. Since much of this literature is driven by normative concerns, it is not surprising that even the facts of the matter are highly contested.

We have just seen that networks play a major role in getting people from one place to another. Different, but surely overlapping, networks are equally important in helping migrants find housing, jobs and, difficult to measure but surely of considerable importance, comfort in a foreign (and often hostile) land. In network theoretic terms, broad notions of social capital imply that there is sufficient density of linkage within a network for common information and expectations to support extended reciprocity. However, as sociologists emphasize, common culture also eases entry of new members into a local network. This is partly due to easier communication, common normative expectations, and more portable reputations. Thus, newly arrived migrants need not be known widely in the network to reap the benefits of participation in the network (Portes and Stepick 1993; Portes and Rumbaut 2006).

The key issue in research on networks/social capital in the assimilation of migrants is whether, loosely speaking, they act as springboards or traps. On the one hand, by offering access to financial, informational, and social support that would not be available on the same terms to immigrants, immigrant networks must have a positive effect on both individual members of the network and, thus, on the overall performance of the community. Especially work that views networks through the lens of social capital tends to take the "springboard" view (e.g. Coleman 1988; Lin 2001; Burt 2005). In this work, social capital is about access to resources that are available to members of a given network. Ethnographic studies of immigrant networks tend to emphasize these benefits.[12]

The other side of the coin, however, is that these resources are available because of the social relations among members of the network, and it is here that closure plays a particularly significant role. By protecting collective resources from opportunistic exploitation, closure ensures continuing access of those resources to members of the community. Enforcement in this context includes exclusion from both tangible resources that are the usual focus of network/social capital theories and the more general emotional support deriving from membership in a community. As a practical matter, what this means is that members of the network need to engage in behaviors that are reproductive of the network. This may involve general social behaviors like attending particular churches or community celebrations, but may also involve behaviors inconsistent with market logics. This, of course, is precisely the point: a broader social logic displaces pure market logic. If this results in hiring less skilled workers, or more workers (from the community) than the cost-minimizing number, the result could be lower productivity and lower profits than in firms outside the network. Similarly, if workers need to maintain linguistic and other cultural markers that identify them as community members, but also identify them as outsiders to native employers, the result could easily be poorer

[12]Portes and Sensenbrenner (1993) provide a useful review of the relevant sociological literature. It should be noted, however, that Portes and Sensenbrenner also discuss the negative effects of social embeddedness at length.

labor market performance (Chiswick 1978; Dustmann 1994; Chiswick and Miller 1996; Dustmann and Soest 2001).

There are many challenges facing empirical research on these issues—e.g. identifying meaningful networks/communities, measuring density of links (or any other network topological properties), measuring performance, forging a clean identification of the relationship between degree of social capital and performance. Current research does seem to suggest that the larger the ethnic community ("enclave") the more slowly to members of the community develop local language skill and, presumably, other host country behavioral markers (Chiswick 1991; Cutler and Glaeser 1997; Borjas 1998; Lazear 1999; Chiswick and Miller 2005; Cutler et al. 2008).[13] This leads some to conclude that immigrant enclaves result in poor assimilation (Borjas 1994, 1995, 2000; Lazear 2007; Warman 2007; Xie and Gough 2011; Danzer and Yaman 2013). There are, however, difficult endogeneity issues here. For example, if the biggest gains from participation in networks go to relatively unskilled co-ethnics, we would expect to see enclaves characterized by relatively low levels of skill, education, language acquisition, and the like. Studies that have focused on these issues tend to find more positive effects from participation in the enclave economy for unskilled workers (Wilson and Portes 1980; Edin et al. 2003; Mahuteau and Junankar 2008; Damm 2009). Similarly mixed results are found when one looks at the effect of enclaves on the development of immigrant entrepreneurs (Sanders and Nee 1987; Portes and Jensen 1989; Sanders and Nee 1992; Light et al. 1994; Portes and Zhou 1996, 1999; Aguilera 2009).

