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- ▶ **The Economics of Temporary Migrations**
- ▶ Christian Dustmann and Joseph-Simon Görlach

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The Economics of Temporary Migrations

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Abstract: Many migrations are temporary – a fact that has often been ignored in the economic literature on migration. Such omission may be serious in that expected migration temporariness can impart a distinct dynamic element to immigrants’ economic behavior, generating possible consequences for non-migrants in both home and host countries. In this paper we provide a thorough examination of the various aspects of temporary migrations that matter for the analysis of economic phenomena. We demonstrate the extent of temporary migrations in population movements. We show how temporariness can affect the various economic choices and how better data have improved both the measurement of nonpermanent migrations and the analyses of various aspects of migrant behavior. We propose a general theoretical framework for modeling temporary migration decisions, based on which we outline the various motives for temporariness while simultaneously reviewing related literature and available data sources. We discuss the possible consequences of migration temporariness for non-migrants in both home and host countries.

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1. Introduction

In a recent report, the OECD (2008) estimates that, depending on the countries and time periods considered, 20 to 50 percent of immigrants leave the host country within the first five years after arrival. In 2011, foreign-born outflows stood at a ratio of 21 percent to the inflow of migrants to Australia; 41 percent, 64 percent, and 76 percent to the UK, Germany, and Spain; and 71 percent and 87 percent to Korea and Japan, respectively (OECD, 2013). For the U.S., an estimated 2.1 million foreign-born individuals emigrated between 2000 and 2010 (Bhaskar, Arenas-Germosén and Dick, 2013).

We illustrate the temporariness of migrations in Figure 1 using combined evidence from existing academic studies. Specifically, the figure plots the fraction of immigrants who leave the host country against the time since immigration for two groups of destination countries: Australia, Canada, New Zealand, and the United States – all typically viewed as traditional immigration countries – and Europe.² The graph reveals three interesting details. First, immigrant outmigration rates are substantial and larger from European destination countries than from the more traditional immigration countries. Second, 10 years after arrival, close to 50 percent of the original arrival cohort has left the destination country in the case of Europe and 20 percent in the case of Australia, Canada, New Zealand, and the United States. Third, outmigration rates are highest during the first decade and then level out. Overall, therefore, the figure emphasizes the non-permanence of many migrations. This fact, although stressed by some authors long ago (e.g. Piore, 1979; Massey, 1987; see also our more detailed overview in Section 2), has been – and still is – ignored in parts by the empirical literature on immigrant economic behavior.

² Figure 1 is based on estimates taken from Ahmed and Robinson (1994), Alders and Nicolaas (2003), Aydemir and Robinson (2008), Beaujot and Rappak (1989), Bijwaard (2004), Bijwaard, Schluter, and Wahba (2013), Böhning (1984), Borjas and Bratsberg (1996), Bratsberg, Raaum, and Sorlie (2007), Dustmann and Weiss (2007), Edin, LaLonde, and Åslund (2000), Klinthäll (1999), Lukomskyj and Richards (1986), Michalowski (1991), Nicolaas and Sprangers (2004), OECD (2008), Rendall and Ball (2004), Shorland (2006), and Warren and Peck (1980). If estimates refer to the fraction of migrants who entered within a time interval and have left by the end of that interval (as in Bratsberg et al., 2007), the year of immigration is approximated by the interval midpoint, a choice likely to somewhat overestimate emigration rates given that remigration propensities are generally higher during the early post-immigration years. The exact numbers used are available upon request.

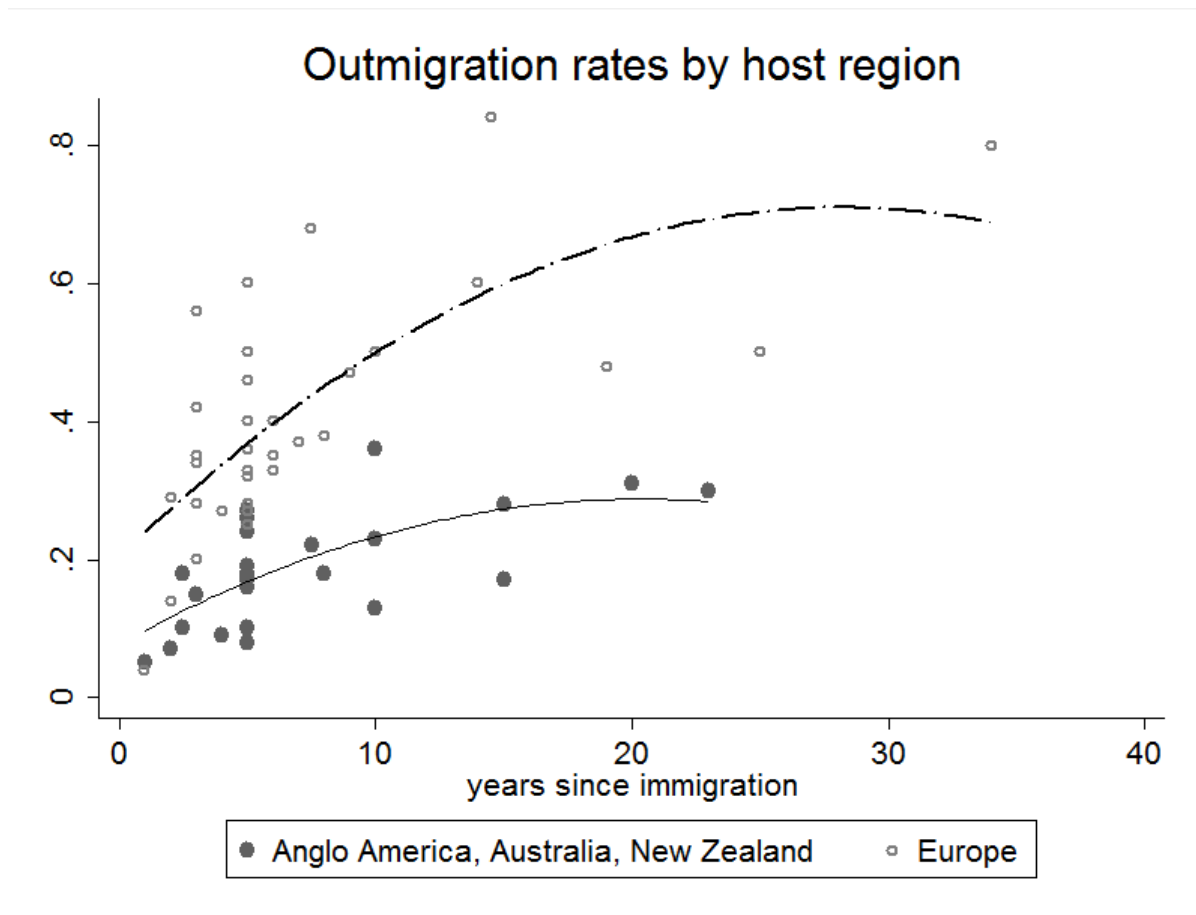


Figure 1: Estimated outmigration rates by host region.

How important, then, is it to consider migration temporariness when analyzing various aspects of immigrant economic behavior? We answer this question using the example of a Polish immigrant who arrived in the UK in May 2004, the month in which Poland joined the European Union and the UK allowed Polish workers free access to its labor market. At that time, the average wage in Poland was 17 percent of the average nominal wage in the UK (40 percent in real terms).³ We now consider the same migrant in two scenarios: In the first, the migration is permanent, and the migrant remains in the UK for the remainder of her life. In the second, the migration is temporary, and the migrant plans to return home after three years. Obviously, the immigrant's behavior under the two scenarios (modeled in Section 3) will be distinctively different. Under the temporary scenario, the large wage differential between the two countries is likely to motivate the migrant to work hard during the three years of planned stay and enjoy leisure later in life, while under the permanent scenario, the migrant will spread consumption of leisure more equally over the life cycle. Similarly, under the

³ <http://stats.oecd.org/> (accessed 12.01.2015).

temporary scenario, the migrant will typically have a lower reservation wage and accept jobs that would not be acceptable if immigration was permanent. She will also be less willing to invest in human capital that is specific to the UK (e.g., language proficiency) but may save more and/or remit more. Hence, as this simple example illustrates, migration temporariness may imply important shifts in immigrant behavior and choices.

The temporariness of migration has thus important implications for the modeling and empirical assessment of immigrants' economic behavior, especially given that migration plans are endogenous to many core economic variables, as the following example shows. Figure 2a uses data from the U.S. New Immigrant Survey (NIS) to break out the fraction of working age immigrants reporting an intention to stay permanently by years of schooling.⁴ Figure 2b, based on data from the German Socio-economic Panel (GSOEP), shows the same pattern for immigrants to Germany. These profiles suggest that immigrants' plans to return differ along the distribution of pre-migration education, albeit in a nonlinear (here inverse U-shaped) way. Thus, if ignoring temporariness of migrations, differences in behavior that are due to different expected migration durations may erroneously be associated with different pre-migration education.

If these intentions translate into actual behavior, then one obvious consequence is that outmigration may lead to selection, which would affect estimations of immigrants' assimilation profiles. There is a literature that investigates the effects such selection has on the estimation of earnings profiles of immigrants (see e.g. Lubotsky, 2007; Dustmann and Görlach, 2014, provide an assessment and survey of that literature). That literature however does usually not consider the effect return plans may have on economic behavior of migrants. Rather than treating economic outcomes as exogenous with respect to re-migration plans, we focus in this paper on the implications that different migration plans have for economic choices and outcomes, such as employment, wages and savings. Since these choices are determined by re-migration *plans* (rather than ex-post realizations), we consider immigrants as permanent or temporary depending on their *intended* migration durations at any given point in time.

⁴ The New Immigrant Survey only samples new legal immigrants to the U.S, and is therefore not representative for the entire immigrant population.

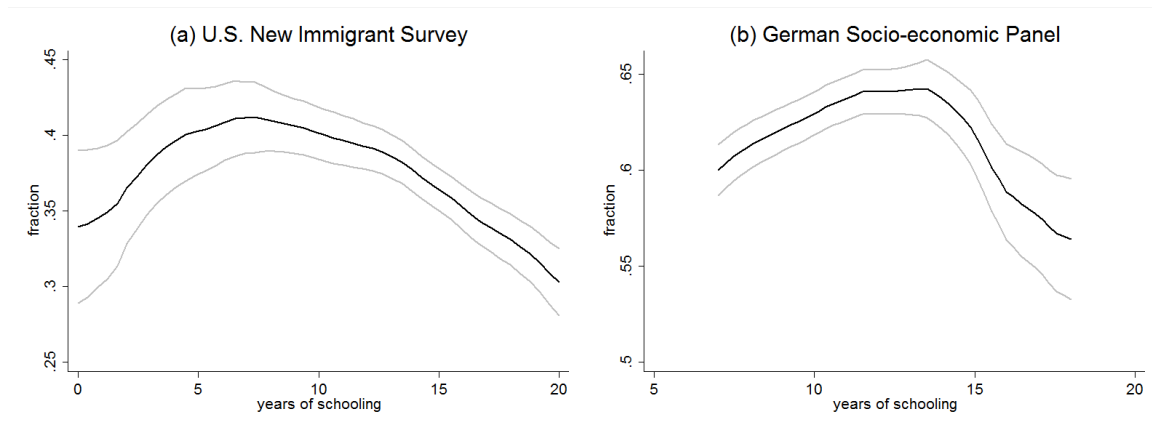


Figure 2: Fraction intending to stay among immigrants aged 18-64 who arrived at ages 16 or older: (a) U.S. data from the first wave of the New Immigrant Survey (2003/2004), and (b) data from the German Socio-economic Panel, waves 2000-2012.

A permanent migration to a host country is not always just an extreme case of temporary migrations of various durations. Consider for instance the case where skills that have a high return in the country of origin can be accumulated faster abroad. Many student migrations fit that scenario. While if faced with the choice between staying in their home country and a permanent settlement abroad, it may be that individuals choose the former, but they may still find it optimal to migrate temporarily to accumulate skills that are highly valued in their home country. Hence, while in some cases a permanent migration can simply be considered as a corner solution of an individual's optimal migration duration, in other cases, a temporary migration is a conceptually different form of migration.

