# *Compositional and Temporal Dynamics of International Migration in the EU/EFTA: 2002-2007*

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***ABSTRACT***

The present study articulates a theoretical and empirical rationale for envisioning the *temporal* dynamics of international migration as a property of place, and subsequently develops some of the first country-level estimates of migrants' average time of residence in 31 EU/EFTA countries from 2002-2007. Comparing these estimates to the percent foreign-born, a marker of migrants' *compositional* exposure, I observe little overlap. High foreign-born concentrations do not entail more permanent stays, and render an incomplete picture of migration during a period in which the EU grew from 15 to 27 countries. The key theoretical and policy implications are discussed.

## *INTRODUCTION*

Cross-national research on international migration places almost exclusive reliance on migrants' *compositional* exposure, e.g., percent foreign-born, in receiving countries to describe migration trends (Kupiszewska et al. 2009) and their linkages to migrants' social exclusion (Citrin and Sides 2006; Pettigrew et al. 2010; Quillian 1995; Schneider 2008; Semyonov et al 2006). Though there are important theoretical and practical reasons for this usage, there are nonetheless alternative conceptualizations with the potential to generate valuable insights on the complex dynamics of international migration and their linkages to stratification and inequality in receiving countries.

Although the theoretical and empirical terrain is less well charted, one alternative concerns the *temporal* dynamics of international migration, e.g., time, stability and permanence of residence in receiving countries. Usually conceptualized as an individual-level attribute (Borjas et al. 1992; Klinthäll 2001; Reagan and Olsen 2000; Waldorf 1994), this paper looks to develop a theoretical and empirical motivation for viewing these dynamics as a property of place. Receiving countries possess definite and, in many cases, similar age profiles of migration (Raymer and Rogers 2008; Rogers and Castro 1981), which can be translated into expectations of life to be lived, and thus times of residence, in receiving countries (DeWaard and Raymer 2011; Rogers 1975, 1995).

Using harmonized, i.e., consistent definition, estimates of migration flows between countries in the European Union (EU) and European Free Trade Association (EFTA) from 2002-2007, I derive some of the first country-level estimates of migrants' expected time of residence in 31 EU/EFTA

countries. In contrast to comparable efforts employing survey data (Waldorf and Esparza 1991), the estimates derived here account for the fact that both migration levels and the age structure of flows vary according to the particular sending and receiving countries involved. As such, they attend to the interconnectedness of places, namely countries. They are likewise among the first to be amenable to cross-national comparison across such a range of countries. Presently, cross-national research on international migration lacks such a tool.

I compare my estimates against corresponding figures for the percent foreign-born in EU/EFTA countries. I aim to identify important similarities and discontinuities between the two, and also the extent to which each corresponds to what is known about migration in the EU/EFTA during this period. The EU twice expanded from 15 to 27 countries in 2004 and 2007, setting the stage for a unique natural experiment. Examining receiving countries which experienced little change in the percent foreign-born *and* noticeable fluctuations in migrants' expected time of residence over the period, I consider the reasons for these observed discrepancies. I close the paper with a discussion of the relevant theoretical and policy implications.

## *BACKGROUND*

### *Orienting Definitions*

I understand the *compositional* dynamics of international migration to denote both the volume of and changes in *foreign-born population stocks* in receiving countries (Kupiszewska et al 2009;

Raymer and Willekens 2008; Schneider 2008), usually expressed relative to the total population at destination. In existing research, owing to the dearth of cross-nationally comparable data on foreign-born population stocks (Kupiszewska and Bijak 2008), estimates of *foreigners*, i.e., non-citizens, or of persons *from foreign countries* as specified by the researcher, e.g., non-European Economic Community (EEC) countries (Quillian 1995), are often taken as acceptable substitutes (Schneider 2008; Semyonov et al. 2006). In one (or more than one) of these forms do almost all cross-national studies of international migration conceptualize and measure the compositional dynamics of migration (see also Kritz et al. 1992; Massey et al. 1998).

The *temporal* dynamics of international migration mark a distinct population process, involving the duration, stability and permanence of residence in receiving countries. In the current paper, I look to provide a more systemic account of these dynamics than in prior research, which views migrants' time of residence in receiving countries as an individual-level attribute (Klinthäll 2001; Reagan and Olsen 2000; Waldorf 1994; Waldorf and Esparza 1991). Specifically, I am interested in formulating a concept and corresponding summary measure which can express the temporal dynamics of international migration as a characteristic of place, namely of receiving countries. Depending on the age pattern of migration (and fertility and mortality), where migrants tend to be much younger than populations in receiving countries (Raymer and Rogers 2008; Rogers and Castro 1981), migrants have the potential to live a larger portion of their lives in those countries to which they moved at earlier ages. These age profiles of migration, which vary by country, can be translated into expectations of remaining life to be lived, and thereby the times of residence, in receiving countries (DeWaard and Raymer 2011; Rogers 1975, 1995; Schoen 1988; Willekens

and Rogers 1978).[1] As such, in the current project, I use the temporal dynamics of international migration to denote migrants' expected time of residence with respect to countries' unique age profiles of migration.

Though I later investigate the differences between the compositional and temporal dynamics of international migration in EU/EFTA countries, it is worth considering at the outset a substantive example to motivate this distinction. From 2002 to 2007, a time window which includes the two most recent expansions of the EU from 15 to 27 countries, the percent-foreign born in Germany remained constant at 12.8% (Kupiszewska et al. 2009). Germany was one of several countries to enact restrictions on intra-EU mobility by new member countries (Brenke et al. 2009). Whether these measures were successful, however, cannot be fully determined by examining changes in the percent foreign-born.

