

Chapter 2

The Determinants of International Migration: Theory

Abstract The economic theory of cross-border migration is concerned with three questions—*why* migrate, *who* migrates, and *what are the consequences* for source and destination countries? While there is a strong tendency in the literature to distinguish between domestic (internal) and international (external) migration, there is actually just one economic theory of migration. In mainstream economics, the theory of why people migrate is simply an application of the human capital model; migration is an *investment* in one's well-being. The human capital perspective leads to the implications that the immigration rate depends upon international differences in the returns to factor supply, controlling for migration costs, skill levels, income inequality, and immigration policies. We also discuss other models that focus on how the immigration decision is influenced by family considerations, the option value of waiting, and feelings of relative deprivation. There is still a big gap between theory and empirical work, and much needs to be done on the theoretical side of this literature to bridge that gap.

The greatest challenge to migration theorists is the organization of all hypothetically relevant factors into one coherent theoretical framework that will specify their interaction with each other in empirically testable form and thereby serve as a guide to future research.

Chapter Overview

Forty years ago, there was no single, unified theory of why people migrate. Today, there is *still* no such convergence to a single model of immigration. Sociologists and economists have very different views about why people emigrate, and politicians and policymakers seem to have yet another set of views. Economic models are based on the fundamental assumption that people's decision to relocate abroad

depends on international differences in the returns to their labor, net of migration costs. This approach is useful in understanding what could be called *purely economic migration*, but not so useful in understanding refugees, family members who decide to accompany or follow immigrants, or those who are forced to migrate against their will. In contrast, sociologists have tended to focus on a broader range of determinants of international migration, although important economic determinants are often given secondary emphasis in their analysis. As with any area of research that cuts across the different social sciences, often one discipline's explanation seldom matches the explanations offered by other disciplines. The economic literature has been restricted by its use of labor market models favored by the labor economists who have done most of the economic analysis of immigration.

It is certainly not obvious that the primary motive for immigration is a *factor supply* decision. Does a person relocate in order to obtain a higher price for her labor supply? Or, is migration a *consumption* decision? For example, does a person move because she expects the destination to have a more pleasant climate and attractive scenery, a preferred social culture, or better quality local public goods such as schools, parks, or police protection? Or, is migration a decision to relocate *household production*? For example, does a family move because the destination has a better climate and soil for growing food or a better environment for home-schooling children? Or, do people relocate internationally to be closer to family and friends in the destination country, to seek political freedom and avoid persecution, or to safeguard one's wealth and property? A theory of the determinants of migration requires specifying what the migrant's motives are.

In this chapter, we survey the theoretical literature on the determinants of international migration. A number of things will quickly become apparent about this literature. First, the standard mainstream economic theory of why people migrate is simply an application of the human capital model. Second, the theoretical literature on why people migrate internationally is quite small. Third, the current popular model of immigration, the Borjas (1987) model and subsequent embellishments of it, is a model designed to explain both the determinants of immigration and the composition of immigrant flows. Finally, our survey of the theoretical literature on immigration will show how limited are the perspectives of the theoretical literature. Empirical researchers have often taken a much broader approach to immigration and have tested many variables representing influences not included in the available theoretical models of immigration. Much work must be done on the theoretical side to bridge the gap between theory and empirical work.

The organization of this chapter takes us first to a discussion of the very early contributions, including those made by scholars outside of economics, to understanding why people migrate. Second, we present an overview of the theory since the 1960s, focusing on the human capital investment model of migration developed by Sjaastad (1962). We then survey a number of other economic theories of international migration that have appeared in the mainstream literature.

2.1 Early Migration Theory

Prior to the 1960s, the theory of migration was mostly focused on domestic migration, and it was closely linked to the location models from regional economics and economic geography. Economic historians discussed international migration, but not from a theoretical perspective. With the development of the human capital investment model beginning in the late 1950s, migration began to be discussed from a more theoretical perspective. In this section, we survey the main developments in this older theory.

2.1.1 Pre-1960 Theory

Interestingly, an economic analysis of migration dates back to Smith's (1776) *An Inquiry into the Nature and Causes of the Wealth of Nations*, in which Smith (1776 [1976], Part I, pp. 83–84) wrote,

...the wages of labour vary more from place to place than the price of provisions. The prices of bread and butcher's meat are generally the same or very nearly the same through the greater part of the United Kingdom. These and most other things which are sold by retail, the way in which the labouring poor buy all things, are generally fully as cheap or cheaper in great towns than in the remoter parts of the country. . . . But the wages of labour in a great town and its neighborhood are frequently a fourth or a fifth part, twenty or five-and-twenty per cent. Higher than at a few miles distance. Eighteen pence a day may be reckoned the common price of labour in London and its neighbourhood. At a few miles distance it falls to eight pence, the usual price of common labour through the greater part of the low country of Scotland, where it varies a good deal less than in England. Such a difference of prices, which it seems is not always sufficient to transport a man from one parish to another, would necessarily occasion so great a transportation of the most bulky commodities, not only from one parish to another, but from one end of the kingdom, almost from one end of the world to the other, as would soon reduce them more nearly to a level. After all that has been said of the levity and inconstancy of human nature, it appears evidently from experience that a man is of all sorts of luggage the most difficult to be transported.

The above quote contains insightful observations which foreshadow research in the migration field two centuries later. Smith's observation that there is greater spatial dispersion of wages (the rural/urban wage differential is particularly large, for example) than there is of commodity prices is certainly still relevant today; international commodities seem to be more efficiently arbitrated today than labor. Smith effectively suggests that migration is potentially a response to spatial disequilibrium in labor markets. His observation of large wage differences in Britain suggests that wage differences are clearly not the only determinant of migration.

More than 150 years later, another leading economic theorist, Hicks (1932), wrote that "...differences in net economic advantages, chiefly *differences in wages*, are the main causes of migration" (our italics). Yet, during the 150 years between Smith and Hicks, the world had seen an incredible widening of wage differences across countries and regions. Clearly, other things influenced immigration, and the

rising arbitrage opportunities did not cause enough migration to prevent wage differences from growing. Indeed, Smith correctly foresaw the barriers to migration with his statement “man is of all sorts of luggage the most difficult to be transported.”

Shields and Shields (1989) formalize Smith’s observation in a model that hypothesizes labor moves from location i to location j if the wage is higher in j than i , and that the volume of migration is related to the wage differential in the following manner:

$$M_{ij} = \beta_{ij}(W_j - W_i), \quad (2.1)$$

where W is the wage, M is the number of migrants and β reflects barriers to migration, such as distance, imperfect information, and policy restrictions, that may reduce the speed at which wages adjust to migration. The parameter β takes on a higher value when the barriers to migration are reduced. The theory of migration must be able to explain why wage differences do not generate enough arbitrage.

2.1.2 *Ravenstein and Zipf*

In between Smith (1776) and Hicks (1932), there were three scholars, two outside of economics, who made important contributions to the study of migration: British geographer Ravenstein (1889), American economist Jerome (1926), and American sociologist Zipf (1946). After extensively studying British census data on nativity of the population and place of residence along with vital statistics and immigration records, Ravenstein hypothesized seven “laws” of migration. Greenwood (1997) provides the following useful summarization of Ravenstein’s seven laws: (1) most migrants move only a short distance and usually to large cities; (2) cities that grow rapidly tend to be populated by migrants from proximate rural areas and gaps arising in the rural population generate migration from more distant areas; (3) out-migration is inversely related to in-migration; (4) a major migration wave will generate a compensating counter-wave; (5) those migrating a long distance tend to move to large cities; (6) rural persons are more likely to migrate than urban persons; and (7) women are more likely to migrate than men.

Building upon several of Ravenstein’s “laws,” Zipf hypothesized that the volume of migration between two places is directly proportional to the product of the populations of the origin and destination and inversely proportional to the distance between the two. This “ $P(1)P(2)/D$ ” hypothesis, where $P(1)$ is origin population, $P(2)$ is destination population, and D is distance between origin and destination, came to be known as the *gravity model* of migration. The gravity model of migration is obviously an application of Newton’s law of gravity, which predicts the level of attraction between two bodies. In applying Newton’s law, Zipf treated “mass” as the population of a place, and “distance” as referring to miles between

two places. Zipf's intuition is that distance is a good proxy for the costs of migration. Secondly, the gravity model effectively hypothesizes that the volume of migration is higher the greater are the populations of the origin and destination communities. The intuition behind this assumption is that at any point in time, some fraction of persons in the origin will face wage opportunities in alternative locations that exceed the wages they currently earn, net of migration costs, and those persons will migrate. Assuming that that fraction stays the same as the size of the origin population rises, the number of persons choosing to migrate will then also rise. Also, as the population of the destination community rises, the quantity and quality of employment opportunities will also be greater, inducing more migration.