If the intended return itself affects choices such as immigrants' labor force participation and human capital investment decisions, then this introduces additional complexities into the estimations of career profiles or other types of behavior over and above those instigated by selective outmigration. We illustrate what we view as some of the core channels generating these complexities in Figure 3. For non-migrants or for permanent migrants, economic modelling usually considers only the relationship between economic choices, individual heterogeneity and economic conditions in one location, as in the dotted circle. However, when immigrants expect to return to their home countries, then this will lead to migrants' behavior over their life cycle being affected by (expected) economic conditions in their home country environment as well. The key element that links economic circumstances in the home country and economic choices of migrants in the host country is the intention of the migrant

to re-migrate at a later stage, and to spend part of his or her life cycle in the home country (or, in more complex settings, in a third country).⁵ Obviously, researchers have to make choices about which economic decisions to model and which sources of shocks and heterogeneity to consider, depending on the research question to be addressed. We will discuss some of these below.

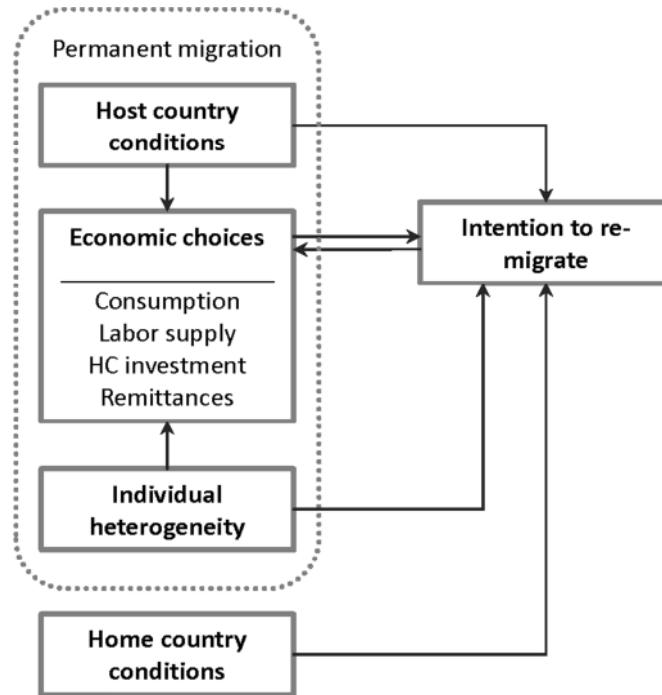


Figure 3: Interdependencies of economic outcomes and return decisions.

The first important question in any thorough assessment of temporary migration and the related economic literature is why migration temporariness has received so little attention despite potentially having major consequences for the analysis of immigrant behavior. We attribute this lack of attention primarily to the poor quality of available data. We therefore begin by discussing the advances enabled by better data sets and the possibilities for linking administrative and survey information across national borders. We also summarize the key papers that advance the availability of these higher quality data.

We then consider the individual immigrant decision on the optimal length of a migration. To do so, we set out a simple flexible model framework with which to examine the various

⁵ In the case of undocumented migration or if a permanent residence is not granted, a return may not be voluntary but forced upon the immigrant. The risk of being deported will be taken into account when economic choices are made, leading to these choices being affected by e.g. home country conditions in a similar way to immigrants who chose their return optimally, see also Section 3.4.7.

motives for why a migration may be temporary rather than permanent and illustrate the possible impact of this decision on certain behaviors, such as savings. We also use this framework to review the extant literature. Having provided insights into why temporary migration may be chosen, we then extend this framework in various directions. First, we outline the different forms of temporary migrations – including repeat or circular migrations, undocumented migrations, student migrations, and guest worker migrations – and how these forms could be modeled using extensions of our modeling framework. Second, we consider the possibility that temporary migration decisions are made not by an individual but rather by a non-unitary household, and briefly summarize some of the papers that take such an approach. Third, we touch on the various research areas of migration economics and how taking migration temporariness into account changes the way analyses are conducted, thereby possibly influencing a range of econometric estimates. Finally, we briefly discuss the consequences of temporary migration not only for the migrants and their families but also for residents in the receiving and sending countries.

2. Migration Temporariness: Data and Measurement

The fact that migration temporariness has been so persistently ignored in the empirical literature is largely related to the inability to measure it. That is, although it is common to register newly arrived immigrants, it is far less common – and often not even feasible – to measure outmigration. Hence, assessing the degree to which immigrants may later leave the country of destination is challenging. Nevertheless, recent advances have been made in this area, partly by combining multiple data sources but also by adding items on emigration plans into survey questionnaires.

One useful illustration of the importance of measurement when trying to capture the degree of outmigration is the estimation of the fraction of immigrants who, during the 19th century Age of Mass Migration, arrived in the U.S. and then left again. That assessment has changed considerably with the availability of better data and the ability to process large data files using advanced computer technology. For example, one early assessment by Mayo-Smith (1893), which relied on passenger data from the principal shipping lines, estimated that about 16 percent of immigrants who arrived in the U.S. between 1881 and 1890 left again. Nearly 40 years later Willcox (1931), using official emigration records for 1908-1914 and earlier immigration statistics, estimated that, assuming a constant ratio of net to gross immigration

for 1900-1910, the ratio of departures to arrivals of foreign-born individuals was about 39 percent. Kuznets and Rubin (1954) refined this estimation by performing similar but separate extrapolations for males and females and obtained a ratio of 45 percent. A recent paper by Bandiera, Rasul, and Viarengo (2013), in contrast, by combining records on all immigrants arriving at Ellis Island between 1892 and 1924 with census data from 1900, 1910, and 1920, estimates outmigration rates from the U.S. to have been around 60 percent for the 1900-1910 decade and around 75 percent for the 1910-1920 decade. As is obvious, each of these outmigration estimations relies on more comprehensive and better data.

Not only was outmigration an important part of U.S. history in the 19th century, but more recent migrations are also likely to have been to a large extent temporary. For instance, Warren and Peck (1980), using 1960 and 1970 U.S. census data and INS data on immigrants admitted to permanent residency within that decade, estimate that more than 1 out of every 6 immigrants admitted during the 1960s emigrated by the end of the decade. Jasso and Rosenzweig (1982), in contrast, using combined administrative and survey data to compute lower and upper bounds on emigration rates by 1979 for immigrants who arrived in 1971 from various nations, estimate that the overall emigration rate for the entire cohort during those eight years could have been as high as 50 percent. Nevertheless, they do find considerable variation by origin country. Moreover, Borjas and Bratsberg (1996) estimate that of the 2 million legal immigrants who arrived in the U.S. between 1970 and 1974, only 1.6 million were counted in the 1980 census, implying an outmigration rate of 21.5 percent. Of the 2.6 million immigrants who arrived between 1975 and 1980, about 2.1 million were counted by the 1980 census, implying an outmigration rate of 17.5 percent. For the 1980s, Ahmed and Robinson, using census data and life table survival rates, estimate that of the 1980-1990 immigrants to the U.S., 8 percent left again during the same decade, and of immigrants included in the 1980 census who had arrived during the previous decade, 19 percent had emigrated again by 1990. In more recent estimates, Bhaskar, Arenas-Germosen, and Dick (2013) calculate that about 14 percent of immigrants who arrived during the 1990s and were recorded in the 2000 census had left by 2010. It should be noted that these last two estimates refer to outmigration rates conditional on having stayed until the 1980 and 2000 census date, respectively. Given that most outmigration occurs during the first few years after arrival (see Figure 1), these figures are likely to underestimate the overall emigration rate of the initial arrival cohorts.

Over the past two decades, much progress has been made in migration assessment, with improvements occurring on several different fronts, and resulting in different approaches to measure temporariness of migrations. We display the different types of data products that exist and allow assessment of temporariness in Table 1, where we also provide some examples of data sets. We now discuss these in detail.

Data type	Dataset examples	Examples of studies using these datasets
Source country survey data	Egyptian Labour Force Sample Survey (LFSS) Mexican Migration Project (MMP)	McCormick and Wahba (2001, 2003), Wahba and Zenou (2012) Deléchat (2001), Colussi (2003), Rendon and Cuecuecha (2010), Thom (2010), Angelucci (2012), Lessem (2013), Nakajima (2014a,b)
Destination country survey	German Socio-economic Panel (GSOEP)	Dustmann (2003), Bellemare (2007), van Baalen and Müller (2008), Kirdar (2012)
Administrative destination country data	Dutch Central Register Foreigners (Centraal Register Vreemdelingen, CRV) Finnish register data Norwegian register data Swedish register data	Bijwaard et al. (2014), Bijwaard and Wahba (2014) Sarvimäki (2011) Bratsberg et al. (2007) Nekby (2006)
Matched origin-destination data	Matched Finnish-Swedish population registers	Rooth and Saarela (2007)
Linked administrative and survey data in destination countries	U.S. Social Security records linked to the Survey of Income and Program Participation (SIPP) and to the Current Population Survey (CPS)	Lubotsky (2007)

Table 1: Types of datasets available to research on temporary migration.

First, data collection by survey now frequently permits assessment of migration temporariness from particular source regions, and the results have been used to evaluate such aspects as returnees' propensity to be self-employed or to estimate the returns to having migrated. Dustmann and Kirchkamp (2002), for instance, evaluate surveys of former Turkish immigrants to Germany who returned home and who retrospectively report their migration histories in Germany. Similar survey data are used by Mesnard (2004) for Tunisia; de Coulon and Piracha (2005) and Piracha and Vadean (2010) for Albania; Collier, Piracha, and Randazzo (2011) for Algeria, Morocco, and Tunisia; and McCormick and Wahba (2001, 2003) and Wahba and Zenou (2012) for Egypt. Another valuable source of retrospective migration histories is the Mexican Migration Project (MMP), which has been widely used in both the sociological (e.g., Massey, Durand, and Malone, 2002; Gentsch and Massey, 2014) and economic literature (e.g., Deléchat, 2001; Colussi, 2003; Rendon and Cuecuecha, 2010;

Thom, 2010; Angelucci, 2012; Lessem, 2013; Reinhold and Thom, 2013, Nakajima, 2014a,b). Other Mexican datasets that contain information on previous migration experience include the Mexican Census used by Chiquiar and Hanson (2005) and Lacuesta (2010) in their analyses of emigrant selection, and the Mexican Family Life Survey used by Gitter, Gitter, and Southgate (2008) in their study of past migration experience's effect on employment in Mexico after return.

Second, the availability of comprehensive administrative data sets, covering entire populations, and that record arrival and departure of immigrants, has allowed precise assessment of the temporariness of migrations for some countries. There are two prerequisites for such measurement: First, not only must such administrative or register data be made available, but they tend to be useful only when matched with other datasets containing additional variables. Second, procedures must be in place that record the immigrants' length of residence or departure date, which is not the case for every country. Scandinavian countries, the Netherlands and Australia, in particular, have been at the forefront of developing such administrative data sets, which are used to advantage in Edin, LaLonde, and Åslund (2000) and Nekby (2006) for Sweden; Bratsberg Raaum and Sørbye (2007) for Norway; Sarvimäki (2011) for Finland; Bijwaard, Schluter, and Wahba (2014) and Bijwaard and Wahba (2014) for the Netherlands; and Cobb-Clark and Stillman (2013) for Australia. Some of the register datasets, especially, contain not only the date of exit but also information about the destination country. For instance, Nekby (2006) and Bratsberg et al. (2007) use register data from Sweden and Norway, respectively, which include information on year of emigration, destination, and the migration history to and from these countries backwards in time. Nekby then links this migration information to additional data from Statistics Sweden that provides such information as labor market outcomes.

Third, data collection has also been advanced by a number of recent initiatives that combine micro-datasets (such as administrative or census information) across different countries, which allows precise measurement of migrations across national borders. Again, Scandinavian countries are at the forefront of these efforts. Rooth and Saarela (2007), for instance, link Finnish and Swedish population registers to investigate emigrant and returnee selection, using birth date, sex, municipality of residence, and year of migration to match over 85 percent of Finns who migrated to Sweden after 1970 and who lived there in 1990. Such efforts to merge administrative data across national borders extend also to historical data, although such mergers are constrained by the availability of particular variables without

which they are infeasible. All too often, for example, the required information becomes available only after a substantial period has passed, such as the practice of not making U.S. census records publicly available until 72 years after each decennial census.