More than in the case of the migration decision, when we seek to understand the relationship between network and assimilation we are faced with the importance of understanding the meaning of the links and not simply their topology. The study of capitalist markets is greatly eased by the extent to which real markets approximate the ideal of relatively asocial relation in those markets.[14] Once we admit a more broadly socialized domain of economic decision-making, we need to be much more aware of shared meanings and specific (as opposed to abstract) social relations.

[13] An exception is recent work by Munshi (2003, 2011), who develops models of migration with job search and occupational traps, respectively, in which networks increase the likelihood of positive outcomes. In both cases, the empirical work presented by Munshi is consistent with the implications of the models. A very useful review of the literature on networks, neighborhoods and job search that covers many of the topics, but without a focus on migration is Ioannides and Loury (2004).

[14] Of course, real markets are characterized by varying mixes of social content (Kirman 2011). It remains the case that, as a wide variety of analysts have suggested, the disembedding of the market is one of the truly distinctive features of capitalism and the extent to which that disembedding fails is a potential source of crisis in the overall capitalist system (e.g. Schumpeter 1942/1975; Polanyi 1994/2001; Habermas 1975).

5 Migration Networks and International Trade

To this point, we have focused on first-order relations between networks and migration. Another way of examining the link between networks and migration is to examine how migrant networks affect some other economically relevant phenomenon. There is a surprisingly large literature on the link between migration and trade, and one branch of this literature has seen the relationship as being about networks from the earliest papers on this topic. Specifically, empirical work on this question tends to view migration as a factor potentially reducing the cost of trade between countries. Not surprisingly, the gravity model as applied to trade has been seen as a natural econometric framework for such empirical work (for surveys, see Anderson and VanWincoop 2004; Anderson 2011; Bergstrand and Egger 2011). It is well known that the gravity model can be rationalized in a variety of ways, but the various social relations added to distance to capture reductions in cost (e.g. language, common border, common FTA or currency union, etc.) are essentially ad hoc additions. Migration flows enter in the same way.

There is a growing body of work on the role of networks in trade (Rauch 2001). However, this research generally fails to distinguish between the two distinct aspects of those networks that we have already noticed: one is the role of networks in mediating the economic relationship between two dense networks; and the other is the internal structure of the networks that do the spanning. Following Ronald Burt (2005, 2009), we have referred to these as *brokerage* and *closure*.

Burt's work tends to focus on the organization of firms, but the application to broader market relations is immediate. In our context, immigrants are naturally brokers between their source country and the host country in which they settle. That is, they carry information about commodities available in source country to consumers in the host country, and vice versa. At the same time, the internal structure of a network plays a fundamental role in determining the effectiveness with which it is able to carry out the business of brokerage. Closure (i.e. relatively dense relations among members of a group) supports both reputation-building and punishment via exclusion from group benefits. Thus, especially for countries characterized by poor enforcement of contract and property rights, and/or commodities for which an arm's length market does not exist, a high degree of closure within an immigrant community permits information exchange and bonding that supports more extensive exchange.

The literature on migration and trade emphasizes the market creation (brokerage). Starting with Gould's (1994) paper that initiated the massive empirical literature using gravity models to evaluate the link between trade and migration, most of the papers in this area have seen that link in terms of spanning between dense networks of consumers.[15] The basic notion is that, in addition to their own demand for products of their home market, immigrants carry information about

[15]This body of research really is "massive". Starting from Gould's original paper until the time of writing of this paper, I count over seventy published and unpublished papers. For an extensive

those products that is useful to native consumers. Both of these will tend to increase demand for products of the immigrant home market in their new host country. Thus, both of these channels involve market creation.