It is important to note that, in terms of popularity, this gravity model of migration has received very little attention compared to another gravity model, namely the *gravity model of international trade*. The latter, which hypothesizes that the level of international trade between two countries is proportional to the product of their GDPs or populations and inversely related to the distance between the two, has been widely applied in empirical work in the field of international economics.¹

Jerome, a macroeconomist specializing in business cycle analysis, studied empirically the extent to which: (1) US immigration and emigration are driven by business cycle fluctuations; and (2) How migration flows influence the business cycle itself. His study, involving many different measures of US economic performance and migration flows dating back to the early nineteenth century, confirmed that there is strong correlation between cyclical changes in employment and cyclical changes in immigration and emigration. He concluded that migration does respond to changes in employment conditions, but may contribute as well to unemployment. Interestingly, the latter conclusion foreshadows work decades later on the distributional effects of immigration, discussed in a later chapter.

2.1.3 The Standard Modern Theory of Migration

The recent literature on the determinants of migration can be divided into three categories, each corresponding to a particular motive for migration. Specifically, a migrant can be (1) a supplier of her factor services or, effectively, a maximizing investor in her human capital, (2) a consumer of amenities and public goods, or (3) a producer of her own household goods and services. Most theoretical work on international migration is grounded in the human capital approach; the consumption approach is heavily favored by urban and regional economists and focuses on domestic migration; the "household production" approach is merely an application of the human capital approach.

¹ Tinbergen (1962) first applied the gravity model of trade to explain international trade patterns, and trade economists have consistently found it to explain a large proportion of the variation in trade flows, making the model attractive for testing the marginal influence of other hypothesized variables on international trade. Theoretical justifications for the gravity model of trade have been provided by Linneman (1966), Anderson (1979) and Deardorff (1998).

2.1.3.1 The Migrant as Investor in Human Capital

Most economists who study migration apply a *labor-flow* model, which posits that migration is a response to spatial differences in the returns to labor supply. At the micro level, this model implies that the migrant's goal is to maximize utility by choosing the location which offers the highest net income. Hence, users of this model implicitly assume that utility maximization is achieved through the maximization of income. These models, therefore, ignore the obvious fact that people migrate for reasons other than income maximization, e.g., family reunification, seeking refuge or political asylum, a more attractive culture, and religious beliefs. Those reasons are compatible with a more complex specification of utility maximization, but not with a simple assumption of income maximization.

To the extent that relocation involves up-front costs followed by an uncertain payoff in the future, migration is effectively an *investment* decision. Since labor income is a return to human capital, migration is effectively an investment in one's human capital. This view of migration draws on Becker² (1975) and hypothesizes that people invest in their skills in order to maximize the net present value of future earnings.

The connection between migration and investment in human capital was first made by Sjaastad (1962). Sjaastad argued that a prospective migrant calculates the value of the opportunity available in the market at each alternative destination relative to the value of the opportunity available in the market at the point of origin, subtracts away the costs of moving (assumed to be proportional to migration distance), and chooses the destination which maximizes the present value of lifetime earnings. Nearly all recent *neoclassical* economic analyses of the internal migration decision proceed from this basic framework.³ Within this framework, migration is usually treated as a once-and-for-all decision involving a change in the location of one's employment. This framework is, effectively, an inter-temporal version of the simple graphic labor market model we presented in the introduction to this section of the book, in which would-be migrants respond to differences in wages across labor markets in different geographic locations.

Sjaastad uses distance as a proxy for migration costs. He justifies this by pointing out that the greater is distance traveled, the greater are the monetary costs of migration such as transportation expenses, food and lodging costs for oneself and one's family during the move, and interruptions in income while between jobs. The migration decision is also very dependent on available information about job vacancies. Such information is both informal (provided by friends and relatives, for example) and formal (advertisements in publications and

² Becker makes it clear that migration is an act of investment in one's human capital when he states "The many forms of such [human capital] investments include schooling, on-the-job training, medical care, *migration*, and searching for information about prices and income" (our italics).

³ See expository surveys by Greenwood (1975, 1985, 1997), Molho (1986), Massey and Garcia Espana (1993), Shields and Shields (1989), Bauer and Zimmerman (1998), Ghatak, Levine, and Price (1996) and Gorter, Nijkamp, and Poot (1998).

employment agencies). Other pecuniary expenses include losses from selling one's home, car, or appliances prior to the move, or additional expenses incurred to replace certain assets left behind at the destination. Also, a move will sometimes necessitate a loss of job seniority, employer contributions to pension plans and other types of employment benefits, which are also monetary expenses of moving. Sjaastad effectively assumes that all these types of expenses vary with distance.

In Sjaastad's model, nonmonetary benefits of migration such as better climate and recreational opportunities, a desirable social, political, or religious environment, or more desirable quantities of public goods, available at the destination, are not counted in migration returns. Sjaastad reasoned that spatial differences in these factors are already accounted for by spatial differences in living costs (Sjaastad's model includes spatial differences in *real* pecuniary returns to migration). For example, a more pleasant climate in Arizona versus North Dakota should already be reflected in higher prices for Arizona real estate.

Elaborating slightly on an approach taken by Shields and Shields (1989, p. 284), we can depict Sjaastad's ideas mathematically. Specifically, suppose that w_t^H represents earnings per period at home, w_t^M earnings per period if a person migrates to another market elsewhere, CL_t^H an index measuring the cost of living at home, CL_t^M an index measuring the cost of living at the destination, i the discount rate, and C the cost of migration. If a person lives T years, in discrete time, the present value of the net gain to migration π is then

$$\pi = \sum_{t=1}^T \frac{(W_t^M - W_t^H)}{(1+i)^t} - \sum_{t=1}^T \frac{(CL_t^M - CL_t^H)}{(1+i)^t} - C(D, X), \quad (2.2)$$

where D is distance between origin and destination and X is a vector of any other determinants of migration costs. In continuous time, the present value is

$$\pi = \int_{t=0}^T [W_t^M - W_t^H - CL_t^M + CL_t^H] e^{-rt} dt - C(D, X). \quad (2.3)$$

In both the discrete and continuous time versions of the model, if $\pi > 0$, the decision-maker moves; if not, no move occurs. If there are multiple destination options, then Eq. 2.1 or 2.2 are computed for all those options and the individual chooses the option which yields the highest value of π . Nearly all theoretical and empirical studies that adopt the human capital investment approach utilize some behavioral model that is equivalent to, or is some permutation of, Eq. 2.2 or 2.3.

Sjaastad's model captures four aspects of the migration investment decision: (a) the imperfect synchronization of migration's benefits and costs in time; (b) earnings differences between origin and destination; (c) cost of living differences between origin and destination; and (d) the migrant's rate of time preference. The Sjaastad model is a single period model and, therefore, cannot explain why some people

migrate on multiple occasions during their lifetimes. Sjaastad's unit of analysis is the individual, which means that it cannot address the researchers who argue that the preferences and goals of persons close to the migrant such as family members must be taken into account when analyzing the migration decision. For example, if a husband and wife both work, then the husband's decision to migrate is likely to depend upon his wife's career prospects at the destination and vice versa. Migrants with more children tend to have a lower likelihood of migrating than those with fewer children. An explanation for this requires a model where the decision-making unit is the family, not just one person in isolation.

Another shortcoming of Sjaastad's model is its implicit assumption that migrants are perfectly informed about labor market opportunities at alternative destinations. This is a shortcoming of many investment models; uncertainty is very difficult to deal with in a model. But, in reality a prospective migrant will always face some degree of uncertainty about the size and path of his lifetime earnings stream at the destination. This uncertainty and the migrant's attitudes towards risk will influence his choice to migrate. Perhaps because Sjaastad ignored uncertainty in his model, he did not consider the role of past migration that has been shown to play such an important role in explaining both internal and international migration.

Sjaastad's model has some further shortcomings. Many international migrants remit some of their destination country earnings back home, which means that the benefits to immigration may include the benefits of remitting. Also, when remittances are part of the decision process the benefits of migrating also depend on the real exchange rate between the destination and home countries. The appreciation of the destination country's currency will boost the benefits of migration.

2.1.3.2 The Migrant as Consumer

Greenwood (1997) points out that by the early 1980s, tests of migration theory based on the human capital approach were consistently failing to confirm wages or earnings as determinants of migration. These empirical failures gave rise to an alternative view, favored by some urban and regional economists, called the "equilibrium" perspective on migration (in contrast to the "disequilibrium" perspective implied by the traditional labor flow model that posits people migrate to take advantage of regional income differences⁴). The basic idea behind the equilibrium models is that people migrate adjust their consumption to continual changes in incomes, prices, the supply of goods, services, and amenities, and their utility functions.

These models recognize that a person's utility function includes goods and services that are not all available in each geographic market. Desirable goods that

⁴For a sampling of important early papers using the equilibrium perspective, see Roback (1982, 1988), Graves (1979, 1983), Greenwood (1997), Green, Deller, and Marcouiller (2006) and Glaeser and Shapiro (2003).

are not universally available are called *amenities* and include such things as attractive scenery, a pleasant climate, and clean air. The basic idea behind this group of migration models originated with Rosen's (1974) work on hedonic prices and implicit markets.