An example for the possibilities such merger allows for analysis of immigrants' return pattern is a recent paper by Abramitzky, Boustan, and Eriksson (2014). They match 10 percent of foreign-born men residing in the U.S. in 1900 to records from the 1910 and 1920 censuses⁶ and use the generated panel to evaluate selective outmigration of immigrants. Based on a comparison of panel and cross-sectional estimates of earnings equations they conclude that immigrants at the lower end of the earnings distribution were more likely to leave. To further substantiate this, in the working paper version of their paper (Abramitzky et al., 2012a), they take advantage of information from a supplement to the 1910 Norwegian Census, which asked individuals who had migrated to the U.S. and returned to Norway, for their departure and return dates, as well as their occupation in America. This allows a direct comparison of the occupational distribution of Norwegian immigrants in the U.S. to those who are known to have returned to Norway. It confirms their hypothesis of negatively selective outmigration.⁷

Fourth, some recent initiatives link survey datasets to administrative data sources, a technique used by Hu (2000) and Lubotsky (2007) to construct stock-based samples for the U.S. with which to estimate immigrants' earnings profiles. Similar large scale projects are under way elsewhere. In Germany, for instance, data from a new immigrant sample has been released in 2014, which is based not only on a wide range of survey questions asked by the GSOEP but includes a randomized subsample linked to administrative employment histories from the Institute of Employment Research (Brücker et al., 2014).

Finally, one notable aspect of return migration, and one explored in much detail below, is that at any point in time, individuals condition such decisions as how much to save or how much to invest in learning on their *expected* future duration in the host country. Although these expectations may deviate from realized migration durations because of uncertainties or access to new information over an individual's migration history, they matter when modeling immigrant behavior because migrants will base choices such as human capital investment on current return migration plans rather than the measured completed migration history. The

⁶ Naturally, outmigration sets an upper limit to the fraction that can be matched. The match rate for U.S. born men is at 19 percent considerably higher.

⁷ See also the more detailed discussion on selection in initial and return migrations among Norwegian migrants to the U.S. in Abramitzky et al. (2012b).

GSOEP is perhaps the best source of longitudinal data on *intended* length of stay, while the short panel NIS (Jasso, Massey, Rosenzweig, and Smith, 2006) and the cross-sectional National Immigrant Survey (Reher and Requena, 2009) offer similar data on legal immigrants to the U.S. and Spain, respectively.⁸

Temporary migrations may however take more complex forms than simple return migration, which poses additional challenges on measurement. For example, individuals may transit across different countries before settling in a final country or may repeat migrate in the sense of only staying in the host country for a limited period before returning home and then migrating back at a later time. Many migrations in Europe are of this type, as are migrations between Mexico and the U.S.⁹ This “circular migration” may create measurement problems as for instance in surveys time since immigration is often not clearly linked to a first or more recent arrival. One possible way to measure circular or transitory migrations is to combine administrative data sources across countries, or to draw on retrospective surveys such as the MMP. Constant and Zimmermann (2011) use information from the GSOEP on household members who temporarily leave Germany to assess the prevalence of circular migration.

As is apparent, progress has been made in recent years on measuring migration temporariness and collecting information that follows migrants across different destinations. Nevertheless, although such progress is encouraging and will certainly positively affect future research, challenges still remain in using such data for structured analysis. In the next section, therefore, we outline a framework for modeling temporary migrations that is capable not only of encompassing special cases from the literature but of accommodating various extensions.

3. Modeling Temporary Migrations

To better understand why migrants return to their home countries even when wages are persistently higher in the destination country and how migration temporariness affects migrant behavior, we develop a simple dynamic model that formulates the migrant’s decision problem as a dynamic program. This provides a simple unified framework that not only describes many motives for return migration discussed in the literature but encompasses most of the models used therein. The exposition draws on ongoing work by Adda, Dustmann, and

⁸ Figures 2 are based on such expectations from the NIS and the GSOEP.

⁹ See Constant, Nottmeyer and Zimmermann (2013) for a recent survey.

Görlach (2014), where we formulate and estimate a structural dynamic discrete choice model of return migration and economic behavior. There are few similar models developed elsewhere (e.g., Deléchat, 2001; Colussi, 2003; Bellemare, 2007; van Baalen and Müller, 2008; Thom, 2010; Rendon and Cuecuecha, 2010; Kırdar, 2012; Lessem, 2013; Nakajima, 2014a,b) that address aspects of temporary migration. Using this model, we first identify and graphically simulate the possible triggers of temporary migration and then, while referencing pertinent studies, develop the implications of return plans for some economic behaviors, including human capital investment, labor supply, and savings.

We focus on aspects of *international* migration, as do most of the studies to which we relate our discussion. However, the literature on *internal* movements is concerned with many similar issues. Much of this research analyses rural-urban migration (see e.g. the classic papers by Sjaastad, 1962, and Harris and Todaro, 1970), and – as the early literature on international migration – treats such movements as a permanent change of location. More recent papers introduce temporariness, such as Morten (2013), who analyses temporary migration as an insurance mechanism in rural areas in India. These papers restrict attention to choices between two locations, an origin and a destination, as does the model we formulate below. An extension to multiple locations is feasible, albeit computationally demanding. Kennan and Walker (2011) estimate a model of internal mobility in the U.S. that allows for sequential moves based on income expectations in different locations. To the best of our knowledge, there are no estimated structural models of *international* migration that allow for a choice among multiple destinations, which may be due to the computational challenge, but also because of the data availability problems discussed previously, especially for third country destinations.

3.1. A Theoretical Framework for Analyzing Migrant Choices

As shown in the previous sections, temporary migrations are frequent – perhaps the rule rather than the exception. Hence, the literature over the last two decades has offered numerous explanations for migrant return even in the face of higher earnings in the host country. Hill (1987) and Djajić and Milbourne (1988), for example, explain return migration in terms of location-specific preferences. Dustmann (1995, 1997b, 2003) shows that further motives for a return migration are a high purchasing power of the host country's currency in the migrant's home economy and higher returns back in the home economy to human capital accumulated in the host country. Dustmann and Kirchkamp (2002) also illustrate that a higher

rate of return on self-employment activities in the home country may trigger return migration, while Mesnard (2004) shows that return migration may be one way to overcome credit constraints. Dustmann, Fadlon, and Weiss (2011) further demonstrate that return migration can be induced by migration to “learning centers,” countries in which human capital that has a high value in the home country can be accumulated more quickly.

We focus here on the individual’s post-migration maximization problem, but extensions to the primary migration decision are straightforward. We also discuss extensions to a family context with more than one decision maker. In our basic framework, individuals decide on consumption and optimal duration in the destination country, considering changes in earnings potential in both countries brought about by human capital accumulation. This dynamic model of return migration, although simple, not only encompasses most of the return motives discussed above but is flexible enough to accommodate a variety of extensions that capture different types of temporary migration, including circular (repeat) migrations.

3.2. Model Setup

To illustrate the motives for a temporary migration in a simple model of migrant optimization across consumption and location, we use $V^L(\Omega_a)$, with state space $\Omega_a = \{a, A, S\}$, to designate an individual’s value of being in country L at age a , where A denotes the stock of assets and S the individual’s skills. Here, $L \in \{d, o\}$, where d and o denote destination and origin country, respectively. Skills are accumulated according to $S_a = S_{a-1} + \theta_S^L$, where $\theta_S^L \geq 0$ is the increase in the skill stock in every period, which may differ between countries. We further assume that human capital summarizes individual skills in terms of productive capacity, which may also differ across countries according to parameter α_1^L . Thus, human capital H in location L is given by $H^L = S^{\alpha_1^L}$, which reflects the notion that individuals may be able to enhance their human capital through migration. Accordingly, log real earnings in country L for an individual with skills S are given by

$$(1) \quad \ln Y^L(S) = y^L(S) = \alpha_0^L + \alpha_1^L \ln S, \quad L \in \{d, o\},$$

where α_0^L is the log rental rate for human capital that immigrants receive in location L . Earnings can differ between countries either because the (log) rental rates α_0^L differ (e.g., because of different technologies) or because the rates of return to skills α_1^L differ (e.g., because of different industry structures and thus different skill demands).

Per period utility in the destination country is given by $u^d(\pi, c)$, where c is consumption and π is a (positive) preference parameter that affects the marginal utility of consumption and captures the preference for the host relative to the home country. Utility in the country of origin is $u^o(1, c)$, with the preference parameter normalized to 1;¹⁰ that is, an individual prefers consumption at home whenever $\pi < 1$. The mechanisms driving return decisions can be illustrated using a non-stochastic model, which is why – for now – we abstract from randomness. Nevertheless, our setting can easily be generalized to a situation in which, for instance, π is subject to unforeseen shocks or π changes over time if immigrants get accustomed to a host country, as in rational addiction models (see e.g. Becker and Murphy, 1988).

While in the host country, a migrant decides at the beginning of each period whether to return to the country of origin or to stay for at least one more period. The value function is thus given by

$$V(\Omega_a) = \max\{V^d(\Omega_a), V^o(\Omega_a)\},$$

with the value of being in the destination country expressed as

$$\begin{aligned} V^d(\Omega_a) &= \max_c u^d(\pi, c) + \beta V(\Omega_{a+1}) \\ \text{s. t. } A_{a+1} &\leq (1 + r)A_a + Y^d(S_a) - c_a, \end{aligned}$$

where r denotes the real interest rate,¹¹ and consumption decisions are made conditional on the location choice at the beginning of the period. The law of motion for S is specified as above.

Assuming for now that there are no multiple migration spells (i.e., being back in the country of origin is an absorbing state), the value of having returned to the country of origin is

$$\begin{aligned} V^o(\Omega_a) &= \max_c u^o(c) + \beta V^o(\Omega_{a+1}) \\ \text{s. t. } xA_{a+1} &\leq (1 + r)xA_a + Y^o(S_a) - c_a, \end{aligned}$$

¹⁰ We assume that $\frac{\partial u^d}{\partial \pi} > 0$, $\frac{\partial u^L}{\partial c} > 0$, $\frac{\partial^2 u^L}{\partial c^2} < 0$, $\frac{\partial^2 u^d}{\partial \pi \partial c} > 0$.

¹¹ To abstract from the additional choice of the location where assets are held, we assume real interest rates in the countries of origin and destination to be equal. See Section 3.4.3 for a discussion of differential investment opportunities in the two locations.

where assets are converted by the real exchange rate x to adjust for the purchasing power of the host country currency in the country of origin. $Y^o(S)$ and $Y^d(S)$ denote real income in the home and host country, respectively, each depending on accumulated skills S (see (1)), and adjusted by each country's price level.¹² The analysis below assumes that upon immigration, $a = a_0$, $A = A_0$ and $S = S_0$. At the end of the individual's time horizon, T , his or her terminal value is assumed to be $V^L(T, A, S) = 0$, for all levels of A and S , thus abstracting from any bequest motives.

In this model, the optimal migration duration is determined by comparing the value of staying in the host country, $V^d(\Omega_a)$, with the value of returning to the country of origin, $V^o(\Omega_a)$, in each period. Given optimal consumption choices in each of the previous periods, resulting in a stock of assets A_a and a skill level S_a accumulated by age a , the indifference condition is

$$\begin{aligned} u^d(\pi, Y^d(S_a) + (1+r)A_a - A_{a+1}^d) + \beta V(a+1, A_{a+1}^d, \theta_S^d S_a) \\ = u^o(Y^o(S_a) + (1+r)x A_a - x A_{a+1}^o) + \beta V^o(a+1, x A_{a+1}^o, \theta_S^o S_a), \end{aligned}$$

where A_{a+1}^L results from the optimal consumption decision at age a given the location choice $L \in \{d, o\}$.

