The Future of International Migration

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CHAPTER 7

THE FUTURE OF INTERNATIONAL MIGRATION

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7.1 Introduction

Migration is a key means by which human beings act to preserve or enhance their well-being. Since *Homo sapiens* first emerged in Africa about 200,000 years ago, geographic mobility has been a prominent strategy for human adaptation and improvement (Cavalli-Sforza et al., 1994). In modern societies, people most commonly migrate to further their economic position or to join family members who migrated before them (Massey et al., 1993). Yet, many others move, both temporarily and permanently, with the more explicit purpose of reducing social, economic, political, or environmental vulnerability (Bardsley and Hugo, 2010; Hunter, 2005; Lundquist and Massey, 2005). All of these forms of human mobility frequently span international borders, oftentimes despite substantial barriers to transborder movement.[2]

Estimates of migration flows are the expression of these heterogeneous motivations. As the drivers of migration also vary conspicuously across nations (Clark et al., 2004;

[1] The contributing authors have drafted considerable parts of sections 7.1 ('Introduction') and 7.2 ('Migration Forces'). They were selected as lead experts in respective topics and regions.

[2] Although international mobility may be particularly costly (and thus less common than intranational movement), in no small part due to restrictive immigration policies and practices, transnational movement may still be likely and possible for individuals with access to various forms of human, financial, and social capital that can support and facilitate lawful and extralegal moves.

Massey and Sana, 2003) and evolve over time within countries (Lindstrom and Ramírez, 2010; Massey, 1990; Massey et al., 1994), they are particularly difficult to forecast. As we show in this chapter, even developing a homogeneous series of baseline estimates at a global level is very complex (Abel, 2013a), further complicating forecasting efforts. Reliable baseline estimates are hard to obtain, for instance, given differences in the definitions across countries of what is an international migrant (Kupiszewska and Nowok, 2008) and owing to the presence of sizable irregular or unauthorized flows in some nations (e.g. Passel et al., 2009).

Notwithstanding these difficulties, international migration has increasingly become, and will remain, a crucial component of the population dynamics of many sending and receiving nations. While only 2 per cent of the world's population lives outside of their country of birth,[3] this figure is above 10 per cent for nationals of countries like Mexico and El Salvador. Foreign-born shares are also substantial relative to the population of many migrant-receiving countries, with levels above 10 per cent (in some cases well above) in North America, most of Western Europe and Oceania, and parts of South East Asia. At the extreme, this share has reached levels of 60–80 per cent in some age groups in the oil-producing nations of the Gulf Cooperation Council (GCC).[4] Furthermore, the origins and destinations of international migrants have become more diverse in the last four decades (Abel and Sander, 2014; Özden et al., 2011).

These shares imply the increasing importance of international migration as a component of national population growth (Zlotnik, 2004), reproduction (Ediev et al., 2007; Preston and Wang, 2007), and (to a lesser extent) the age structure of immigrant-receiving nations (Espenshade, 2001; Wu and Li, 2003).[5] Because of the increased demographic relevance of international migration, developing plausible quantitative central and conditional 'what if' scenarios has become increasingly important. The inclusion of realistic assumptions is hindered by the difficulties in measuring past migration flows required to quantify future levels of movements for projection models. Consequently, the accurate and realistic projection of longer-term migration (through both immigration and emigration rates) is one of the most difficult, but unavoidable, challenges in population forecasting.

[3] Note that many of the people included in this count are 'statistical migrants', such as ethnic Russians living in former Soviet Republics. These people became foreigners not because they moved but because the nation of their birth ceased to exist. Another large share of the world's foreigners consists of displaced persons fleeing civil violence or natural disaster. Such people generally lack the resources to migrate internationally and proceed instead to the closest safe haven, usually within their own or an adjacent country. Leaving aside statistical migrants and displaced persons, only about 1.5 per cent of the world's foreigners are immigrants in the conventional sense—people who emigrated deliberately as part of a conscious strategy to enhance well-being.

[4] All figures come from the United Nation's International Migrant Stock: 2008 Revision, available at <http://esa.un.org/migration/> (accessed 15 August 2012).

[5] As a result of this relevance, ignoring the addition or subtraction of population due to migration can distort traditional calculations of net reproduction rates in both sending and destination countries (Ediev et al., 2007; Preston and Wang, 2007). Under some circumstances, emigration and immigration can also have a significant effect on the age structure of a nation (Coleman, 2002; Espenshade, 2001; Keyfitz, 1971).

This chapter outlines our approach for meeting this challenge. We first present an overview of the economic, climate, political, policy, and socio-demographic forces that affect migration. In section 7.3, we outline the available data to study international migration. We describe our methodology to estimate a set of bilateral migration flow tables of past movements between all countries, which seeks to address the lack of comparable migration statistics at the global level. The spatial patterns of contemporary migration, as revealed by our estimates of bilateral flows, are summarized in section 7.3.3. These estimated flow tables serve as base data for the bi-region population projection model discussed in section 7.4. In section 7.5, we outline how scenarios for the projection model are constructed. This includes details on how expert views expressed in an online survey and meta-expert meetings were combined with the baseline data estimates to develop three future migration scenarios. Section 7.6 sets out the medium scenario and two alternative 'what if' scenarios derived from expert judgement. Selected results of the Wittgenstein Centre (WIC) population projections regarding projected numbers of migrants and different spatial scales are presented in section 7.7.

7.2 Migration forces

For this book's scenario-based approaches, it is important to consider what kinds of forces have affected migration in the past and might in the foreseeable future.[6] We classify these in a relatively straightforward manner distinguishing between economic, demographic, migration policy, environmental, and political factors, although migration, as noted previously, is the outcome of interaction among these factors, such that distinguishing the relative importance of each force is often difficult.[7] Before that, we introduce a more general overview of the volume of international migration flows.

7.2.1 The geography and timing of the initiation of international migration flows

As mentioned earlier, international movement is strongly motivated by economic forces. Although the commonplace idea of an international migrant is one moving

[6] While this overview may also be useful for informing and guiding other forms of forecasting taking them into account in practice is generally extremely difficult (and, oftentimes, counterproductive) given the difficulty in itself in forecasting economic, social, political, and environmental change at both national and global scales.

[7] We present these forces (as opposed to a review of theories) because the migration response to these forces could be consistent with several theories in non-mutually exclusive ways. Further, it may be less problematic to assume that a given force (e.g. wage differentials) may continue to have an effect on migration in the future than to assume that a whole theory (i.e. the combination of a set of forces acting in a particular way, such as the notion that wage differentials net of a specific set of migration costs) will continue to have a similar effect on migration in the future.

from less developed to more developed countries, the magnitude of 'north–north' and, especially 'south–south', movement has increased in recent decades. Scholars estimate that 'south–south' movement may be larger than (or at least almost up to par with) 'south–north' movement (Ratha and Shaw, 2007). Examples of this movement include that of Nicaraguans to Costa Rica (Gindling, 2009; Lundquist and Massey, 2005); Haitians to the Dominican Republic (Grasmuck, 1982); Bolivians and Paraguayans to Argentina (Aide and Grau, 2004; Parrado and Cerrutti, 2003); Bangladeshis to India; and Filipinos to Malaysia (Sadiq, 2009); as well as cross-border labour migration to South Africa (McDonald, 2000).[8]

Uneven processes of development, in their broadest sense, are at the core of factors that explain the initiation of large international migration flows between two given countries. Differences in living standards between sending and destination areas suggest that economic conditions have a preponderant role in stimulating international migration in most corridors, including those with large amounts of intra-regional 'south–south' migration (Clark et al., 2004; Massey et al., 1998). Yet, 'pioneer' migrants move and choose their destinations not only on the basis of where they can achieve the largest present net wage gains; the establishment of most migration 'corridors' is clearly facilitated by prior relations of trade and exchange. That is, although substantial wage differentials are generally a necessary condition for jumpstarting sizable international movements, wage disparities alone are not a sufficient driver of movement. As suggested by the fact that the poorest people from the poorest countries are generally not the most likely to migrate, nor do those moving go to the richest nations necessarily, many other economic and non-economic factors play a role in influencing the timing and geography of international migration flows.[9]

For instance, several kinds of active private and public recruitment efforts have set in motion corridors such as Turkish migration to Germany (Abadan-Unat, 1995); Mexican migration to the USA (Calavita, 1992); Puerto Rican migration to the continental USA (Duany, 2011; Rivera-Batiz and Santiago, 1996); Caribbean migration to the UK, France, and the Netherlands (Grosfoguel, 1997); Middle Eastern, South Asian, Indonesian, and Filipino migration to the Persian Gulf (e.g. Ling, 1984); and ethnic Japanese migration from Brazil, Peru, and Colombia to Japan (e.g. Tsuda, 2003). All of these flows increased only after recruitment took place, despite the fact that persistent income differentials between these sending and destination areas existed well before recruitment began.

In addition to the timing, the choice of specific countries where to recruit from (and thus the pairing of particular sending and destination areas) was further structured by

[8] Note, however, that bilateral migrant stocks within developing countries had risen by 1990, but have flat-lined since then. The big rise since 1970 was in developing country migrants in developed countries (Özden et al., 2011; Figure 1).

[9] While this may not be convincing evidence against the power of wage differentials per se, it does suggest at the very least that other factors mediate the role of wage disparities (for instance, by entering the migration decision as costs (Todaro and Maruszko, 1987)). As such, one of course needs to understand these other factors.

historical connections between places. The labour-importing countries directed recruitment efforts to the less developed nations mentioned earlier not only because of mere propinquity (which played a role in the Mexico–USA case, but only after railroad networks connected the south-western USA with central-western Mexico, (Cardoso, 1980), but owing to colonial (Caribbean–UK/France/the Netherlands; Algeria–France) and cultural/religious ties (Middle East/South/South East Asia–Persian Gulf, ethnic 'return migration' from Latin America to Japan).

In flows where active recruitment was not at play, similar kinds of translocal and transnational connections had a role in influencing the initiation of migration flows and their timing. For instance, military interventions in South East Asia explain the beginning of migration from these countries to the USA (Rumbaut, 1994). US involvement in Latin America and the Caribbean also explains flows from countries such as the Dominican Republic (Grasmuck and Pessar, 1991), Cuba (Duany, 2011), and Nicaragua (Lundquist and Massey, 2005), among others (see Mitchell, 1989).

7.2.2 The continuation of migration flows

Whatever the original motivation for international migration, it tends to set in motion a series of social and economic changes in both sending and receiving societies that facilitate migration and make additional migration more likely. For instance, international migration is facilitated by different institutions and 'industries' facilitating either legal or 'irregular' movement (Spener, 2009). Particularly deep transformations of place lead to a process known as cumulative causation (Massey, 1990). The translocal, transnational exchanges associated with the migration process change life in sending and destination areas in many ways (e.g. Levitt, 1998; Levitt and Lamba-Nieves, 2011), some of which motivate migration even after the conditions originally motivating migration are mitigated (for a more detailed account of cumulative causation processes, see Massey et al., 1998: Chapter 2). One of these mechanisms takes place when migrants remit to their families or bring back large amounts of money that help shift the income distribution of sending areas, motivating the subsequent emigration of individuals from 'non-migrant' households in the wake of their newfound relative deprivation (Stark and Taylor, 1991). Another process of cumulative causation is related to the creation of a 'culture' of migration that perpetuates mobility by making it a rite of passage (e.g. Kandel and Massey, 2002).

The most powerful form of cumulative causation appears to be social capital formation, which occurs through the progressive expansion and elaboration of migrant networks. Social capital is created within a migrant's social network whenever he/she gains access to employment in a high-wage country. Friends and relatives thereby acquire a tie to someone who can lower the costs of movement and overcome the barriers to entry, thus increasing their likelihood of migrating (e.g. Massey and Aysa-Lastra, 2011). Each new departure from the source country expands the migrant network further, creating

more social capital that prompts others to emigrate, further expanding the network and creating more social capital, particularly in the context of labour migration and under relatively favourable economic conditions in destinations. Under these circumstances, migrant networks can sometimes operate as informal recruitment mechanisms for employers (Krissman, 2000), linking the processes with labour demand and economic development. After this brief overview of how migration flows initiate and continue, let us now turn to discussing the different types of forces and drivers associated with international migration flows in more detail.

7.2.3 Economic forces, development, and emigration

International migration is mostly driven by economic development and the penetration of markets into non-market societies. The creation of markets for land, labour, and capital, the mechanization of agriculture, and the industrialization of production powerfully transform societies, displacing large numbers of people from more 'traditional' ways of life in the process. The entry of nations into the global regime of trade, production, and exchange thus creates populations of people highly motivated to look for new ways of securing their material well-being. Economic development, at least in its early stages, may produce, rather than inhibit, migration (Sassen, 1998).

Under conditions of economic transformation, international migration becomes an 'attractive' strategy that people can deploy in order to adapt to changes set in motion by globalization and development. In the absence of international recruitment, most of those displaced by market penetration may move within their own countries, either to urban destinations or to rural areas with commercial primary sector production. Those who do move internationally are either highly selected with respect to risk-taking, ambition, and motivation, or have access to forms of capital that can support and facilitate an international move, including the social capital discussed in section 7.2.2.

In seeking to move internationally, migrants adopt one of two basic economic strategies. Those with access to human or financial capital seek to maximize material well-being by relocating to a more affluent nation in search of higher wages (Todaro and Maruszko, 1987) and greater returns to capital. These moves tend to be permanent, or at least of longer duration, and often involve the 'tied' migration of dependent family members (Cerrutti and Massey, 2001; Zlotnik, 2005). The costs and barriers to international movement are lower for those with access to human or financial capital, as many nations have policies to encourage the entry of skilled, educated, and wealthy immigrants.

Apart from maximizing earnings, another motivation for international migration is to overcome the non-existence or malfunctioning of markets at places of origin (Stark and Bloom, 1985). By sending family members to work in high-wage countries, households can also generate remittance streams to smooth consumption in the absence of

credit markets, accumulate savings to fund investments in the absence of capital markets, and overcome capital and crop losses in the event of climatic variability in the absence of insurance markets. By sending different family members to different geographic locations, households can also self-insure against other risks to income (e.g. due to unemployment) by diversifying their labour portfolios and generating multiple earnings streams.

Whereas a migration strategy aimed at maximizing individual earnings may suit skilled workers who move for purposes of settlement or long-term employment, migration decisions in the wake of market failure and volatility in sending areas are oftentimes temporary and collective, involving households sending out unskilled workers for shorter periods of foreign labour to generate funds that can solve economic problems at home. This latter motivation seems to predominate in many international flows (Massey et al., 1998), partly, perhaps, as it responds to several forms of economic, social, and environmental change.

7.2.4 Migration as an adaptation strategy to climate and environmental change

The effects of environment and environmental change are complex (Hugo, 1996) and mediated not only by the severity and nature of environmental change but also by the vulnerability, resilience, resources, and situation of affected communities. As a whole, research on the environmental drivers of migration suggests that environmental factors act in concert with socio-economic, political, and cultural considerations to shape migration decision-making (e.g. Black et al., 2011). In some cases, environmental scarcity may constrain some types of mobility (e.g. Gray, 2009) as natural resources provide the capital necessary for livelihood diversification (e.g. Nawrotzki et al., 2012).[10] Overall, short-distance mobility is typically more common than international movement among drought- and/or poverty-stricken populations (e.g. Gray and Mueller, 2012; Henry et al., 2003).

Stojanov (2008) has classified environmentally-induced migrations according to the nature of their causes, distinguishing between environmental migrations initiated by dramatic and sudden environmental events, such as tsunamis, hurricanes, and volcanic eruptions, and those of slow onset, with gradual, but cumulative, environmental forces. This is an important distinction as both the mobility responses and the policies relating to them are different.[11] Sudden disasters can be very destructive and cause major displacement of population, but that displacement is usually temporary. For

[10] Access to productive land also positively predicts outmigration in some settings (e.g. Gray, 2009; VanWey, 2005).

[11] The sudden environmental hazard impact attracts the most attention among policymakers and researchers, while the latter has been neglected, particularly with regard to international migration (see Hunter et al., 2013).

instance, most people displaced by the Asian Tsunami of 2004 eventually returned and rebuilt their communities (Laczko and Collett, 2005). Indeed, the influx of resources and the magnitude of the task of rebuilding can lead to an immigration of additional workers (Laczko and Collett, 2005). In contrast, migration associated with slow-onset environmental change can be much more varied because residents of areas affected by this kind of deterioration are generally able to deploy a larger variety of in situ adaptations.

Yet, specific types of migration may indeed take place in response to slow-onset environmental change, particularly if this in situ adaptive capacity worsens. For instance, a common initial response to perceptions of food shortages associated with environmentally-induced crop failure is temporary circular migration of some of a family's labourers to work in areas not affected by the famine, such as cities. If the famine is prolonged and it becomes unsustainable to remain in the area, this gradually gives way to displacement of entire families on both temporary and permanent bases. In extreme cases, where the entire food resources of an area are exhausted, the result may be mass distress migration (Black et al., 2011).

Drought has dramatic impacts on livelihoods, especially in rural, agriculturally-dependent regions such as northern Africa. Yet, evidence suggests that ongoing adaptation through livelihood diversification often reduces rural household vulnerability. In northern Ethiopia, for example, households with more diverse livelihoods involving animals, non-agricultural income, and/or migrant remittances have more options for coping with drought. Still, there seems to be a threshold above which rainfall deficits force even diversified peasant households to migrate (Meze-Hausken, 2000). Similarly, residents of dry regions of Burkina Faso are more likely to engage in both temporary and permanent migrations (Henry et al., 2003), perhaps related to diversification of origin incomes through remittances.

Historical research in the US Great Plains also links outmigration in the early 1900s to rainfall deficits in agriculturally-dependent regions and in periods of particularly poor weather (Deane and Gutmann, 2003; Gutmann et al., 2005). Indeed, migration has long been a human strategy in the face of climate constraints, with some scholars making use of historical analogues to consider future climate impacts (McLeman and Hunter, 2010; McLeman and Smit, 2006).

As mentioned earlier, some types of moves (urban-oriented, short distance, internal) may be more likely to take place under these conditions. Although it has been argued that many of the processes shaping internal and international migration are similar (King and Skeldon, 2010; Skeldon, 2006), the fact remains that the controls exerted over migration between countries are much greater than those within countries. Internal migration is usually a more available option than international migration, involving smaller distances, lower costs, ease of travel, and less economic, social, and cultural disruption. Accordingly, in most contexts, the rates of internal migration are greater than international movement (Bardsley and Hugo, 2010).

International migration is a much less likely response to these kinds of environmental forces. Migration across national boundaries is not an easy undertaking—and resource

scarcity may inhibit costly diversification strategies. For example, people in dryer regions of Burkina Faso were less likely to emigrate to international locales (Henry et al., 2003). Yet, international migration can be a response to environmental stress in some circumstances, in the presence, for example, of pre-established international migrant networks. This is the case in rural Mexican communities with a longstanding history of migration to the USA, where rainfall deficits are associated with higher international migration (Hunter et al., 2013). Still, 'climate-related migration' out of these Mexican communities seems to be an exception to a pattern of low international outmigration in the wake of slow-onset environmental change.

The increased focus on environmental drivers of migration has stemmed largely from the recognition that human-induced climate change is one of the most significant global challenges of the twenty-first century. Part of the burgeoning global discourse on climate change has focused on its potential effects in displacing populations. While it has long been recognized that changes in environmental conditions can have an important effect on migration (Hugo, 1996), this relationship has been oversimplified in much of the recent discourse on the impact of climate change. Much of this discussion assumes that there is a simple deterministic effect whereby environmental change results, inevitably, in population displacement. For example, the most authoritative Fourth Assessment of the Intergenerational Panel on Climate Change (2007) stated: 'Stresses such as increased drought, water shortages and riverine and coastal flooding will affect many local and regional populations. This will lead in many cases to relocation within and between countries, exacerbating conflicts and imposing migration pressures'.

Accordingly, there have been a number of 'projections' of future population displacement that largely assume all people in areas severely affected by climate change will move. Hence, there are pronouncements, which have been given wide currency, that climate change, and especially associated sea level rises, will result in the displacement of hundreds of millions of people between countries (Christian Aid, 2007; Myers, 2002). These 'projections' are not based on a detailed analysis of future trends in climate patterns (McLeman, 2011) nor on an understanding of drivers of migration (Bardsley and Hugo, 2010). The reality is that the relationship between migration and environmental change is complex, and that this complexity must be taken into account in any assessment of future effects of climate change on migration.