On one hand, that the percent-foreign born stayed constant over the period suggests that these polices kept the foreign-born population in check. Alternatively, it may also be the case that this stability was produced by very high levels of emigration and immigration which happened to be offsetting. Though fairly high levels of immigration to Germany are documented (Kahanec et al. 2009), one must likewise consider Germany's motivations for enacting these restrictions. These policies were enacted to incubate German workers from possible labor market pressures, e.g., a

[1] A similar argument is routinely applied in research on health and mortality, where the expectation of life, e.g., life expectancy, is more sensitive to illness and death at younger (versus older) ages.

labor surplus, with EU expansions (Bauer and Zimmermann 1999). Thus, an accurate evaluation of their effectiveness entails knowing whether fewer migrants *of working age* ultimately arrived and settled (presumably working) during this period. As noted earlier, this feature of a country's age profile of migration lies at the center of the concept and measure of the temporal dynamics of international migration as developed below.

***Theoretical and Substantive Motivations***

In addition to the implications for determining the effectiveness of migration policies, there are theoretical and substantive reasons for separating the compositional and temporal dynamics of international migration. Concerning the former, theories of migrants' social exclusion posit that larger foreign-born concentrations are associated with heightened perceptions of ethnic threat among native-born persons (Allport 1954; Blalock 1967), e.g., anti-foreigner sentiment (Quillian 1995; Semyonov et al. 2006). On this view, higher foreign-born concentrations awaken dormant forms of ethnic prejudice, which ultimately find their expression in perceived struggles over key economic and political resources (Bonacich 1972). These sentiments are a vital moderator tying foreign-born concentrations to inequality promoting behaviors and migrants' social exclusion in receiving countries (Scheepers et al. 2002; Schlueter and Scheepers 2010; Schneider 2008). This model has therefore conveniently been termed the "visibility-discrimination" thesis (Beggs et al 1997:65; Blalock 1967).

While any such linkages between migrants' temporal exposure and social exclusion in receiving countries are not explicitly codified in the theoretical literature, they are nonetheless implicit in in several theoretical traditions. Intergroup contact theory is a telling example. This perspective posits that constructive intergroup "contact with members of a minority group can significantly offset the negative effects of context" (Stein et al. 2000:299). That the negative effects of larger foreign-born concentrations on migrants' social exclusion can be remedied by the development of constructive intergroup ties suggests several mechanisms involved, including: learning about other groups, developing and maintaining affective ties, limiting contacts with one's own group, and behavioral change (Mullen et al. 1992; Pettigrew 1998, 2008; Pettigrew et al. 2011; Tropp 2008). Clearly, this implies that not all forms of intergroup contact are alike (Allport 1954)[2], and that *constructive* intergroup relations are to a considerable degree a function of time and place, two central features in the current paper.

Intergroup contact theory offers an important vantage point for understanding how individuals, embedded within groups and acting as group representatives, can transcend perceptions of and experiences with other groups. The presence of constructive intergroup contact is a key vehicle. Yet, in thinking more broadly about the ecology of intergroup contacts, one must separate their mere presence or absence from the situational contexts which make these sorts of ties more or less likely. This is precisely where the temporal dynamics of international migration enter in. As

[2] Allport (1954) theorized four necessary conditions for constructive intergroup contact: equal group status, shared goals, intergroup cooperation, and an environment of authority support.

Cook (1962:74, emphasis mine) noted, this entails less consideration of intergroup contact and more of "contact *situations"* and their inherent variation over time and place.

In all fairness, Allport (1954:227-228) did spend a small part of his book on the "size and density of minority groups," thus acknowledging groups' compositional presence in places. More recent work, however, suggests that a similar logic applies to the case of groups' temporal exposure to one another. Cook (1962:75) defined "acquaintance potential" as the "opportunity provided by the situation for the participants to get to know and understand one another." Although Allport (1954) clearly saw the increasing compositional presence of groups as eroding this opportunity, Cook (1962:75) had another ecological process in mind, namely the temporal exposure of groups to one another "everyday for months." The implication is that constructive intergroup ties require the availability of the same persons to regularly interact over time. The size of a group, whether large or small, does not necessarily imply a membership comprised of the same individuals over time. This is especially the case with international migration, wherein the very object of analysis concerns these entries and exits.

Since "intergroup contact requires *time*…[and] implies the *potential* for extensive and repeated contact" (Pettigrew 1998:76, emphasis mine), the primary theoretical rationale for the work in this project lies in providing a concept and corresponding summary measure which can be used in future research in several important ways. First, since so much of previous research has been focused on migrants' compositional presence in receiving countries, the result has been to view population diversification in general, versus just changes in the percent-foreign born, as a *prima*

*facie* negative stimulus where migrants' social exclusion is concerned. However, as proposed in this paper, populations can diversify in many ways, including temporally, which may have a very different set of implications for migrants' social exclusion. Second, one must also attend to how the positive benefits of intergroup contact for lessening migrants' social exclusion are amplified (or repressed) depending on the temporal dynamics of migration in receiving countries. Though large foreign-born concentrations inhibit these benefits (Pettigrew et al. 2010; Schneider 2008), migrants' greater temporal exposure may actually result in *increasingly* constructive intergroup relations among native- and foreign-born persons given the availability of the latter to regularly engage in and maintain these contacts over time (Cook 1962; Pettigrew 1998; Saguy et al. 2008; Schneider 2008; Wagner et al. 2008).