When migration is interpreted as an investment decision (either in terms of financial assets or human capital), rearranging terms reveals that the choice is between a current utility gain from returning now and a future gain from staying for at least one more period:

$$\begin{aligned} (2) \quad & \underbrace{u^o(Y^o(S_a) + (1+r)x A_a - x A_{a+1}^o) - u^d(\pi, Y^d(S_a) + (1+r)A_a - A_{a+1}^d)}_{\text{current utility gain from returning this period}} \\ & = \underbrace{\beta [V(a+1, A_{a+1}^d, \theta_S^d S_a) - V^o(a+1, x A_{a+1}^o, \theta_S^o S_a)]}_{\text{future gain from staying one more period}}. \end{aligned}$$

When preferences for consumption in either country are identical ($\pi = 1$), currencies do not differ in their purchasing power ($x = 1$) and there is no skill accumulation ($\theta_S^d = \theta_S^o = 0$), migration occurs solely because of wage differentials. When wages are lower in the destination country ($y^o(S) > y^d(S)$), the value of being in the country of origin is higher at

¹² We assume constant, though possibly different price levels in the two locations. An extension to differences in inflation rates is straight forward, though estimation of a stochastic version of the model would become computationally more demanding, as an additional state variable would have to be included.

all ages than in the destination country ($V^o(\Omega_a) > V^d(\Omega_a)$), so individuals have no incentive to migrate in the first place. When wages are higher in the host country, however, the reverse is true. That is, the current utility gain from returning will be negative at all ages, while the future gain from staying will always be positive except in the last period of the individual's time horizon, when it is zero, so the individual will never want to return. This scenario corresponds to the classic case in which migration, if it occurs, is considered permanent.

For different parameter constellations, however, this framework produces varying motives for temporary migration: (1) a high preference for consumption in the home country, while wages are higher in the host country; (2) a high purchasing power of the host country currency in the country of origin; (3) an initially positive wage differential in the host country versus the country of origin, which reverses once sufficient human capital has been accumulated; and (4) a faster accumulation of human capital in the host country. We detail each of these return motives separately in the next section.

3.3. Reasons for Return Migration and Behavioral Implications

3.3.1 Preference for Consumption in the Country of Origin

Individuals may have an incentive to return despite persistently higher earnings in the host country ($y^d(S_a) > y^o(S_a)$, $\forall S_a$) if the marginal utility of consumption in the country of origin is higher than that in the host country ($\pi < 1$). Continuing to assume that currencies do not differ in their purchasing power ($x = 1$) and no differences exist in human capital accumulation ($\theta_S^d = \theta_S^o$), then individuals will migrate if initially $V^d(\Omega_{a_0}) > V^o(\Omega_{a_0})$. The migration will be permanent if earnings in the host relative to the home country are high and/or if the marginal utilities of consumption are not too different across the two countries, so that the value of being in the host country exceeds that of being in the country of origin throughout a migrant's lifetime. Apart from the corner solutions of no migration and permanent migration, there may also be an internal solution, where the values of being in the two locations intersect within an individual's time horizon. Such a case is depicted in Figure 4a, in which the dashed line shows the instantaneous utility gain from returning at any given

age (first term in (2)), while the solid line is the future gain from staying in the host country for at least one more period (second term in (2)).¹³

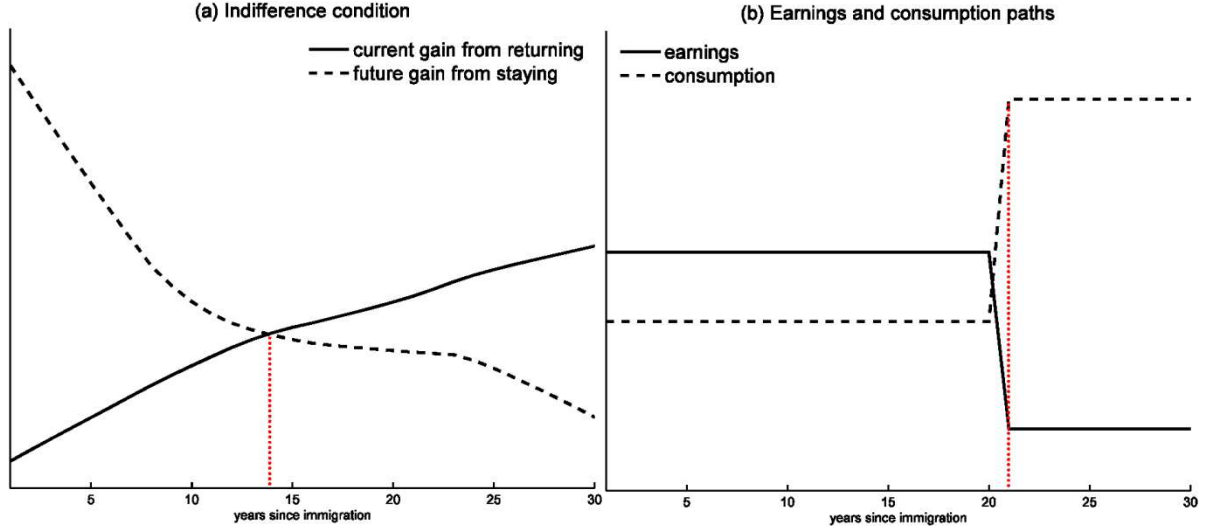


Figure 4: Preference for the home country: (a) indifference condition, and (b) earnings and consumption paths.

Intuitively, the trade-off a migrant faces is that between a higher lifetime income (and higher consumption) from staying longer and the loss in foregone utility (inability to consume at home) from spending additional time in the host country. In the scenario graphed in Figure 4, the migrant would return to the country of origin at $a = 14$. The purpose of migration in this case would be the accumulation of assets in the host country in order to finance higher consumption after return to the country of origin where the marginal utility of consumption is higher. This motive for migration is the most commonly cited in the early economic literature on return migration (see, e.g., Hill, 1987; Djajić and Milbourne, 1988; Dustmann, 1995).

The consumption and earnings profiles for this scenario are illustrated in Figure 4b. While in the country of destination, consumption is lower than earnings and the migrant accumulates savings; upon return, earnings drop because of lower wages in the country of origin, but

¹³ In the simulations, we assume that $u^o = c^{1/2}$ and $u^d = \pi c^{1/2}$. The parameter values common for all simulations are $r = 0.05$, $\beta = 1/(1+r)$, $T = 30$, $A_0 = 0$, $a_0 = 0$ and $S_0 = 2$. In the scenario of location dependent preferences (depicted in Figures 5 and 6a), we set $x = 1$, $\theta_S^d = \theta_S^o = 0$, $e^{\alpha_0^d} = 0.5$, $e^{\alpha_0^o} = 0.25$, $\alpha_1^d = \alpha_1^o = 0.3$, and $\pi = 0.75$ ($\pi = 0.8$ in the high preference asset profile).

consumption augments because of an increase in the marginal utility of consumption. Thus, migrants save while abroad and then de-save back in the country of origin.¹⁴

The pattern of asset accumulation is illustrated by the dashed line in Figure 5a. In the figure, we also illustrate asset accumulation for a migrant with all the same characteristics but a higher consumption utility in the host country, π (depicted by the solid line in Figure 5a). There are two differences between this latter migrant and that depicted by the dashed line: first, he or she stays considerably longer; and second, although the overall stock of assets accumulated during the migration is only slightly lower, the smaller difference in marginal utilities from consumption in the countries of origin and destination induces much higher consumption and lower savings in the host country, as shown by the flatter asset accumulation profile.

3.3.2 High Purchasing Power of the Host Country Currency

A second motive for temporary migration is that price levels in a migrant's home country are lower because the destination country's currency has a higher purchasing power there. In such a case, by migrating and saving while abroad, migrants may be able to increase their lifetime consumption through return migration even if earnings in the two countries are the same in terms of purchasing power in the respective countries. For example, a Polish migrant to the UK may be able to buy one restaurant meal for each hour worked in the UK and an identical restaurant meal in Poland for each hour worked in Poland, but when she spends the salary for one hour of work in the UK in Poland, she can afford two restaurant meals. This scenario may characterize many migration situations, with price differentials especially in the non-traded goods sector. They may even extend to traded goods if migrants have a high demand for goods produced in their countries of origin that must be shipped to their respective host country and are thus more expensive than if purchased and consumed in the country of origin.

To show how these differentials may generate return migrations, we again assume no differences in human capital accumulation ($\theta_S^d = \theta_S^o$) and, as in the benchmark case, no locational preferences ($\pi = 1$). We further assume that wages (in terms of each country's price level) are identical ($y^o(S) = y^d(S)$). Supposing, however, that the currency in which

¹⁴ This point also has been made by Galor and Stark (1990), albeit in a model in which immigrants face an exogenous probability of return.

host country wages are paid has a higher purchasing power in the migrant's country of origin ($x > 1$), the instantaneous cost of staying abroad increases because the migrant is prevented from consuming a larger bundle of goods in the country of origin. At the same time, because life is finite, the future benefit also decreases. At the time of return, the migrant experiences an increase in his or her accumulated savings in real terms, as shown in Figure 5b, which depicts the asset paths for two different purchasing power parities.¹⁵

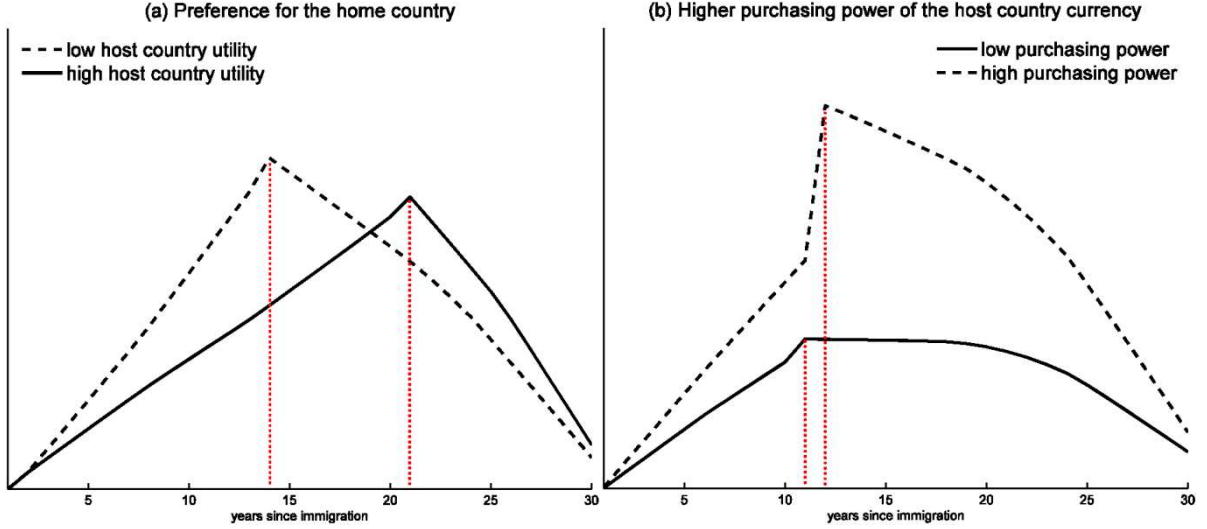


Figure 5: Asset accumulation: (a) with preference for the home country, and (b) a higher purchasing power of the host country currency.

Similar to the above scenario, differences in purchasing power are compatible with the target saving behavior of temporary migrants. One important difference from the locational preferences scenario, however, is that a high purchasing power of the host country currency alone can trigger a migration despite the same earnings in the two countries. Nevertheless, it will not on its own induce permanent migration because the incentive to spend time abroad arises solely from the purchasing power of that currency *in the country of origin*. Thus, in this scenario, without earnings differences between the two countries, migrations will always be temporary. This can be seen by noticing that the instantaneous utility gain from returning at any age is positive, versus the zero future gain from staying in the last period of the individual's time horizon.

¹⁵ Here, we set $x = 1.5$ ($x = 1.1$ in the low purchasing power asset profile), $\theta_S^d = \theta_S^o = 0$, $e^{\alpha_0^d} = e^{\alpha_0^o} = 0.5$, $\alpha_1^d = \alpha_1^o = 0.3$ and $\pi = 1$.

3.3.3 Temporarily Higher Earnings in the Destination Country

Although we have so far abstracted from human capital accumulation, this model offers two scenarios in which human capital accumulation may make it worthwhile for an individual to migrate temporarily. In the first, which again assumes individual indifference to consumption in either location ($\pi = 1$) and no differences in either currencies' purchasing power ($x = 1$), human capital is accumulated at the same positive pace in both countries ($\theta_S^d = \theta_S^o > 0$).