7.2.5 Shocks to the system? Violence, political upheaval, and displacement

Shocks are extreme disturbances that affect social systems. In addition to the types of sudden-onset environmental events discussed earlier, dislocation associated with war and political turmoil can cause vast population displacements out of conflict zones, including refugees. These more forced migrations oftentimes take place against a backdrop of more voluntary movement undertaken for reasons related to work, family,

education, and retirement. In this section we provide a brief outline of international political events and conflicts that have generated migrant flows around the world.

At the global level, the 1960–2000 time series of intercountry migration indicate a great deal of politically generated migration. The United Nations High Commissioner for Refugees (UNHCR) (2012) estimated that at the end of 2010 there were an estimated 33.9 million people 'of concern'. These included 10.6 million refugees, 838,000 asylum seekers, 14.7 million internally displaced persons protected or assisted by UNHCR, 3.5 million stateless persons, and 1.3 million in 'other' dire circumstances. As the focus of this chapter is on international movement, we do not focus on internal displacement that is common in conflict situations, which (as the quoted figures suggest) is in many cases more common than refugee outflows (also see International Displacement Monitoring Centre (IDMC), 2013).

Domestic and international conflicts in North Africa and West Asia have been numerous. Since 1960 there have been wars involving Afghanistan (1979–89, 2003–12), Algeria (1954–62), Iraq/Iran (1980–88), Iraq/Kuwait/USA coalition (1990–91), Iraq/USA coalition (2003–11), Israel/Jordan/Egypt/Syria (1967), Israel/Lebanon (1982–85, 2006), Libya (2011), Syria (2012–), and Yemen (1994). These conflicts all generated political refugees—several millions in the case of Afghanistan. It is likely that violence will continue in the decades ahead as political, religious, and ethnic divides continue to be sources of conflict.

In South Asia, massive international movement was spurred by population exchanges between India and Bangladesh after the secession of East Bengal from Pakistan; by the India/Pakistan wars; and by the decades-long Tamil–Singhalese conflict in Sri Lanka. South East Asia saw a quarter century of war (roughly between 1950 and 1975) in Vietnam, Cambodia, and Laos, leading to large refugee flows into the USA and Europe (Rumbaut, 1989). In Burma/Myanmar the civil war between the military and ethnic minorities has persisted for decades, leading to the emigration of several thousand people to neighbouring Thailand (Lang, 2002). East Asia experienced large refugee flows during the Korean War.

West Africa has seen civil wars in Nigeria, Sierra Leone, Ivory Coast, Mali, and Liberia. Central and East Africa have seen decades of conflict in the Republic of the Congo, Rwanda, Burundi, Uganda, South Sudan, and Sudan. Southern Africa has experienced refugee flows as a result of wars of independence in Mozambique and Angola, and consequent to the economic collapse in Zimbabwe. Latin America has also experienced civil wars displacing people out of Guatemala, El Salvador, and Nicaragua (Coutin, 2003; Lundquist and Massey, 2005), as well as a large exodus of political refugees from Cuba (Duany, 2011). Most of the refugees from Latin America relocated to the USA.

Europe also saw large refugee flows during the twentieth century, including the massive movement of people during World Wars I and II, and the exodus of individuals of Jewish descent out of Eastern and Central Europe. During the Cold War, refugees trickled out of Warsaw Pact nations, with larger outflows observed in times of unrest, such as in Czechoslovakia (1968) and Poland (1980–89). Although the break-up of the Soviet Union and the fall of the Iron Curtain, a structural break that

was a shock to the political and social systems, did not lead to major refugee flows per se, it did greatly facilitate the migration of Eastern and Central Europeans of Jewish descent to Israel and of ethnic Germans (*Aussiedler*) into the newly reunified Germany.[12] In addition to the relocation of Russians, Kazakhs, Uzbeks, and people from other former Soviet Republics back to their ethnic/national homelands, several million of them were classified as international migrants by virtue of the break-up of the Soviet Union and their location in a country different to their ethnic/national homeland (Zlotnik, 1998, p. 446–9).

Unfortunately, it is expected that these flows will continue in the future as turmoil continues in much of the world. This complicates projection exercises as it is, indeed, difficult to forecast international flows that include a non-trivial component of movement related to conflict and other types of shocks, not only in terms of magnitude, but also in terms of timing and directionality. Yet, with hardened refugee and asylum policies around the world, it is likely that many displaced individuals will not leave their countries of origin, but will be increasingly classified as internally displaced (hopefully while still protected by organizations such as UNHCR). Since 1951, the asylum regime has gone through several global policy shifts, giving preference to third-country resettlement to the USA, Canada, and Australia until the late 1950s; integration in the country of first asylum or voluntary repatriation from the 1960s to 1980s; and preventing refugee flows from occurring or confining them to their region of origin since the 1980s (Crisp, 2000). We now turn to policies influencing different forms of immigration flows, where we also discuss asylum policies.

7.2.6 The effects of migration policies on migration dynamics

Political theorists and migration scholars have posited that the ability to exert control over a bounded territory and determine who is allowed to enter and remain in it is one of the foremost defining features of a state (Gibney, 2004; see also Haddad, 2003; Held, 1995; Zolberg et al., 1989). Broadly conceived, policy is one of the most important barriers to and facilitators of migration. For instance, intraregional movement has been facilitated by bilateral and regional agreements allowing the free movement of people, such as in the case of the European Union and envisaged and currently underway for the Economic Community of West African States and the East African Community. Yet, movement to and from nation-states may be affected not only by migration policies, but also by what Czaika and de Haas (2011) term 'non-migration' policies. Migration policies are laws or regulations that have the express aim of regulating the size and structure of migration flows, such as the British Alien Act of 1844 or Uganda's Control of Alien Refugees Act of 1960. Non-migration policies are laws and regulations that carry no such direct (or even intended) aim, but nevertheless affect the size or structure of

[12] The reunification of the German Democratic and Federal Republics into a single nation also led to massive (but, in this case, internal) population redistribution.

migration flows because they influence migration determinants, such as the UK's Welfare Reform Act 2010–12 (Czaika and de Haas, 2011; Haddad, 2003).[13]

Non-migration policies may have a greater effect on migration flows than migration policies in terms of magnitude and long-term trends, as they may be linked to structural determinants of migration, such as macroeconomic and political conditions (e.g. labour demand in countries of destination; social and development policies in sending areas). Migration policies, however, target specific aspects of migration and categories of migrants (Czaika and de Haas, 2011, p. 5). The effects of such policies on flows are easier to evaluate than the effects of non-migration policies.

The effect of a migration policy can be ascertained by its effectiveness in influencing the size or composition (e.g. gender, nationality, age, education, skill distribution) of migration flows. Migration policies can affect migration in both intended and unintended ways. Typically, if a migration policy yields an unexpected outcome, it is because (1) the policy interacted with powerful non-migration policies or macrolevel migration determinants in ways unforeseen by policymakers, (2) the policy was comprised of contradictory and self-undermining aims, or (3) a gap existed between the discourse surrounding the policy and the actual policy measures and the implementation of the policy (Czaika and de Haas, 2011; Ellermann, 2006).

De Haas (2011) posits that there are four types of unintended migration policy effects or 'substitution effects': spatial, categorical, inter-temporal, and reverse flow. Spatial substitution refers to migration flows diverted to other locations, rather than being disrupted, as in the case of Chinese migrants 'diverting' into the north-west of Mexico and other parts of Latin America at the advent of the 1882 Chinese Exclusion Act in the USA (Lee, 2003, p. 157). Categorical substitution occurs when migrants shift to different legal or unauthorized migration channels after a particular channel is targeted by control policies, as in the interplay between overstaying tourist visas and crossing borders without authorization. Inter-temporal substitution occurs when migrants anticipate a tightening of migration policies, prompting them to migrate en masse, as in the 1980 Mariel boatlift out of Cuba (Duany, 2011). Last, reverse flow substitution takes place when return migration flows decrease as a result of increasing migration restrictions, as with the decreasing return rates of undocumented Mexicans in the aftermath of increased US border enforcement in the 1990s (Angelucci, 2012; Reyes, 2004).

Before exploring specific types of migration policies and their effects, it is important to acknowledge that although migration policies can have an observable impact on migration flows, they are not an independent migration determinant. Rather, migration policies are, to some degree, endogenously determined by prior migration flows and can reflect existing migration patterns, which are, in turn, affected by the effectiveness of past migration policies.

[13] The line between migration and non-migration policies is at times difficult to draw, for laws regarding citizenship or labour market policies may have elements that seek to address migration issues (Czaika and de Haas, 2011).

7.2.6.1 *Immigration policies*

The empirical literature on the effects of immigration policies suggests that restrictive immigration policies reduce the flows of people and, more generally, that migration policies affect migration flows in the intended 'direction', but not necessarily in the fully intended manner (Czaika and de Haas, 2011, p. 17; see also Green and Green, 1995; Mayda, 2010; Ortega and Peri, 2009). Additionally, the effects of structural migration determinants in sending or receiving countries in constraining or promoting migration are larger when coupled with more restrictive or open immigration policies respectively. Hence, the positive effect of increasing gross domestic product per capita on immigration flows is more pronounced during times of relatively open immigration policies. Compared with macro-level migration determinants like economic growth, labour demand in receiving countries, conflict, or youth cohort size in sending countries, immigration policies appear to have a small effect on flows, particularly on undocumented, 'illegal', or irregular migration (Angelucci, 2012; Cornelius and Salehyan, 2007; Czaika and de Haas, 2011; Spilimbergo and Hanson, 1999).

7.2.6.2 *Asylum policies*

The right to seek asylum from persecution was established in the Universal Declaration of Human Rights in 1948 and formed the basis of the 1951 Refugee Convention. At its core, this right allows any non-citizen to enter a territory, either through authorized or unauthorized channels, and apply for asylum without the threat of being forcibly returned to his or her country of origin before a status determination is made and before it can be established that the non-citizen would not return to cruel or inhuman treatment. Although the concept of asylum from persecution is established in international law, some states and regions have adopted more expansive asylum policies that include generalized violence and individuals fleeing conflict (see the 1969 Organisation of African Unity (OAU) Convention and 1984 Cartagena Declaration). Furthermore, while the right to seek asylum from persecution is well established, the right to settle in a country is not.

As a result, states and regions uphold the right to asylum and settlement through their own policies and procedures, including status determination waiting periods, resettlement quotas, detention practices, and welfare benefits. Thus, it is possible to observe the effects of different asylum policies on migration flows. For example, some studies have found that increasingly restrictive asylum policies in Europe have reduced immigration flows (Hatton, 2004; Holzer et al., 2000; Thielemann, 2005). In contrast, it is unclear in the USA whether the tightening of asylum policies reduced immigration or only pushed flows into irregular forms of movement (e.g. Coutin, 2003).

7.2.6.3 *Emigration policies*

In examining the impact of policies on migration, few studies explore the effects of policies designed to control emigration or of non-migration policies issued by 'sending' countries (de Haas and Vezzoli, 2011; Kureková, 2011). Emigration policies that

encourage or restrict emigration often aim to control the migration of specific groups of individuals, based on gender, skill level, education, or ethnic affiliation. We know of no empirical studies of the effects of these policies on contemporary migration flows (de Haas and Vezzoli, 2011; Fitzgerald, 2009; Kureková, 2011), perhaps because of the tendency in the literature to emphasize other forms of immigration; the lack or low quality of emigration data; the relatively small amount of emigration policymaking compared with immigration; and the fact that the right to leave one's country is internationally recognized.

7.2.7 Socio-demographic factors

Demographic factors that can affect the level of migration include not only the size and growth rate of the population per se, but its age and sex structure, all of which are the expression of past demographic rates (e.g. Preston et al., 1989). There are two main types of migration related to demographic factors. The first refers to how population growth and, especially, age structure imbalances influence relative labour supply and labour migration patterns. The second relates to how the age–sex structure of the population shapes marriage markets and stimulates marriage migration.

7.2.7.1 *The demography of labour demand and supply as drivers of labour migration*

High population growth rates resulting from high fertility and low mortality rates lead to a young population and, potentially, to excess labour supply, which can increase unemployment rates and curb wage growth. A large cohort of people in the mobile young adult ages is a potential source of migrants (e.g. in the case of Mexico–USA migration; see Hanson and McIntosh, 2010), particularly when sending nations face challenging economic or political conditions (e.g. Coleman, 1993), although the lack of development per se does not necessarily yield the highest emigration rates.

By the same token, slower population growth, stability, or decline, when combined with the appropriate structural and institutional conditions, can also affect migration and even lead to immigration. Fertility decline and slower population growth lead to fewer young people in the mobile age groups, thus reducing the supply of potential emigrants. Some former migrant-sending nations, mainly in East and South East Asia, and Southern and Western Europe, have undergone this kind of demographic transition while also having solid social, political, and economic institutions, and experiencing high economic growth and expansion due to investments in human capital and infrastructure (Bloom and Canning, 2008; Paldam, 2003).

This prosperity might have not only led them to reap fiscal and economic benefits of having a population heavy in the middle-age groups, but could also explain their transition

from sending to receiving nations.[14] Population and labour force ageing can result in a shortage of workers, which is most likely to be felt in the service sectors. Countries experiencing a short supply of either skilled or unskilled labour have turned to importing labour from other countries with a more abundant supply of workers (Piore, 1980). For example, labour demand and supply issues have been important drivers of Australia's immigration programme since the 1950s and in the current context of below replacement fertility rates since the 1980s. Labour issues will continue to be important drivers of immigration policy with the impending retirement of the baby boom cohorts in the next two decades (McDonald and Temple, 2008).

The likelihood of population decline in industrialized countries with very low fertility rates has led the United Nation's (UN) Population Division to project the scale of migration needed to prevent population decline, to maintain a constant population in the working ages, and to maintain a constant ratio of older persons to persons of working age (United Nations, 2000). These projections are illustrative of the role of demographic factors as drivers of migration if countries decide to consider migration as a policy instrument for addressing the issue of future population and labour force declines (see also Coleman, 2002; Espenshade, 2001).

7.2.7.2 *Socio-demographic drivers of marriage migration*

Demographic factors can also affect the availability and choice of marriage partners, stimulating cross-border marriage migration. The sex ratio of the population in the marriage ages is a function of changing fertility, sex-selective mortality, and migration in younger ages, and imbalances in the sex ratio at birth. In most societies, men usually marry younger women. In a population experiencing declining fertility rates, the size of younger cohorts of women would be smaller than those of older cohorts of men, implying that some of these older men may have difficulty finding a spouse in the 'appropriate age group'. Demographers refer to these circumstances as a 'marriage squeeze'. Advances in female education and other social and cultural factors affecting people's preferences in the choice of a marriage partner can exacerbate the problem.

In addition, the contemporary increase in sex ratios at birth in several Asian countries (e.g. Coale and Banister, 1994; Guilmoto, 2007) to figures well above the 'normal' ratio of 103–107 male per 100 female births (e.g. to 110–117) also has the potential to exacerbate the problem in future. A marriage squeeze can lead to men looking abroad for potential

[14] Demography may have a role in the current status of China and India as two of the top source countries of migration. These two most populous countries in the world currently have a relatively large proportion of people in the peak migration age groups and have emerged as significant sources of migrants to countries such as Australia, Canada, and the USA. They have been the largest sources of immigrant arrivals in Canada since 1996 (Statistics Canada, 2006); the first and third largest sources of immigrants to Australia in 2010–11 (Department of Immigration and Citizenship, 2011); and the second and third largest sources of legal permanent resident admissions in the USA (Office of Immigration Statistics, 2010).

marriage partners (Davin, 2007; Guilmoto, 2007), particularly when cross-border marriage migration is facilitated by cheap transport and communication.

In addition to marriage migration motivated by age–sex structure imbalances, newly established migrant or ethnic communities (which, in some cases, may have an unbalanced sex ratio in the marriage age groups, such as an excess of young single men) may further stimulate marriage migration from the country of origin if there is a preference for a marriage partner of the native ethnic origin (among the first or second-plus generations), or there are other barriers to intermarriage with local residents, as in the case of some ethnic communities in Australia, Europe, and North America (e.g. Telles and Sue, 2009).

7.2.7.3 *Beyond drivers: the relevance of understanding the demographic profile of migrants*

Although demographic factors are generally not the main drivers of international migration flows, it is important to understand them for better estimation and forecasting of migration. In addition to their mild influence on the magnitude of flows, understanding the composition of migrants and their socio-demographic selectivity is also useful for surmising some of the root causes and potential consequences of migration for sending and receiving areas, and for investigating them further. Given the paucity of detailed data for many immigrant groups, socio-demographic profiles of both emigrants and return migrants have helped scholars understand migration trends, particularly at the regional and global levels (e.g. Fassmann and Munz, 1992; Zlotnik, 1998).

Demographic characteristics can also be useful for the indirect estimation and forecasting of migration, given that many migration flows exhibit relatively stable demographic patterns (Rogers et al., 2010). This is particularly true in the case of age patterns of directional migration flows (e.g. Rogers and Castro, 1981; Rogers et al., 2007), which have remarkable stability, which is also the case in other demographic events. We take advantage of these regularities in our estimations and projections of global international migration flows, as explained in section 7.3.

7.3 Global estimates of international migration flow data

International moves are typically enumerated in a demographic context using a measure of either migrant stocks or migration flows. A migrant stock is defined as the total number of international migrants present in a given country at a particular time. A migration flow is defined as the number of persons arriving or leaving a given country over the course of a specific period of time. Flow measures reflect the dynamics of the migration process, but are harder to estimate and less available than stock measures (Bilsborrow et al., 1997).

Flow data have several desirable qualities. Information on migration patterns from studying stocks can potentially provide a poor indication of contemporary international migration flows in relation to the forces outlined in section 7.2. In countries where there are significant return migrations or mortality among foreign population, migrant stock data can yield a misleading portrait of the current migration system (Massey et al., 1998). Flow data provide a quantifiable measure of the number of movements over a specified time period, along with rates of births and deaths, by population projections models.

In this section, existing statistics on international migration flow data for global movements produced by national statistics agencies and the UN are discussed first. Currently, detailed flow data required for advanced projection models tend to be available only for more developed nations. In response to this demand, we outline a methodology to estimate bilateral migration flows between all countries. The methodology, fully detailed in Abel and Sander (2014) and Abel (2013a), allows a number of different detailed migration measures to be used from the resulting estimates. It also allows additional regularities by age and other factors to be incorporated into the disaggregation of estimated migration flows by age and sex, as required by advanced projection models. An outline of the estimation procedure is followed by a discussion of the estimated trends in migration in recent decades.

7.3.1 International migration flow data

International migration flow data often lack adequate measurements of volumes, direction, and completeness, making cross-national comparisons difficult. The lack of comparability in flow data can be traced to a number of causes. First, migration is a multi-dimensional process involving a transition between two states. Consequently, movements can be reported by sending or receiving countries. When data collection methods or measurements for countries differ, the reported counts do not match. Second, international migration flow data are typically collected by national statistics institutes in each country, where measures have been designed to suit domestic priorities. Data are often produced within a legal framework, and hence alterations to their collection are difficult to implement. Finally, in many countries, migration data collection systems do not exist. In other countries, collection methods such as passenger surveys may provide inadequate detail for some data users.

These problems have motivated demographers to estimate migration flows, rather than rely on incomplete and non-comparable sets of government migration statistics. To date, at the global level, the only recognized set of flow estimates for all countries is the set of net migration flows over five-year periods produced by the UN Population Division (UNPD, 2011).

These estimates are based predominately on scaled annual flows derived from either migration records or through demographic accounting. They provide an important set of base data for most global projection models. However, as with any net migration

measure, they suffer from a number of problems. Net migration measures can often confound insights into migration patterns and migrant behaviours, as they provide no detail on the scale of movements in and out of a country. Hence, it can be difficult to fully disentangle the effect of various forces on the level of migration. The use of estimates of net international migration flows in global forecasting exercises often runs the risk of well-documented problems when using net measures in projection models (see, e.g., Rogers, 1990, 1995). This can often lead to distinctly different projections than might be obtained from using immigration and emigration measures with the same net migration. Net migration is also more difficult to forecast and could potentially lead to greater uncertainty in the population projections (Raymer et al., 2012), as net migration tends to be more volatile than alternative measures of migration flows.