To be clear, this project does not aim to test the above theoretical propositions empirically, but, rather, to demonstrate that there exist important theoretical motivations for differentiating the compositional and temporal dynamics of migration. If the theoretical rationale detailed above is sufficient, this warrants the work in next section examining each of these dynamics empirically.

***Defining Characteristics and Ideal Types***

In an effort to move beyond thinking about the temporal dynamics of international migration as a property of actors (Borjas et al. 1992; Klinthäll 2001; Reagan and Olsen 2000; Waldorf 1994; Waldorf and Esparza 1991), the theoretical motivations provided above warrant a discussion of

how these dynamics and their variations can be demarcated with respect to place. I offer three defining features: the recency, turnover, and, most importantly, age pattern of migration.

The former two elements comprise the basis for considering *rates* of international migration, as opposed to foreign-born population stocks (Wilkes et al. 2008). Since the rates of in-, out-, and net-migration capture recent changes in migration levels, they provide a more accurate read of the dynamic nature of flows. With respect to the temporal dynamics of international migration, by definition, *new* migrants have resided for less time in receiving countries than past migrants. Thus, to the extent that new migrations can be differentiated from relatively less recent moves, the recency of flows is a key consideration in place-based accounts of the temporal dynamics of international migration.

So, too, is the turnover inherent in migration. It is well documented that rates of immigration to key receiving countries in the EU/EFTA, e.g., Spain, are higher than the rates of emigration from these places (Castles and Miller 2003; Kritz et al. 1992; Kupiszewska et al 2009). However, when these two dynamics are jointly examined in theoretical and empirical research, they are usually combined to reflect the balance of migration irrespective of the sending and receiving countries involved. Consider, for example, the Czech Republic, where the rate of net-migration increased from -9.97 per thousand in 2002 to +6.64 per thousand in 2007 (Kupiszewska et al. 2009). These gains, while impressive, obscure the fact that much of this increase was on account of migration from Slovakia after each country's accession to the EU in 2004 and, before that, the dissolution of Czechoslovakia in 1993. Where the temporal dynamics of migration are concerned, given this

heterogeneity, the presenting issue is not just with new migrants and the time lived in receiving countries, but with new migrants *from specific countries of origin* who are more likely to end up in some destinations than others.

The last consideration in detailing the temporal dynamics of international migration at the level of receiving countries is that of the age structure of flows. Countries possess highly definite and, often, comparable age profiles of migration. Although four variations are typically distinguished (Raymer and Rogers 2008), there is usually a peak in migration at early age, a second at working age, and a third at retirement age (Castro and Rogers 1981). Unlike the recency and turnover of migration, the age pattern of migration is not expressed in measures of foreign-born population stocks or migration rates[3]; yet it is perhaps *the* defining characteristic of the temporal dynamics of international migration as developed here. Migrants are usually younger than populations in receiving countries. By virtue of the age at which persons migrate, they accrue time in receiving countries (barring emigration). Thus, the degree to which the age structure of migration can be evaluated, both conceptually and empirically, has important implications for understanding the temporal dynamics of international migration, including time of residence in receiving countries and other temporal processes like time in the workforce, a foremost consideration in the spatial assimilation literature (Alba and Logan 1993:1390; Massey 1985; Massey and Mullan 1984).

Having detailed how the compositional and temporal dynamics of international migration differ both theoretically and empirically, it is also important to consider how the two co-vary. The fact

[3] That is, unless these are calculated and reported separately for each age group.

that the temporal dynamics of international migration have not been elucidated in place-based research on international migration suggests that migrants' compositional presence is seen as a proxy for their temporal presence. If so, one should anticipate two types of receiving countries, those in which the compositional and temporal dynamics of migration are correspondingly high or low, respectively. Of course, two alternative configurations are possible. If large foreign-born stocks stimulate anti-foreigner sentiment (Quillian 1995; Semyonov et al 2006), this may render receiving countries as less hospitable environments for migrants toward driving down migrants' time of residence. Alternatively, if smaller foreign-born stocks signify relatively more hospitable environments, then migrants may elect to remain in these countries for longer. As I will discuss, these configurations have different implications where the migration and integration policies of receiving countries are concerned.

***DATA AND METHODS***

The data employed in this paper are taken from the MIgration MOdeling for Statistical Analysis (MIMOSA) project (de Beer et al. 2010; Raymer et al. 2011).[4] Coordinated by the Netherlands Interdisciplinary Demographic Institute (NIDI) with funding from Eurostat, the MIMOSA project developed *harmonized*, i.e., consistent definition, and *complete*, i.e., non-missing, estimates of migration flows between 31 EU/EFTA countries, including from/to the "rest of the world," each

[4] The methodology and estimates are described in detail by de Beer et al. (2010) and Raymer et al. (2011), and are publicly available at http://www.knaw.nl/Pages/NID/24/928.bGFuZz1VSw.html.

year from 2002 to 2007. It is well-documented that publicly available migration data are not fit for use in cross-national research given a host of problems, including conflicting data collection systems, definitions of a valid transition (migration) or status change (migrant), timing criterion which must be satisfied, and incomplete/missing flow data (Bilsborrow et al. 1997; DeWaard et al. forthcoming; Kupiszewska and Nowok 2008; Poulain et al 2006). Compared to the published migration reports of sending and receiving countries, e.g., from Eurostat or the United Nations, the MIMOSA estimates are benchmarked to a one-year timing criterion for long term migration per the recommendations of the United Nations (1998). To date, they represent the largest and most complete estimates of migration flows between countries in the world.