Assuming also that the rate of return for skills is higher in the origin country ($\alpha_1^o > \alpha_1^d$) but that the log rental rate for human capital is higher in the destination country ($\alpha_0^o < \alpha_0^d$), then migration may be attractive because wages are initially higher abroad. As skills accumulate, however, return may become increasingly appealing because the new skill level raises the migrant's human capital. This scenario may characterize a situation in which the advanced technology in the host country shifts the entire log wage distribution upwards but the relative scarcity of skills leads to higher skill returns in the home country, a situation implicitly assumed by Chiquiar and Hanson (2005) in their analysis of the selection of migrants from Mexico to the U.S.

In this scenario, migration occurs if the initial wage differential, driven by high rental rates in the host country α_0^d , is positive. If this initial wage differential is very large, the differences in returns to skills modest, or skill accumulation relatively slow, migration will be permanent. However, if differences in skill prices are large, migrations may be temporary because at some point, the immigrant's higher productivity potential in the origin country will overcompensate for the differences in rental rates. The earnings and consumption profiles in such an intermediate case with an interior solution are graphed in Figure 6a.¹⁶ Although skill accumulation is the same in both locations, earnings increase more strongly after return because the returns to skill are higher in the country of origin ($\alpha_1^o > \alpha_1^d$). As earnings increase throughout the individual's working life, the migrant will initially borrow and then repay debt later in life. Nevertheless, the point at which he or she starts repaying debt need not coincide with the time of return (as is the case in Figure 6a) because in this scenario, both initial emigration and return are entirely driven by wage differentials. Moreover, in contrast to the two previous cases, consumption will be perfectly smoothed because individuals are indifferent to consumption in either location and price levels do not differ across countries.

¹⁶ The parameters in this case are set to $x = 1$, $\theta_S^d = \theta_S^o = 0.1$, $e^{\alpha_0^d} = 0.5$, $e^{\alpha_0^o} = 0.25$, $\alpha_1^d = 0.3$, $\alpha_1^o = 0.9$, and $\pi = 1$.

It is also worth noting that here we have abstracted from individual heterogeneity. However, if individuals differed in their initial skill endowments, then under this scenario, those who migrated would be negatively selected from the overall population of the home country, and those who return migrated would be positively selected from the migrant population. This pattern corresponds to the motivation for a return migration in Dustmann (1995) and Borjas and Bratsberg (1996) in which migrants increase their earnings potential in the country of origin after having spent some time in the U.S. The other possible reason for return proposed by Borjas and Bratsberg (1996) is limited access to earnings information in the country of destination. The model discussed here can be extended to include this case by assuming that prior to immigration, individuals are unsure of either the earnings function parameters α_0^d and α_1^d or how successful they will be in skill accumulation in the country of destination, θ_S^d .

3.3.4 Faster Accumulation of Skills in the Destination Country

A second case in which human capital can be a motive for a temporary migration is when skills can be accumulated more quickly in the destination country than in the origin country ($\theta_S^d > \theta_S^o$), a condition examined by Dustmann et al. (2011) using a dynamic Roy (1951) model with different skill dimensions. This scenario is typified by student migrations in which the knowledge acquired abroad is more valuable in the home country or migrations in which skills can be more easily accumulated in the workplace in the destination country; for example, through the higher skill levels of co-workers.

To illustrate this case, we again assume that $\chi = 1$ and $\pi = 1$ and that although the rate of return to skills is higher in the origin country ($\alpha_1^o > \alpha_1^d$), the log rental rate for human capital is equal in both countries ($\alpha_0^o = \alpha_0^d$). As a result, earnings are always higher in the individual's home country, and migration will typically not occur. There is, however, an incentive for temporary migration if skills can be accumulated more quickly in the destination country. Although seemingly similar to the previous situation in which wages are initially higher in the destination country, there is one important difference: just as when a disparity exists in currency purchasing power, a permanent migration will not occur because the sole purpose of migration is asset accumulation (in this case, human capital), which is of higher value for income generation in the origin than in the host country. As in the previous case, the instantaneous utility gain from returning increases with time in the host country because the migrant returns with a larger stock of skills that are valued more highly in the country of origin. The earnings and consumption paths for this scenario are depicted in

Figure 6b.¹⁷ At the time of return (here, at $a = 5$), earnings exhibit a discontinuity because of the higher return to skills in the country of origin. Again, since income increases over the individual's lifetime, he or she initially borrows and, given the parameter values chosen, will start repaying only after having returned. As in the earlier scenario, there is no asset accumulation: immigrants would rather borrow while abroad and repayment does not necessarily coincide with the time of return.

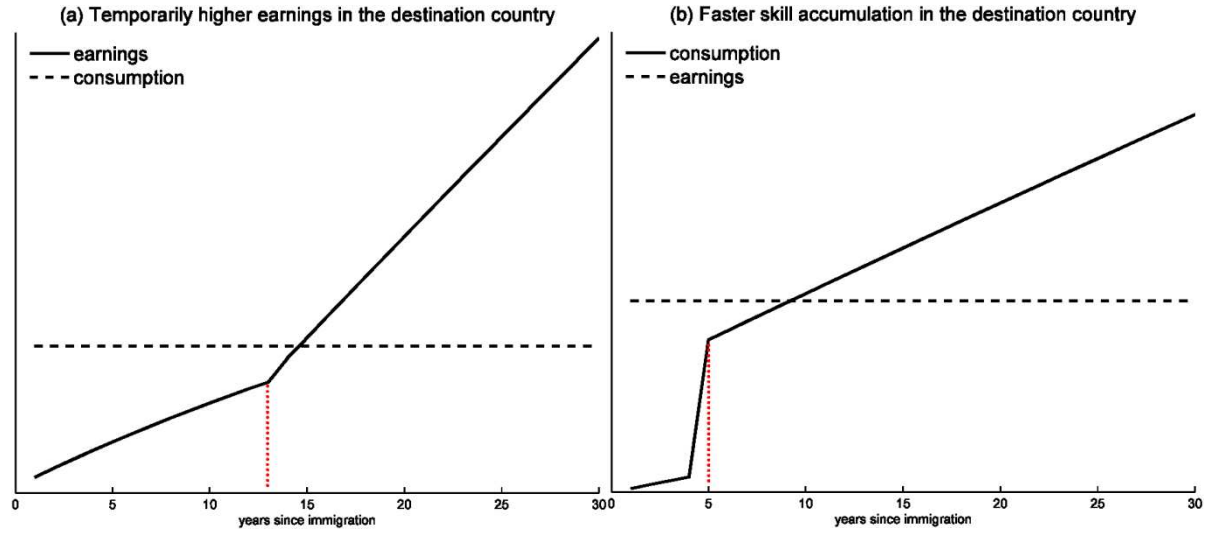


Figure 6: Earnings and consumption profiles: (a) with temporarily higher earnings, and (b) faster skill accumulation in the destination country.

A combination of these two scenarios can help explain the observation in some empirical literature of positive (negative) returns in the origin country to having spent time abroad. Nevertheless, the evidence on such returns is mixed and suggests considerable heterogeneity in both the returns to skills and the rates at which skills are accumulated. Ramos (1992) and Enchautegui (1993), for example, find that Puerto Rican returnees from the U.S. mainland, especially those who have stayed abroad for a long time, suffer penalties that individuals who never migrated do not. This situation corresponds to one in which skills are accumulated at a lower rate abroad or skills that are productive in the country of origin depreciated while the individual was abroad. Emigration and return in such a case may be driven by higher average wage levels on the U.S. mainland. Lacuesta (2010), drawing on Mexican census data, on the other hand reports that Mexican returnees from the U.S. do have higher earnings than non-

¹⁷ Here we let $x = 1$, $\theta_S^d = 0.2$, $\theta_S^o = 0.1$, $\alpha_0^d = \alpha_0^o = 0.5$, $\alpha_1^d = 0.3$, $\alpha_1^o = 0.9$ and $\pi = 1$.

migrants, which is more similar to the parameterization chosen above. He also finds, however, that this difference is already observable for returnees who have remained in the U.S. for less than a year and does not increase with length of migration. This latter points to a positive selection of emigrants from the origin country rather than an accumulation of human capital. Contrary to Lacuesta (2010), who uses Mexican census data, Reinhold and Thom (2013) do find a significantly positive effect of longer migration durations in the U.S. on workers' wage after their return to Mexico, which they ascribe to the more continuous measurement of lifetime migration experience by the Mexican Migration Project. Findings for other countries, however, are mixed: whereas Co, Gang, and Yun (2000) identify a positive wage premium for female returnees to Hungary from OECD countries, Barrett and O'Connell (2001) report a wage premium for male but not female Irish returnees, and De Vreyer, Gubert, and Robilliard (2009) find significantly higher earnings for workers from a number of West African cities who have spent some time abroad.

3.3.5 Discussion

Whereas the above analysis isolated each return motive separately to illustrate the different reasons for return migration and their effects on consumption behavior and selection, in real migration situations, both emigration and remigration decisions are likely to be driven by a combination of these motives.¹⁸ Nevertheless, our analysis offers several interesting insights: First, differences in purchasing power can be a powerful motive for return migrations and, given differences in consumption preferences, can induce particular savings patterns that are commonly associated with temporary migrations. Second, alternative highly plausible scenarios exist when a return is driven by differential rental rates to human capital or different skill accumulation possibilities that can lead to situations of no savings accumulation in the host country. Third, two of the scenarios outlined above create a situation in which a migration will only take place in conjunction with a return; in both cases, a migration allows the individual to attain a higher level of lifetime consumption, in one case driven by price differences; in the other, by faster skill accumulation in the host country.

¹⁸ In the above baseline model, the four scenarios discussed so far amount to necessary conditions. As pointed out in the discussion, however, depending on the actual parameter values, migration may not occur in the first place or may (in two of the scenarios) turn out to be permanent. Sufficiency for migrations to occur and be temporary requires an interior solution to indifference condition (2): that is, that initially $V^o(a_0, A_0, S_0) < V^d(a_0, A_0, S_0)$ so that an individual finds it optimal to emigrate, while for a certain age $a \in \{a_0 + 1, T\}$, the value of returning must exceed the value of staying in the host country, $V^o(a, A_a, S_a) > V^d(a, A_a, S_a)$, where $\{A_a\}_{a=a_0+1}^T$ and $\{S_a\}_{a=a_0+1}^T$ are the sequences of asset and human capital stocks resulting from optimal consumption and location choices.

Return migrations, therefore, are not always special cases of permanent migrations; rather, they may be forms of migration that take place only if there is a period of consumption – or work – in the origin country after remigration.

One important question that remains is who returns and who migrates in the first place,¹⁹ a point not addressed by the above modeling of one single representative individual. Our modeling framework is easily extendable to return migrant selection; for example, in terms of the skills among migrants who stay abroad permanently. One way to extend the framework would be to assume a distribution of skills over the population and investigate from which parts emigrants from the origin country and return migrants are drawn (cf. Borjas and Bratsberg, 1996). In such a framework, the selection of returnees among a host country's immigrant population depends on the relative returns to skills in the two locations, with the skill level of return migrants lying between that of non-migrants and migrants who stay abroad permanently. Thus, when emigrants are positively selected from their home country's population, returnees will be negatively selected among all migrants, and when emigration is negatively selective, return migrants will be positively selected.²⁰ Although this same outcome is predicted by the third case discussed above, the selection from a distribution of skills will be less clear cut if individuals also have a higher preference for consumption in their country or origin and if the population of immigrants is characterized by a distribution of preference parameters.

3.4. Extensions of the Basic Model

Extending our basic model will allow more elaborate analyses of temporary migrations and provide a building block for stochastic and eventually estimable models. Possible extensions include changes in preferences while residing in a foreign location, habit formation when locations are changed, multiple skills with different degrees of transferability across countries, active investments in human capital, endogenous labor supply, unemployment risk,

¹⁹ See the extensive literature on migrant selection (e.g. the analyses of Mexico-U.S. migrant selection by Borjas, 1987; Chiquiar and Hanson, 2005; McKenzie and Rapoport, 2010; Moraga, 2011). This literature, however, focusses on selection of migrants from their source country population and does not distinguish permanent from temporary migrants.