In order to address these problems, we developed a set of estimated bilateral migration flow tables that not only provide values on total immigration and emigration (from which a net migration figure can be derived), but also provide details on the origin and destinations of migrants.

7.3.2 Estimating global migration flow tables

A full exposition of the methodology to estimate global bilateral flow tables is given in Abel and Sander (2014) and Abel (2013a). This section consists of a brief overview of the general concept in order to allow the reader to understand how further disaggregations of the bilateral flow table, by age and sex required for the projection model, are possible.

The estimation of global migration flow tables is based upon linking sequential migrant stocks tables to derive the flow estimates that are consistent with changes in the stocks. Basing estimated migration flows upon stocks has a number of potential advantages. First, bilateral migration flow tables can be considered as part of a wider accounting of demographic data. Rees (1980) noted that national account statistics of financial stocks and flows have served economists well in their modelling activities, encouraging users to compare data for consistency, check for inadequacies, and attempt to match available data with a conceptual model. He suggested that a similar system of demographic accounts in migration stocks and flows would likely lead to similar improvements. Second, stock data are, in comparison to international migration flow data, far easier to measure and more widely available, both across time and countries. This is reflected in World Bank migration stock data, which include bilateral records from more than 200 nations and 4 decades (Özden et al., 2011). In comparison, the 2010 revision of bilateral international migration flow data released by the UN (Henning and Hovy, 2011; UNPD, 2009) covers only 29 nations, predominately developed world countries, from the last two decades. The greater availability of migrant stock data makes them an invaluable source of information on migrant patterns that can, as will be illustrated next, be used as a basis to estimate global bilateral migration flow tables.

7.3.2.1 *Methodology*

Bilateral migration data are commonly represented in square tables. Values within a table vary, depending on definitions used in data collection or the research question. Values in non-diagonal cells represent some form of movement, for example a migration flow or a foreign-born stock between a specified set of regions or areas. Values in diagonal cells represent some form of non-moving population, or those that move within a region, and are sometimes not presented.

Consider two migrant stock tables in consecutive time periods (t and $t + 1$) in Table 7.1. Regions A–D represent places of birth in the rows, and place of residence in the columns. Hence, non-diagonal entries represent the number of foreign-born migrants in each area of residence, while diagonal entries contain the number of native-born residents. In this hypothetical example there are no births or deaths. This results in two noticeable features. First, the row totals in each time period remain the same, as the number of people born in each region cannot increase or decrease. Second, differences in cells must implicitly be driven solely by migration flows. These movements occur by individuals changing their place of residence (moving across columns), while their place of birth (row) characteristic remains fixed.

To derive a corresponding set of flows that are constrained to meet the stocks tables, one can alternatively consider the data in Table 7.1 as a set of four birthplace-specific migration flow tables where the marginal totals are known, shown in Table 7.2. These are formed by considering each row of the two consecutive stock tables as a set of separate margins of a migration flow table. Place of residence totals at time t from the stock data now become origin margin (row) totals for each birthplace-specific population. Similarly, place of residence totals at time $t + 1$ from the stock data now become destination margin (column) totals for each birthplace-specific population. As the row totals from the stock tables are equal, the sum of the row and column marginal totals in each of the birthplace-specific migration flow tables in Table 7.2 are also equal.

Within each birthplace-specific table in Table 7.2, missing non-diagonal cells represent the migrant transition flows between a chosen origin and destination, within time period t to $t + 1$ and categorized by birthplace. In order to estimate the missing migrant

Table 7.1 Dummy Example of Place of Birth Migrant Stock Data in Stock Table Format

		Place of residence (t)							*Place of residence* (t + 1)				
		A	B	C	D	Sum			A	B	C	D	Sum
Place of birth	A	1,000	100	10	0	1,110	*Place of birth*	A	950	100	60	0	1,110
	B	55	555	50	5	665		B	80	505	75	5	665
	C	80	40	800	40	960		C	90	30	800	40	960
	D	20	25	20	200	265		D	40	45	0	180	265
	Sum	1,155	720	880	245	3,000		Sum	1,160	680	935	225	3,000

Table 7.2 Dummy Example of Place of Birth Migrant Stock Data in Flow Table Format

		Place of birth = A							*Place of birth = B*				
		Destination							*Destination*				
		A	B	C	D	Sum			A	B	C	D	Sum
Origin	A	950				1,000	*Origin*	A	55				55
	B		100			100		B		505			555
	C			10		10		C			50		50
	D				0	0		D				5	5
	Sum	950	100	60	0	1,110		Sum	80	505	75	5	665
		Place of birth = C							*Place of birth = D*				
		Destination							*Destination*				
		A	B	C	D	Sum			A	B	C	D	Sum
Origin	A	80				80	*Origin*	A	20				20
	B		30			40		B		25			25
	C			800		800		C			0		20
	D				40	40		D				180	200
	Sum	90	30	800	40	960		Sum	40	45	0	180	265

transition flows an assumption is made about the non-movers on the diagonal entries. Abel (2013a) proposed to fix the diagonal elements to their maximum possible values that do not violate their corresponding marginal constraints in the row and column sum totals. These values, also illustrated in Table 7.2, allow the missing cells to correspond to the minimum number of migrant flows required to match the known marginal stock totals.

The remaining missing (non-diagonal) cells in Table 7.2 can be estimated using indirect model-based methods. These involve adoption of an underlying model. In Abel (2013a) a log-linear model is chosen to allow the imputations of all missing cells in Table 7.2 to maintain both the marginal and diagonal constraints. The parameters in the model are chosen to match the known data, and hence include terms for origins (rows), destinations (columns), and non-movers (cell-specific). Similar approaches have been previously applied to estimate internal migration flow tables with known marginal totals (see, e.g., Willekens, 1990 or Raymer et al., 2007). An iterative set of equations to estimate the parameters is derived by maximizing the Poisson likelihood of the log-linear model. A program to perform this estimation is available in the *migest* R package (Abel, 2013b). Running the program on the data in Table 7.2 gives the complete estimates of all migration flows by birthplace in the top panel of Table 7.3. These detailed estimates can be summed over to derive traditional origin to destination migration flow tables in the bottom panel of Table 7.3 (having deleted the non-movers from the principle diagonals

Table 7.3 Estimates of Migrant Transition Flow Tables Based on Stock Data in Table 7.2

Estimates of origin–destination–birthplace flow tables

Place of birth = A

		Destination				
		A	B	C	D	Sum
Origin	A	950	0	50	0	1,000
	B	0	100	0	0	100
	C	0	0	10	0	10
	D	0	0	0	0	0
	Sum	950	100	60	0	1,110

Place of birth = B

		Destination				
		A	B	C	D	Sum
Origin	A	55	0	0	0	55
	B	25	505	25	0	555
	C	0	0	50	0	50
	D	0	0	0	5	5
	Sum	80	505	75	5	665

Place of birth = C

		Destination				
		A	B	C	D	Sum
Origin	A	80	0	0	0	80
	B	10	30	0	0	40
	C	0	0	800	0	800
	D	0	0	0	40	40
	Sum	90	30	800	40	960

Place of birth = D

		Destination				
		A	B	C	D	Sum
Origin	A	20	0	0	0	20
	B	0	25	0	0	25
	C	10	10	0	0	20
	D	10	10	0	180	200
	Sum	40	45	0	180	265

Estimates of origin–destination flow tables

		Destination				
		A	B	C	D	Sum
Origin	A		0	50	0	50
	B	35		25	0	60
	C	10	10		0	20
	D	10	10	0		20
	Sum	55	20	75	0	150

and margins of each birthplace table). Estimates represent the number of migrant transition flows from each origin to each destination within the time period t to $t + 1$.

In reality, changes in migrant stock populations from births and deaths occur, which ensure that the row totals of sequential stock tables, such as those in Table 7.1, are not equal. However, these changes can be controlled for using demographic procedures outlined in Abel and Sander (in press). Using data on the total number of births and deaths for each country available from the UN Population Division (UNPD, 2011), the stock tables are altered to adjust for changes due to births and deaths during the interval. This procedure allows the estimated bilateral flow table to have the same net migration during the period as implied by application of demographic accounting in each country (Abel and Sander, 2014).

7.3.2.2 *Application of the methodology to obtain global flow table estimates by sex*

As discussed in Abel and Sander (2014), bilateral migrant stock data published by the UN (2012) provide bilateral migrant stock tables by sex at the start of each of the last three decades (1990, 2000, and 2010) for 230 countries. Data are primarily based on place of birth or citizenship responses to census questions, or details collected from population registers or nationally representative surveys. In order to create a complete data set the UN undertook a number of estimation steps, which are now briefly described (for full details the reader is referred to UNPD, 2012). For countries where there are no place of birth data available, data on citizenship are used as approximate measures of place of birth totals. In countries where neither place of birth nor citizenship measure were available, missing values were addressed using various propensity and interpolation methods. These were based on either historical or future data when a measure in a specific period was missing, or using available data from model countries chosen to reflect similar criteria for enumerating migrants, geographical proximity, and migration experience. Estimates of refugee populations from other UN agencies were included in the final stock totals. Some bilateral cells in the published tables are empty. These represent—for the most part—small, foreign-born populations. Aggregations of these cells are provided in two additional places of birth rows labelled 'Other north' and 'Other south'. These counts represent less than 5 per cent of the total foreign-born populations in almost all countries.

In order to estimate five-year migrant transitions flows by sex during the base year period, 2005–10, using the methodology outlined in Abel and Sander (in press) and Abel (2013a), two further steps were taken to prepare the data. First, the diagonal elements in each stock table of the native-born male or female population totals in each place of residence j, ($P_j^{k=j}$), not provided by the UN, were estimated. This was calculated as a remainder ($P_j^{k=j} = P_j^{+} - \Sigma_{k \neq j} P_j^k$) using annual male and female population totals from the UN Population Division (2011), (P_j^{+}), and the column sums of the foreign-born populations in each place of residence ($\Sigma_{k \neq j} P_j^k$). This procedure constrained the column totals of the stock tables to meet those of the reported male and female populations at the start of each decade. Second, in order to estimate five-year transition flows, a bilateral migrant stock table was required in 2005. The mid-decade table was estimated using a similar procedure used by the UN to calculate partially missing migrant stock data. The proportions of each foreign-born stock in the bilateral flow table were interpolated to their mid-decadal values. The proportions were then multiplied by the population total in 2005.[15]

Demographic data on the number of births and deaths by sex in each country, which are controlled for when estimating the flows from the stocks, were also taken from the UN Population Division (2011). In addition, data on the geographic distances between

[15] Note, we set all missing values (of small, foreign-born populations discussed in the previous paragraph) to zero.

all capital cities were also used in the estimation procedure, as outlined in Abel and Sander (2014) and Abel (2013a). These were taken from the Centre d'Etudes Prospective et d'Informations Internationales data by Mayer and Zignago (2012).

The conditional maximization routine was then run to calculate the migration flow tables for men and women in the five-year period between 2005 and 2010 using the ffs routine in the *migest* R package (Abel, 2013b). This resulted in a single bilateral table of migrant transitions from mid-2005 to mid-2010 for each sex.

7.3.2.3 *Disaggregation by age*

As with other components of demographic change, populations have been found to have considerable regularities in age-specific rates of migration. A typical migration age schedule is shown by the solid grey line in Figure 7.1.

Migration rates among infants and young children are relatively high, similar to those of their parents and other young adults in their 20s and early 30s. Migration rates of adolescents are low, but exceed those of young teens, for whom the lowest migration rate is about age 15. Rates rise to a peak after the completion of education and then fall monotonically with age to retirement years. Rogers and Castro (1981) proposed a mathematical representation of migration age schedules, $M(x)$, for age x using seven parameters:

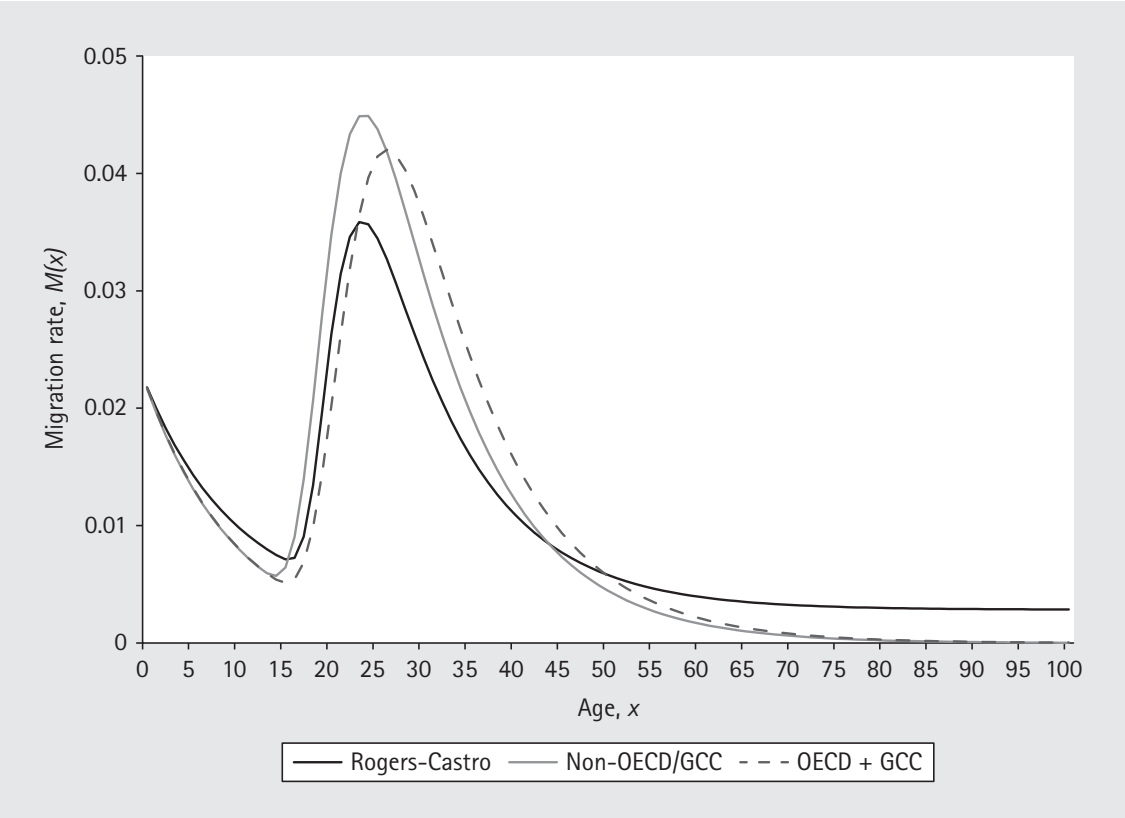

FIGURE 7.1 Model migration schedules. OECD: Organisation for Economic Co-operation and Development; GCC: Gulf Cooperation Council.

Table 7.4 The Parameters of the Model Migration Schedule for the Standard Rogers–Castro and Our Two Custom Schedules

Parameter	Rogers–Castro	Non-OECD/GCC	OECD + GCC
α_1	0.02	0.015	0.015
α_1	0.10	0.10	0.10
α_2	0.06	0.06	0.06
λ_2	0.40	0.30	0.25
μ_2	20	20	22.5
α_2	0.10	0.10	0.10
c	0.003	0	0

OECD: Organisation for Economic Co-operation and Development; GCC: Gulf Cooperation Council.

$$M(x) = a_1 \exp(-\alpha_1 x) + a_2 \exp\{-\lambda_2(x-\mu_2) - \alpha_2(x-\mu_2)\} + c$$

The first exponential in the schedule controls the rate of descent in the prelabour force component. The second exponential controls the shape of the labour force peak. In the first half, the exponential term, λ_2, represents the rate of ascent in the peak, while in the second half, the α_2 parameter controls the descent. The μ_2 term controls the location of the peak.

Rogers and Castro (1981) proposed a unisexual standard set of fundamental parameter values, having separately fitted the schedule to inter-region migration flows in 17 countries and then averaging. Later studies have proposed extensions to the model schedule, adding more parameters to include retirement peaks, post-retirement slopes (Rogers and Little, 1994), and entry into higher education (Wilson, 2010). These values, shown in the first column of Table 7.4, imply a number of simple ratios between various parts of the age schedule (see Rogers and Castro, 1981, for further details).

The migration schedule formed by entering the fundamental parameter set parameters into $M(x)$ is plotted in the solid grey line of Figure 7.1. The estimates from the schedule have been scaled to fix the area under the curve to be unity.

As there was no information on migrant stock populations by age, we were unable to estimate age-specific flows using the flows-from-stock methodology outlined earlier. In order to derive estimates by age groups, required for cohort component projection models, we relied upon the seven-parameter age schedule of Rogers and Castro to disaggregate each estimated flow in our bilateral table. Given the age schedules, where the sum of the age-specific migration rates summed to unity, we multiplied through age-specific rates at each five-year interval to each origin–destination–sex (m_{ijs}) table:

$$m_{ijxs} = m_{ijs} M(x)$$

This resulted in an array of origin–destination migration flow tables by sex and age.

In order to account for differences between internal migration (from which the fundamental parameters were derived) and our international migration application, we altered some values of the fundamental parameter set used to derive the age-specific rates, depending on the country of origin. For flows from countries outside the Organisation for Economic Co-operation and Development (OECD) and GCC countries, we applied a migration schedule with a larger labour force peak, shown in Figure 7.1. This schedule is based on the parameter set given in the second column of Table 7.4, and then scaled to set the age-specific rates to sum to unity. Only three parameters differ from those in the fundamental parameter set. First, the α_1 parameter was reduced to lower the relative amount of child migration flows in relation to young adults entering the labour force. Second, the rate of ascent in the labour force peak was lowered to average over differing ages of entrance into the labour force across multiple countries. Third, the *c* parameter was set to zero, lowering elderly international migration intensities to very low levels.

Flows that originated from OECD and GCC countries were assumed to follow a migration age schedule with a later peak, shown in Figure 7.1. This schedule is based on the parameter set given in the third column of Table 7.4 and then scaled to set the sum of the age-specific rates to unity. Two parameters differ from the schedule used for the non-OECD/GCC nations. First, the ascent of the labour force peak is further reduced. Second, the location of the peak is shifted by 2.5 years. Both alterations reflected an assumption of moves after longer periods of education and later entry into the education market in these countries, while also allowing return migration of temporary workers from non-OECD/GCC countries at older ages.

7.3.3 Current trends in global migration flows

In the absence of adequate data on bilateral migration flows, the number of net migrants and the stock of foreigners present in a given country are commonly used as proxy measures for the global flow of people. Consequently, progress towards understanding the complex patterns of country-to-country migration flows has been slow. Our unique new bilateral data on the contemporary global flow of people outlined in Abel and Sander (2014) and summarized in section 7.3.2 allow us to paint a comprehensive picture of recent intensities and patterns. Our interactive online visualization 'The Global Flow of People' is available at: <http://www.global-migration.info>.

Here, we present estimates of international migration flows disaggregated by sex that capture the number of men and women who changed residence over the five-year interval from mid-2005 to mid-2010. According to our estimates, 41.5 million people (or 0.61 per cent of the world population in 2005) moved between countries over the period 2005–10 (Abel and Sander, 2014). Of these, 21.7 million (or 55 per cent) were men. Hence, the migration rate among men was, with 0.66 per cent of population in 2005, higher than the rate for women (0.55 per cent).