Some of these models of migration focus on changes in the *demand for amenities*. The demand for amenities may change as a person moves from one phase of his/her life cycle to another. Or they may change as culture changes or as economic growth changes incomes and the mix of products available. For example, long-term technological advances will raise peoples' real incomes and, assuming that consumption amenities are normal goods, boost the demand for those amenities. Because amenities tend to be distributed unevenly across the country, migration will occur and efficient markets will quickly re-equilibrate markets. Consequently, amenity-rich areas will experience in-migration, driving down wages and driving up land prices. In amenity-poor areas, wages will rise and rents will fall. Technological advances could have the same sorts of effects on producer demand for amenities. There will be a new set of interregional wage, rent, and price differentials that emerge and they will reflect a new set of compensating differentials.

Because it focuses on demand, the equilibrium model assumes the market clears instantaneously, unlike the so-called disequilibrium approach that assumes labor flows gradually in response to earnings differences. Also, the demand-driven equilibrium model concludes that earnings differences across locations can be permanent because differences in amenities will tend to offset earnings differences in equilibrium.

The notion that people migrate in response to spatial differences in amenities also extends to public goods. Long before regional economists were constructing models relating spatial equilibrium to amenities, Tiebout (1956) argued that an important factor explaining why people move from one locality to another is differences in the quality of public goods such as police and fire protection, education, hospitals, courts, beaches, parks, roads, and parking facilities. The idea that people "vote with their feet," picking communities which best satisfy their preference patterns for public goods, has come to be known as the *Tiebout Hypothesis*.

The consumption/equilibrium model has been used largely to explain internal migration in developed countries. The equilibrium perspective has generally not been applied to the study of migration in developing countries and it has not been applied at all to the study of international migration. Because of the regulated nature of international migration and the relatively higher costs of international movement, the equilibrium perspective is not very applicable to international migration. At the same time, there is no doubt that even from a disequilibrium perspective differences in amenities can drive migration.

The notion of the migrant as consumer does have some relevance for the study of international migration. There are huge differences between countries, especially developing versus developed countries, in the supply of nontradable goods, public goods, and amenities. For example, amenities include such things as a free and

democratic society, a lower perceived risk of persecution, a greater likelihood of cultural acceptance or an environment more permissive of creative expression. Furthermore, international migrants may be attracted by higher levels of public goods such as good quality health care, educational systems, and more functional judicial systems. In fact, the developed countries that have attracted most of the world's immigrants typically have a greater variety, quality, and accessibility to nontradable goods, e.g., lower cost and higher quality food, housing, home furnishings, cars, entertainment, and recreation goods, that contribute overall to a higher quality of life.

As in the case of internal migration in developing countries, it is difficult to justify the assumption of immediate adjustment to a changing equilibrium in the case of international migration because that would, implicitly, assume zero migration costs. Again, this criticism does not deny the importance of amenities and the differences in the availability of nontradable goods for international migration. But the equilibrium models that incorporate the idea would not be realistic. Further relaxation of trade barriers, lower transportation costs, international regional economic and political integration, and liberalization of immigration agreements between countries could reduce international mobility costs sufficiently to enhance the equilibrium migration model's accuracy in explaining international migration.

2.1.3.3 The Migrant as Household Producer

Another set of models focused again on domestic migration proceeds from the assumption that a main motive for individual and family migration is the cost of household production. Shields and Shields (1989) suggested that households choose a location where they can produce the best combination of household goods and services. Their model is based on the literature of the *new household economics*, pioneered by Lancaster (1966) and Willis (1973). This "migrant as household producer" view is complementary to the "migrant as consumer" view of why households move because it emphasizes the influence of amenities in the choice of migration destination.

According to the *new household economics*, all households to varying degrees produce goods and services for their own consumption. These could include meal preparation, housecleaning, growing fruits and vegetables, home repair, educational services, recreational goods and services, activities with friends and relatives, and child care. The household derives utility from its consumption of these goods and services, which are produced using its time, its physical capital, and various inputs purchased in the market. The household's goal is hypothesized to maximize utility by choosing the optimal combination of commodities to produce and consume, subject to the household's income to purchase goods and capital and its technology of household production. Since there are significant locational differences in goods prices and amenities, there will be locational differences in

the costs of household production. For example, if the household grows fruits and vegetables for its own consumption, then the cost of home grown produce will be lower in areas where climate and soil quality are more appropriate.

The implications of the household production models of migration actually match those of the human capital model. For example, suppose that real wages rise in an alternative location. According to the household production view, *ceteris paribus*, a household where family members allocate time to the labor market will relocate to the higher wage area because doing so will bolster income opportunities and allow for greater levels of household production. This choice of relocation matches what the human capital view would predict. Thus, the household production approach to migration may be taken as another application of the human capital approach.

2.1.4 Further Influences on Migration

Models all make assumptions that simplify the framework and permit the user to focus on a limited number of variables. For example, recall that in the original Sjaastad model, pecuniary migration costs depend only on distance traveled, that psychological and social costs are constant, and that there are zero information costs. It is, therefore, to be expected that for a complex phenomenon like immigration researchers will soon specify additional models that include variables not included in earlier models. In this subsection, we address several other strands of literature on internal migration that address other influences on people's decision to migrate.

2.1.4.1 The Role of Past Migration

Some researchers have argued that psychological and social costs, as well as information costs, are likely to fall when there is greater access to family, friends, and other previous migrants in the destination. In the sociology literature on migration, the community of family and friends at the destination is often referred to as a *kinship network*, and the community of earlier migrants from a similar ethnic or regional background is referred to as a *migrant network*. Access to these networks can greatly improve the efficiency of migration. For example, as Yap (1977) has suggested, "Destination contacts have a positive effect on migration to a specific area, when contacts are measured by the presence of parents in the city, . . . by potential ethnic contacts, . . . by language similarity between areas. . . or by the stock of persons in the destination who had migrated earlier from the home area." A similar point has been made by Hugo (1981), Taylor (1986), Massey and Garcia Espana (1987), and Lundborg (1991). Kinship and migrant networks can lower job search costs, the costs of securing housing and child care, and reduce vulnerability to exploitation, fraud, and crime. Also, having family and members of a familiar

culture at the destination can reduce the personal and cultural stresses associated with migration. To the extent that kinship and migrant networks are effective in reducing information and psychic costs, migration costs are endogenous to the volume of past migration.

One modeling approach is to enter kinship and migrant networks into the migrant's objective function under the assumption that people experience increased utility from having familiar faces and contacts in a new place. Another approach is to relate migration costs to a risk variable that varies inversely with the size of kinship and/or migrant networks. This was the approach of Taylor (1986), who argued that kinship networks serve as "migration insurance" that protects against potential income losses at the destination.

2.1.4.2 Migration as a Life Cycle Decision

Polachek and Horvath (1977) argue that migration should be modeled as an investment process undertaken at each stage of the life cycle rather than a one-investment decision. Their model generates clear, refutable predictions about when in their life cycle people are most likely to migrate and the likelihood of return migration. They argue that the Sjaastad model does not generate such predictions because it says nothing about choice of locational characteristics. Polachek and Horvath's model could fit into the category of consumption demand models of migration because they assume that what matters to people are locational characteristics. They model locations as composites of various locational characteristics, including the rate of unemployment, price levels, industrial composition, occupational structure, and per capita public expenditures on education. As a person moves through the life cycle, demand for locational characteristics changes. For example, a young person in the early stage of her career may have a strong preference for locations with many other young people and high income jobs, whereas a person nearing retirement may have a strong preference for locations with good climate and healthcare. Because there are multiple stages to the life cycle, it is very likely that there will be multiple migrations during a person's life.

2.1.4.3 The Expected Income Hypothesis

A weakness of the Sjaastad model is that it assumes the probability of a migrant finding employment in the destination is 100 %. If migration costs are zero and all migrants find work at the destination instantly upon arrival, a pure disequilibrium model then implies complete wage convergence between source and destination. Beginning with Todaro (1969, 1976) and Harris and Todaro (1970), many development economists have pointed out that this assumption is very unrealistic for

cases involving internal rural-to-urban migration in developing countries.⁵ They point out that urban unemployment rates in developing countries have historically been high and that rural migrants usually face a long wait before they find a job in the urban “modern” sector. While they search and wait, migrants are either unemployed or underemployed, occasionally performing menial tasks for low pay.

Provided a model in which prospective migrants explicitly take into account the probability of obtaining work in the modern urban sector. In terms of the Sjaastad framework presented as Eq. 2.1 or 2.2 above, this involves substituting expected income at the destination for actual income:

$$\pi = \int_{t=0}^T [p(t)W_t^M - W_t^H - CL_t^M + CL_t^H] e^{-rt} dt - C(D, X), \quad (2.4)$$

where $p(t)$ is the probability a migrant will be employed in the modern urban sector in period t . This probability is assumed by Todaro to be equal to the ratio of new modern sector employment openings to the number of “waiting” job seekers in the urban traditional sector. The number of modern sector job openings grows at the rate of industrial output growth less the growth rate of labor productivity in the modern sector. Rural-to-urban migration will continue despite high unemployment as long as the *expected* wage in the urban sector, net of migration costs, equals the average wage in the rural sector. This basic model was subsequently extended by Harris and Todaro (1970), Bhagwati and Srinivasan (1974), Corden and Findlay (1975), and Calvo (1978), among many others, to take into account additional characteristics of developing countries.