In addition to seeking an accurate measure of the effect of immigration on trade, most of the empirical literature also seeks to explicitly distinguish the brokerage effect from a pure demand effect. Since, in the absence of data that distinguishes imports/exports by immigrants from imports/exports by natives, there is no straightforward structural way to make this distinction, all of these efforts involve attempts to infer which channel is relevant based on information about type of commodity, type of immigrant, or type of country involved. For example, Gould (1994) approaches this problem primarily by arguing for an asymmetry between effects on imports and exports. Specifically, he argues that pure demand effects should not have any effect on exports from the host country to the immigrant home, but should affect imports.[16] Thus, Gould's inference is that: if immigration positively affects imports, but not exports, then the demand channel is revealed to dominate; but if immigration positively affects exports, but not imports, then the brokerage effect dominates. In the event, for the case of the US 1970–1986, he finds that both are significant, but that exports are influenced more than imports by immigrant flows.[17] In addition to further studies using US data, similar studies have been done for a number of countries (e.g. Canada, UK, Australia, Switzerland, Sweden, Denmark, Spain Greece, Italy, Malaysia, and Bolivia).[18] All of these papers find a statistically significant, positive link between immigration and both imports and exports; however, there doesn't seem to be any particular pattern in the relative magnitude of the import versus the export link. Similarly, a large number of studies disaggregate the host country to subnational units (e.g. US states, Canadian Provinces, Spanish Provinces, French départements). Again, the results show significant effects of migration on trade, but no particular pattern in the effect on exports relative to imports. More recently, the development of multicountry datasets has permitted the analysis of multiple hosts and multiple homes. The great majority of these focus on (some subset of) OECD host countries and a large number of home countries (Lewer 2006; Konečný 2007a,b; Moenius et al. 2007; Dolman 2008; Lewer and Van den Berg 2008; Morgenroth and O'Brien 2008; Bettin and Turco 2010; Egger et al. 2012b; Felbermayr and Toubal 2012; Konečný 2012), while some use a matched sample of countries that trade and exchange immigrants

review of this literature, see Part I of White (2010), Chapter 2 of White and Tadesse (2011), or the meta-analysis in Genc et al. (2012).

[16]This makes sense in a partial equilibrium way. However, if the scale of either return migration or emigration of host country natives is correlated with the scale of immigration, this inference may run into trouble.

[17]As in most of the empirical literature, we use the language of immigrant flows (because that matches the theory used to interpret the results), but it should be understood that the variable in question is invariably a stock.

[18]References to the large number of papers here can be found in White and Tadesse (2011, Chapter 2) or Gaston and Nelson (2013).

(Hatzigeorgiou 2010; Parsons 2011; Tadesse and White 2011). The results here are as with the previous work on this question.

One possibility for trying to distinguish preference from information effects is to determine whether the effect of migration on trade decays above some threshold. We have already noted that both of these should increase trade. However, one might argue that demand effects should simply be linear in the immigrant population, while information effects should be subject to decay.[19] Gould (1994) did this with a non-linear functional form developed for the purpose and a handful of other papers followed suit (Head and Ries 1998; Wagner et al. 2002; Bryant et al. 2004; Morgenroth and O'Brien 2008; Egger et al. 2012b). The general result here is that the effect of migration on trade is subject to diminishing returns. Furthermore, this effect sets in at quite low levels of migration. Unless this effect is driven by the effect of migration on diffusion of preference for migrant source goods to the native population, this would seem to be strong evidence for the information link.

To further unpack this result, Gould considers consumer and producer goods separately, under the assumption that the former is more differentiated than the latter and that, as a result, the demand by immigrants will be greater. Imports and exports of both types of good are positively affected by immigration, but imports of consumer goods have the largest effect found in Gould's analysis. He takes this to suggest that both there is evidence of demand effect for consumer goods imports, but brokerage plays the dominant role in the other cases. A number of studies follow Gould in trying to find a disaggregation that provides additional leverage in distinguishing demand from brokerage effects. A variety of disaggregations are used, including: Gould's choice of consumer v. producer goods (Herander and Saavedra 2005; Mundra 2005; Blanes-Cristóbal 2008; Kandogan 2009); finished v. Intermediate (Mundra 2005); and cultural v. non-cultural goods (Tadesse and White 2008; White and Tadesse 2008; Tadesse and White 2010). In the cases of