Table 7.5 Estimated Numbers of Migrants (in 1,000) Within and Between Regions, 2005–10

	Europe	North America	Latin America	Africa	Former Soviet Union	West Asia	South Asia	East Asia	South East Asia
Europe	2,401	61	16	138	38	136	0	5	134
North America	1,216	96	277	47	113	130	0	39	94
Latin America	1,763	3,628	879	23	11	39	0	112	39
Africa	2,108	541	12	3,142	5	673	0	3	157
Former Soviet Union	609	21	1	2	1,871	22	0	6	1
West Asia	450	169	9	99	68	927	14	0	43
South Asia	1,390	1,508	7	61	16	4,902	1,308	74	873
East Asia	469	1,058	35	17	65	3	0	781	424
South East Asia	772	1,000	8	29	13	881	59	386	2,167

At the regional level,[16] Table 7.5 shows that just under 5 million people moved from South Asia to West Asia (mostly the oil-rich Gulf States), while 3.6 million people moved from Latin America to North America. Europe and North America recorded substantial numbers of migrants moving to and from many other regions, whereas migration in South Asia and Africa was mostly occurring within the region.

The spatial patterns of international migration flows hidden in Table 7.5 can be visualized effectively using circular migration plots (Abel and Sander, 2014). Figure 7.2 illustrates the key elements of our new method for visualizing complex flow data. A detailed discussion of these plots and how to create them is provided in Sander et al. (2014).

Figure 7.2 gives a snapshot of our flow estimates in 2005–10, aggregated into four major world regions (Abel and Sander, 2014). Compared to the widely available data on migrant stocks (i.e. people living outside their country of birth) (UNPD, 2012), our estimates suggest fewer movements in Europe and more movements within and from Asia.

The overall pattern of migration flows depicted in Figure 7.2 is one of substantial movements within each continent, as well as migration from Asia to the USA and Europe. The counter-flows from the USA and Europe to Asia are negligible in size, highlighting the substantial impact of migration on the redistribution of population (Abel and Sander, 2014).

[16] Based on regional classification of the UN, South East Asia, including Oceania.

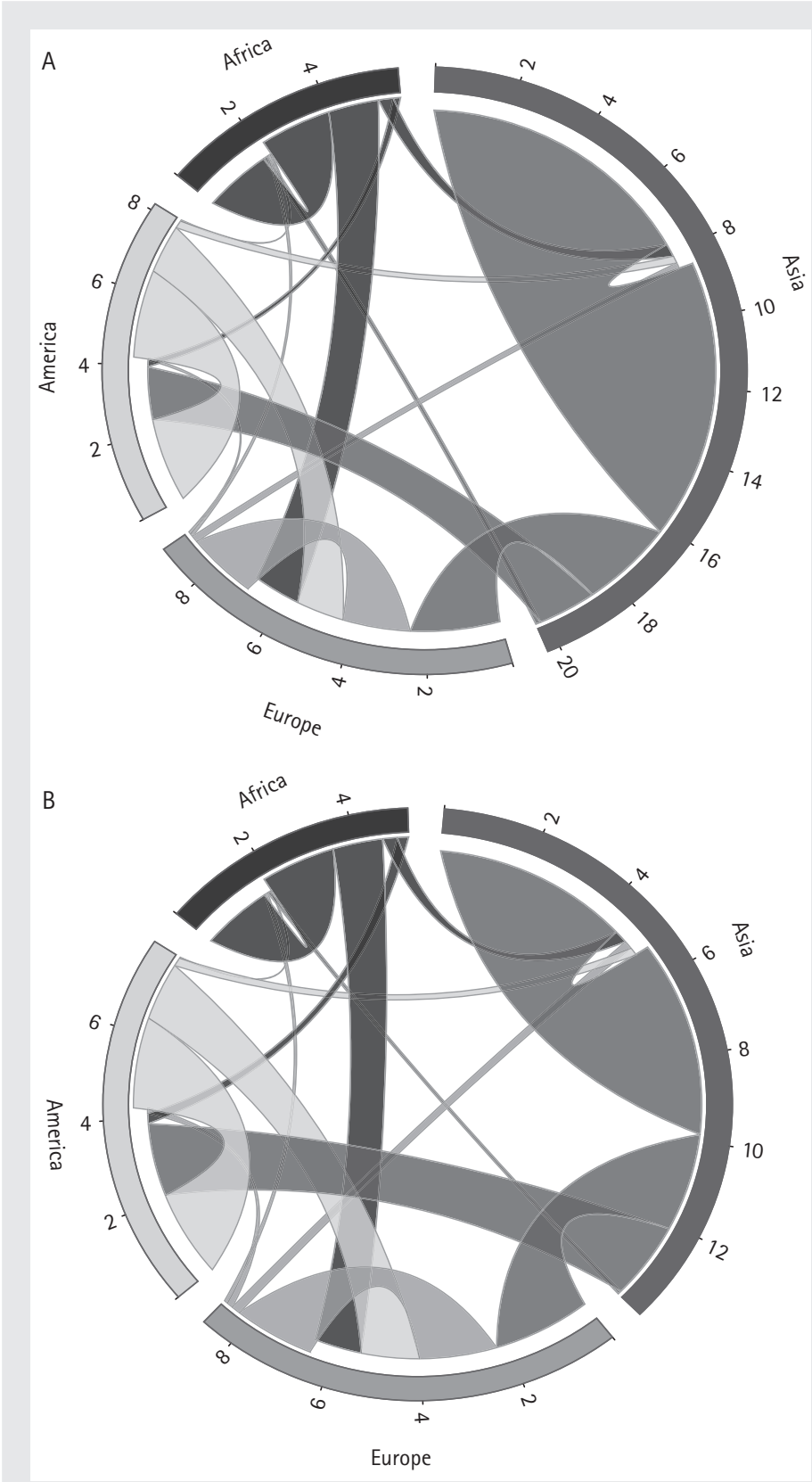

FIGURE 7.2 Circular plots of migration flows between and within world regions in 2005–10 for **(A)** males and **(B)** females (see Abel and Sander, 2014 for details). The origins and destinations of migrants (Africa, Asia, Europe, and America) are represented by the circle's segments. The direction of the flow is encoded by both the shading and a gap between the flow and the destination's segment. The volume of movement is indicated by the width of the flow. Tick marks on the circle segments show the number of migrants in millions.

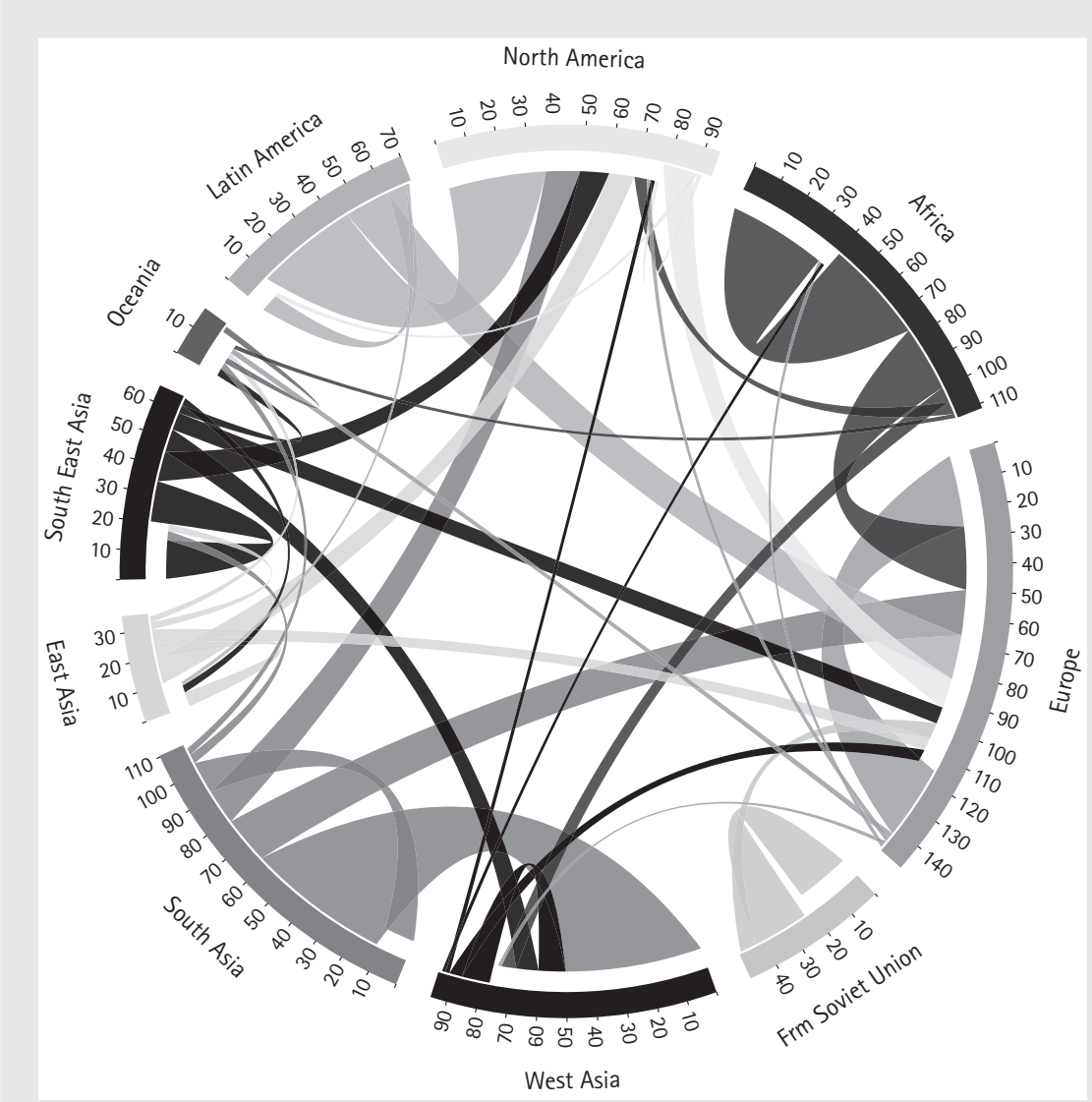

FIGURE 7.3 Circular plots of migration flows between and within world regions in 2005–10 (see Abel and Sander, 2014 for details). The origins and destinations of migrants are represented by the circle's segments. The direction of the flow is encoded by both the shading and a gap between the flow and the destination's segment. The volume of movement is indicated by the width of the flow. Tick marks on the circle segments show the number of migrants in millions. Only the largest 75 per cent of flows are shown.

Our estimates point to strong gender differences in migration, especially in movements within and from Asia. An estimated 7.7 million men (or 35 per cent of all flows among men) moved within Asia, whereas movements among women were substantially lower, with 4.6 million (or 25 per cent of all flows among women). In contrast, migration from Asia to the USA was characterized by a higher share of women (1.8 million women vs 1.5 million men). Substantial movements of female nurses and doctors from countries such as the Philippines to the USA and Canada may go some way to explain the female dominance of migration from Asia to the USA (Clark et al., 2006).

Figure 7.3 depicts our estimates of bilateral migration flows within and between ten regions in 2005–10. The high volume of migration within Asia appears to be mostly due to substantial movements from South Asia and India to the oil-rich Gulf States in West Asia. The patterns of movements between regions confirm earlier observations based on European harmonized flow data (Beer et al., 2010; Raymer et al., 2011), as well as fragmented data on migrant stocks and international flows for selected countries (see, e.g. Zlotnik, 1999). This earlier work demonstrated the dominance of migration from less to more developed countries in North America, Oceania, Europe, and—at increasing rates—the Gulf States in West Asia, alongside movements between developing countries.

The comprehensive overview of contemporary global migration flows as shown in Figure 7.3 uncovers several important features of international migration (for details, see Abel and Sander, 2014). First, the dominance of within-region flows in Africa over movements to a different continent. Second, the high spatial concentration of migrants in a relatively small number of flows from South Asia to other regions, especially to West Asia and to North America. And, third, a number of longer distance intercontinental movements through the centre of the circular migration plot.

Little attention has been paid in the literature to the gendered nature of international migration flows, owing largely to the lack of adequate data. Figure 7.4 confirms the presumption that movements to the Gulf States in West Asia are dominated by male migrants, whereas migration flows from South Asia to North America and Europe (most prominently the UK) are dominated by female migrants. The data underlying the migrant flows shown in Figure 7.4 are the same as those in Figure 7.3. The only difference between the figures pertains to the colouring of the bilateral flows. In Figure 7.4, flows are coloured based on the sex ratio (women/men) of each bilateral flow. All flows with a sex ratio of 0.5 or lower (suggesting a male-dominated flow) are coloured dark grey, whereas flows with a sex ratio of 1.5 or higher (suggesting a female-dominated flow) are coloured black. All flows with a more even sex ratio (0.5 to 1.5) are coloured light grey.

Migration within and between Africa, Europe, and Latin America is characterized by a remarkably even sex ratio, whereas migration from South Asia shows substantial differences in the sizes of flows by gender, which are strongly dependent on the destination of migrants. Movements from South Asia to North America are comprised of mostly women, whereas migration flows from South Asia to West Asia and from South East Asia to West Asia are dominated by male migrants.

What explains the movements among women from South Asia to North America? Canadian immigration statistics on the composition of immigrants by origin, occupation, visa category, and gender suggest substantial movements of female health care professionals from South Asia to Canada (Clark et al., 2006). Figure 7.5 provides some empirical evidence for the notion of skilled female labour migration to North America, Singapore, and the UK. Showing the ten largest country-to-country migration flows for women with origins and destinations of these flows arranged based on gross national income per capita in PPP (constant 2005 international $), Figure 7.5 highlights the dominance of flows from lower- to higher-income countries (UN, 2012). Not surprisingly, the largest female migrant flow (800,000 migrants) in 2005–10 went from Mexico to the

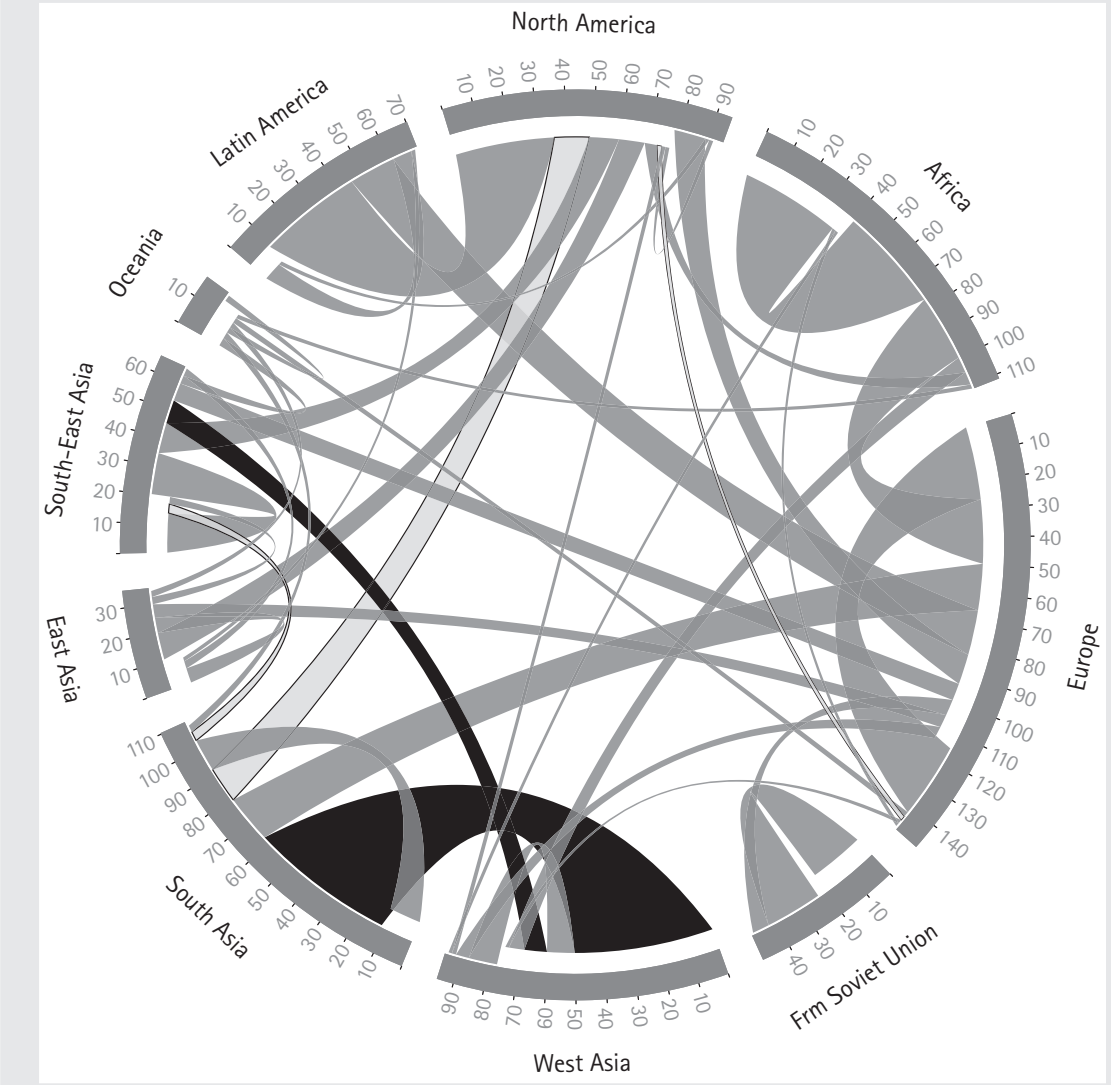

FIGURE 7.4 Circular plots of migration flows between and within world regions in 2005–10. The colour of the flow indicates the sex ratio (female/males) of the bilateral flow: black shading indicates less than 0.5 women for each men moving; grey shading indicates a sex ratio between 0.5 and 1.5; and light grey shading indicates more than 1.5 women moving for each men. The direction of the flow is encoded by a gap between the flow and the destination's segment. The volume of movement is indicated by the width of the flow. Tick marks on the circle segments show the number of migrants in millions. Only the largest 75 per cent of flows are shown.

USA, followed by 320,000 women moving from India to the USA, and just under 300,000 women moving from India to the United Arab Emirates.

The Philippines and China are also important origins of female migrants moving to the USA, confirming earlier findings about large volumes of Philippino nurses moving to more developed countries that are experiencing shortages of health care professionals (Clark et al., 2006). Noteworthy is the one-way nature of the ten largest female migrant flows, with India being the only country that is both an origin and a destination of these flows.

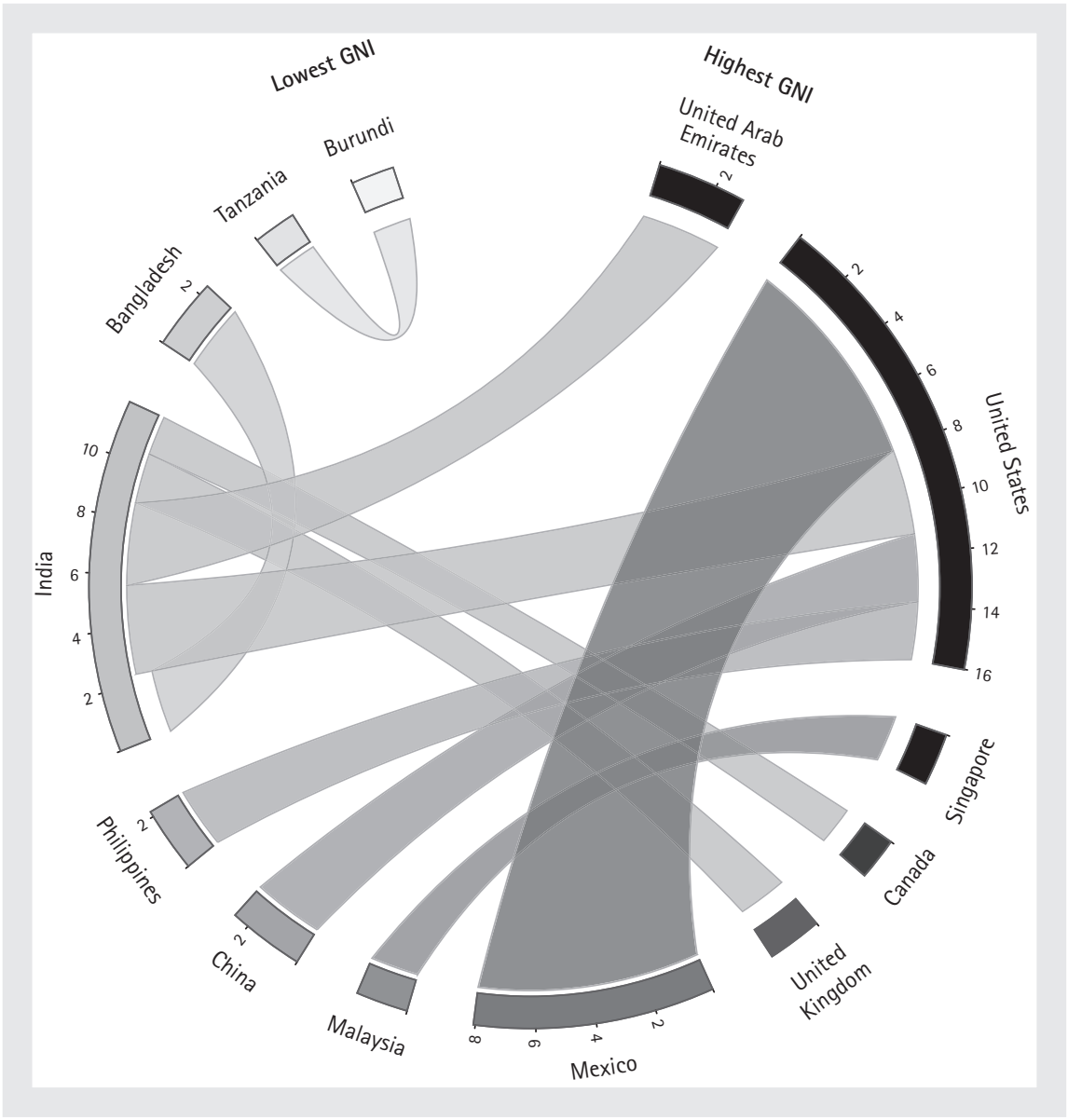

FIGURE 7.5 Circular plots of the 10 largest bilateral migration flows in 2005–10 for females. The direction of the flow is encoded by the shading and a gap between the flow and the destination's segment. The volume of movement is indicated by the width of the flow. Tick marks on the circle segments show the number of migrants in 100,000s.