It is important to emphasize at this juncture that while most of the literature discussed above focuses on internal migration, it is easily applicable to cross-border migration. From our perspective, there is only one theory migration, whether one takes it from a human capital perspective or a gravity model that is preferred by geographers. Institutional factors may be a consideration—in the USA today there are no restrictions across subnational units, but there are restrictions on entry from the outside. There have, however, been times and places, e.g., China’s “Hukous” system, the old Czarist Russia, or former USSR, in which there have been substantial legal barriers to domestic migration. There have also been barriers to emigration, e.g., medieval serfs tied to the manor, the treatment of Jews in the former USSR, or racial discrimination in the USA that kept blacks out of certain neighborhoods or entire communities. One can even think of state occupational licensing laws as barriers to domestic migration. These institutional factors affect the costs of immigration.

⁵For a very recent and thorough review specifically of the literature on rural to urban internal migration in LDCs, see Lall, Selod, and Shalizi (2006).

2.2 The Modern Model of Immigration

The development of theoretical models of immigration has gained momentum in the past several decades. One of the better-known immigration economists is Borjas (1987, 1991), who drew on the prior work of Sjaastad (1962) to develop what has become arguably the most popular model in immigration economics. It is fair to say that Borjas adds little substance to the theoretical models for migration presented in the previous section. His mathematical model is a close derivative of the simple graphic model presented in the introduction to this section of the book, which is, of course, a close relative of the Sjaastad migration model. Borjas does add some interesting innovations that have permitted him to address the characteristics of immigrants versus nonimmigrants. Therefore, the exposition of Borjas' model in this part of the chapter also serves as the first step towards analyzing immigrant selectivity, the topic of Chap. 3.

2.2.1 *The First Borjas Model*

In two papers, Borjas (1987, 1991) developed closely related versions of a human capital investment model of international migration.⁶ These models assume that the incentive to migrate is driven purely by the international differences in the average returns to labor and human capital in the source and destination countries. Borjas (1987) presents a model in which the distributions of human capital among workers in the source and destination countries determine immigration flows in addition to the overall differences in labor returns.

2.2.1.1 The General Intuition of the First Model

Borjas's approach reflects the observation that people in the source and destination countries are not all the same in terms of their abilities, education, age, etc. Rather, he assumes that people in both economies are characterized by entire ranges of talents, skills, education levels, and other personal characteristics. The migration decision, therefore, depends on how a would-be migrant with a specific set of skills and talents perceives his or her gains from migrating from a labor market where the labor force has a certain distribution of worker characteristics to a country where the labor force has a different distribution of talents, skills, and education levels. The migration decision thus depends not just on the average difference in wages across countries, but on where the immigrant would fit into the destination country

⁶Borjas has also presented the same models in three expository surveys of the immigration literature (see Borjas, 1990, 1994, 1999).

labor market and how well the worker's abilities and other human capital can be applied there. Borjas' model is thus able to predict the flows of different types of workers between countries.

The Borjas model we discuss here is in fact the first stage of a two-stage model of international migrant selectivity. The second stage of the model will be discussed in detail in the next chapter.

2.2.1.2 The Specification of the Model

In the simplest version of the model, Borjas assumes that migration is an irreversible "yes/no" decision and there is just one destination country. The source and destination countries have different earnings distributions, which reflect differences in earnings opportunities available to a would-be migrant. It is important to emphasize that in this model, Borjas assumes that country differences in earnings distributions are not due to differences in skill distributions (which are assumed to be the same), but to differences in markets and policies. For example, Norway has a more compressed earnings distribution than the USA because Norway has higher income tax rates and, through its social insurance programs, a broader system of income redistribution. As a result, a person of given skill has a greater chance of reaping a very high or a very low return to his factor supply in the USA than in, say, Norway.

Borjas further assumes that a person's earnings in either country are equal to the mean earnings in that country plus a random variable. Specifically, a person's earnings in his/her home country are

$$\ln(w_0) = \mu_0 + \varepsilon_0, \quad (2.5)$$

where μ_0 is the mean income home country residents would earn if they stayed at home, and ε_0 is random, uncorrelated with μ_0 , with a mean of 0 and a variance of σ_0^2 . Some home country residents will earn less than the mean, others above the mean, and earnings differences could be due to differences in skills or random factors such as luck, unexpected health shocks, and job loss.

A migrant's earnings in the destination will be

$$\ln(w_1) = \mu_1 + \varepsilon_1, \quad (2.6)$$

where μ_1 is the mean income home country residents would earn if they *all* migrated to the destination country, and ε_1 is a random variable with the same assumptions as for ε_0 above. Borjas makes the assumption that μ_1 equals the mean income migrants would earn abroad *if all* home country residents migrated because it simplifies the model's solution without, he claims, changing the model's basic predictions.

The variance terms σ_0^2 and σ_1^2 are the parameters in the Borjas model that describe the income inequality in the source and destination countries, respectively. Holding the distribution of skills constant, the variance of earnings effectively indicates the

dispersion of earnings *opportunities* in a country. If the destination country has a greater dispersion, then an immigrant with a given level of socio-economic characteristics will have a greater chance of reaping an exceptionally large return to his labor and human capital. Of course, there is also a greater risk, all other things equal, of reaping an exceptionally low income. In this version of Borjas' model, the variance of earnings in the source and destination countries is driven entirely by the variance of the error terms σ_0 and σ_1 , and not by specific identifiable character and skill variables. Therefore, σ_0 and σ_1 effectively measure the returns to *unobservable* characteristics in the source and destination countries.

To incorporate skills transferability across borders, Borjas assumes that the random variables ε_0 and ε_1 have a correlation coefficient of ρ . A value of ρ that is positive and close to unity indicates that skills are easily transferrable across borders and a person who earns relatively well (poorly) in the home country is highly likely to earn relatively well (poorly) in the destination country. One would expect that the earnings correlation between home and destination countries will be positive and high if the labor markets, levels of development, industrial structures and quality of schools, for example, are similar. Canadian doctors who obtained their schooling in Canada should easily be able to transfer their skills to the USA and continue to earn relatively high incomes after migration. In contrast, a ρ that is positive but very small implies that skills do not transfer well across borders. It is also possible that $\rho < 0$, which is the case if a person's skills generate relatively low (high) earnings at home, but relatively high (low) earnings in the destination country. Such could be the case of a talented folk musician, who is well paid at home for performing native songs greatly appreciated by her countrymen. Were he to migrate, residents of his destination country may not know the music his countrymen are so fond of. Hence, the singer moves from being near the top of his native country's earnings distribution to singing on the street corner in the destination country for a few tips from sympathetic passers-by. Borjas suggests that ρ is positive and relatively high for pairs of developed countries, but low or even negative correlations will more often be the case for migrants from developing countries to developed economies.

In Borjas' model, if the costs of migrating are C , then a person migrates if $w_1 > w_0 + C$, or $[w_1/(w_0 + C)] > 1$. Taking logs, she migrates if $I > 0$, where

$$I \equiv \ln(w_1) - \ln(w_0 + C) > 0. \quad (2.7)$$

Note that $\ln(w_1 + C)$ is approximately equal to $\ln(w_0) + (C/w_1)$.⁷ Borjas defines C/w_0 as π , and calls this a "time equivalent" measure of the costs of migration. He assumes it to be constant across all individuals in the home country. It then follows from Eq. 2.6 that the person will migrate if

⁷ For example, suppose that home earnings are \$10,000 and migration costs are \$1,000. Note that $\text{Log}(11,000) = 4.04$ while $\text{Log}(10,000) + (1,000/10,000) = 4.1$, a difference of only about 1.5 %.

$$I = (\mu_1 - \mu_0 - \pi) + (\varepsilon_1 - \varepsilon_0) > 0 \Rightarrow (\varepsilon_1 - \varepsilon_0) > -(\mu_1 - \mu_0 - \pi). \quad (2.8)$$

According to expression (2.8), migration will occur if the destination country rewards the migrant more for her or his particular skills and if net mean earnings in the destination country are higher.

Recall that the model introduced a random element to earnings. Hence, it is the probability that $I > 0$, which we will call P , that serves as a measure of the migration rate. From Eq. 2.8, the emigration rate will be positive if $\Pr[(\varepsilon_1 - \varepsilon_0) > -(\mu_1 - \mu_0 - \pi)] > 0$. For analytical convenience, Borjas standardizes the emigration rate to a Z value by noting that P is equivalent to

$$\Pr\left(Z > \frac{-(\mu_1 - \mu_0 - \pi)}{\sigma_v}\right) = 1 - \Phi(Z), \quad (2.9)$$

where σ_v is the standard deviation of $(\varepsilon_1 - \varepsilon_0)$, $\Phi(Z)$ is the cumulative distribution function for Z , and $\sigma_v = \sqrt{\sigma_0^2 + \sigma_1^2 - 2\rho\sigma_0\sigma_1}$ under specific assumptions about the distributions. The emigration rate thus depends upon mean earnings in each country, each country's earnings variance, relative migration costs, the degree of skills transferability across borders, and the interaction of the source and destination country earnings variances (the $\sigma_0\sigma_1$ term in σ_v).