The migration model developed in this section is a variant of the one proposed by Rogers (1975, 1995) and Schoen (1988). Their idea was to follow a hypothetical birth cohort from one *sending* country *i* over the life course, i.e., at each age, to derive estimates of migrants' expected time of residence in each receiving country *j* (*j=1, 2,…,k*). Thus, for example, one might derive estimates of the time lived by Romanian migrants in each EU/EFTA country, e.g., in Spain. Summing these estimates across receiving countries, one generates a single summary measure which expresses the average number of years that, in this case, a person in Romania can expect to live outside of Romania over their lifetime. One of the problems with this approach is that is not clear how one might derive a comparable summary measure from the vantage point of the *receiving* country *j*. Scholars and policy makers frequently require such snapshots of migration from the perspective of receiving countries, e.g., to gauge potential labor market pressures associated with migration

(Bauer and Zimmermann 1999). The model developed here looks to provide as much where the temporal dynamics of migration are concerned.

To begin, it is useful to define the *state-space*, comprised of the locations to which persons may transition in the model. In this project, the state-space is specified as 31 EU/EFTA countries, the "rest of the world," and death.[5] The inclusion of death is necessary to ensure that the system is closed to all forms exit.[6] At each age, persons are permitted to remain in the current country of residence, migrate to an EU/EFTA country or the "rest of the world," or die. To demonstrate the steps involved in the model, and how these differ from those developed by Rogers (1975, 1995) and Schoen (1988), I walk through a hypothetical example where I estimate migrants' expected time of residence in a single receiving country, hereafter *j=1*, in year *t*.

In considering the set of potential migrants to *j=1*, the interest here is with any/all persons born outside of *j=1*. Following convention in the literature (Palloni 2001; Preston et al. 2001), this set

[5] The "rest of the world" is a residual category in the MIMOSA data to capture non-EU/EFTA migration. This results in a total of 114,048 possible transitions analyzed in this project:

114,048 = [31 EU/EFTA sending countries + Rest of World] * [31 EU/EFTA receiving countries, including *i=j*, + Rest of World + Death] * 18 five-year age intervals * 6 years from 2002-2007.

[6] Mortality data for EU/EFTA countries come from Eurostat's New Cronos database and, for the "rest of the world," from global model life tables available from the World Health Organization.

of persons in each sending country *i* (*i=1, 2,…,k*) represents a *hypothetical birth cohort*, with the matrix, ***l(0)***, containing the size of each cohort.

$$\boldsymbol{l(0)} = \begin{bmatrix} 0 & 0 & \cdots & 0 & 0 \\ 0 & l_0^2 & \cdots & 0 & 0 \\ \vdots & \vdots & \ddots & \vdots & \vdots \\ 0 & 0 & \cdots & l_0^k & 0 \\ 0 & 0 & \cdots & 0 & 0 \end{bmatrix} \quad (1)$$

wherein $l_0^i$ is the size of the birth cohort in country *i* at exact age zero. To eliminate the effects of differential fertility, and thus of unequally sized birth cohorts, across countries (Herting, Grusky and van Rompaey 1997), I fix the size of each cohort to a single constant, i.e., $l_0^2 = l_0^3 = \ldots = l_0^k = c$. Examining the main diagonal in (1), note that the first element is zero, and reflects the fact that persons may not begin the transition process in country *i=1*, the receiving country of interest in this example (*j=1*; thus *i=j*). The last element is likewise zero to show that death is built into the model and is absorbing, i.e., only transitions *to* death are permitted. The cohorts in (1) are then exposed to the risk of country-to-country migration and death, as calculated from the MIMOSA and mortality data detailed above for this age interval, which in these data is zero to five. These risks are, properly, age-specific transition probabilities, and are conveniently summarized in the ***q(0)*** matrix.

$$\boldsymbol{q(0)} = \begin{bmatrix} {}_5q_0^{11} & {}_5q_0^{12} & \cdots & {}_5q_0^{1k} & {}_5q_0^{1d} \\ {}_5q_0^{21} & {}_5q_0^{22} & \cdots & {}_5q_0^{2k} & {}_5q_0^{2d} \\ \vdots & \vdots & \ddots & \vdots & \vdots \\ {}_5q_0^{k1} & {}_5q_0^{k2} & \cdots & {}_5q_0^{kk} & {}_5q_0^{kd} \\ 0 & 0 & \cdots & 0 & 0 \end{bmatrix} \quad (2)$$

wherein ${}_5q_0^{ij}$ is the probability of transition from country *i* (*i=1, 2,…,k*) to country *j* (*j=1, 2,…,k*) or death (*j=d*) between ages zero and five. Note, the final row and column in (2) denote transitions from and to death, respectively. Recalling the previous assertion that the temporal dynamics of international migration in receiving countries encompass the recency, turnover and age pattern of migration, we should consider how these three elements are expressed in the probabilities in (2). The *recency* of migration is expressed by virtue of probabilities for each period, year *t* in this example (note, period subscripts are omitted). *Turnover* is likewise explicit, and importantly not conflated, given inclusion of flows in both directions, e.g., ${}_5q_0^{12}$ and ${}_5q_0^{21}$. Finally, *age* is expressed by probabilities which are age-specific, zero to five in the present example. An important aside, each of the probabilities in (2) are estimated from observed rates of migration and death, ${}_5M_0^{ij}$, calculated from the MIMOSA and mortality data.[7] Because these data are available for *five-year* age intervals for *single* calendar years, e.g., zero to five in 2007, I derive these probabilities from