The ten largest international migrant flows among men reveal a remarkably different picture compared with that for women. Figure 7.6 shows that, for men, the USA is a less prominent destination, owing largely to the attractiveness of the Gulf States for male labour migrants.

Among the ten largest flows in the world, only two went to the USA (originating in Mexico and China), whereas the Gulf States were the destinations of five of the largest flows. The origins of large male migrant flows differed substantially from those of women. For example, flows from Bangladesh to India and to the Gulf contained 1.3 million men, but only 200,000 women.

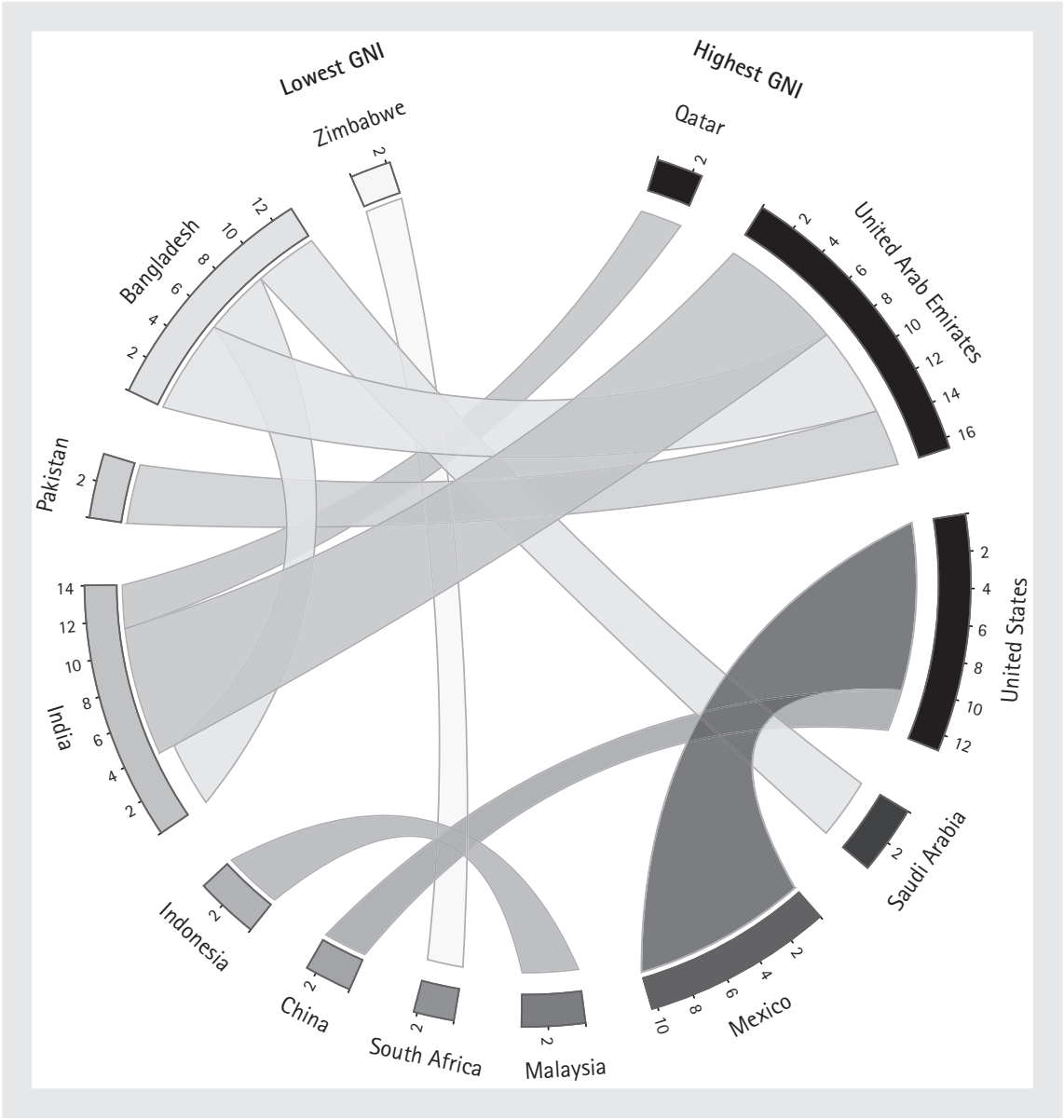

FIGURE 7.6 Circular plots of the 10 largest bilateral migration flows in 2005–10 for males. The direction of the flow is encoded by the shading and a gap between the flow and the destination's segment. The volume of movement is indicated by the width of the flow. Tick marks on the circle segments show the number of migrants in 100,000s.

For the new set of WIC projections, we extracted from our flow estimates information on the intensity of immigration and emigration for each country in the period 2005–10 disaggregated by age and sex. These immigration and emigration rates serve as the basis for our assumptions about future migration. Owing to lack of space, we present in Figures 7.7 and 7.8 only the ten countries in the more developed world (left) and the less developed world (right) with the highest immigration and emigration intensities in 2005–10. Rates were calculated using each country's population in 2005.

Figure 7.8 depicts the more and less developed countries with the highest emigration rates in 2005–10. The overall pattern is one of much lower emigration rates compared

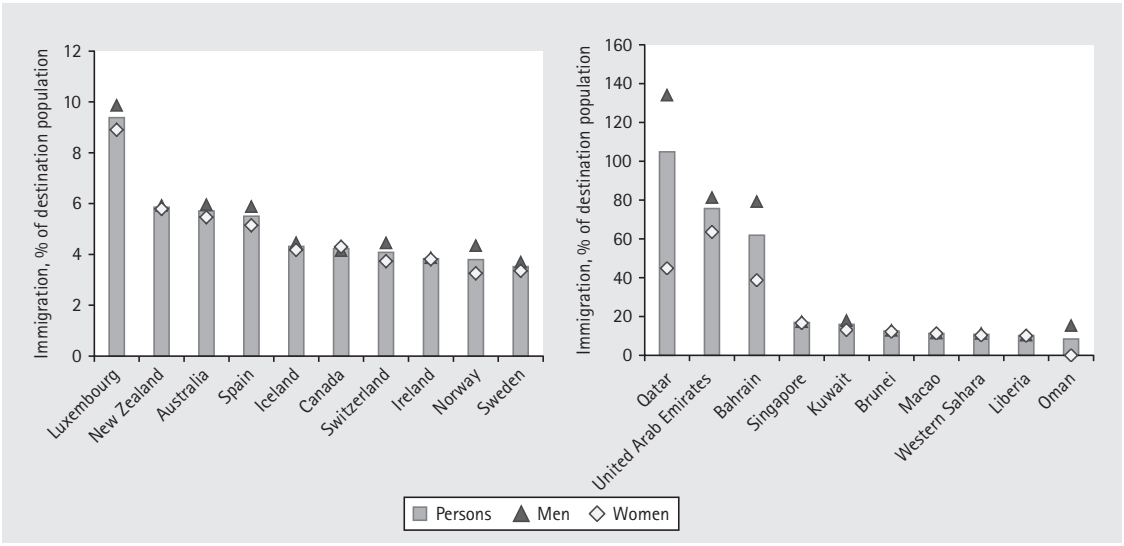

FIGURE 7.7 The top ten *immigration* countries (in per cent of population) among more developed (left) and less developed (right) countries in 2005–10.

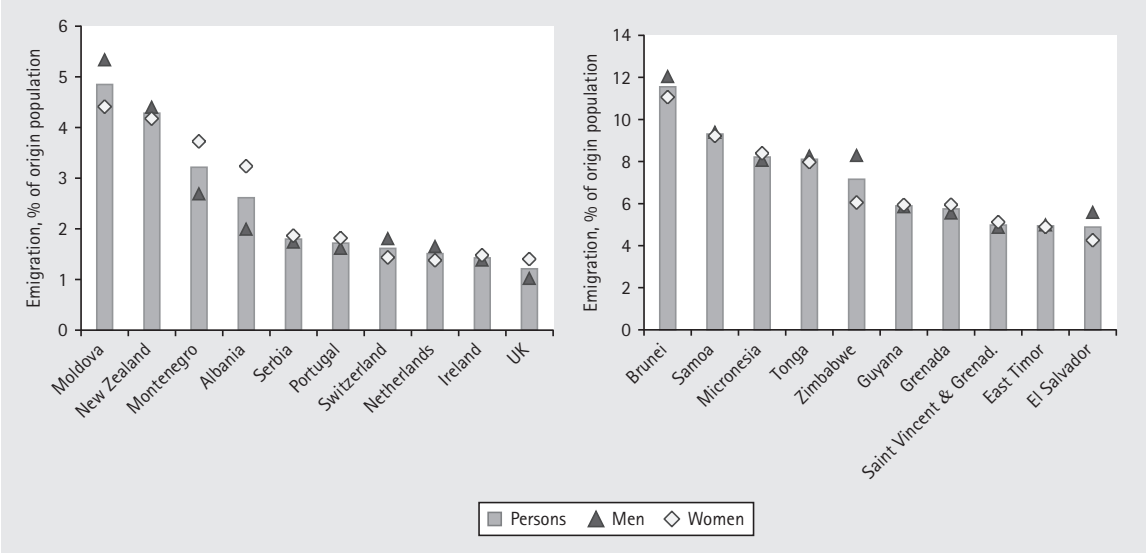

FIGURE 7.8 The top ten *emigration* countries (in per cent of population) among more developed (left) and less developed (right) countries in 2005–10.

with the immigration rates shown in Figure 7.7. Moreover, gender differences are stronger for emigration from more developed countries than from less developed ones (with the exception of Zimbabwe, which records strong male labour migration to South Africa). High intensities of emigration from several Eastern European countries (e.g. Moldova, Montenegro, Albania, and Serbia) can be expected to accelerate population ageing and decline in these countries. As we discuss in section 7.5, the projected size of populations in these countries strongly depends on whether assumptions about future trends are made in terms of absolute numbers of emigrants or in terms of emigration rates.

7.4 Population projections using a bi-regional model

The accurate projection of migration in the long run is one of the most difficult challenges in population forecasting. The high temporal volatility in net migration in many countries coupled with the lack of adequate bilateral flow data has hindered the application of multiregion flow models (Rogers, 1995) in global population projections. Consequently, the widely used projections published biannually by the UN use simplistic assumptions of net migration measures derived as residuals from demographic accounting. However, net migration numbers are known to introduce inaccuracies when projecting populations (Raymer et al., 2012; Rogers, 1995; Wilson and Bell, 2004).

The global population WIC projections presented in this volume depart from the common practice of focusing on a convergence of net migration rates towards zero. Instead, we apply a multiregion projection model to forecast global population. The baseline migration data for the projection model are obtained from the application of a methodology to estimate global bilateral flow tables from known migration stock totals detailed in section 7.3. A more detailed discussion of the methodology is given in Abel (2013a).

Multiregional projection models are frequently used in subnational projections (Wilson, 2011). Rather than projecting each country-to-country flow, we use the bi-regional model as a spatial aggregation of the full multiregional framework (Rogers, 1995). In the bi-regional setting, each country in the world is handled in turn. Migration to and from each country is projected by dividing the world into the target country and the rest of the world (see Figure 7.9). Then, international migration flows from the target country (here: USA, then Canada) to the rest of the world, and vice versa, are projected. While yielding results that are similar in accuracy to the multiregion model, the bi-regional version requires much fewer input data and fewer assumptions (Wilson and Bell, 2004; Raymer et al., 2012).

To take into account the effects of population ageing and decline on migration intensities, our migration assumptions correspond to probabilities rather than absolute numbers. The assumption of constant probabilities rather than constant absolute numbers of migrants can, over time, produce changes in the absolute flows as a function of changing national population size (for emigration) or world population size (for immigration). Using a transitions framework, we compute emigration probabilities in 2005–10 using the origin population in 2005, conditional upon survival to 2010. Immigration probabilities for a given country are calculated using the population in the rest of the world in 2005, conditional upon survival to 2010. Directional migration flows are then projected as the product of migration probabilities and the population in the origin (for emigration) and the rest of the world (for immigration). As with all bi-regional models, a small adjustment is made at each five-year projection step to ensure that total emigration across all countries equals total immigration.

FIGURE 7.9 Dividing the world in a target country and the rest-of-the-world in the bi-regional model using USA and Canada as examples.

7.5 Expert views on the future of migration

Future intensities and spatial patterns of international migration will be shaped by myriad forces, ranging from economic development to policy interaction to demographic trends. Such complexities render any approach to projecting global migration trajectories naturally difficult and lead to a large degree of uncertainty about future trends. Consequently, international projection-making agencies commonly use simplistic assumptions of net-migration converging to zero over the projection horizon, despite sustained increases in net migration in many developed countries.

The bi-regional projection model allows us to circumvent the aforementioned problems by making assumptions for immigration and emigration flows. We tackle the challenging task of making plausible assumptions about future international migration by drawing on expert views about the future trajectory of migration, which were collected using a structured online survey (referred to as source experts' views hereafter) and a two-day expert group meeting (referred to as meta-experts' views hereafter).

7.5.1 Source experts' views from the online survey

The IIASA–Oxford online survey was sent to all members of international population associations in mid-2011.[17] The survey's objective was to obtain source experts' views on the likely impact of various factors on future immigration and emigration levels to/from a particular country of the respondent's choice. The impact that economic, demographic, environmental, and policy factors may have on migration combine the various pull and push forces prevailing in more developed and less developed countries, and were formulated as neutral arguments. For example, one argument on economic growth reads: 'Remittances will become more important for the economic development of migrant-sending countries'. A full list of the arguments pertaining to five different forces is given in Appendix 7.1.

For each of the 30 arguments, the experts were asked:

'Based on your understanding of current scientific knowledge and with reference to the period up to 2030, do you think the argument is . . . (very likely to be wrong to very likely to be right)'

'If the above argument were completely true, what effect would this have on future levels of immigration? (strongly decreasing to strongly increasing)'

'If the above argument were completely true, what effect would this have on future levels of emigration? (strongly decreasing to strongly increasing)'

[17] See Chapter 2 for a detailed discussion on the online survey.

Three key indicators are provided as follows.

1. Validity, ranging from 0 to 1.0, indicates whether a given argument is likely to be true, based on five predefined response options and the validity score attached to them.
2. Impact, assessing the hypothetical influence of a given trend on migration. The predefined range was from –1.0 (strongly negative) to +1.0 (strongly positive).
3. Net impact, assessing validity and impact in combination. This was calculated by multiplying the validity score with the impact score.

The respondents were also asked to give a point estimate for the number of net migrants they expect the country of their choice to gain or lose. Unfortunately, the directional flow estimates presented in Abel and Sander (2014) and summarized in section 7.3 were not yet finalized at the time the IIASA–Oxford survey was distributed. Thus, we relied on the UN estimates of net numbers of migrants as the only migration data set available for the period 2005–10 that covered all countries in the world. The results from this section of the survey were inconclusive, reflecting the dearth of migration theory that could provide guidance in determining future trajectories, and the fact that scientific endeavour into thinking about future international migration has lagged behind fertility and mortality. Moreover, respondents noted problems with setting the 80 per cent range using the web interface, which may explain a large degree of disagreement among respondents about future net migration levels for individual countries. Given that the bi-regional projection model requires assumptions for immigration and emigration flows, rather than net migration, we found the assessment of the impact of arguments more beneficial than the point estimates for setting migration assumptions.

The 30 arguments pertaining to economic, demographic, climatic, and policy impacts on migration were grouped into five clusters. Towards the end of the survey, respondents were asked to assign weights of relative importance to each of these clusters. The weights sum to 100 per cent for all clusters combined. We computed the mean cluster weights over all respondents and countries, as they showed only minor regional differences.

Overall, we obtained 122 responses in the migration module of the survey. Table 7.6 shows the distribution of the responses across regions for which responses were given. There was a reasonable spread across regions, with a considerable share of responses for North America and Europe.

Figures 7.10 and 7.11 summarize source experts' views on the likely future trajectory of global migration flows over the period 2010–30. The figures indicate the relative weight of each of the five clusters and the mean net impact of each argument at region level. The relative weight of each cluster is indicated by the slice of the circle devoted to them. For example, the largest slice of the circle is devoted to the cluster of arguments on economic factors as this cluster was expected to have the strongest relative impact. Within each cluster, the arguments are arranged based on their identification (ID). The net impact, calculated simply by multiplying the impact score with the validity score pertaining to each argument, is shown on a scale from –0.8 to 0.8. Values below 0 (inside of the solid black line) cause the intensity of migration to decrease; values above 0 (outside of the solid black line) cause migration to increase. To aid visual examination of the survey

Table 7.6 IIASA–Oxford Survey Responses by Region

Region	Responses
North America	29
Latin America	17
Europe	36
Former Soviet Union	1
West Asia	5
South Asia	9
East Asia	3
South East Asia	7
Oceania	6
Africa	9
Total	122

results, the argument ID and an abridged version of the argument text are shown on the outside of the circular graph.

Figure 7.10 depicts the net impact of each argument on future immigration, calculated as region-specific mean net impact. The effect that each argument is expected to have on immigration varies substantially across regions, reflecting the well-established pattern of sending and receiving countries. For example, argument M 1–7 'Economic recession' has a negative impact on immigration to North America and Europe, and a positive impact on immigration to Africa. The latter effect appears to be primarily driven by return movements of African migrants as a result of less demand for migrant workers in North America and Europe. The overall picture is one of more positive than negative effects of arguments on future immigration. Arguments pertaining to climate and migration costs are expected to increase migration levels, although the relative importance attributed to these two clusters is low, as indicated by the small slice of the circle.

Arguments pertaining to economic forces are expected to have the strongest impact on immigration levels. Immigration is expected to increase if remittances become increasingly important for economic development in sending countries, if income differentials between countries further widen, and if population ageing results in increasing labour and skill shortages in more developed countries. At the other end of the spectrum, immigration to North America and Europe would decline if foreign direct investment in developing countries as a stimulus to economic growth rectifies the imbalance between supply and demand in the labour markets in those countries (M 1-5), or if global wage levels converge in the long run (M 1-8). The strongest negative impact is given to economic recessions in industrialized countries and the resulting decline in demand for migrants (M 1-7).