²⁰ While Borjas and Bratsberg (1996) implicitly assume a fixed migration duration for all temporary migrants, Dustmann and Görlach (2014) endogenize the time spent abroad. They show that in this setting, the migration duration is a monotonic function of an individual's skill level. In earlier work, Dustmann et al. (2011) use a multidimensional Roy model to investigate selective return migration (see also Dustmann and Glitz, 2011, for a simplified discussion of selective migration in a general Roy model setting).

repeat migrations, borrowing constraints, migration costs, and collective decision making. In this section, we briefly discuss the most pertinent of these possible extensions and how they can be implemented.

3.4.1 Habit Formation

If the preference parameter π , which determines the marginal utility from consumption in the host relative to the home country, increases with the time spent in the host country because of changing habits and assimilation, then the time since immigration would have to be included in the state space, Ω . Then, in addition to human capital, “habit capital” will accumulate as immigrants integrate into their host country’s native society. If such accumulation results from an individual’s choice to actively invest in integration, then social capital is accumulated that may in turn affect both preferences for living in the host country and job opportunities (cf. Adda, Dustmann, and Görlach, 2014).

3.4.2 Multiple Skill Dimensions

Another simplification adopted in the basic model is the assumption of one skill dimension, S , with different prices in the two locations. This skill dimension, however, is extendable to a Roy model with multiple skill dimensions (Dustmann et al., 2011), a multi-skill framework that has interesting implications for the way we should think about migrations, brain drain, and brain gain. In particular, not only may different skills have different prices in the origin and destination countries, they may also accumulate differently, producing emigration and remigration patterns that select individuals into the migrant and return migrant populations according to their innate skill endowments.

3.4.3. Borrowing Constraints

Self-employment can be an attractive option for many returnees and is a choice likely to interact with decisions to migrate in the first place (see Dustmann and Kirchkamp, 2002). For example, migration may have been chosen in response to borrowing constraints by individuals hoping to set up a business in their country of origin (Mesnard, 2004; Yang, 2006). Individuals who face borrowing constraints that prevent them from accumulating the necessary assets to set up their own businesses may choose migration as a means to accumulate the required initial capital. In this case, self-employment s would be an additional choice in the model set out above, perhaps also as a further argument of the utility function so that $u^o = u^o(c_a, s)$. Adjusting the budget constraint in the country of origin to reflect this

extension yields $xA_{a+1} \leq (1+r)xA_a + s_a Y_s^o(S_a) + (1-s_a)Y_e^o(S_a) - c_a - I_a$, with $A_a \geq R$, where R is the borrowing constraint and s_a indicates whether the individual chooses to be self-employed. Further, let $Y_s^o(S_a)$ and $Y_e^o(S_a)$ be the earnings after return one can obtain when being self-employed or dependently employed, and let I_a be the level of initial investment required to set up the business, which is equal to zero once the business is set up or if the individual chooses not to become self-employed. Then such a scenario corresponds to what Piore (1979) labels “target earning,” a factor he considers the main motive for temporary migrations.

This distinction between migration motives is important because it implies different individual responses to changes in economic conditions. That is, dependent on the relative magnitudes of income and substitution effects, a change such as an increase in host country wages can have ambiguous effects on optimal migration durations in the baseline model (see Dustmann, 2003). For borrowing-constrained target savers, on the other hand, for whom the purpose of migration is the accumulation of sufficient assets to cover investment cost I_a , an increase in host country wages will always reduce the time spent abroad (Yang, 2006; Djajić and Vinogradova, 2014). If the returns to accumulated assets differ for employed workers versus entrepreneurs, with higher returns for the latter (so that $r_s > r_e$), the budget constraint becomes $xA_{a+1} \leq (1 + s_a r_s + (1 - s_a) r_e) xA_a + s_a Y_s^o(S_a) + (1 - s_a) Y_e^o(S_a) - c_a - I_a$. Then, contrary to the former case and the baseline model without entrepreneurs (where an increase in $Y^o(S)$ always shortens migration duration), an increase in r_s in the country of origin, interpretable as improved investment opportunities, has an ambiguous effect on the optimal time spent abroad given higher wages and more easily accumulated assets. For instance, Lindstrom (1996) finds that improvements in investment opportunities in the origin communities of Mexican migrants to the U.S. tend to increase migration durations as asset accumulation becomes more valuable.

3.4.4 Household Migration Decisions

In contrast to our basic model in which decisions are made by one individual, some evidence – particularly for developing countries – suggests that migration decisions are frequently made on the household level (Stark, 1991; Lessem, 2013). Such household decisions, sometimes taken with the aim of reuniting with family, may lead to different remigration patterns. For instance, Bijwaard (2010) shows significantly lower outmigration hazards for immigrants to the Netherlands who immigrated for family formation or family reunification

reasons as compared to labor or student migrants. Junge, Munk and Poutvaara (2014) document far lower outmigration rates from Denmark for couples than for either single men or women. Likewise, for the U.S., Van Hook and Zhang (2011) plausibly show outmigration rates to be lowest for married immigrants whose spouses reside in the U.S.

Our model can be extended to allow for the possibility that migration and re-migration decisions are taken in a household framework. For example, if a migrant must finance the family in the origin country, a simple extension would include a per period utility while in the destination country, adjusted to include not only the migrant's consumption but also that of family members back home, $u^d(\pi, c_a^d, c_a^o)$, and possibly the location vector of other family members. Abstracting from the choice of location in which financial assets will be kept, the budget constraint is then extended to $A_{a+1} \leq (1 + r)A_a + Y^d(S_a) - c_a^d - \chi c_a^o$, possibly also including income from other family members. This modest extension of the baseline model, though likely worthwhile considering in many empirical applications does not change the model's qualitative implications. In fact, the framework can further be extended beyond the unitary household setting. Having more than one decision maker choose his or her location in conjunction with, for instance, a spouse's migration decision requires solving for an equilibrium outcome, which tends to be computationally demanding.²¹ Approaches taken in the literature to deal with this challenge include assumptions about within-household transferable utility (Gemici, 2011) and categorizations of household members as primary and secondary movers, with the secondary movers conditioning their choice(s) on decisions made by the primary mover (Lessem, 2013).

3.4.5 Repeat or Circular Migrations

It also is possible to extend our focus on temporary migrations in which return is an absorbing state to other, possibly more complex, forms of temporary migrations, such as repeat (circular) migrations. In a non-stochastic setting, repeat migration may occur if the relative preference for being in the destination country, π , decreases with the uninterrupted time spent in that country. For instance, long periods away from family and home environment may create a cost for the migrant that increases with separation but returns to its

²¹ See Mincer (1978) for a model describing the interplay between family migration and marital stability in a static setting. Building on this, Djajić (2008) analyses potentially conflicting interests of parents and children in their return decisions. An intuitive implication of these models is that the probability of all family members staying or moving jointly increases with the option of intra household transfers.

initial value once the individual has spent some time at home, as in Nakajima, 2014b. In such a case it might be preferable for migrants to split their optimal total migration duration into several stays. The vector of state variables would then also include years since last immigration, and the per period utility in the country of destination would be given by $u^d(\pi(ysm), c_a)$. Return to the country of origin would then no longer be an absorbing state, so that regardless of migrant location, his or her value would be given by $V^L(\Omega_a) = \max\{V^d(\Omega_a), V^o(\Omega_a)\}$, $L \in \{d, o\}$. We recognize, however, that in a stochastic environment, repeat migrations may occur for other reasons, including unforeseen events. Moreover, many repeat migrations, such as agricultural migrations, are likely to be determined by the types of jobs available to immigrants.

3.4.6. Risk and Uncertainty

To assess risk and uncertainty, the model can be augmented with stochastic terms that induce return and possibly repeat migrations. For instance, if unforeseen exchange rate fluctuations change the value of accumulated savings back in the home country, they may affect return decisions. Such a situation is observed for Filipino migrants by Yang (2006), who uses exchange rate shocks during the 1997 Asian crisis to distinguish target savers from migrants whose return decisions seem driven by classical lifetime utility maximization. If such fluctuations reverse individual economic prospects, a returned migrant may choose to re-migrate. Similarly, if an undocumented migrant who optimally would have chosen to stay longer is deported, that individual may want to re-migrate. In our model, return or repeat migrations may also be triggered by time variant locational preferences π or income $Y^L(S)$, fluctuations that also determine the location choices of Mexican migrants in the models estimated by Colussi (2003), Thom (2010), and Lessem (2013). These authors formulate a migrant's decision problem as a dynamic program in a framework not too different from ours and then use these structural models to predict the effect of changes in U.S. border enforcement on migration decisions.

3.4.7. Legal Constraints, Undocumented Migration and Border Controls

If the risk of being prevented from entering or staying in a destination country increases, perhaps because of stricter visa requirements or, in the case of illegal immigrants, stricter border controls, it may affect the return decisions of immigrants currently in the host

country.²² For instance, in a model of circular migration, a tightening of visa requirements or border controls would either constitute a cost C of immigration, so that $V^o(\Omega_a) = \max\{V^d(\Omega_a) - C, V^o(\Omega_a)\}$, or, in the case of illegal migrations, might increase the probability p of being apprehended at the border and forced to stay in the country of origin, so that $V^o(\Omega_a) = pV^o(\Omega_a) + (1 - p) \max\{V^d(\Omega_a), V^o(\Omega_a)\}$. Importantly, many legal migrations take place under temporary visa schemes. If these are binding and granted durations of residence are shorter than they would be if chosen optimally, forward looking individuals will anticipate the risk of not being granted a visa extension, and adjust their choices accordingly. For instance, immigrants expecting a relatively short stay in the host country (voluntarily or not) will have higher savings and/or send more remittances to their home country.

Enforcement directed at undocumented immigrants who are already in the host country could be modeled as a stochastic term denoting migrant deportation irrespective of the relative magnitudes of $V^d(\Omega_a)$ and $V^o(\Omega_a)$. If such enforcement and the risk of being deported imposes a permanent cost \tilde{C} to utility while in the host country, then $V^d(\Omega_a) = \tilde{p}V^o(\Omega_a) + (1 - \tilde{p}) \max\{V^d(\Omega_a) - \tilde{C}(ysm), V^o(\Omega_a)\}$, where \tilde{p} is the probability of being deported and \tilde{C} varies with years since immigration. This cost to utility may, for example, be higher for immigrants who have just arrived and may lack knowledge about the destination country or who have yet to establish a secure network. The model thus allows analysis of the effect that border controls have on the probability of migrants returning to their countries of origin. Existing analyses of the effect of U.S. border enforcement on Mexico-U.S. migration flows, for instance, all find that an increase in U.S. border enforcement not only discourages the inflow of undocumented Mexican migrants but also increases the average time migrants who have crossed the border remain in the U.S. (Thom, 2010; Angelucci, 2012; Lessem, 2013).

3.4.8 Human Capital and Labor Supply

Another extension would replace the assumption that human capital accumulates rather deterministically and only dependent on location decisions with a scenario in which migrants choose when and how much human capital to accumulate. Under that condition, if there is uncertainty about future earnings or locational preferences (e.g., because of uncertain

²² Border enforcement may also affect the initial migration decision, as suggested by Orrenius and Zavodny (2005) in a study of the selection of undocumented Mexico-U.S. migrants.

developments in the destination or home country), the immigrant's *anticipated* length of stay in the destination country would affect human capital investment decisions at any point over the migration cycle. Because such anticipated durations of stay may change over the migration cycle, immigrants would re-optimize their investment decisions. Adda et al. (2014) develop a model that includes endogenous skill accumulation, which demonstrates that, for instance, policies that induce uncertainty about immigrants' chances of remaining permanently in the destination country may lead to ex-post suboptimal human capital investment.

Similarly, when labor supply is endogenous, the anticipated time spent in either location will be important in choosing between leisure and labor supply, see Galor and Stark (1991). Hence, whereas in our basic model, the planned migration duration is important for consumption choices, this duration will generally influence every additional choice allowed for in the model. As a result, when migrations are temporary and migrants choose the optimal migration duration, all other choices will be taken in conjunction with their planned duration abroad, which obviously introduces considerable complexity and heterogeneity into immigrants' economic decisions.