[7] The rates are calculated for pairs of sending and receiving countries by age and period, e.g., those age zero to five who emigrated from Poland to Germany in 2007, with those at risk of emigrating, i.e., the denominator, defined as the set of all persons who emigrated from each sending country by age and period, e.g., those age zero to five who emigrated from Poland in 2007.

the probability of *not* transitioning in a single year, raised to the power of five, to express the risk of transition over *five years* (DeWaard and Raymer 2011).[8]

$$ {}_5q_0^{ij} = 1 - \left[ 1 - \left( \frac{{}_5M_0^{ij}}{1 + 0.5{}_5M_0^{ij}} \right) \right]^5 \tag{3} $$

Continuing with the present example, the matrix of completed transitions between the ages of zero and five takes the following form:

$$ \boldsymbol{I(0)q(0)} = \begin{bmatrix} 0 & 0 & \cdots & 0 & 0 \\ {}_5n_0^{21} & {}_5n_0^{22} & \cdots & {}_5n_0^{2k} & {}_5n_0^{2d} \\ \vdots & \vdots & \ddots & \vdots & \vdots \\ {}_5n_0^{k1} & {}_5n_0^{k2} & \cdots & {}_5n_0^{kk} & {}_5n_0^{kd} \\ 0 & 0 & \cdots & 0 & 0 \end{bmatrix} \tag{4} $$

wherein ${}_5n_0^{ij}$ is a count of persons who transitioned from country *i* (*i*=1, 2,…,*k*) to country *j* (*j*=1, 2,…,*k*), or died (*j=d*), between ages zero and five. Note the first row in (4). That the elements are uniformly zero reflects the fact that persons in the present example did not begin the transition process in country *i=1*. The last row is likewise zero since death is absorbing. The main diagonal contains counts of persons in each country who did not migrate or die, i.e., non-migrants. Since each column in (4) represents a receiving country *j* (*j*=1, 2,…,*k*), summing its elements generates

[8] I acknowledge the assistance of Jenna Nobles and Nico Keilman.

a new matrix of persons from the original birth cohorts now living in country *j* (*j=1, 2,…,k*) at the start of the next age interval, *x=5*.

$$\boldsymbol{l(5)} = \begin{bmatrix} \sum_i {}_5n_0^{i1} & 0 & \cdots & 0 & 0 \\ 0 & \sum_i {}_5n_0^{i2} & \cdots & 0 & 0 \\ \vdots & \vdots & \ddots & \vdots & \vdots \\ 0 & 0 & \cdots & \sum_i {}_5n_0^{ik} & 0 \\ 0 & 0 & \cdots & 0 & \sum_i {}_5n_0^{id} \end{bmatrix} \Rightarrow \begin{bmatrix} l_5^1 & 0 & \cdots & 0 & 0 \\ 0 & l_5^2 & \cdots & 0 & 0 \\ \vdots & \vdots & \ddots & \vdots & \vdots \\ 0 & 0 & \cdots & l_5^k & 0 \\ 0 & 0 & \cdots & 0 & 0 \end{bmatrix} \tag{5}$$

Compared to the ***l(0)*** matrix in (1), the first element in the main diagonal in (5) is non-zero, and includes those persons who migrated to country *j=1* between the ages of zero and five. The ***l(5)*** matrix is then used to repeat the steps in (1)-(5) as detailed above for the next age interval, five to ten. Iterating this process at each age sequentially generates a set of ***l(x)*** matrices. These are the inputs for estimating migrants' expected time of residence, $e_0^{\neg 11}$, in receiving country *j=1.*

$$e_0^{\neg 11} = \frac{\sum_x 2.5\left(l_x^1 + l_{x+5}^1\right)}{\sum_i l_0^i}, \quad i \neq 1 \tag{6}$$

Since the ***l(x)*** matrices contain counts of persons in country *j=1* at the start of each age interval, i.e., at exact age *x*, deriving an estimate of migrants' expected time of residence in *j=1* requires exploiting this information. To begin, the number of *person-years* lived by migrants within each age interval in *j=1* is calculated as the average of $l_x^1$ and $l_{x+5}^1$, where multiplying by 2.5 in (6) is an

imposed assumption that all transitions via migration and to death occur at the midpoint of the age interval (Palloni 2001; Preston et al. 2001). Summing these person-years over age yields the total number of person-years lived by migrants in *j=1*. Next, we divide through by those *persons* who contributed to this total, which is the trace of the ***I(0)*** matrix in (1), $\sum_i l_0^i$ . These steps yield a ratio of person-years to persons, which simplifies so that $e_0^{\neg 11}$ is the expected number of years that a migrant, i.e., one starting the transition process outside *j=1* at exact age zero, is expected to live in *j=1* over their lifetime, i.e., above age zero (Willekens and Rogers 1978). Repeating the above steps in (1)-(6) for each receiving country, one at a time, results in estimates of migrants' expected time of residence in each country, and thus of the temporal dynamics of international migration. This measure expresses the recency, turnover and age structure of flows, and can be profitably compared against corresponding estimates of migrants' compositional presence, e.g., percent foreign-born. In what follows, I detail these two summary measures for 31 countries in the EU/EFTA each year from 2002 to 2007, and examine the joint relationship between two.