The impact of each argument on future emigration (see Figure 7.11) reveals larger differences between regions than for immigration. The impacts are expected to be very strong for Africa (white circle) and East Asia (light grey triangle), whereas the

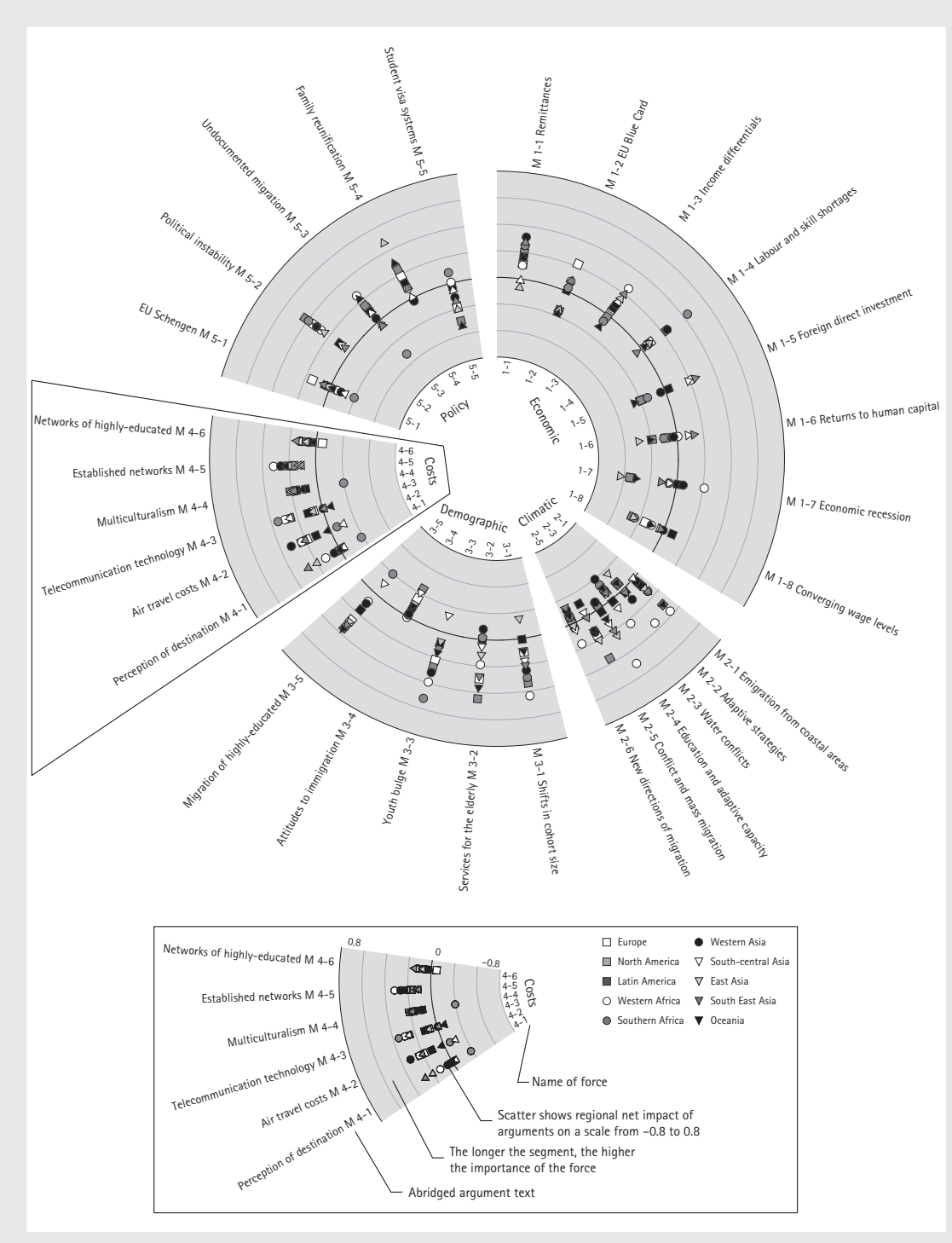

FIGURE 7.10 Mean net impact by region for all arguments about future immigration. EU: European Union.

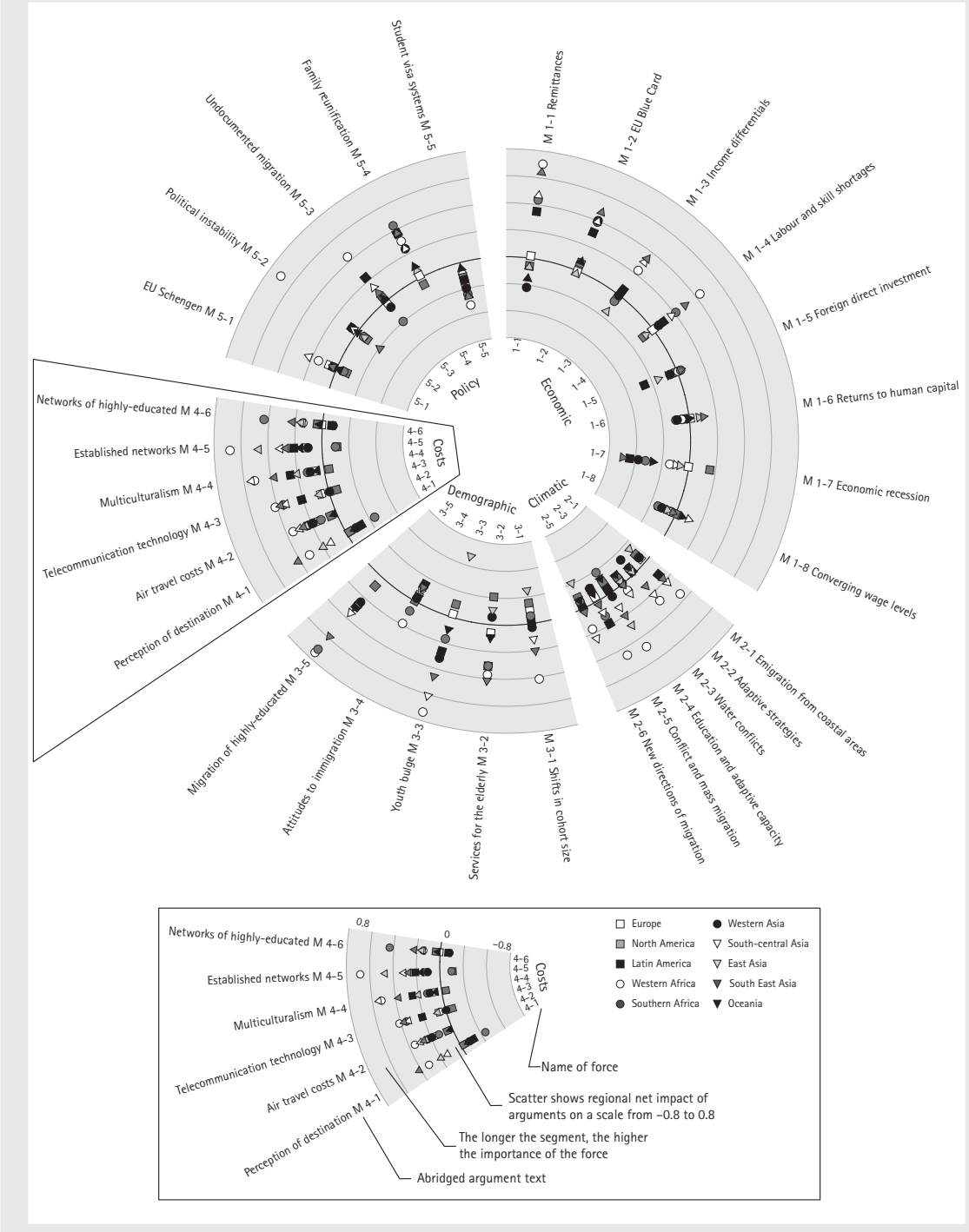

FIGURE 7.11 Mean net impact by region for all arguments about future emigration. EU: European Union.

expected impact on emigration from Europe and North America is closer to zero for most arguments. Noteworthy are the strong positive impacts of arguments on remittances (M 1-1), a demographic youth bulge (M 3-3), education differentials (M 3-5), and family reunification (M 5-4) on emigration.

In summary, it appears that overall trends in future migration will be driven mostly by economic and demographic developments, as well as selected policy-related factors. Environmental forces are expected to have a strong impact, but the validity scores of the arguments within this cluster were the lowest of all 30 arguments, and the relative weight of the cluster was the smallest of all clusters. These results partly reflect the large degree of uncertainty about potential negative impacts of climate change on migration, with most environmentally-induced migration expected to be within countries rather than across borders.

7.5.2 Meta-expert's views

These results from the IIASA–Oxford survey were complemented by an expert group meeting held at the University of Colorado at Boulder, USA, in the autumn of 2011. The participants, representing different geographic regions, scientific disciplines, and areas of expertise included nine meta-experts, one representative of the University of Colorado, and three representatives of the Wittgenstein Centre for Demography and Global Human Capital (WIC).[18] Selected results from the survey were presented to the meeting participants to serve as a basis for discussion. All participants stressed the importance of departing from convergence to zero assumptions and making plausible assumptions about future migration flows. They also emphasized the need for more adequate data on contemporary migration flows. The lack of flow data and the dominance of zero convergence scenarios in existing global population projections meant that discussing future levels of immigration and emigration for each country in the world was too ambitious a task.

In considering the issues related to the dearth of existing migration projections that could have served as a basis for discussions about future numbers of migrants, the aim of the meeting was to elaborate in qualitative, rather than quantitative, terms the likely future trajectory of migration flows to and from the major regions. The meta-experts were asked to identify the arguments from the survey that, in their opinion, best capture the key determinants of migration that are likely to be most influential in shaping future trends. The seven arguments identified by the participants are shown in Figures 7.12 and 7.13, and listed in Table 7.7. In several round table discussions, we then elaborated how these arguments will shape migration to and from major regions. Experts expressed their views on whether arguments would increase, decrease, or have no impact on immigration and emigration. Figures 7.12 and 7.13 depict the outcomes of the roundtable discussions and provide a comparison with the results of the survey. The meta-experts were

[18] Meta-experts participating in the meeting were Ayla Bonfiglio, Philip Rees, James Raymer, Andrei Rogers, Graeme Hugo, Siew-Ean Khoo, Joel Cohen, David Coleman, Guy Abel, Bill Butz, Fernando Riosmena, Nikola Sander and Jeffrey Passel.

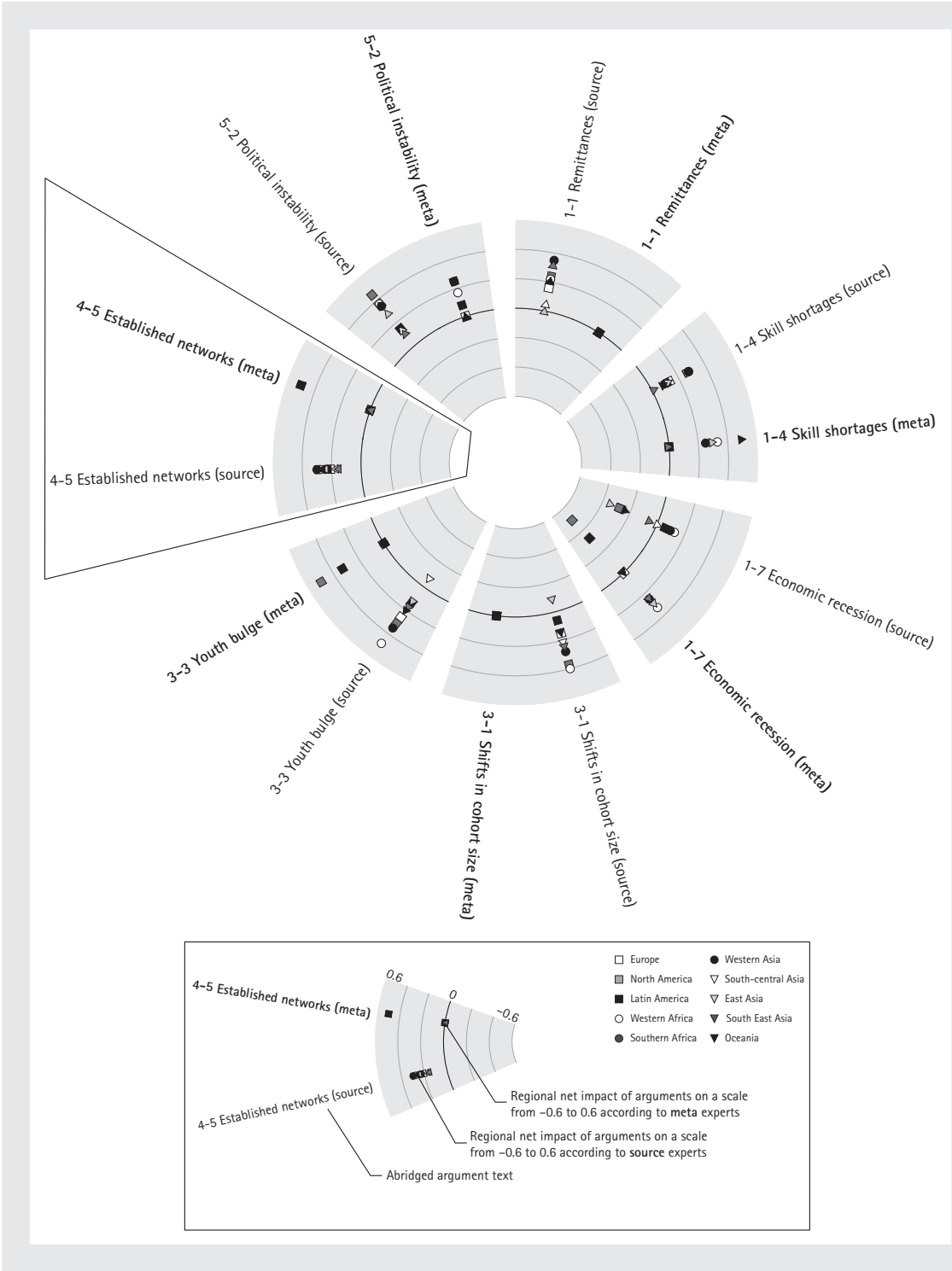

FIGURE 7.12 Expert views on future immigration among source experts (normal font) and meta-experts (bold font) for seven arguments identified by meta-experts as having a strong impact on future trends. Results for source experts are identical to those shown in Figure 7.10. EU: European Union.

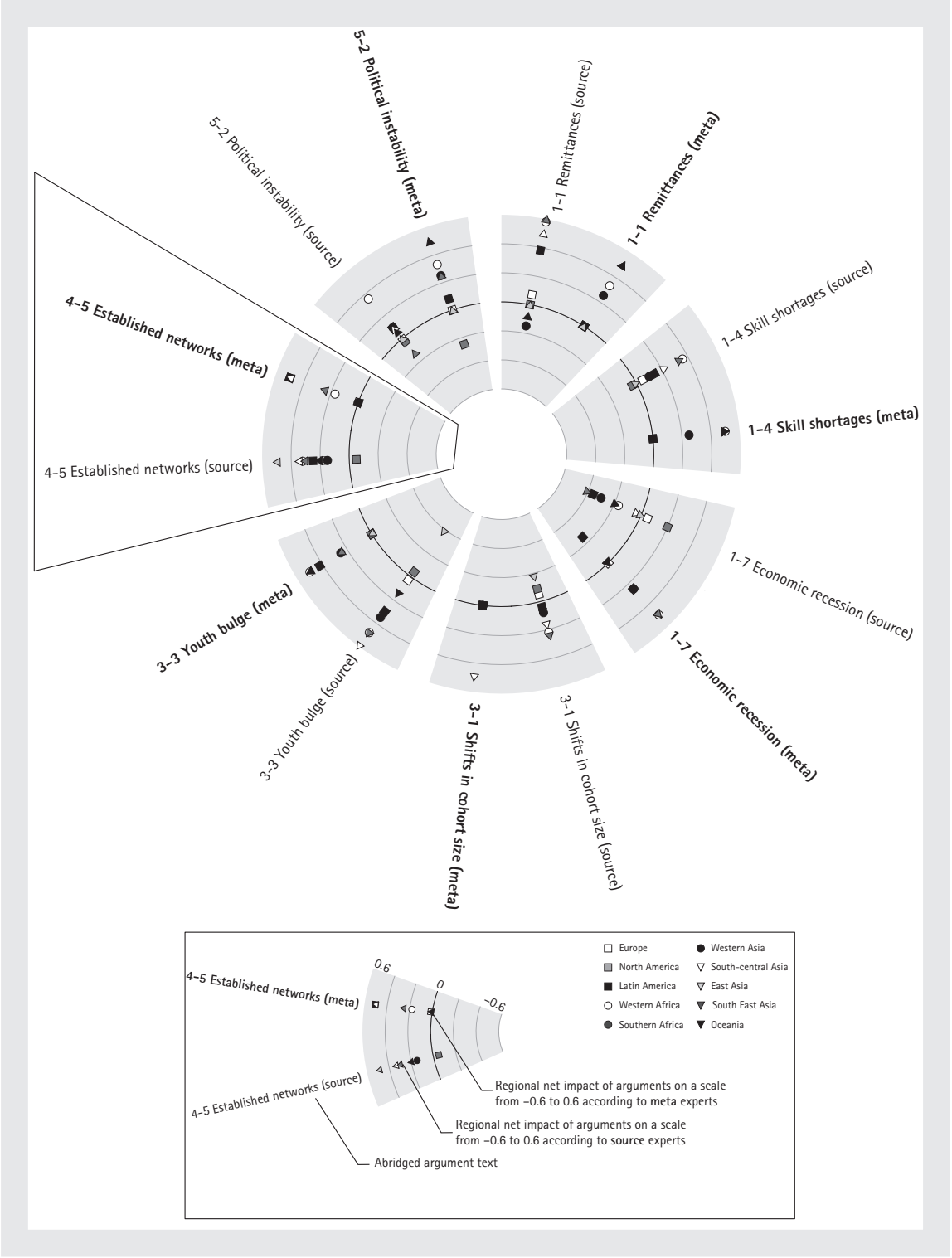

FIGURE 7.13 Expert views on future emigration among source experts (normal font) and meta-experts **(bold font)** for seven arguments identified by meta-experts as having a strong impact on future trends. Results for source experts are identical to those shown in Figure 7.11. EU: European Union.

Table 7.7 Key Arguments Identified by Meta-experts as Having a Strong Impact on Future Trends

Identification	Argument text
1–1	Remittances will become more important for the economic development of migrant-sending countries.
1–4	Temporary labour migration will increasingly compensate for skills shortages in developed countries and thus replace permanent migration.
1–7	Major economic recessions/stagnation in industrialized countries will lead to less demand for migrants.
3–1	Shifts in cohort size, especially related to the baby boom and bust, will play an important role in shaping international migration levels.
3–3	The propensity to move abroad among 15–29-year-olds will be particularly high in countries with a large 'youth bulge'.
4–5	International migration will mostly follow established paths and existing migrant networks.
5–2	Political instability and oppression in African and Middle Eastern countries will result in more people seeking political asylum in democratic countries.

broadly in agreement about the way our seven key arguments are likely to shape future trends.

The overall pattern of expert views suggests that prolonged economic recession in the traditional migrant-receiving countries in the developed world is the only argument that may cause immigration to the receiving countries and emigration from the traditional sending countries to decrease. All other arguments, especially those pertaining to cohort size and occurrence of a youth bulge, are expected to lead to higher volumes of migration.

7.6 Specification and justifications of assumptions

The development of assumptions for future immigration and emigration for each country in the world was primarily based on (1) meta-experts suggesting a 'business-as-usual scenario' to be most appropriate as a medium scenario; (2) meta-experts emphasizing the importance of accounting for changes in the size and age structure of origin populations through assumptions for migration rates rather than numbers; and (3) the net impact scores for the seven key arguments identified by the meta-experts.

The expert views collected in the IIASA–Oxford survey and subsequent discussions with meta-experts focused on the period 2010–60. Likely trends for the period 2060–2100 were not considered in the meeting because of major uncertainties concerning migration trends in the second half of the century. In light of this uncertainty, we assume a

gradual convergence to zero net migration over the period 2060–2100. This is achieved by converging each country's immigration and emigration flows towards their average, so that each country's net migration reaches zero in the last projection period, 2095–2100.