2.2.1.3 The Predictions of the Model

Ideally, we would like to be able to integrate the density function of earnings and obtain a reduced form expression for the emigration rate. That expression would then specify an empirical model of the emigration rate. It is not possible to obtain a reduced form expression for the normal distribution, which is what Borjas necessarily assumes for his model in order to derive the relationships above. Hence, predictions about the behavior of the migration rate can only be inferred by analyzing how changes in the variables that determine the migration rate influence the distribution function.

Suppose we are interested in knowing how the emigration rate varies with some exogenous variable Ω . We can obtain the sign of $\partial P / \partial \Omega$ by deriving the expression

$$\frac{\partial P}{\partial \Omega} = \frac{\partial \Phi}{\partial Z} \frac{\partial Z}{\partial \Omega} \quad (2.10)$$

From a table giving areas under the standard normal curve, it can be verified that $\partial \Phi / \partial Z$ and $(\partial^2 \Phi) / (\partial Z^2) > 0$. The sign of the expression $\partial Z / \partial \Omega$ depends upon whether the destination is relatively rich ($\mu_1 > \mu_0 + \pi$) or relatively poor ($\mu_1 < \mu_0 + \pi$) and on the sign of $(\partial \sigma_v) / (\partial \Omega)$. If we assume that the destination is relatively rich and apply expression (Eq. 2.9) above, we conclude that

$$\frac{\partial P}{\partial \mu_1} = -\frac{\partial \Phi}{\partial Z} \left(\frac{1}{\sigma_v} \right) > 0 \quad (2.11)$$

and

$$\frac{\partial P}{\partial \mu_0} = -\frac{\partial \Phi}{\partial Z} \left(\frac{1}{\sigma_v} \right) < 0 \quad (2.12)$$

Hence, the model effectively hypothesizes that⁸

1. *The migration rate will rise (fall) if the destination country's mean income rises (falls).*
2. *The migration rate will fall (rise) if the source country's mean income rises (falls).*

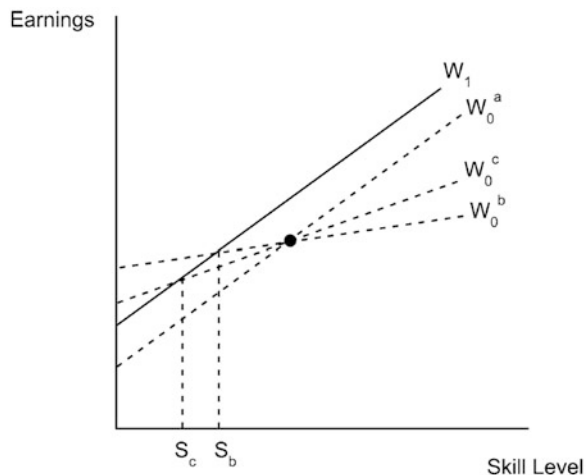
These predictions match those of the internal migration models discussed earlier, which is that when the net return to migration rises there will be a stronger incentive to migrate. However, the predictions implied by Eqs. 2.11 and 2.12 also address the question of why, when the mean income of an immigrant destination country is much larger, as in the case for the USA versus many developing countries, we do not see a country's entire population migrating. Differences in countries' variance of earnings and the degree of skills transferability between countries means that people with different skills, talents, education, etc., will have different incentives to migrate.

To see how differences in the dispersion of earnings affects migration, consider Figs. 2.1 and 2.2. Each of the figures shows a mixture of wage profiles, where each profile relates the level of earnings to the level of skills in a country. Since a higher (lower) variance of earnings opportunities increases the return to skills, a higher variance in earnings implies a steeper wage profile in the figures. In both figures, it is assumed that the destination country is relatively richer. In each figure, w_1 shows the relationship between wages and skills in the destination country and the three other profiles are for the source country. In both figures, w_0^a shows the wage profile in the source country when the variance of earnings there equals the destination country variance. When the variances are equal and skills are fully transferable, all persons in the source country have an incentive to migrate and the migration rate is 100 %. The result that in both figures the three source country profiles intersect at a mean income level lower than the mean of w_1 reflects the assumption that the destination country is relatively richer.

In Fig. 2.1, both countries have the same level of income inequality, as evidenced by the parallel wage profiles w_0^a and w_1 of the source and destination

⁸ These predictions are implied by the first derivatives of the emigration rate with respect to each of its six determinants. There are also predictions implied by second derivatives (which would indicate rates of change) and cross-partial derivatives (which indicate interaction effects). Borjas did not discuss second-order effects, however.

Fig. 2.1 The effects of relative income inequality when source country inequality is lower



countries, respectively. If skills are fully transferable, all individuals in the source country have an incentive to migrate, and the emigration rate is 100 %. When the source country wage profile is less steep, as for example w_0^b , then only those persons with skill level s_b or higher will migrate. If source country inequality rises and the wage profile rotates upward to w_0^c , those persons with skill level s_c or higher will migrate, and total migration increases. As long as source country inequality is initially relatively lower, an increase in that country's inequality will result in a higher emigration rate.

According to Fig. 2.2, if the source country's wage profile is w_0^b , then those persons with skill level s_b or below will migrate since for those persons, the destination country offers a higher return. If income inequality in the source country rises and the wage profile rotates upwards to w_0^c , then only those persons with skill level of s_c or below will move. Hence, the emigration rate will fall. When source country inequality is greater (so that the source country wage profile is steeper), an increase (decrease) in source country inequality will *lower* (raise) the emigration rate.

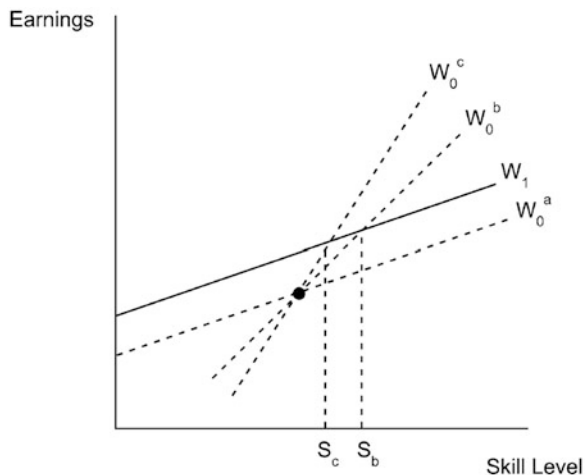
Borjas uses the same analysis as above to show that (a) if destination country inequality is initially relatively low, an increase in that country's inequality will raise the emigration rate, and (b) if destination country inequality is initially relatively high, the emigration rate will be negatively related to that country's inequality.

The first Borjas model also derives the following relationship

$$\frac{\partial P}{\partial \pi} = -\frac{\partial \Phi}{\partial Z} \left(\frac{1}{\sigma_v} \right) < 0, \quad (2.13)$$

which suggests the following hypothesis:

Fig. 2.2 The effects of relative income inequality when source country inequality is higher



3. *The migration rate is lower the higher are relative migration costs.*

Finally, the model generates the following relationship

$$\frac{\partial P}{\partial \text{cov}(\varepsilon_0, \varepsilon_1)} = \frac{\partial \Phi}{\partial Z} [(\mu_1 - \mu_0 - \pi)[\sigma^2_0 + \sigma^2_1 - 2\text{cov}(\varepsilon_0, \varepsilon_1)]^{\frac{3}{2}}] > 0. \quad (2.14)$$

Because the covariance measures the transferability of skills and talents, Eq. 2.14 suggests that

4. *The migration rate rises if the degree of skills transferability rises.*

This latter conclusion is an important result for Borjas' ultimate purpose, which is to show how differences in income distributions and skill distributions affect the characteristics of immigrants. When skills are not easily transferred, it becomes more likely that only less skilled workers will migrate, all other things equal.

2.2.2 Borjas' 1991 Model

In his 1991 study, Borjas presents a variation of the above model. Instead of assuming independently random fluctuations in earnings, Borjas (1991) assumes that the earnings of a person with socioeconomic characteristics or skill endowment X is equal to that country's average valuation of X plus a random component. This model again finds that migration is more likely to occur if the destination country values the migrant's characteristics, net of migration costs, more than the source

country does. Also as before, Borjas (1991) concludes that the migration rate for persons with given characteristics X depends upon international differences in the values attached to those characteristics, each country's earnings variance, relative migration costs, and the degree of transferability of X across borders.