3.4.9 Guest Worker Migrations

Many migrations are temporary by definition; for instance, when migration is firmly linked to a particular work contract, such as the exchange of financial service providers across national borders, teaching or domestic positions in the Middle East, or seasonal agricultural work in Europe or the U.S. In these cases, the optimization problem simplifies considerably because now the length of the migration is predetermined and cannot be chosen by the migrant. As a result, although decisions in the host country continue to be affected by work contract and expected economic conditions in the home country after return (e.g., wages), the migrant will no longer choose the optimal time of return because this is now set exogenously. When the constraint becomes binding, it may result in different decisions than in the case of an optimal migrant-chosen duration. For instance, in our first scenario, in which the migrant has a preference for consumption in the home country (section 3.3.1), the decreasing marginal utility from consumption implies that a shorter guest worker contract would reduce consumption and increase savings during the stay in the host country.

4. Optimal Migration Duration and Economic Behavior

4.1 Measuring Migration Durations

Although, as previously stressed, measurement is a major problem for temporary migration research, even if data were available that allowed assessment of migration length, it is questionable how useful such information would be for assessing the relation between immigrants' economic behavior and migration duration. For example, using information on completed durations to understand its impact on behavior would inherently assume that expected durations always equal immigrants' completed durations and that the optimal migration duration is the same at any point over the migration cycle, which would indeed be the case in the deterministic baseline model sketched above. Such is unlikely to be the case, however, once we introduce stochastic shocks to earnings and preferences into the model, as in that case individuals re-optimize and the optimal re-migration decision may change over the life cycle. Thus, at different stages in their migration history, immigrants may condition on different expected migration durations, meaning that information on the length of a completed migration may give little indication of e.g. planned migration duration just after arrival in the host country, when immigrants make choices about investments in, for example, language acquisition. What is needed, rather, is information on *intended* migration duration, which is only available in a few surveys.

To illustrate, we plot the changes in immigrants' return intentions over time in Figure 7 for the U.S. and for Germany. For the U.S., we use the two waves of the NIS to show the fraction of immigrants who intend to stay permanently, conditional on having stayed until the second wave (Figure 7a). The longer time span of the GSOEP allows the fraction to be plotted by years since immigration (Figure 7b), again for the subsample of immigrants who are observed throughout the first 20 years of their stay. Both parts of the figure show a tendency for these immigrant subsamples to revise their migration plans over the migration cycle toward a permanent stay.²³

²³ This observation cannot, of course, be shown for entire immigrant cohorts, as those who revise their intended length of stay downwards are more likely to select out of the observed samples.

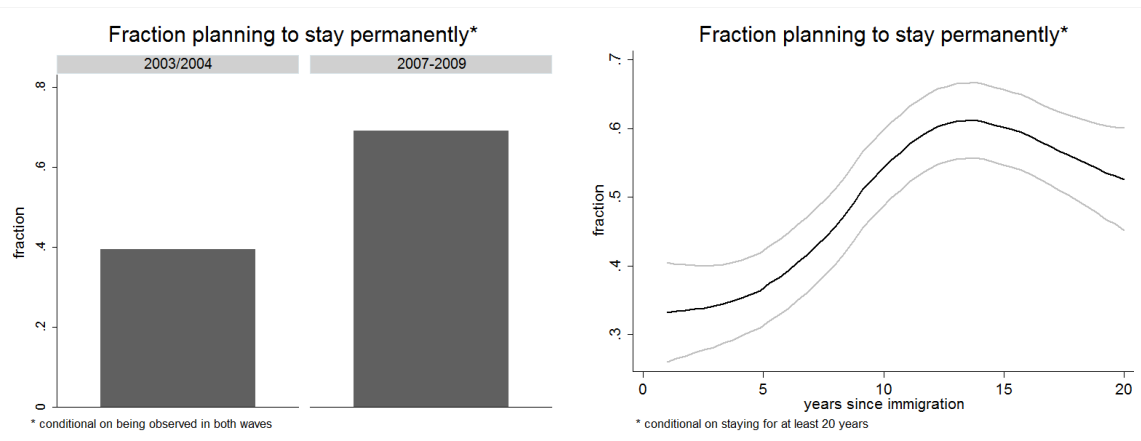


Figure 7: Fraction intending to stay permanently for immigrants aged 18-64 who arrived at ages 16 or older: (a) U.S. data from the two waves of the New Immigrant Survey and (b) data from the German Socio-economic Panel, waves 1984-2012.

4.2 Return Migration and Economic Behavior

As already discussed, a temporary, as opposed to a permanent, migration affects immigrant behavior in virtually every dimension. For instance, immigrants who intend to remain only temporarily in the host country, and who will spend the remainder of their life in the origin country, condition any present day choice on expectations about their expected future situation in the country of origin. Thus, if wages back home are far lower than in the host country, for example, it may lead to an intertemporal substitution of leisure whose extent may differ between migrants dependent on individual expectations or length of intended migration. This variation introduces heterogeneity into immigrant economic behavior that depends on variables which may be difficult to measure and thus have consequences for such empirical work as analyses of life cycle wage profiles or estimations of labor supply elasticities.

In fact, Dustmann (1993), seeking to explain why the earnings paths of immigrants to Germany were flatter than those of immigrants to the U.S. (see Chiswick, 1978; Long, 1980; Borjas, 1985), emphasized early on that immigrants' human capital investments and ensuing assimilation profiles may depend on migration duration. In particular, he demonstrated that the nature of the migration – whether permanent or temporary – may have an important impact on the earnings growth that should be seen in immigrant populations. Drawing on the key insight that the incentive for any investment in skills depends on the length of the pay-off period for that investment (Ben-Porath, 1967), he suggested that immigrants, if they intend to remain only temporarily in the destination country, are likely to invest less in the type of

human capital that is productive in the destination country but has little value in the origin country (e.g., language skills). In later work, using unique survey information on immigrants' intended migration duration and instrumenting this variable with unforeseen events (e.g., family deaths in the home country), Dustmann (1999) demonstrates that those with nonpermanent intentions do indeed invest less in language capital. He further shows that female migrants whose husbands intend to return have higher labor market participation rates, which is compatible with an intertemporal substitution of leisure (Dustmann, 1997a). Bellemare (2007), using a dynamic life cycle model in which accumulated working experience affects both wages and locational preferences, refines this finding, showing that restricting migration duration reduces the participation of low-skilled migrants to Germany but has little effect on high-skilled immigrants.

Cortes (2004), on the other hand, by comparing the outcomes for economic migrants and refugees in the U.S. with the assumption that the latter expect to stay longer and thus have stronger incentives for post-immigration human capital investment, identifies a positive effect of expected migration duration on wages. Khan (1997), using a similar argument, finds higher post-immigration investment in education among refugee migrants to the U.S. relative to economic migrants. Similarly, Dustmann (2008) shows that among second generation immigrants to Germany, the intention by foreign-born fathers to stay permanently increases the probability of their sons' attaining upper secondary schooling. This latter implies that human capital investment decisions may also be affected by return plans in an intergenerational setting in which parental investments in children depend on where parents believe their children will be living in the future. To the extent that immigrant parents expect their children to be better off in the host country – either because the latter are socially better integrated there than in their parents' country of birth, or because of an expected intergenerational upward mobility –, the presence of children may defer a return migration. On the other hand, parents with a strong attachment to their home country, may want their children to be raised and educated in their parents' cultural environment, and thus be more likely to return.

There is also evidence of a positive association between immigrant return plans and savings and remittance decisions, as shown by Merkle and Zimmermann (1992) for immigrants in Germany based on the GSOEP. Pinger (2010), using a household survey that also collects information on current and former household members living abroad, offers similar evidence for migrants from Moldova. Likewise, Dustmann and Mestres (2010a) show that immigrants

who plan to remain only temporarily in Germany have higher remittances than migrants who plan to stay permanently and are more likely to transfer their assets to the origin country (Dustmann and Mestres, 2010b). In a comparison with German households, Bauer and Sinning (2011) reveal that although immigrant households save less on average, temporary migrants have a higher savings rate than natives once remittances are taken into account.

As the above discussion suggests, even though much of the literature continues to treat economic outcomes as exogenous determinants for outmigration decisions, there is now considerable evidence that many outcomes are affected by expected migration duration. Most of the extant work, however, depends on return plans reported in surveys and models the relation between return plans and economic outcomes in a reduced form setting. Not only may it be overly simplistic to assume that economic outcomes are exogenous with respect to migration duration, but return migration intentions in turn may change over the immigrants' migration cycle because of shocks to wages and preferences. Capturing these changes requires that economic behavior and return plans be modeled in conjunction. To do this, several recent papers use frameworks similar to ours. These studies include Deléchat (2001), Colussi (2003), Thom (2010), Rendon and Cuecuecha (2010), Lessem (2013) and Nakajima (2014a,b) for Mexican-U.S. migration, and Bellemare (2007), van Baalen and Müller (2008), and Kırdar (2012) for Germany (all based on GSOEP data).

5. Temporary Migrations and Their Implications for Host and Home Countries

Because immigrants who plan only a restricted stay in the destination country adjust their investment in human and social capital accordingly, migration temporariness has effects beyond the individual immigrant. For example, these immigrants' flatter earnings profiles and lower investment in language skills or networking may reinforce segregation in the host country and result in their contributing below their economic potential. Return plans may also affect immigrants' investments in their children and impact savings and consumption choices. There are also consequences for the sending country: immigrants who intend to return home may not bring their families with them but instead make higher remittances, or they may return with knowledge or initiatives that aid development in their country of origin. In this section, we briefly examine such consequences and review related analyses.

5.1 Consequences of Temporary Migrations for the Sending Country

5.1.1 Remittances

The arguably most important channel by which migration affects individuals who stay behind in the origin country is via remittances, whose impacts are the subject of a large body of literature (see Rapoport and Docquier, 2006, and Yang, 2011, for surveys). The focus of such studies ranges from effects on nonmigrant family members' labor supply (Rodriguez and Tiongson, 2001; Amuedo-Dorantes and Pozo, 2006) to the aggregate effects on the wider economy (Durand, Kandel, Parrado, and Massey, 1996; Taylor and Whyatt, 1996; Taylor, 1999; di Giovanni, Levchenko and Ortega, 2015). Dustmann and Mestres (2010a), defining remittances as "all transfers from the immigration country to the immigrant's home country," distinguish three primary motives for such transmissions, each likely to be affected by migration temporariness: support for remaining family members, savings for future consumption or investments held in the origin country, and insurance against a future return. The first motive is likely to be more common in temporary migrations because in these cases, immigrants are more likely to leave their families behind (see Funkhouser, 1995, for a simple model of this remittance motive). As regards the second, Dustmann and Mestres (2010b) show that temporary migrants are more likely to hold assets in their home countries. In terms of remittance as insurance, migrants planning to return at some future time may contribute to the home community in order to "pay their way" back in. This remittance motive may also serve as an insurance mechanism for migrants who currently do not plan to return. For instance, Batista and Umblijs (2014), in an analysis of the relation between risk aversion and remittances among immigrants in Ireland, find that both more risk-averse individuals and individual with higher wage risks are more likely to remit, possibly to ensure a welcome back home if their migration must be terminated. Such transfers may have important consequences for the home community.²⁴

To illustrate the importance of taking into account expected migration duration at the time decisions are made, we consider the remittance behavior of immigrants to the U.S. and to

²⁴ A number of papers attempt to disentangle different remittance motives, including Lucas and Stark (1985) using data from Botswana, whose results do not support altruism (defined as utility from consumption of family members) as the sole cause of remittances. Similarly, Cox, Eser, and Jimenez (1998) find that remittances received by Peruvian households increase with pre-transfer income, contradicting the pure altruism hypothesis. Faini (1994), however, identifies a negative relation between remittances sent by foreign-born workers in Germany and recipients' incomes as predicted by an altruistic remittance motive. Likewise, Agarwal and Horowitz (2002), who test altruism against a risk-sharing motive, find evidence for the altruistic explanation.

Germany as sampled by the NIS and GSOEP, respectively. Figure 8a depicts remittance profiles by years of schooling separately for immigrants who report an intention to stay in the U.S. only temporarily and those who plan to stay permanently. The figure clearly shows that highly educated immigrants who intend to stay permanently remit less on average than those planning to leave and presumably return to their communities of origin.²⁵ A similar pattern emerges for immigrants to Germany (see Figure 8b), although of course, the relation in the figures is merely suggestive rather than causal.