7.6.1 The medium scenario

A 'business-as-usual' scenario assuming jump-off period rates to remain constant was suggested during the expert group meeting. A constant rates scenario was therefore preferred over a time series forecast, the assumption of turning points, or a projection model based on other projected covariates.

Our medium scenario therefore assumes immigration and emigration rates estimated for the period 2005–10 to remain constant throughout the projection horizon until 2060.[19] We make assumptions for rates rather than absolute numbers to take into account changes in the population size and age structure of origin populations. For example, using migration rates assumptions, we ensure that emigration from strongly ageing and weakly growing populations in Eastern Europe will decrease over the projected period. Adjustments are made to the constant rates assumption for 25 countries where rapid changes to migration trends occurred in the last decade (e.g. immigration to Spain), which are unlikely to persist until the year 2060 (Table 7.8).

7.6.2 Two alternative 'what if' scenarios

We drew on expert views regarding the impact of a set of arguments for future migration patterns and intensities for developing alternative immigration and emigration assumptions. The net impacts of seven key arguments for migration identified by the meta-experts as being most relevant in shaping future trajectories were translated into two 'what if' scenarios. The number of scenarios had to be limited to two so that the migration scenarios could be readily combined with the high and low scenarios for fertility and mortality. A key distinction between the two migration scenarios had to be that one results in lower levels of global migration flows, whereas the other results in higher global volumes. We therefore based the first scenario on the net impact scores of all key arguments that cause immigration to the traditional receiving countries and emigration from the traditional sending countries to decrease. The second scenario was based on the net impact scores of all key arguments that yield higher immigration to the receiving countries. The resulting scenarios can be summarized as follows.

The 'rise of the east' (referred to as RE scenario hereafter) scenario assumes economic stagnation in Europe and North America, resulting in restrictive migration policies.

[19] A table with the assumed immigration and emigration rates for each country is given in Appendix II.

Table 7.8 Percentage Change in Assumed Rates of Immigration and Emigration Over the First Two Projection Periods Under the Medium Scenario for Countries Where the Constant Rates Assumption Appears Not to be Plausible. For Example, Immigration Into Australia is Assumed to Decrease by 20 Per Cent in the Period 2010–15 to 2015–20

Country	Immigration	Emigration
Australia	-0.20	–
Austria	-0.20	–
Bahrain	-0.65	0.20
Burundi	-0.20	–
Czech Republic	-0.20	–
Greece	-0.20	–
Iceland	-0.20	–
Ireland	-0.20	–
Italy	-0.65	–
Kuwait	-0.20	–
Liberia	-0.20	–
Luxembourg	-0.20	–
Macao	-0.20	–
Micronesia	–	-0.20
Norway	-0.20	–
Qatar	-0.65	0.20
Samoa	–	-0.20
Singapore	-0.65	–
Spain	-0.65	–
Sweden	-0.20	–
Switzerland	-0.20	–
Tonga	–	-0.20
United Arab Emirates	-0.65	0.20
UK	-0.20	–
Zimbabwe	–	-0.20

South and South East Asia become increasingly attractive destinations, resulting in a shift in global migration patterns. Assumptions under this scenario are based on the mean net impact of argument 1–7, 'economic recession'.

The 'intensifying global competition' scenario (referred to as IGC scenario hereafter) assumes dynamic economic growth and social development, resulting in growing competition among governments and the private sector for (skilled) labour and natural resources, as well as between the traditional activities of agriculture and mining and industry, residential development and recreational activities. Economic growth in the developing world contributes towards rising levels of global mobility, which is paralleled by liberal immigration policies in the more developed world. Assumptions under this scenario are based on the mean net impact of arguments 1–4 'labour and skill shortages', 2–3 'water conflicts', 3–3 'youth bulge', 4–5 'established networks', and 5–2 'political instability'.

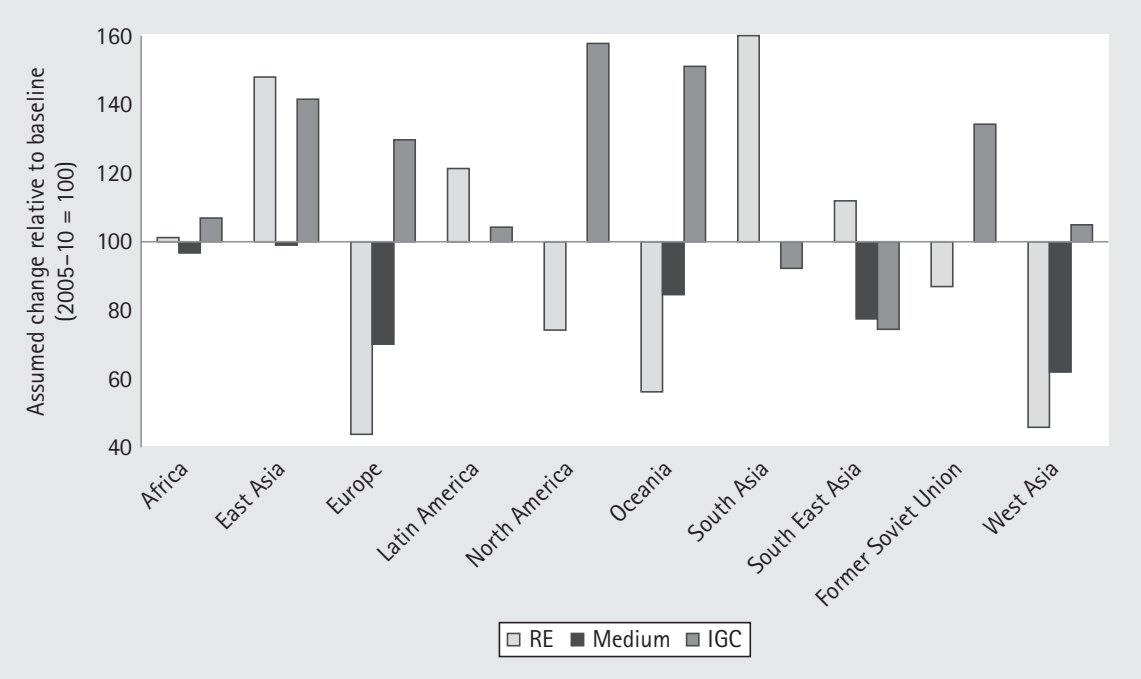

FIGURE 7.14 Translating expert views on future *immigration* into alternative scenarios. The assumed relative change in immigration volumes by region under the 'rise of the east' (RE), medium, and 'intensifying global competition' (IGC) scenarios. Immigration volumes in the jump-off period 2005–10 are set to 100.

The mean net impact scores were translated into a set of multipliers, which cause the global volume of flows to decrease under the RE scenario and to increase under the IGC scenario. The multipliers were region-specific and applied to all countries in a given region in the first two projection periods (2010–15 and 2015–20). After 2020, rates are then kept constant until 2055–60. Figures 7.14 and 7.15 show assumed region-specific changes in immigration and emigration between 2005–10 and 2015–20 under alternative scenarios. For most countries, migration intensities are assumed to stay constant under the medium scenario, with some exceptions in Europe, Oceania, South East Asia, and West Asia.

The traditional receiving countries in Europe, North America, and Oceania are assumed to record lower immigration volumes under the RE scenario and higher volumes under the IGC scenario. At the other end of the spectrum, East Asia, South Asia, and South East Asia are assumed to experience higher levels of immigration under the RE scenario. In East Asia, immigration volumes are assumed to rise under both the RE and the IGC scenarios, reflecting the sustained pattern of strong economic growth and hence the growing attractiveness of the region as a migrant destination.

To illustrate how expert opinion was translated into immigration and emigration assumptions for each of the 195 countries in the age–sex projections, Figure 7.16 shows the assumptions on future immigration for Austria.

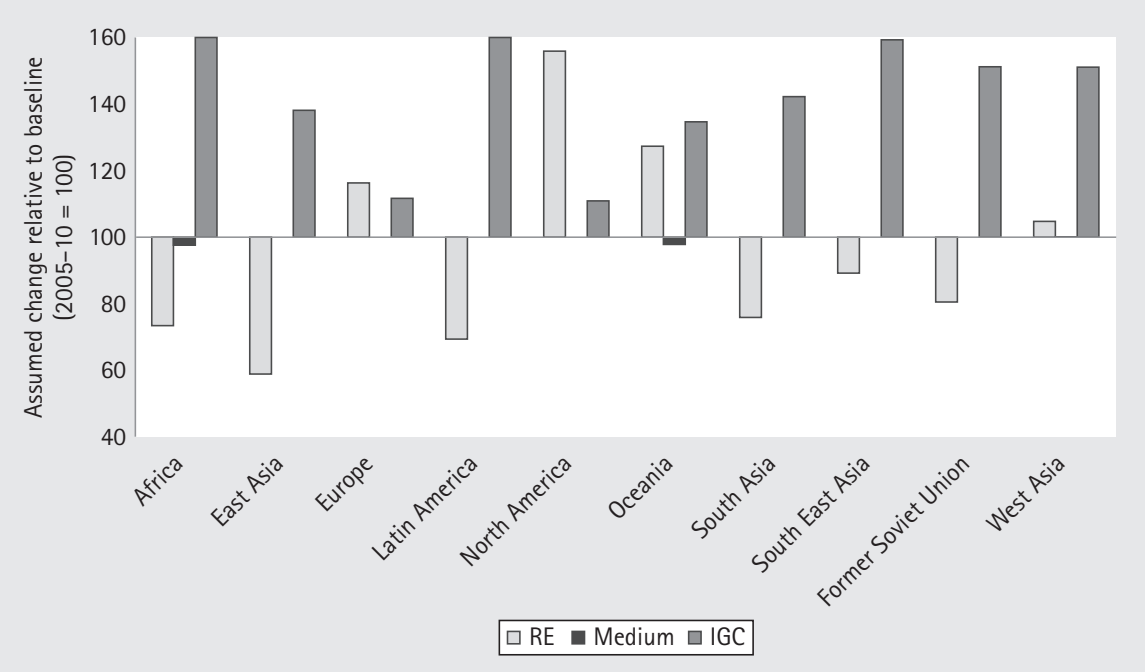

FIGURE 7.15 Translating expert views on future *emigration* into alternative scenarios. The assumed relative change in emigration volumes by region under the 'rise of the east' (RE), medium, and 'intensifying global competition' (IGC) scenarios. Emigration volumes in the jump-off period 2005–10 are set to 100.

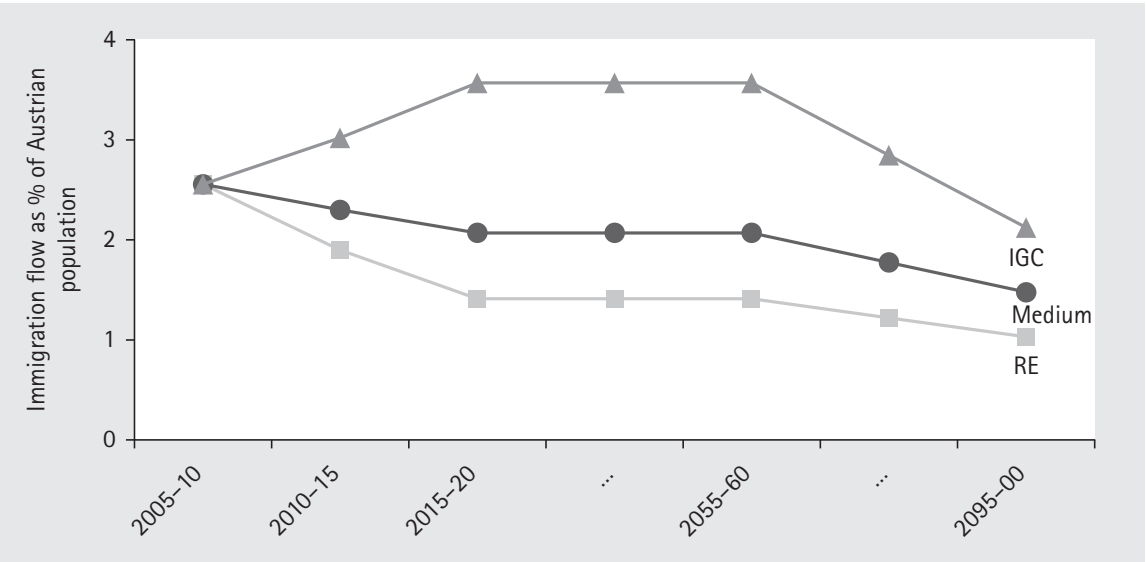

FIGURE 7.16 Assumed rates of immigration for Austria under alternative scenarios. Expert-based multipliers cause the estimated intensity of immigration in 2005–10 to decline under the 'rise of the east' (RE) scenario and to increase under the 'intensifying global competition' (IGC) scenario until 2015–20. Under the medium scenario, the estimated intensity in 2005–10 is assumed to decline slightly over the first two projected periods. All rates are assumed to remain constant over the period 2020–60. A gradual convergence to zero net migration is assumed for the period 2060–2100.

7.7 Projected numbers of migrants

This section presents selected results of the bi-regional cohort-component population projections by age and sex for 195 countries. We focus on the projected numbers of migrants at world, region, and country levels. A detailed discussion of the overall results of the population WIC projections for 195 countries and the human capital projections for 171 countries is provided in Chapters 10–12.

Figure 7.17 shows the projected number of global migrants under three alternative scenarios. In the 5-year period 2005–10, an estimated 40 million people changed their country of residence. Under the medium scenario, this number is projected to decline to 32 million in 2015–20 owing to the correction factors we applied under the medium scenario for the periods 2010–15 and 2015–20 to lower assumed volumes of immigration in selected countries. Because we draw on a bi-regional flow model to project migration, our assumption of decreasing immigration flows to countries like Spain and Singapore over the first two projected periods results in less emigration from the origin countries (e.g. Latin America for Spain and Malaysia for Singapore) and thus smaller numbers of global migrants. Under the IGC scenario, global migration volumes are projected to increase substantially compared with the medium scenario, whereas the decline under the RE scenario is more subtle. The decline in global migration under the RE scenario is small because of the assumed shift in spatial patterns of global migration. Destinations in Europe and North America become less attractive, whereas destinations in Asia become increasingly popular.

Under all three scenarios, the global number of migrants is projected to peak in the period 2040–45, with population ageing combined with our assumed Rogers–Castro

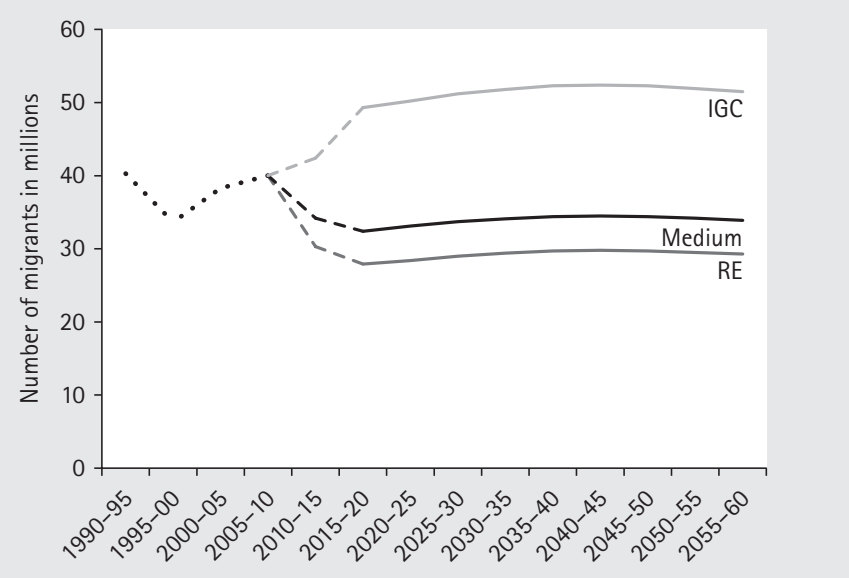

FIGURE 7.17 Estimated (1990–95 to 2005–10) and projected (2010–15 to 2055–60) number of global migrants moving over five-year periods under alternative scenarios. RE: 'rise of the east' scenario; IGC: 'intensifying global competition' scenario.

migration schedule causing numbers to decline thereafter. The dawning of an era of mass migration seems to be rather unlikely if current trends continue as assumed under the medium scenario.

Figures 7.18–7.20 depict the projected numbers of immigrants, emigrants, and resulting net migration by region under alternative scenarios. Differences between scenarios are most pronounced in the traditional destination regions in North America, West Asia, and Europe (for immigration) and the sending regions in South Asia and Africa (for emigration). Under the medium scenario, sub-Saharan population growth is projected to boost emigration numbers, although at lower rates than commonly assumed. Population ageing in many parts of the world, including East Asia, Latin America, and Europe, is projected to result in lower volumes of emigration from these ageing regions.

The overall pattern is one of projected increases in emigration from South Asia and Africa, much reduced losses in East Asia, smaller gains in West Asia and stable gains in North America and Europe. Since in the bi-regional model, immigration is projected as the product of the assumed immigration rate and population in the rest of the world, one could have expected a substantial increase in immigration numbers to North America and Europe as a result of global population growth. Figure 7.18 shows that the positive effect of population growth in the less developed world will be offset by widespread population ageing, which, under the assumption of a Rogers–Castro migration schedule, results in lower numbers of projected migrants.

Figure 7.21 shows the projected numbers of migrants for Austria until 2060. The results can be readily compared to the assumed immigration rates shown in Figure 7.16.

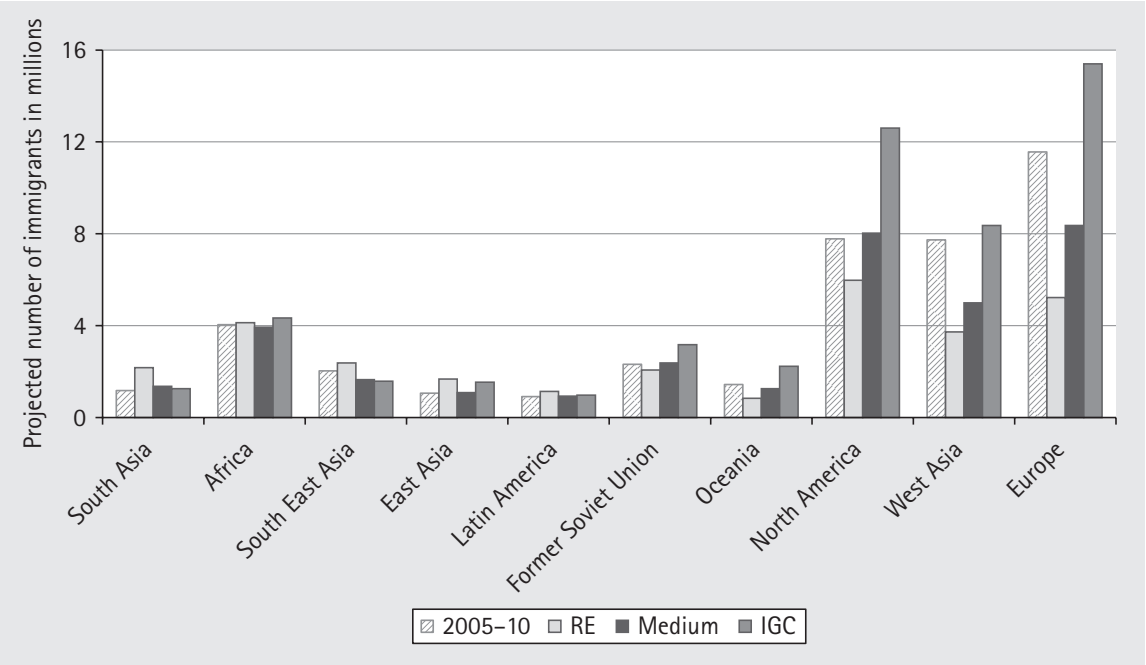

FIGURE 7.18 Estimated (2005–10) and projected (2055–60) number of *immigrants* moving over five-year periods under alternative scenarios, by region. RE: 'rise of the east' scenario; IGC: 'intensifying global competition' scenario.