Borjas uses this model to show that earnings variance in a country can be driven by variations in *observable* characteristics such as schooling and experience. In this case, a person's earnings in the source and destination countries are modeled as depending on mean country earnings for a person with a set of personal characteristics other than schooling, a variable for the level of schooling, the rate of return to schooling (δ_0), and a random error. The migration rate now depends on two distributions—the distributions of unobservable characteristics in each country and the distribution of returns to schooling in each country. One of the predictions that Borjas' second model generates is the following:

5. *The migration rate is higher (lower) the higher (lower) is the mean level of schooling in the source country.*

In the extreme case where mean schooling in the source country is zero, there is no “educational premium” to capture in the destination country, and hence there is no incentive to emigrate on the basis of one's education. In contrast, in a country where mean schooling is very high, the potential gains available to migrants in the destination country will be very high and there will be a strong incentive to migrate. The important point here is that emigration rates will be higher for source countries that have more skilled labor forces.

The model also concludes that

6. *The migration rate is higher (lower) the lower (higher) is the variance of schooling in the source country.*

When the variance of the distribution of skills (measured in this case by level of educational attainment) rises, there will be a larger number of persons who fall far below the mean level of education and who have little incentive to migrate because the potential gains to education in the destination country would then also tend to be very low. There will, of course, also be more persons with exceptionally high levels of education in this case, but they would have been strong candidates for migration anyways. Hence, there is a net reduction in the overall migration rate. The implication is that in countries where there are substantial disparities in schooling across the population (such as in developing countries), smaller fractions of the population will migrate abroad.

2.2.3 Recent Extensions of the Borjas Model

Approximately a quarter of a century has passed since Borjas first published his model of international migration in which he supplemented the role of income differences with various assumptions about the distributions of personal

characteristics. Since then, others have built other determinants of international migration into Borjas' models. For example, Hatton and Williamson (2005) and Clark, Hatton, and Williamson (2007), and Hatton and Williamson (2010) have extended the Borjas model to account for the effects of non-pecuniary costs of migration and explicit immigration restrictions. We focus here on some novel predictions derived in Clark, Hatton, and Williamson (CHW).

2.2.3.1 The CHW Model

CHW model the decision to migrate as a function of the destination/source country wage differential, the distributions of skill levels, and a several types of migration costs. The authors specify four types of migration cost:

1. *Individual-specific migration cost (z)*. According to CHW, the value of z could be a compensating differential. For example, persons who have relatives and friends in the destination country are likely to have lower levels of z . We have already discussed some reasons why relatives and friends reduce migration costs, but CHW add the important observation that persons with family members in the destination can obtain admission through family reunion or family-sponsored preference categories, as compared with other (potentially more expensive) categories. Furthermore, persons who have stronger preferences for amenities available in the destination will have lower values of z . Note that in the case of amenities, z could be negative. For example, a person's preference for the destination's warm climate could be so strong that she would migrate there even if that meant a cut in income. Refugees escaping political persecution or risk to life and limb as a result of civil war will also have a negative z .
2. *Direct cost*. Direct migration costs are directly related to distance. Also, migration costs rise when the destination country imposes higher visa costs or imposes more difficult visa application procedures.
3. *Migration costs that result from quantitative restrictions on immigration*. This measure uses the total cap on the number of migrants from source country y allowed to enter destination country x . The larger is the cap, the lower are the costs of waiting for permission to enter or the cost of moving to a higher-preference category.
4. *Migration costs resulting from "skill-selective" immigration policy*. A skill-selective policy generally implies that the more-skilled migrants face a lower cost of admission.

CHW derive a probit equation for the emigration rate using the same approach as Borjas in which they predict the effects on migration from changes in each of the four types of migration costs. CHW generate a number of novel predictions. One result is that, while the migration rate still depends on the relative variance of the country's income distributions, the migration rate now also depends on the level of skill-selective immigration policy and the variance of schooling in the source country. Another novel result is that different immigration policies will influence

the emigration rate in different ways. For example, expanding family reunification policies lowers average person-specific migration costs μ_z , which will stimulate emigration. A reduction in an overall immigration quota will dampen emigration, as will an increase in admission standards under a skill-selective policy. However, CHW find that there is an ambiguous relationship between the parameter measuring the relative importance of skill-selective policy in the destination country. Skill-selective immigration policies may increase or decrease immigration, depending on more specific circumstances.

2.2.3.2 Migration as a Response to Relative Deprivation

Some immigration economists have applied the concept of *relative deprivation* due originally to the social psychologist Runciman (1996). The notion of relative deprivation is very fundamental: a person derives happiness not only from the goods his own income can buy, but also on how his income ranks relative to his peers. This hypothesis is solidly founded on evidence from psychology, neuroscience, and experimental economics.

Stark (1984, 1991), Katz and Stark (1986), Stark and Taylor (1989, 1991) and Stark and Yitzhaki (1984) model migration as being undertaken because it can improve a person's income relative to members of his or her "reference group," which in the immigration literature is assumed to be other income-earning persons in the source country or source community. It follows that if migration leads to higher absolute income elsewhere (assuming we have controlled for cost of living differences), the migrant experiences a higher level of welfare or satisfaction because relative deprivation is reduced.

The notion that relative deprivation motivates migration is well rooted in the psychology, happiness studies, and experimental economics literature. For example, Blanchflower and Oswald (2000), Frey and Stutzer (2002a, 2002b), Layard (2005), and Veenhoven (1996, 1999), among others, have examined responses to life satisfaction surveys and concluded that human happiness or life satisfaction is often more influenced by their relative incomes than absolute levels of income. The evidence suggests that for levels of income below \$10,000, people's happiness or life satisfaction is strongly responsive to gains in absolute income, but for higher incomes, relative status overwhelms absolute income levels as the determinant of human happiness. Hence, for immigrants from high income countries, a focus on how immigration is likely to change a person's income relative to his peers in the source country is clearly called for. On the other hand, for migrants who move from poor countries to wealthy countries, improvements in both absolute income and relative income are likely to influence the migration decision.

The relative deprivation models generate potentially important testable implications of the hypothesis. First, the relative deprivation hypothesis implies that characteristics of the migrant's home income distribution will influence his decision to migrate. For example, if his absolute income stays the same, but the variance of the distribution or its degree of positive skewness rise, this will alter his

utility and give him greater incentive to migrate. Since one can usually obtain reasonably accurate data on the distribution of individual or household income in a community, province, or country, the relative deprivation hypothesis can be tested for many cases.

There is a second and potentially very important implication of the relative deprivation hypothesis. Following Todaro (1969) and Harris and Todaro (1970), suppose people face only *expected* income. Assume, also, that the probability distribution of possible employment outcomes in the destination is such that a migrant stands only a small chance of reaping a very high reward after migrating. Assume, however, that utility is very dependent on relative income in his reference group, so were (s)he to get lucky and reap the very high reward at the destination, utility would rise substantially. Under such conditions, the expected utility from migrating could be very high even if there is no differential in expected income between the two locations. Migration could be attractive even if expected income at the origin is greater than at the destination, provided there is a higher chance of hitting the jackpot in the destination compared to the source country. In other words, the relative deprivation hypothesis is capable of contradicting the traditional hypothesis that expected income differentials between urban and rural areas must be positive in order to induce migration.

2.2.3.3 Migration as Sequential Search and the Option Value of Waiting

It is likely that someone contemplating migration will be imperfectly informed about labor market opportunities at the destination. Hence, the migration decision is generally made under some degree of uncertainty. Models like those of Todaro (1969) and Harris and Todaro (1970) explicitly recognized uncertainty and how it determined internal rural-to-urban migration. A number of theories of international migration also explain migrant decision-making when would-be migrants face probability distributions rather than full information on foreign opportunities.

Pickles and Rogerson (1984) and McCall and McCall (1987) model the decision to migrate as a sequential search process in which the migrant maximizes expected net income and faces a stationary probability distribution of wages at the destination. Every period, an observation from that distribution is revealed in the form of a wage offer, at which point the potential migrant compares the offer with the reservation wage, which is usually the wage in the source country. When a foreign wage offer exceeds the reservation wage plus migration costs, the migrant moves abroad. The model answers the question: How long does it take before a move is made? The model concludes that, all other things equal, the more favorable labor market conditions are at the origin, the longer before a sufficiently attractive wage offer arrives and migration occurs. Alternatively, the more favorable are labor market conditions in the destination country, the sooner a person decides to migrate.

These models add time as a variable in the immigration decision. They help explain the evidence showing that international migration almost always responds only sluggishly to real income differences. For example, Burda (1995) found that

Table 2.1 The option value of waiting to migrate

| | Period 1 income | Period 2 income | Expected present value |
|----------------------------|-----------------|--------------------------------|-------------------------|
| Migrate | 10,000–9,500 | $(50,000 - 20,000) \times 0.5$ | $500 + 15,000 = 15,500$ |
| Wait | 0 | $(50,000 - 9,500) \times 0.5$ | 20,250 |
| Option value of waiting | | | 4,750 |

following a large spike immediately after reunification of West and East Germany, migration from the East to the West was surprisingly sluggish despite very large real wage differences. This type of pattern, where migration is sluggish despite significant real income differentials between countries, has been found for most other cases of internal and external migration.