***RESULTS***

In Table 1, I provide estimates of migrants' expected time of residence in 31 EU/EFTA countries each year from 2002 to 2007. Taking Germany in 2002 as an example, 10.36 can be interpreted as the average number of years that a migrant to Germany could expect to live in Germany over their lifetime given the age-specific migration and mortality conditions observed in 2002. While Germany lies at the upper tail of the distribution, Liechtenstein (0.08 years) and Malta (0.12) lie at the lower tail, with times of residence of just 29 and 44 days, respectively.

-----TABLE 1 ABOUT HERE-----

At first glance, that migrants' expected time of residence in many receiving countries lies below one appears to be at odds with the fact that the MIMOSA estimates are benchmarked to a one-year timing criterion (United Nations 1998). However, this observation serves to illuminate the distinction between viewing the temporal dynamics of international migration as a property of place, versus an individual-level attribute. The starting point for the latter is often with persons who have *actually* migrated, and surveying these individuals about their time(s) of residence in receiving countries (Akresh and Massey 2004). In contrast, the former denotes the *potential* for migration. As such, in probabilistic terms (Palloni 2001:265-266), very low times of residence in Table 1 reflect low migration propensities at each age (DeWaard and Raymer 2011).[9]

[9] For a comparable and more detailed discussion outside the domain of international migration, see Keyfitz and Caswell (2005:408-409), who show how one abortion actually prevents *less than* one birth at the population level.

The above observation cannot be overemphasized. It is quite possible that migration levels may increase over time without a corresponding increase in migrants' expected time of residence. In fact, the latter may decline if age-specific migration propensities for young migrants experience a downward shift.[10] Italy is one example. The rate of net-migration in Italy increased from +3.59 to +6.45 per thousand over the 2002-2007 period (Kupiszewska et al. 2009); yet, migrants' time of residence declined by -0.48 years. As I later discuss, this discrepancy is due to declines in the age-specific propensities of immigration to Italy below age 25. In this and many other cases, the failure to consider the age pattern of migration renders a very different picture of international migration during the period.

In examining the relative rank of receiving countries in 2002, an intuitive ordering emerges. The top five receiving countries with respect to the temporal dynamics migration include: Germany (10.36 years), Italy (5.15), the UK (4.94), Spain (4.43), and France (4.21). These countries feature prominently in both historical and contemporary treatments of key migrant destinations to and within Europe (Castles and Miller 2003; Kritz et al 1992; Massey et al 1998). At the opposite end of the spectrum lies smaller countries, e.g., Liechtenstein (0.08 years) and Malta (0.12), with the

[10] Let $l_x^i = l_{x+5}^i = c$ in periods *t=1* and *t=2*, where *x+5* denotes an age five years above age *x*, and $c$ is a constant. At *t=1*, assume that ${}_5q_x^{ij} = 0.05$ and ${}_5q_{x+5}^{ij} = 0.01$; and, at *t=2*, that ${}_5q_x^{ij} = 0.02$ and ${}_5q_{x+5}^{ij} = 0.06$. At time *t=1*, 0.06*c* migrants transition from country *i* to country *j*. At *t=2*, the number of migrants is 0.08*c*. Thus, migration from country *i* to country *j* increased over time; however, because the propensity to migrate from *i* to *j* decreased for the younger age group *x*, migrants' expected time of residence would decline.

times of residence in these countries suggesting low age-specific migration propensities relative to countries like Germany and Italy.

The relative rank of countries in 2007 yields about the same ordering, with several key changes. Among the top five countries in 2002, by 2007, Spain (6.59 years) surpassed Germany (6.49) for the top slot, with only Spain and France (4.79) recording increases in migrants' expected time of time of residence over the 2002-2007 period. Among all EU/EFTA countries, Spain (+2.16 years) experienced the largest net-gain over the period, whereas Germany (-3.87 years), the UK (-0.54) and Italy (-0.48) posted the largest net-losses. Many of these changes coincide with the removal of mobility restrictions for migrants from new EU-accession countries. For example, the UK and Spain lifted these restrictions in 2004 and 2006, prompting increases in migrants' expected time of residence of +0.70 and +0.34 years relative to the prior year, i.e., 2003 and 2005, respectively (Kahanec et al. 2009).

Another striking finding evident in Table 1 is the strong correlation between migrants' expected time of residence and total population size in receiving countries.[11] This is not coincidental.[12] An extensive body of research on the key determinants of international migration flows has shown that total population size is one of the most prominent predictors (Cohen et al. 2008;

[11] $r = 0.939^{*}$ over the 2002-2007 period, and ranges from a low of $r = 0.930^{*}$ in 2007 to a high of $r = 0.946^{*}$ in 2006.

[12] Recall that the size of each cohort in the $\boldsymbol{I(0)}$ matrix in (1) was assumed constant, thus ruling out the possibility that this correlation is induced by the model. I am grateful to Nico Keilman for a productive discussion of this issue.

DeWaard et al. forthcoming; Greenwood 1995; Kim and Cohen 2010; Zipf 1946). Pedersen et al. (2008:14) note the reason for this association is that receiving countries with larger populations are more able to withstand and adapt to "population pressure[s]" associated with migration, particularly those altering the age structure, and thus the labor supply, in receiving countries (Mayda 2005). To detail this correlation empirically, in Figures 1 and 2, I display the age pattern of immigration (Figure 1) and emigration (Figure 2) for eight countries with the highest times of residence, and thus the largest total population sizes. For comparison, I also include two countries, Iceland and Liechtenstein, with the lowest total populations among all EU/EFTA countries.