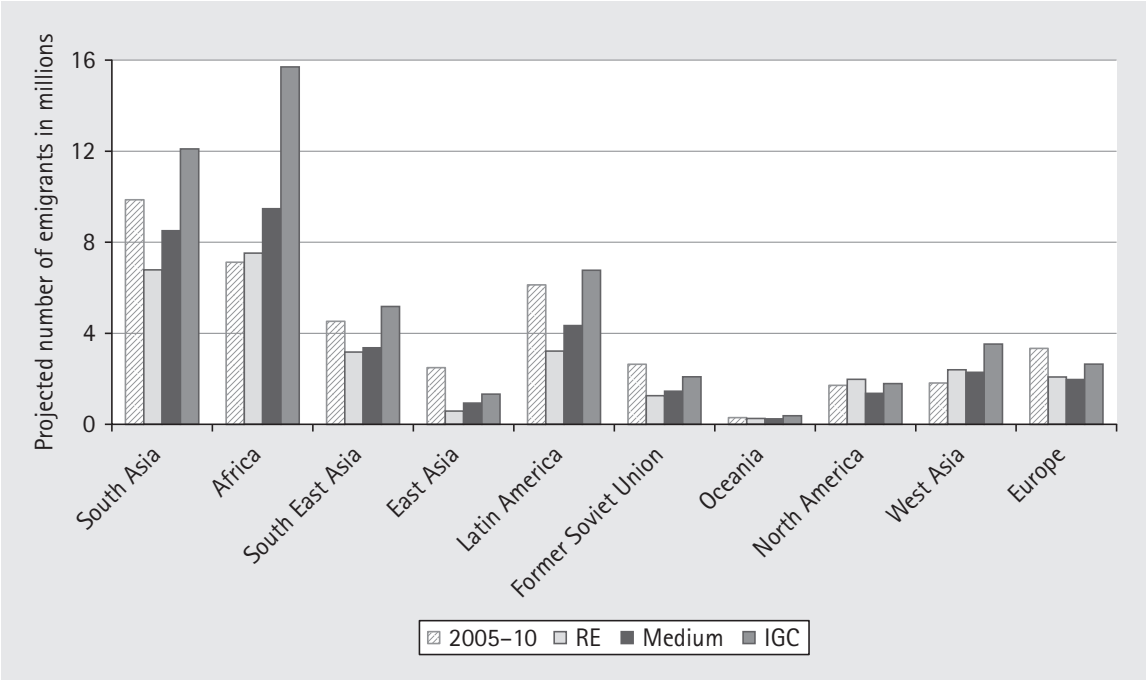

FIGURE 7.19 Estimated (2005–10) and projected (2055–60) number of *emigrants* moving over five-year periods under alternative scenarios, by region. RE: 'rise of the east' scenario; IGC: 'intensifying global competition' scenario.

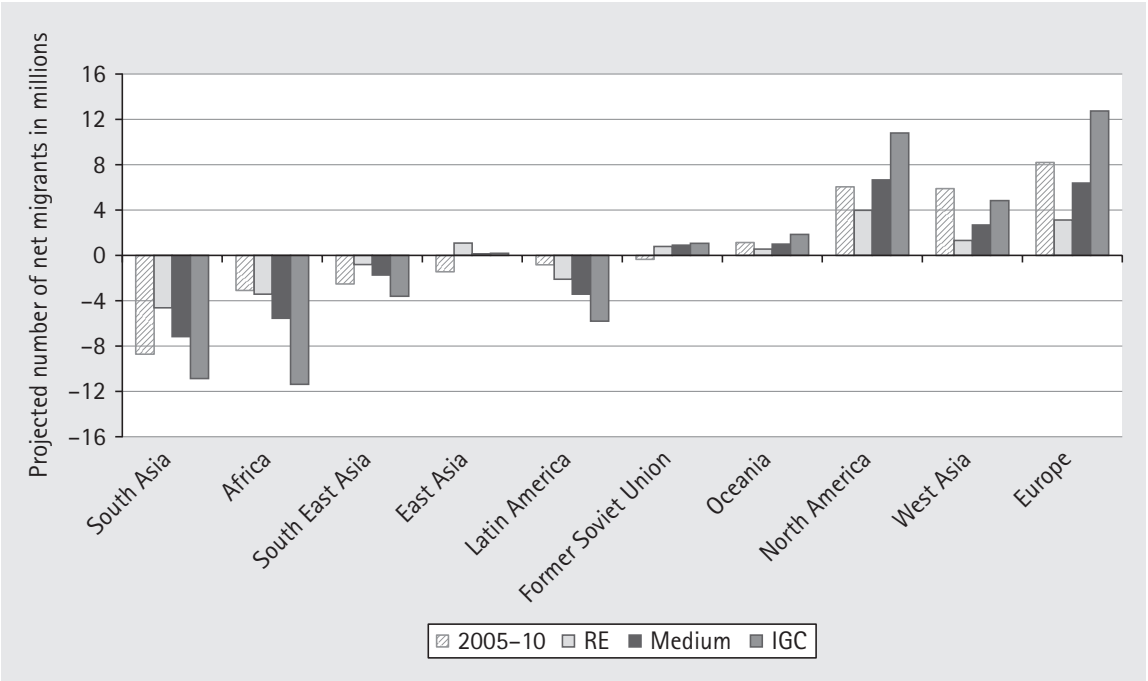

FIGURE 7.20 Estimated (2005–10) and projected (2055–60) number of *net migrants* under alternative scenarios, by region. RE: 'rise of the east' scenario; IGC: 'intensifying global competition' scenario.

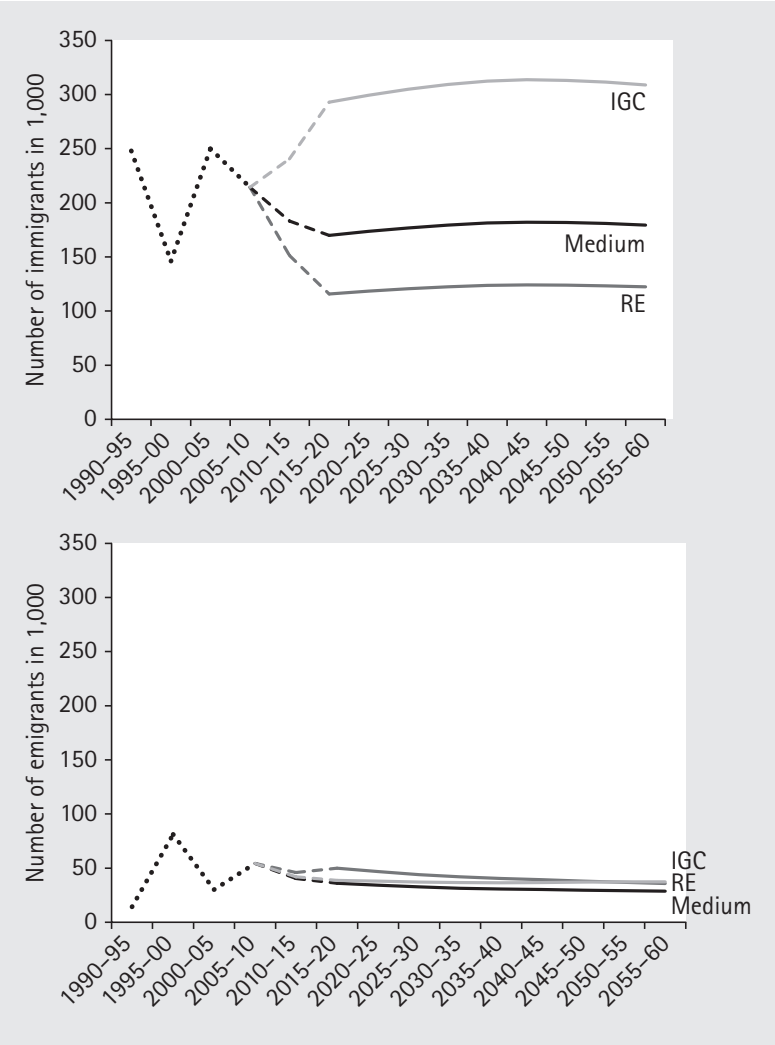

FIGURE 7.21 Estimated (1990–95 to 2005–10) and projected (2010–15 to 2055–60) numbers of *immigrants* and *emigrants* under alternative scenarios, Austria. RE: 'rise of the east' scenario; IGC: 'intensifying global competition' scenario.

Using a projection model based on rates rather than numbers highlights the effects that changes in population size and age structure have on migrant numbers. The results for Austria demonstrate that sub-Saharan population growth has no visible effect on projected numbers of immigrants. In contrast, population ageing is projected to result in a decline in emigrant numbers over the projection horizon.

Figures 7.22 and 7.23 compare the effects of the constant rates assumption for two countries with very different future population growth trajectories. Results are shown for five-year periods until 2060, after which a convergence to zero net migration is assumed. Bulgaria is predicted to experience rapid population ageing and an overall decline of its population, whereas Nigeria's young population is projected to grow strongly. The predicted number of emigrants is predicted to decline substantially in Bulgaria, whereas emigration from Nigeria is set to increase. Immigration to both countries is projected to be almost stable over the projection horizon.

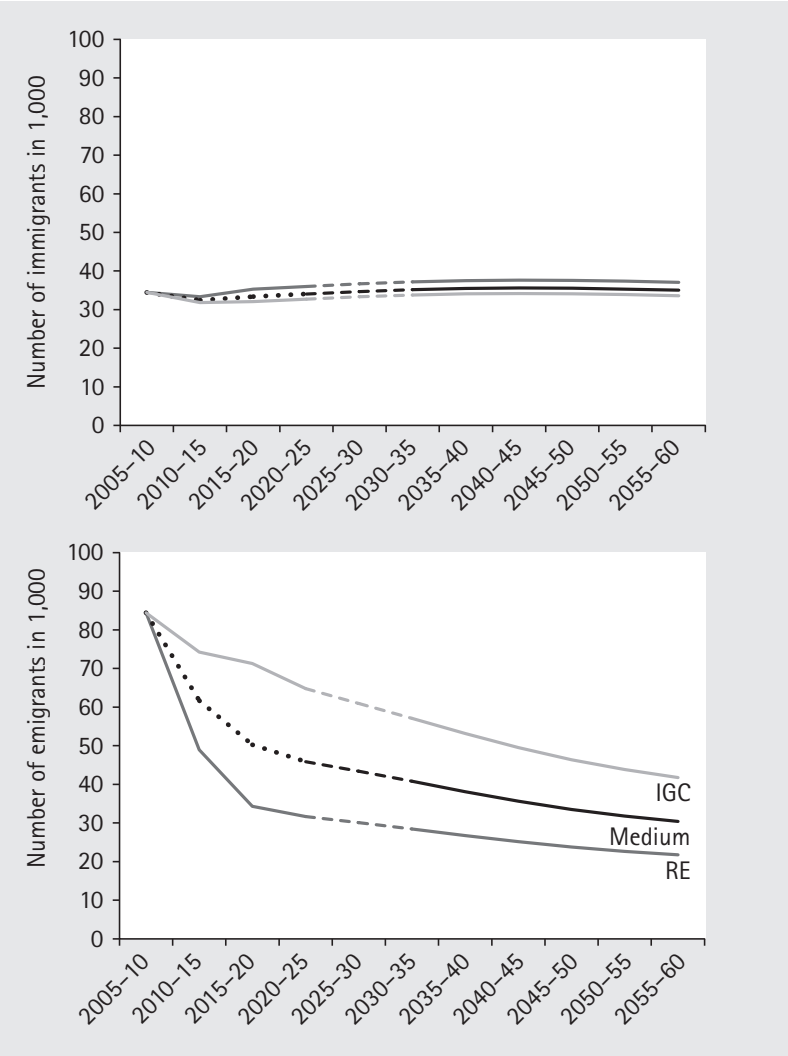

FIGURE 7.22 Estimated (2005–10) and projected (2010–15 to 2055–60) numbers of *immigrants* and *emigrants* under alternative scenarios, Bulgaria. RE: 'rise of the east' scenario; IGC: 'intensifying global competition' scenario.

7.8 Conclusions

International migration has increasingly become, and is likely to remain, a crucial component of the population dynamics of many sending and receiving nations. This chapter presented a comprehensive overview of the economic, climate, political, policy, and socio-demographic forces that affect migration. Drawing on new estimates of global international migration flows (Abel and Sander, 2014) allowed us to overcome the lack of comparable statistics that has thus far hindered the application of multiregion flow models at the global scale. The discussion of contemporary trends in global bilateral migration flows presented in Abel and Sander (2014) has pointed to stable intensities of the global flow of people since the mid-1990s.

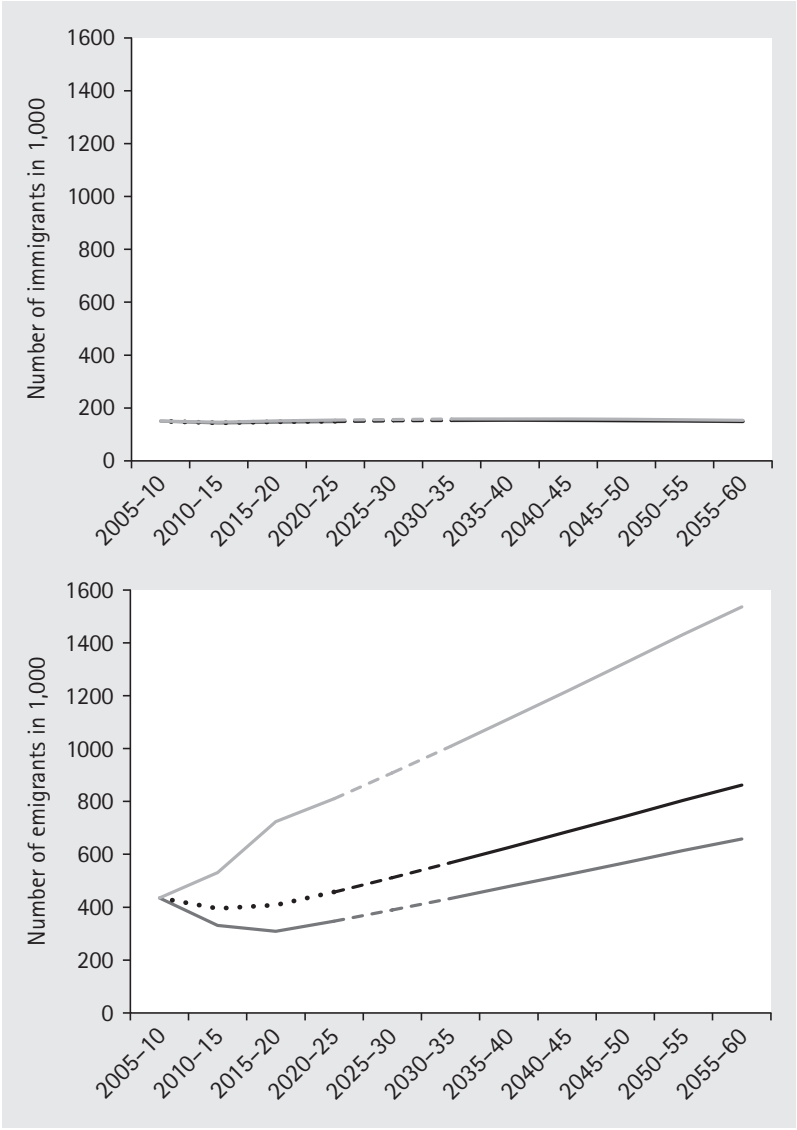

FIGURE 7.23 Estimated (2005–10) and projected (2010–15 to 2055–60) numbers of *immigrants* and *emigrants* under alternative scenarios, Nigeria.

We circumvented the difficulties associated with making ad hoc assumptions about future migration by drawing on expert judgement. The online survey revealed a strong agreement among experts about the factors most likely to shape future migration. Based on the respondents' collective judgement, we are more likely to see an increase in global migration levels than a decrease, unless current economic stagnation does not improve. Assuming a continuation of current trends as the most likely outcome and translating expert views into two alternative 'what if' scenarios allowed us to explore likely future migration trends.

The results of our population projections suggest that the global number of migrants will start declining in about 30 years. This is mostly because in the bi-regional flow model, slowed population growth and substantial population ageing result in fewer emigrants if a constant age schedule is assumed. The results also point to strong effects

of population decline and ageing on projected emigration flows in many European countries, and they highlight differences in the future level and distribution of populations around the globe between the constant rates and two 'what if' scenarios. Using a medium scenario based on rates rather than numbers emphasizes the effects that changes in population size and age structure tend to have on emigration numbers.

APPENDIX 7.1

List of clusters of arguments in the migration module of the IIASA–Oxford survey:

Cluster	Argument	Cluster name	Cluster key	Argument text
1	1	Economic development	Economic	Remittances will become more important for the economic development of migrant-sending countries.
1	2	Economic development	Economic	The EU 'Blue Card' skilled immigration scheme will attract more highly-qualified migrant workers from non-EU countries on a temporary basis.
1	3	Economic development	Economic	Per capita income differentials between Asian countries will further widen.
1	4	Economic development	Economic	Temporary labour migration will increasingly compensate for skills shortages in developed countries and thus replace permanent migration.
1	5	Economic development	Economic	Foreign direct investment in developing countries as a stimulus to economic growth will rectify the imbalance between supply and demand in the labour market in those countries.
1	6	Economic development	Economic	There will be a global convergence in returns to human capital.
1	7	Economic development	Economic	Major economic recessions/ stagnation in industrialized countries will lead to less demand for migrants.
1	8	Economic development	Economic	Global wage levels will converge in the long run.

(*continued*)

Continued

Cluster	Argument	Cluster name	Cluster key	Argument text
2	1	Climate change	Environment	International migration from low-lying coastal areas and small islands in the developing world will increasingly be driven by the negative impacts of climate change.
2	2	Climate change	Environment	Populations in the Mediterranean region that are negatively affected by climate change will be successful in developing adaptive strategies.
2	3	Climate change	Environment	Governments of North Africa and the Middle East will find peaceful resolutions to intensifying water and land use conflicts.
2	4	Climate change	Environment	Relatively better educated populations will have a higher adaptive capacity to the negative impacts of climate change.
2	5	Climate change	Environment	Climate change will lead to conflict in poor countries and mass migration of asylum seekers to countries in the north.
2	6	Climate change	Environment	Climate change will lead to new directions of migration such as from India or the Middle East to Siberia.
3	1	Demographic factors	Demographic	Shifts in cohort size, especially related to the baby boom and bust, will play an important role in shaping international migration levels.
3	2	Demographic factors	Demographic	Strategies for ensuring the provision of adequate health and care services to the growing elderly populations in OECD countries will increasingly draw on immigrant workers.
3	3	Demographic factors	Demographic	The propensity to move abroad among 15–29-year-olds will be particularly high in countries with a large 'youth bulge'.
3	4	Demographic factors	Demographic	Ageing societies will be less open to immigration from different cultures.
3	5	Demographic factors	Demographic	More highly educated people will be more likely to migrate.

4	1	Cost of migration	Costs	Populations in developing countries will develop a more realistic perception of life in developed countries through information technology.
4	2	Cost of migration	Costs	Air travel and international freight will become less expensive, thus reducing the financial costs of migration.
4	3	Cost of migration	Costs	Communication technologies will be a viable alternative to face-to-face communication with friends and relatives left behind, thus reducing the physical cost of migration.
4	4	Cost of migration	Costs	Increasing multiculturalism in developed countries will reduce the linguistic and cultural barriers to migration.
4	5	Cost of migration	Costs	International migration will mostly follow established paths and existing migrant networks.
4	6	Cost of migration	Costs	Migrant networks are not as relevant for the migration of more educated people.
5	1	Migration regimes and policy	Policy	Among countries of the EU, freedom of movement will make it impossible for governments to influence migration.
5	2	Migration regimes and policy	Policy	Political instability and oppression in African and Middle Eastern countries will result in more people seeking political asylum in democratic countries.
5	3	Migration regimes and policy	Policy	Developed countries will be largely unsuccessful in reducing undocumented migration through the tightening of immigration policies and the strengthening of border controls.
5	4	Migration regimes and policy	Policy	Family reunification policies in Western societies will support the right of a family to live together in the destination country.
5	5	Migration regimes and policy	Policy	Rich countries will tighten their student visa systems.

EU: European Union; OECD: Organisation for Economic Co-operation and Development.

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