[19]It should be noted that the econometric implications of own demand and demonstration to host natives are rather different. We would expect own demand to vary more-or-less linearly with immigration, but demonstration effects are likely to be more complex. For example, if there is a uniform propensity of natives to consume new varieties of foreign goods, and information diffuses immediately, the first immigrants provide all the relevant information, leading to an initial jump in demand, but no subsequent change other than the linear increase deriving from own demand. However, if the diffusion of information follows some specific process (or willingness to adopt does) then that process will interact with the linear immigrant process to produce some combination of the two. Most work, either implicitly or explicitly, presumes that there is a positive linear relationship between immigration and demand for imports from host countries running through the preference channel. To the extent that the information bridge runs both ways, immigrants will provide information to their home countries about host country goods, thus increasing exports and, while there is no reason that the process of learning/adoption should be the same in home and host, neither is there any reason to assume the either takes any particular form. From a welfare point of view, both of these channels should increase welfare in the context of a Krugman (1981) monopolistic competition model of the sort that underlies the Anderson-van Wincoop (2003) framework central to much of the gravity modeling used to study the empirical relationship between trade and migration. Romer (1994) makes a similar argument in his discussion of the welfare cost of trade restrictions where imports may be new goods.

all three disaggregations, the expectation is that demand effects will show up in a positive relationship between goods that are in some sense differentiated (i.e. consumer/manufactured/cultural) so that a preference for home varieties makes sense, and there is a fairly consistent pattern of immigration strongly affecting these imports.

Instead of sorting goods by some end-use category, an alternative is to sort the goods by the type of market on which they are traded. Starting from an explicitly network theoretic basis, Rauch (1999) argued that markets could be distinguished by whether: there is an organized exchange; there are reference prices quoted; and all other markets. Rauch argued that the first two types of market require that the goods traded on them be quite standardized (with organized exchanges requiring a higher degree of standardization than reference price goods) and that the residual markets, since they cannot support organized exchanges or reference prices, must be more highly differentiated. In the context of a basic gravity model, this paper found that trade costs (distance) and trade cost reduction (common language, common colonial tie) played a more significant role for differentiated goods than for the more standardized goods. In an important later paper, Rauch and Trindade (2002) argued that coethnic networks can play a significant role in reducing trade costs and, since Rauch (1999) showed that these costs are more important for differentiated goods, they should be particularly important in a gravity model as a factor increasing trade between a home and host country. Rauch and Trindade focus specifically on the Chinese diaspora (widely believed to play a major role in trade) by using Chinese population share as a variable in an otherwise standard gravity regression, finding that this variable is always significant across all types of markets, but has the greatest impact in differentiated goods—as is consistent with the hypothesis that ethnic networks of traders reduce trade costs.[20] Since the publication of Rauch and Trindade, a number of studies have used Rauch's classification in more standard setups where migrants from any country might reduce trade costs (e.g. Briant et al. 2009; Egger et al. 2012a; Felbermayr and Toubal 2012).[21] While immigrant stock tends to be a significant, positive predictor of trade (both imports and exports) in all three categories, there is no particular pattern in the magnitudes of effect (though the meta analysis in Genc et al. (2012) is consistent with a smaller effect of immigration on standardized goods).

An alternative approach reasons that emigration of host natives to the source country cannot affect imports via the preference channel, so a positive coefficient

[20]Felbermayr et al. (2010) replicate and extend the Rauch/Trindade analysis by using more current econometric techniques and by considering additional diasporas. While they estimate much smaller effects across all types of markets, they still find that the Chinese diaspora is more important for differentiated goods than for either of the standardized goods. Interestingly, they also find that, in terms of trade creation, the Moroccan, Polish, Turkish, Pakistani, Philippino, Mexican and British are all at least as important as the Chinese.