-----FIGURE 1 ABOUT HERE-----

-----FIGURE 2 ABOUT HERE-----

In Figure 1, countries with large populations, e.g., Germany and Italy, tend to experience higher immigration propensities at every age relative to countries with small populations, e.g., Iceland and Liechtenstein. Though there is clearly heterogeneity among the former group of countries, e.g., the Netherlands, Poland, and Romania, this raises the possibility that total population size, as envisioned by Pedersen et al. (2008) and others, may merely serve as an expedient proxy for the temporal dynamics of international migration. The value of the age profiles shown in Figure 1 is that they go beyond total population size to illustrate *how* "population pressure" is exerted in receiving countries (Pedersen et al. 2008:14). Consider the case of Germany, where migrants' expected time of residence declined by -3.87 years over the 2002-2007 period, the largest such

decline among all EU/EFTA countries. This decline was not on account of a changing age profile of immigration, but instead on account of uniform declines in the propensities of immigration at each age, evidenced by the shift in the location of the age curve in 2007 relative to 2002.

Spain and France likewise experienced positive changes in migrants' expected time of residence over the period on account of higher age-specific propensities of immigration. That the increase for Spain (+2.16 years) was relatively more pronounced than that for France (+0.58) reflects the fact that Spain experienced marked increases in the immigration propensities at young ages. As contended in this paper, these age profiles of migration determine the expectation of life to be lived in receiving countries, and thus the time of residence (DeWaard and Raymer 2011; Rogers 1975, 1995). Young migrants have the potential to spend a relatively larger portion of their lives in receiving countries than do older migrants, thus demonstrating why the increase in migrants' expected time of residence in Spain was so striking. This feature is also demonstrated in the age profile of immigration to the Netherlands, where migrants' expected time of residence declined by -0.43 years over the period, and was due to a subtle drop in the immigration propensities at young ages. The UK experienced a similar decline (-0.54 years) due to reductions at older ages.

How receiving countries react to the population pressures associated with migration is likewise evident in shifts in the age profile of immigration itself. For example, while restrictions on intra-EU mobility implemented by Germany were effective in reducing the immigration propensities at each age, they failed to yield any disproportionate effects on young migrants of working age (Brenke et al. 2009). In contrast, Italy, which lifted restrictions in 2006, experienced an increase

in immigration propensities among migrants of working age, as well as declines in those among younger and older migrants. This is likely on account of high levels of immigration from Albania and Romania, comprised of younger migrants of working age (Barrell et al. 2007; Kahanec et al. 2009). The age profile of immigration to Poland, by contrast, has potentially grave implications for what is anticipated to be a future labor shortage (Kaczmarczyk and Okólski 2008). Although migrants' expected time of residence in Poland increased by +1.82 years during the period, the bulk of this gain was due to older migrants. It is therefore of little surprise that the World Bank (2006) has already warned of likely inflationary pressures in the agricultural and health sectors.

The key driver of migrants' expected time of residence is immigration. As compared against the age profiles of immigration displayed in Figure 1, the age profiles of emigration shown in Figure 2 reveal fewer discrepancies across countries and periods. Indeed, the most telling observation is that the age profiles of emigration for both Iceland and Liechtenstein, the two countries with lowest times of residence in Table 1, are comparable to those for the other countries displayed. Thus, at every age, while the emigration propensities for both Iceland and Liechtenstein are on par with countries like Germany and Spain, their immigration propensities are not. Accordingly, migrants are unable to accrue significant amounts of time in Iceland and Liechtenstein because the balance of these propensities is negative. Importantly, similar to Italy discussed earlier, this dynamic obtains regardless of the fact that Iceland and Liechtenstein experienced positive net-migration by 2007 (Kupiszewska et al. 2009).

One of the key aims of this paper is to demonstrate that the theoretical and empirical intuitions which underlie compositional and temporal understandings of international migration are more or less distinctive. With respect to the former, foreign-born population stocks are an often used measure for summarizing these dynamics, and capture the accumulation of migration since this measure does not differentiate past from recent moves. It also potentially confounds migration with naturalization and mortality (Massey et al. 1998:112). In Table 2, I present estimates of the percent foreign-born in EU/EFTA countries, developed by the MIMOSA project (Kupiszewska et al. 2009; Raymer et al. 2011).

-----TABLE 2 ABOUT HERE-----

Examining the relative rank of countries in 2002, a less intuitive order emerges compared to the figures displayed in Table 1. The top countries now include: Lichtenstein (38.81%), Luxembourg (32.72%), Switzerland (21.42%), Latvia (18.04%) and Estonia (17.97%). In recalling historical and current migration to and within Europe, these countries are not exactly the ones which typically come to mind (Castles and Miller 2003; Kritz et al. 1992; Massey et al. 1998). By 2007, these five countries remained atop the list, with Estonia (16.25%) and Latvia (16.11%) switching places. In examining change over the 2002-2007 period, a much more intuitive order stands out. With the one exception of Liechtenstein (-1.87 percentage points), all countries in Northern and Western Europe experienced positive gains in the percent foreign-born, from +0.03 points in Germany to +5.36 points in Spain. Many of these changes coincide with the removal of restrictions on intra-EU mobility with EU expansions, e.g., by Portugal and Spain in 2006 (Kahanec et al. 2009). There

are, however, a number of exceptions. For example, Austria, Belgium, and Denmark maintained restrictions throughout this period; yet foreign-born stocks increased by +2.04, +1.72 and +0.74 points, respectively. In contrast, Ireland, which lifted restrictions in 2004, experienced a decline in foreign-born stocks that year.