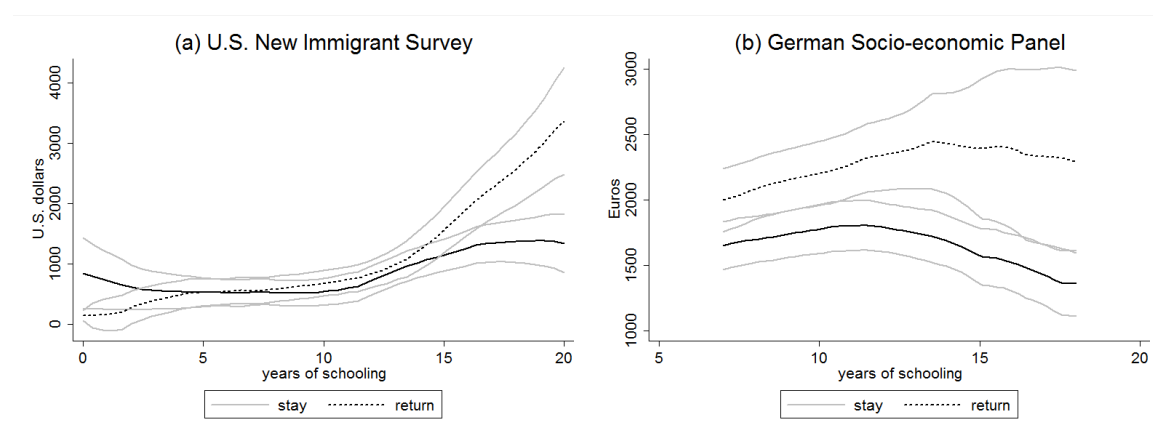


Figure 8: Annual remittances conditional on having remitted by intention to stay for immigrants aged 18-64 who arrived at ages 16 or older: (a) U.S. data from the first wave of the New Immigrant Survey (2003/2004) and (b) data from the German Socio-economic Panel, waves 2000-2012.

5.1.2 Brain Drain and Brain Gain

One issue that has received much controversial attention in the economic literature is brain drain through emigration, a context in which return migration has been used as one argument to support the possibility that high-skilled emigration can also lead to a brain gain (see Docquier and Rapoport, 2012, and Hatton, 2014). For example, Domingues Dos Santos and Postel-Vinay (2003) formulate a theoretical model in which returning migrants contribute to the overall skill endowment of their home country, leaving a potentially positive overall effect even when the initial emigration from the source country is positively selected. In their model, permanent high-skilled emigration has an unambiguously negative effect on the origin country. In an extension, they assume that a migration is temporary with a probability

²⁵ See also Bollard, McKenzie, Morten, and Rapoport (2011) for a detailed discussion of highly educated migrants' remittance behavior from a number of destination countries.

determined by the host country's government – and thus not a migrant choice – and allow for endogenous human capital investment prior to emigration (Domingues Dos Santos and Postel-Vinay, 2004). In this setting, an increase in the fraction of temporary visas has two opposing effects on the sending country's skill endowment; that is, whereas a decrease in the expected time spent in the destination country, with higher returns to human capital, reduces migrants' incentives to invest in education; a larger number of returning migrants and the related diffusion of knowledge increase the sending country's overall human capital. This aspect is also addressed by Dustmann et al. (2011), who point out that in the absence of externalities, individual rationality implies that the reduction in local output caused by emigration is always lower than the gain obtained by immigrants abroad. Defining a reduction in the per capita human capital in the home country as a brain drain and an increase as a brain gain, emigration will lead to a brain drain or brain gain based on the type of individuals who emigrate. In their two-dimensional skill model, however, a brain drain resulting from high-skilled emigration may be mitigated and even reversed by returning migrants if their skills are highly valued in the origin country.

Such “brain circulation” resulting from return migration does indeed seem to be an important aspect that should be considered in any brain drain analysis. The extent to which it benefits sending countries, however, depends on the tendency of highly skilled migrants from these countries to return, with considerable heterogeneity across source countries. For instance, Rosenzweig (2008), using the U.S. NIS pilot and Occupational Wages around the World (OWW) database to investigate the determinants of foreign student return decisions in the U.S., shows that higher skill prices in origin countries lead to higher return rates. His results also indicate that, conditional on skill-prices, Asian students are among the most likely to return. Finally, return migrants may shape their home country's institutions. Spilimbergo (2009) presents support for a positive association between the number of student migrants at academic institutions in democratic countries and the quality of institutions in their countries of origin, while there is no such association for students in non-democratic host countries.

5.2 Consequences of Temporary Migrations for the Receiving Country

Among the obvious consequences of migration temporariness for receiving countries is the tendency for temporary migrants to invest less in their host country specific human capital than permanent migrants, while still tending to save and sometimes remit more. These tendencies affect the contributions made to the receiving country in terms of taxes and productivity. On the other hand, temporary migrants tend to spend their most productive

years in the host country, while spending costly childhood and retirement years in the country of origin.

5.2.1 Fiscal Impact

Although a multitude of studies assess the net fiscal contribution of immigrants to their host country's finances (see e.g., Smith and Edmonston, 1997; Auerbach and Oreopoulos, 1999; Lee and Miller, 2000; Storesletten, 2000, for the U.S.; and Dustmann and Frattini, 2014, for the UK), most do not distinguish temporary from permanent immigrants, even though the fiscal position of each can be expected to differ. On the one hand, as previously discussed, temporary immigrants may have flatter earnings profiles than permanent immigrants, meaning they pay lower income taxes. They may also, however, consume less (and remit more) and thus pay less in indirect taxes. On the other hand, some or even most of the high fiscal burden during old age may be borne by the country in which the migrants settle after retirement.

Storesletten (2000) incorporates this latter point into an overlapping generation model, which is calibrated to reflect the structure of immigration to the U.S. Using outmigration rates, post-migration take-up rates of social benefits, and other parameters based on estimates from the literature, he finds that the net present value of high-skilled immigrants' fiscal contribution would be lower in a scenario without outmigration if these immigrants arrived at ages close to retirement. For younger immigrants, the opposite is true. Nevertheless, because he assumes that outmigration is random, even across age groups, Storesletten ignores selection and abstracts from temporary immigrants having different career paths than permanent immigrants. Kirdar (2012), in contrast, endogenizes outmigration in a dynamic structural model more similar to that outlined in Section 3, which he estimates using data from the GSOEP. By quantifying the effect of immigration on host countries' insurance systems, he shows that taking the endogeneity of return decisions into account increases the net expected gain to the host country's finances because negatively selective outmigration implies that the migrants most prone to be beneficiaries are likely to return first.

Findings on the fiscal impact of immigration are summarized in a recent OECD (2013) report, which emphasizes the important differences between native-born populations and

immigrants in general or temporary immigrants in particular.²⁶ For example, the report notes that compared to the working-age population, the average annual social expenditure in OECD countries is more than twice as high for children and almost six times as high for individuals over 65, which has important implications for assessing the fiscal position of temporary migrants. Nevertheless, among OECD members, Australia is the only country that provides official estimates of immigrants' fiscal contributions, drawing mostly on the Longitudinal Survey of Immigrants in Australia (LSIA) and a model that – although not a life-cycle model – reflects immigrants' fiscal position by visa category over a 20-year period. Not surprisingly, the model predicts a strong positive contribution for temporary business migrants. For instance, the 87,000 immigrants in this visa category who arrived during 2006-2007 stayed an average of two years and contributed an estimated one billion plus Australian dollars during their first year of stay, with almost half a billion dollars per year contributed by those who stayed more than two years (Access Economics, 2008).

5.2.2 Other Consequences

The above mentioned studies treat taxation and redistributive policies as exogenous. However, such policies may be themselves endogenous, giving rise to interesting political economy issues. Abstracting from potential wage effects, Freeman (1986) argues that in a laissez-faire state, temporary immigration programs should be uncontroversial across different interest groups (see also Freeman, 2006), while in a welfare state, redistributive issues may lead to differences between governments and employers in how restrictive policies even regarding temporary migration should be. Ortega (2010) discusses a model in which native workers of a given skill group, when voting on immigration and redistributive policies, trade-off lower current wages due to immigration of substitute workers against future political support for their preferred redistributive policy if immigrants or their children can acquire the right to vote and policy preferences are homogeneous within skill groups. He shows that in the presence of intergenerational upward mobility, long-run support for a welfare state can be maintained under *ius solis*, i.e. if the children of immigrants acquire citizenship and thus voting rights, but not under *ius sanguinis* (if second generation immigrants stay in the host country, but without voting rights) or if migration is temporary. Beyond the direct effects on a host country's finances, the form of immigration may thus

²⁶ See also Kerr and Kerr (2011) for a recent survey of this literature, and Preston (2013) for some theoretical considerations on the fiscal impacts of immigration.

have implications for choices of host country populations and hence on policy parameters themselves.

Many other implications of temporary versus permanent migrations for the receiving country follow directly from the behavioral differences between the two types. For instance, as Adda et al. (2014) point out, temporary migrants may invest less in social capital, which has potential consequences for their social assimilation and the segregation of immigrant communities. One straightforward contribution to the extant literature on migration's trade enhancing effect²⁷ is Jansen and Piermartini's (2009) gravity style regression of bilateral trade flows with the U.S., which includes proxies for the numbers of both temporary and permanent immigrants from the respective trading partners. These authors' results indicate that temporary migrants play a larger role than permanent migrants in fostering both imports and exports with their origin countries, which suggests that the probably lower integration of temporary migrants in the U.S. may be compensated for by better knowledge of the home country market through stronger links these migrants maintain with their home societies.

Temporary migrations are also likely to affect wages and employment of natives in destination countries differently from permanent migrations. The large literature on the labor market effects of immigration is largely static and focusses on immediate wage- and employment effects.²⁸ However, in the longer run, immigrants are likely to move up the distribution of native wages, and impose therefore supply shocks on natives at other parts of the wage distribution than at their initial position, giving rise to an interesting dynamic of wage effects. According to our previous discussion, the pace by which immigrants move through the native wage distribution may partly depend on the temporariness of their duration. Outmigration will also lead to negative labor supply shocks, in the same way as immigration leads to positive labor supply shocks. Again, how that affects native wages will depend on who emigrates, and where emigrants are located along the native wage distribution.

²⁷ A number of papers show a positive relation between international migrant stocks and bilateral trade flows without distinguishing permanent and temporary immigrants (see, e.g., Gould, 1994; Rauch and Trindade, 2002; Herander and Saavedra, 2005).

²⁸ See, e.g., Card (1990, 2001, 2009), Altonji and Card (1991), Borjas (2003), Aydemir and Borjas (2007), Manning and Wadsworth (2012), Ottaviano and Peri (2012), Dustmann, Frattini and Preston (2013), and Piyapromdee (2014), to name just a few.

Borjas (2009) adds another aspect, by highlighting the importance of remittances on labor market outcomes in a general equilibrium setting. He argues that a reduction in aggregate demand due to higher remittances of immigrants will affect native wages negatively. Although he does not distinguish between different forms of migration, it follows from our discussion above that remittances may be higher when migrations are temporary. However, as yet, empirical evidence of these secondary effects of temporariness of migrations for receiving economies is scarce and leaves much room for future research.

6. Conclusions and Outlook

Although migration temporariness induces behaviors that differ from those of permanent migrants, it is typically not considered in analyses of immigrant behavior and immigration's impact on home and host countries. We argue that this omission may be serious: many migration phenomena can only be fully understood when models allow immigrants to choose the optimal migration duration and consider the dynamic implications for immigrant behavior.

To this end, we propose a general dynamic framework that allows analysis of immigrant behavior under different assumptions about reasons and motives for return. This model can be extended in different directions to investigate the behavioral consequences of temporary migrations, making it a potentially useful starting point for researchers wishing to study temporary migrations and their consequences. We illustrate the model's flexibility by suggesting several possible extensions and discussing the few existing papers that explore these avenues.

One major reason for the paucity of research on migration temporariness, we believe, is the lack of appropriate data. In recent years, however, considerable progress has been made on this front, resulting in higher quality data not only from better designed surveys but also from the linking of administrative data sources and the combination of administrative and survey data. Such datasets promise to enhance research progress in this important field and to improve our understanding of immigration and its consequences. Within this context, the framework proposed in this study may serve as a valuable instrument for analyzing more complex forms of migrations.

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