[21]More recently, a couple of studies have used a categorization based on the Broda and Weinstein (Broda and Weinstein 2006) elasticities of substitution (Tai 2009; Bettin and Turco 2010; Peri and Requena-Silvente 2010). The effects here are, if anything, weaker.

on the emigration variable should be seen as evidence for the presence of an information channel. A number of papers have checked this relationship, finding that emigration is consistently positive and significant (Canavire Bacarreza and Ehrlich 2006; Konečný 2007b; Dolman 2008; Hatzigeorgiou 2010; Parsons 2011; Felbermayr and Toubal 2012).

While the brokerage role that is emphasized by the literature is of obvious importance in understanding the link between trade and migration, closure plays a particularly central role in dealing with institutional failures and asymmetric information problems. As with brokerage, there is also a sizable literature on this second link. This work starts from the problems of contracting in certain types of goods or environments. The idea is that, in the absence of relatively complete contracts and/or effective legal environments, the risk of loss due to opportunistic behavior is sufficiently high that many mutually beneficial contracts would not be made in the absence of some alternative source of assurance. Anthropologists, sociologists and historians have long emphasized these factors in explaining the role of ethnic networks and diasporas in the organization of trade across political jurisdictions or, more generally, in the absence of effective protection of contractual/property rights (Polanyi 1957, 1968; Geertz 1963; Cohen 1969, 1971; Bonacich 1973; Geertz 1978; Curtin 1984). Recent theoretical and empirical work strongly suggests that factors such as institutional quality, business conditions, and political order constitute significant trade costs (Anderson and Marcouiller 2002; Anderson and Bandiera 2006; Anderson and Young 2006; Berkowitz et al. 2006; Turrini and Ypersele 2006; Ranjan and Lee 2007; Ranjan and Tobias 2007; Araujo et al. 2012). The earlier work by historians, anthropologists and sociologists suggest that diasporas can play a significant role in reducing these costs. Where this work identifies institutional sources of trading cost, or trading relationships that might be expected to be characterized by the presence of such costs (e.g. south-south relations, or north-south relations), it seems reasonable to expect that migration would have a particularly large trade-supporting role in the presence of such costs. Thus, a number of papers have focused specifically on developing countries as a source of both trade and migration (Co et al. 2004; White 2007; Felbermayr and Jung 2009; Bettin and Turco 2010), finding that south to north migration affects overall trade, but particularly exports of differentiated products.[22] A particularly interesting example of this sort of analysis is presented in White and Tadesse (2011, Chapters 10 & 11), where they consider four main classes of immigration corridors (north to north, north to south, south to north, and south to south), finding the strongest effect in the south to south case, no effect in the north to north case, and intermediate effects in the two north/south links. Consistent with this, analyses that include some measure of institutional quality in the source country tend to find that the trade creating effects of migrants is greater when one of the countries has poor institutional quality (Dunlevy 2006; Konečný 2007b; Briant et al. 2009).

[22]Interestingly, for the Danish case, White (2007) finds that the immigrant trade links are strongest for high income trading partners, rather than low income partners.

An interesting alternative approach to identifying this effect reasons that members of the same diaspora, on both sides of a trading dyad that does not contain the source country of the diaspora, would constitute evidence for the presence of a market-creating response to poor institutions or asymmetric information problems. Rauch and Trindade's (2002) widely cited paper, in its focus on the trade creating effect of the Chinese diaspora, is obviously an example of the application of this inference. Felbermayr et al. (2010) develop the logic of this inference in detail and implement it in a multi-source/multi-host environment.

In an interesting recent approach, a number of studies have built on Chaney's (2008) firm heterogeneity extension of Krugman's (1980) model to evaluate the effect of migration on the extensive versus the intensive margin of trade (Jiang 2007; Peri and Requena-Silvente 2010; Coughlin and Wall 2011). Peri and Requena-Silvente (for Spain) and Jiang (for Canada) find only evidence of an immigrant effect on the extensive margin, while Coughlin and Wall (using US state data) only find evidence of effects on the intensive margin. Peri and Requena-Silvente also include a product categorization based on the Broda/Weinstein elasticities and argue that their finding that immigrants affect mainly the extensive margin of exports for highly differentiated goods implies that migration reduces fixed costs, not variable costs of exporting those goods. To the extent that institutional failures and information asymmetries are interpreted as fixed costs, this interpretation of the Spanish and Canadian evidence would seem to constitute evidence for the importance of closure effects.