Burda (1993, 1995) provides a different explanation for the sluggish response of migration to the usual incentives for migration like income differences. Burda argues that uncertainty about labor market conditions in the destination country justifies delaying the decision to migrate until more information is obtained. Burda effectively models procrastination as an *option* similar to an option to purchase a stock or foreign exchange at a later date. It will pay to wait to make a decision as long as the benefits of waiting for information exceed the opportunity costs.

Consider the following example of Burda's point. Suppose a person living in Source is contemplating a move to Destination and faces a two-period decision problem in which the second period return is not certain. Specifically, suppose that by moving to Destination the migrant can increase her income by \$10,000 in the first period with a probability of 1, but in period 1 there is a 0.5 probability she will find a job with a salary \$50,000 more than in Source in period 2. But in period 1, the would-be migrant also knows that there is an equal 0.5 probability that she will not find that job and, instead, be deported and fined in period 2, in which case she will lose \$20,000 compared to her expected Source income. She also faces migration costs of \$9,500, which must be paid at the time of migration. If, for simplicity, we assume the migrant is risk neutral and has a discount rate of zero, the potential pay-offs from migrating in period 1 or waiting until period 2 when that period's outcome is known are shown in Table 2.1 above. Note the "option" value of waiting and foregoing the \$10,000 income in period 1. At the start of period 2 the migrant will know whether the \$50,000 job is available; if it is, she can cash in her "option" and migrate, but if it is not, she simply ignores the option and stays home. Had she migrated in period 1, she would have faced the risk of losing \$20,000 in period 2 and, overall, her expected gains from migrating would have been less than if she took the option of waiting.

Burda (1995) develops a formal theoretical model from which he derives an expression for the option value of waiting. He demonstrates that the value of the migration option, or the "gain from procrastination," is inversely related to the current wage gap, positively related to migration costs, has an ambiguous relationship with the discount rate, is inversely related to the wage gap when destination labor market conditions are unfavorable, and does not depend on the wage gap

when destination conditions are favorable. In short, uncertainty and changing conditions at home and abroad do necessarily imply sudden large shifts in migration flows. Migrants may opt to wait and see.

2.3 The Family or Household as the Decision-Making Unit

The original economic model of migration does not distinguish between personal and family decisions. In Sjaastad (1962) the focus is on the individual, and there is no analysis of how migration by an individual may affect other persons close to him. The implicit assumption in early research on the migration decision is that if the migrant is part of a family, then the welfare of the rest of the family is unaffected by that person's decision to relocate. In other words, when the migration model is applied to individuals, it ignores the gains or losses accruing to family or household members coming along or staying behind.

For large proportion of internal and international moves, migration is indeed a family decision, and everyone in the family is affected by it. Consequently, the migration model above needs to be extended to take account of the effects that family ties have on the migration decision, and the effects that the migration decision has on all members of the family or household. We need answers to questions such as the following: When family members have conflicting interests, how is the decision to migrate made? Also of interest is the following question: Under what circumstances would only part of the family migrate, leaving the others to remain behind?

2.3.1 *Conflicting Interests and the Family Migration Decision*

Extensions of the standard migration model to the case of a family that migrates began with the work of, Polachek and Horvath (1977) and Mincer (1978). Their models explicitly recognize that individual family members can have conflicting interests. The family's migration may enhance the well-being of some family members but reduce others' well-being. For example, while a software engineer wife may gain income when moving from India to Silicon Valley, her history professor husband might lose income or even become unemployed after the move. While the household head's income and job satisfaction may improve with relocation, other family members may suffer psychological costs that result from leaving family and friends behind, adjusting to a new language and culture, etc. Becker (1974) suggests how an economist tends to view these issues when he wrote the following about a husband's migration decision: "For example, he would not move to another city if his spouse's or children's income would be decreased by more than his own income would be increased." We focus on one of the above-mentioned papers in the next section.

2.3.2 *Mincer's Model*

Mincer's (1978) model of the impact of the family is straightforward. Suppose, for simplicity, that the household includes two persons, a husband and a wife. Let us assume that this two-person family has two alternatives to choose from: (a) both migrate together; or (b) both stay at the origin. We thus rule out the possibility that one person migrates, while the other stays behind, as in the cases of "commuting couples" or broken marriages caused by career conflicts. Mincer argues that the requirement for migration to take place is not that both persons have positive gains to migration, but rather that the family's net gains, i.e., the *sum* of the family's gains be positive. If the private gains to migration for each person are positively correlated, then family migration is of course always the efficient action. When the private gains to migration are negatively correlated, however, Mincer's model suggests it may still be efficient for the family unit to migrate. If, for example, the husband experiences a gain from migration, the wife a loss, but the joint gains are still positive, then Mincer's model predicts the case of a *tied mover*; the wife follows her husband even though her employment outlook is better at their current residence. On the other hand, if the wife's loss from migration dominates the husband's gain, then he becomes a *tied stayer*.

2.3.3 *Family Migration as a Portfolio Decision*

Another strand of migration literature that focuses on the family unit emphasizes the role of immigrant remittances. This literature began with Stark and Levhari (1982), Stark (1984) and Katz and Stark (1986), who model the decision of the *household* to send a family member overseas to work. These authors model such a decision as a "family portfolio diversification decision" where the migration abroad of a family member serves to hedge against risky labor markets at home. Such hedging is especially important for low families in poor countries who have little savings to fall back on in the case of income losses.

The core feature of this collective decision making model is that the family or household, unlike the individual, can reduce risk through diversification in the same way that a portfolio manager controls the risk of investing in the financial markets. Some members of the family, for example, can be assigned to work in the local economy, while others may be sent to work in foreign labor markets where conditions are not closely correlated with local labor markets. If there is a slump in the local labor market and the household faces a liquidity shortfall, then having a family member working overseas who remits his or her income will relieve that shortfall. According to this literature, the decision to have family members migrate is a response to a lack of risk-hedging mechanisms such as unemployment insurance, welfare programs, as credit institutions, crop insurance markets, futures

markets, and other financial markets. This literature stands out for providing the first theoretical economic rationale for immigrant remittances, something that the immigration literature was largely silent on prior to the 1980s.

2.4 Summary and Conclusions

In this chapter, we have surveyed economic theories of why people migrate. We began with the writings of Smith (1776), who described migrants as arbitrageurs who take advantage of regional wage differences. We detailed Borjas' (1987, 1991) recent models which show that international migration is not only influenced by net earnings differences between countries, but also by factors such as international differences in income inequality and the degree of skills transferability. We also discussed Clark et al. (2007), who examine various costs of migration including explicit government policies to control immigration. We concluded with other recent models by economists that capture some of the additional complexities of immigration.

The fundamental premise of nearly all the models discussed is that migration is driven by spatial differences and distributional differences in the net returns to human labor. An important contribution was by Sjaastad (1962), who articulated a theory of internal migration as a type of human capital investment. Sjaastad argued that a person migrates to another state, province or region because, by taking advantage of higher income opportunities elsewhere, migrants in effect increase their lifetime earnings.

The shortcoming of the standard economic model of migration is that observation and research in other social sciences makes it clear that there are many motives for migration beyond the simple pursuit of higher lifetime earnings. Migration may be driven by opportunities to achieve consumption, including amenities, that more closely fits one's preferences. Some migrants may seek a more desirable capability to carry out household production. Or, migration may be motivated by a combination of social, political, or psychological factors. Some theorists have suggested that people move to assuage feelings of relative deprivation, as a solution to a household portfolio diversification problem, or to exploit migrant network effects flowing from the destination. Furthermore, migration is often a family decision as opposed to an individual one, but this obvious fact has not yet been thoroughly dealt with in the theoretical literature on immigration. The internal migration literature is at present not clear on which explanation of migration is the strongest. The international migration literature, because it is younger and less developed, is even less clear.

Much work remains to be done on the international migration model, however. Given the broad range of economic, social, political, cultural, and natural factors that enter into the migration decision, a complete model of immigration would almost certainly have to be somewhat multidisciplinary in nature. Sociological, psychological, political, and ecological factors act alongside economic factors in

pushing, pulling, rejecting, and holding back would-be migrants. An immigration model would also have to be dynamic, even evolutionary in nature. Since the labor economists who have so far dominated the development of immigration theory are still firmly wed to their neoclassical static equilibrium analysis, a dynamic unified interdisciplinary theory of migration remains a distant goal. Opportunities for progress are abundant for anyone willing to think beyond the work presented in this chapter. The upcoming chapters outlining the empirical evidence on migration provide further insight into where we still lack theories that explain the complex reality of human migration.