The work we have just discussed suggests that diasporas can play a particularly strong role in mediating trade links in the context of institutional problems and asymmetric information problems. However, much of the earlier work suggests that the internal structure of groups plays an important role in dealing with contracting problems. This is where Burt's notion of closure plays an essential role. The role of ethnic homogeneity (or, more broadly, social proximity) is also emphasized in the general literature on "middlemen minorities" and trading diasporas generally (Blalock 1967; Bonacich 1973; Iyer and Jon 1999).[23] Landa's (1981, 1994) use of social proximity in a transaction cost framework, and, while not central to the formalisms he develops, it certainly plays an essential role in the historical analysis of Greif (1989, 1991, 2006). For example, Landa's study of the role of Chinese traders in Malaysia suggests that transaction costs rise as one crosses every categorical level implying greater social distance. Greater density of members of a given degree of proximity permits more extensive division of labor within the network and, thus, a more efficient network. By focusing on very specific communities, analyses like Landa's are able to provide clear causal connections between closure and effectiveness in mediating certain types of trade relation. The downside of this approach is that one is constrained to focus on relatively small communities. It is in the nature of large-scale datasets that they do not have this

[23] An interesting specific case that has been well studied involves the role of ultra-orthodox Jews in the organization of the wholesale diamond industry (Bernstein 1992; Richman 2005, 2009).

sort of ethnographic detail. In an effort to substitute (very imperfectly) for this information, Egger et al. (2012a) attempt to use information on common origin and skill. Although this is rather blunt, they hypothesize that, by comparison to migrant communities with a wide range of skills, migrations characterized by a strong concentration of a given skill group will form more effective networks, generate "better" bridges, and thus produce a stronger link between migration and trade. This is, however, less blunt than it seems *prima facie*. After all, networks play an essential role in the location choices of emigrants. Because networks reduce the costs of migration, it is well-known that immigrants drawn from well-defined sending regions tend to go to equally well-defined locations in the receiving country.[24] Thus, when they consider the pre-existing social bonds between any group of migrants, the claim that similarity of education creates closer bonds gains considerable plausibility. This suggests a hypothesis that, other things equal, the effect of migration on trade will be stronger for migration flows made up of people with relatively homogeneous skills.[25] And this is, in fact, the main result of that paper.

6 Conclusion

Overall, then, it is clear that networks play a substantial role in virtually all aspects of the immigration experience. While the language of networks has long played a role in the analysis of migration, we are still very much just beginning to apply the formal network methods to the increasingly detailed data that are becoming available. This is clearly an area where we can predict substantial growth in new research.

[24]This is a standard of immigrant narratives, but there is a sizable body of systematic research on these links as well. One of the most compelling remains Massey et al.'s classic *Return to Aztlan* (Massey et al. 1987). In addition to a steady flow of work from the Mexican Migration Project at Princeton, directed by Massey, there is a sizable body of work across many disciplines in the social sciences (e.g. Taylor 1986; Winters et al. 2001; McKenzie and Rapoport 2007).

[25]A number of the papers on trade and migration have considered different levels of skill, but the emphasis there is on whether some level of skill is particularly strongly associated with trade creation (Hong and Santhapparaj 2006; Dolman 2008; Felbermayr and Jung 2009; Hatzigeorgiou 2010; Javorcik et al. 2011; Felbermayr and Toubal 2012). This work tends to find that skilled immigrants are strongly associated with trade creation, though intermediate levels of skill seem to have no such relationship. Closest to our work is that of Felbermayr and Toubal, which finds that share of high skilled migrants is strongly associated with exports of differentiated goods and goods traded on organized markets, but less so with goods associated with reference prices.

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