References

- Anderson, J. (1979). A theoretical foundation for the gravity equation. *American Economic Review*, 69, 106–116.
- Bauer, T., & Zimmerman, K. (1998). Causes of international migration: a survey. In C. Gorter, P. Nijkamp, & J. Poot (Eds.), *Crossing borders: Regional and urban perspectives on international migration*. Brookfield: Ashgate.
- Becker, G. (1974). A theory of social interaction. *Journal of Political Economy*, 82, 1063–1093.
- Bedker, G. (1975). *Human capital* (2nd ed.). Chicago: University of Chicago Press.
- Bhagwati, J., & Srinivasan, T. (1974). On reanalyzing the Harris-Todaro model: Policy rankings in the case of sector-specific sticky wages. *American Economic Review*, 64, 502–508.
- Blanchflower, D., & Oswald, A. (2000, January). *Well-being over time in Britain and the USA*. NBER Working Paper No. w7487.
- Borjas, G. (1987). Self-selection and the earnings of immigrants. *American Economic Review*, 77, 531–553.
- Borjas, G. (1990). Economic theory and international migration. *International Migration Review*, 23, 457–485.
- Borjas, G. (1991). Immigration and self-selection. In J. Abowd & R. Freeman (Eds.), *Immigration, trade, and the labor market*. Chicago: University of Chicago Press.
- Burda, M. (1993). The determinants of East–West German migration. *European Economic Review*, 37, 452–461.
- Burda, M. (1995). Migration and the option value of waiting. *The Economic and Social Review*, 27, 1–19.
- Calvo, G. (1978). Urban unemployment and wage determination in LDCs: Trade Unions in the Harris-Todaro Model. *International Economic Review*, 19, 65–81.
- Clark, X., Hatton, T., & Williamson, J. (2007). Explaining U.S. immigration, 1971–1998. *Review of Economics and Statistics*, 89, 359–373.
- Corden, W., & Findlay, R. (1975). Urban unemployment, intersectoral capital mobility and development policy. *Economica*, 42, 59–78.
- Deardorff, A. (1998). Determinants of bilateral trade: Does gravity work in a classical world? In: J. Frankel (Ed.), *Regionalization of the world economy*. Chicago: University of Chicago.
- Frey, B., & Stutzer, A. (2002a). *Happiness and economics*. Princeton, NJ: Princeton University Press.
- Frey, B., & Stutzer, A. (2002b). What can economists learn from happiness research? *Journal of Economic Literature*, 40, 402–435.
- Ghatak, S., Levine, P., & Price, S. (1996). Migration theories and evidence: An assessment. *Journal of Economic Literature*, 10, 159–198.
- Glaeser, E., & Shapiro, J. (2003). Urban growth in the 1990s: Is city living back? *Journal of Regional Science*, 43, 139–165.

- Gorter, C., Nijkamp, P., & Poot, J. (1998). Regional and urban perspectives on international migration: an overview. In C. Gorter, P. Nijkamp, & J. Poot (Eds.), *Crossing borders: Regional and urban perspectives on international migration*. Brookfield: Ashgate.
- Graves, P. (1979). A life-cycle empirical analysis of migration and climate, by race. *Journal of Urban Economics*, 6, 135–147.
- Graves, P. (1983). Migration with a composite amenity: The role of rents. *Journal of Regional Science*, 23, 541–546.
- Green, G., Deller, S., & Marcouiller, D. (2006). *Amenities and rural development theory, methods and public policy*. Northampton, MA: Elgar.
- Greenwood, M. (1975). Research on internal migration in the United States: A survey. *Journal of Economic Literature*, 13, 397–433.
- Greenwood, M. (1985). Human migration: Theory, models and empirical studies. *Journal of Regional Science*, 25, 521–544.
- Greenwood, M. (1997). Internal migration in developed countries. In M. Rosenzweig & O. Stark (Eds.), *Handbook of population and family economics*. Amsterdam: Elsevier.
- Harris, J., & Todaro, M. (1970). Migration, unemployment and development: a two-sector analysis. *American Economic Review*, 60, 126–142.
- Hatton, T., & Williamson, J. (2005). What fundamentals drive world migration? In G. Borjas & J. Crisp (Eds.), *Studies in development economics and policy*. New York: Palgrave Macmillan.
- Hatton, T., & Williamson, J. (2010). Are third world emigration forces abating? *World Development*, 39, 20–32.
- Hicks, J. (1932). *The theory of wages*. London: Macmillan.
- Hugo, G. (1981). Village-community ties, village norms, and ethnic and social networks: a review of evidence from the third world. In G. DeJong & R. Gardner (Eds.), *Migration decision making: Multidisciplinary approaches to microlevel studies in developed and developing countries*. New York: Pergamon Press.
- Jerome, H. (1926). *Migration and business cycles*. New York: National Bureau of Economic Research, Inc.
- Katz, E., & Stark, O. (1986). Labor migration and risk aversion in less-developed countries. *Journal of Labor Economics*, 4, 131–149.
- Lall, S., Selod, H., & Shalizi, Z. (2006). *Rural–urban migration in developing countries: A survey of theoretical predictions and empirical findings*. World Bank Policy Research Working Paper 3915.
- Lancaster, K. (1966). A new approach to consumer theory. *Journal of Political Economy*, 74, 132–157.
- Layard, R. (2005). *Happiness: Lessons from a new science*. New York: Penguin.
- Linneman, H. (1966). *An econometric study of international trade flows*. Amsterdam: North-Holland.
- Lundborg, P. (1991). An interpretation of the effects of age on migration: Nordic migrants' choice of settlement in Sweden. *Southern Economic Journal*, 58, 392–405.
- Massey, R., & Garcia Espana, F. (1987). The social process of international migration. *Science*, 237, 733–738.
- McCall, B., & McCall, J. (1987). A sequential study of migration and job search. *Journal of Labor Economics*, 5, 452–476.
- Mincer, J. (1978). Family migration decisions. *Journal of Political Economy*, 86, 749–773.
- Molho, I. (1986). Theories of migration: A review. *Scottish Journal of Political Economy*, 33, 396–401.
- Pickles, A., & Rogerson, P. (1984). Wage distribution and spatial preferences in competitive job search and migration. *Regional Science*, 18, 131–142.
- Polachek, S., & Horvath, F. (1977). A life cycle approach to migration: analysis of the perspicacious peregrinator. In R. Ehrenberg (Ed.), *Research in labor economics*. Greenwich, CT: JAI Press.

- Ravenstein, E. (1889). The laws of migration. *Journal of the Royal Statistical Society*, 52, 241–305.
- Roback, J. (1982). Wages, rents, and the quality of life. *Journal of Political Economy*, 90, 1257–1278.
- Roback, J. (1988). Wages, rents, and amenities: Differences among workers and regions. *Economic Inquiry*, 26, 23–41.
- Rosen, S. (1974). Hedonic prices and implicit markets: Product differentiation in pure competition. *Journal of Political Economy*, 82, 34–55.
- Runciman, W. (1996). *Relative deprivation and social justice*. London: Routledge and Kegan Paul.
- Shields, G., & Shields, M. (1989). The emergence of migration theory and a suggested new direction. *Journal of Economic Surveys*, 3, 277–304.
- Sjaastad, L. (1962). The costs and returns of human migration. *Journal of Political Economy*, 70, 80–93.
- Smith, A. (1776[1937]). *An inquiry into the nature and causes of the wealth of nations*. New York: Modern Library.
- Stark, O. (1984). Migration decision making: A review article. *Journal of Development Economics*, 14, 251–259.
- Stark, O. (1991). *The migration of labor*. Oxford: Blackwell.
- Stark, O., & Levhari, D. (1982). On migration and risk in LDCs. *Economic Development and Cultural Change*, 31, 191–196.
- Stark, O., & Taylor, J. (1989). Relative deprivation and international migration. *Demography*, 26, 1–14.
- Stark, O., & Yitzhaki, S. (1984). Labor migration as a response to relative deprivation. *Journal of Population Economics*, 1, 57–70.
- Taylor, J. (1986). Differential migration, networks, information and risk. In O. Stark (Ed.), *Research in human capital and development* (Vol. 4). Greenwich, CN: JAI Press.
- Tiebout, C. (1956). A pure theory of local expenditures. *Journal of Political Economy*, 64, 416–425.
- Tinbergen, J. (1962). *Shaping the world economy*. New York: Twentieth Century Fund.
- Todaro, M. (1969). A model of labour migration and urban unemployment in less developed countries. *American Economic Review*, 59, 138–148.
- Todaro, M. (1976). *Internal migration in developing countries*. Geneva: International Labour Organization.
- Veenhoven, R. (1996). Happy life-expectancy: A comprehensive measure of quality-of-life in nations. *Social Indicators Research*, 39, 1–58.
- Veenhoven, R. (1999). Quality-of-life in individualistic society: A comparison of forty-three nations in the early 1990s. *Social Indicators Research*, 48, 157–186.
- Willis, R. (1973). A new approach to the economic theory of fertility behavior. *Journal of Political Economy*, 81 (Supplement), 514–564.
- Yap, L. (1977). The attraction of cities: A review of the migration literature. *Journal of Development Economics*, 4, 239–264.
- Zipf, G. (1946). The [P(1)P(2)/D] hypothesis; on the intercity movement of persons. *American Sociological Review*, 11, 677–686.



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2013, XV, 474 p., Hardcover

ISBN: 978-1-4614-2115-3