Existing research provides merely an implicit set of expectations for how the bivariate association between the compositional and temporal dynamics of international migration might look. First, given the dearth of research on the temporal dynamics of international migration as a property of place, i.e., receiving countries, the former might just be a sufficient proxy for the latter. If so, then any association between the percent foreign-born and migrants' time of residence should be strongly positive. One key theoretical implication, then, is that these two dynamics are more or less interchangeable as environmental catalysts of ethnic threat and anti-foreigner sentiment (Blalock 1967; Quillian 1995; Schneider 2008; Semyonov et al. 2006). Another possible scenario is that higher foreign-born concentrations, viewed as a marker of ethnic threat and competition (Bonacich 1972), may be linked to reductions in migrants' expected time of residence given less hospitable receiving environments. Lastly, a third scenario is that there is effectively no relation between two, i.e., the compositional and temporal dynamics of international migration denote distinct population processes, yielding different vantage points for examining migration trends and their linkages to migrants' social exclusion in receiving countries.

In Figure 3, I display for each EU/EFTA country the change in percent foreign-born and migrants' expected time of residence over the 2002-2007 period. In contrast to detailing these estimates for each country and year, analyzing changes in these quantities over the period affords *a priori* knowledge of one possible catalyst, namely EU expansions during this time. In the framework of a natural experiment, change scores are useful since they eliminate any potentially confounding effects associated with countries themselves, versus the period in question, e.g., experiences of nation-state formation and prior political memberships. Andrienko and Guriev (2004:2) refer to these as "geography, initial conditions, and legacies." In essence, change scores effectively limit the scope of analysis to the period under consideration such that any observed variation can be credited to changes which happened *within* the period (Allison 1990; Halaby 2003; Plümper and Troeger 2007).

-----FIGURE 3 ABOUT HERE-----

Excluding Germany, Poland and Spain, the three outliers in Figure 3, among remaining EU/EFTA countries, any association between the percent foreign-born and migrants' time of residence is effectively minimal. Even relatively large changes in the percent-foreign born, e.g., in countries including Latvia (-1.93 points), Iceland (+3.48) and Ireland (+3.56), correspond to minor changes in migrants' expected time of residence ranging from -0.54 years in the UK to +0.75 years in the Czech Republic. This finding is noteworthy because it suggests that the long-run implications of migration, as expressed by changing age profiles of flows, appear effectively inconsequential. Despite concerns that "workers from Central and Eastern European EU-candidate countries will

flood the current EU and reduce the wages of native workers" (Bauer and Zimmermann 1999:I), in the absence of significant changes in the age profiles of migration, these negative effects are short-lived. This point likewise serves to highlight why migration may not be a silver bullet with respect to alleviating pressures associated with population aging and rising public pension costs in many EU/EFTA countries (Bongaarts 2004).

The implications are somewhat different for Germany, Poland and Spain. As evidenced in Figure 1, the age profile of immigration to Spain increased at each age, most notably at the very young ages. Though these gains are expected for those of working age given the removal of barriers to new EU-accession migration in 2006 (Kahanec et al. 2009), the gains at the youngest and oldest ages are less easy to interpret. In historical perspective, however, these make perfect sense. At the time of Spain's accession to the European Community in 1986, previous attempts to control labor migration in Spain, particularly to encourage the long-term settlement of workers, proved unsuccessful since these ultimately ignored the importance of family reunification in promoting long-term migration (Pérez 2003). By the mid-1990s, Spain sought to remedy this oversight, and created the *Plan for Social Integration of Immigrants* in 1994 (Mahía et al 2009). Adjustments to this document in 1996 contained explicit references and related priorities with respect to family reunification. While some restrictions have subsequently been imposed, e.g., reunification with parents and grandparents above age 65 now requires five-years of residence, these have failed to stunt, much less reduce, immigration propensities to Spain at the youngest ages, i.e., among those with the most potential years of life to live in Spain. Thus, in contrast to countries such as Italy and the UK, the compositional and temporal dynamics of international migration for Spain

are complementary. Importantly, however, the former dynamic is silent with respect to the age profile of migration.

The explanations for Germany and Poland are more intertwined. A majority of existing research focuses on Poland's "spectacular and largely unexpected" emigration flows to countries like the UK and Germany (Kaczmarczyk and Okólski 2008:601). Germany, by contrast, is typically viewed as a country of immigration (Brenke et al. 2009). After all, the percent foreign-born in Germany and Poland increased and decreased over the 2002-2007 period, respectively. The rates of net-migration were likewise positive and negative, respectively (Kupiszewska et al. 2009). However, this distinction fails to explain why migrants' expected time of residence changed by -3.87 years in Germany and +1.82 years in Poland. Understanding these dynamics requires consideration of the interconnectedness of Germany and Poland on the issue of seasonal migrants. In particular, as noted by Hess et al. (2011:14), seasonal migrants mostly "from Poland...displayed very little propensity to take up permanent residence in Germany." In essence, although migration levels to Germany remained constant over the period, the composition of these flows may have been such that they increasingly favored seasonal, i.e., temporary, migrants (Brenke et al. 2009). The result was to drive down migrants' expected time of residence in Germany over the period. To complete this circle, the return migrations of these persons to Poland later in life subsequently increased migrants' expected time of residence in Poland. I illustrate this pattern in Figure 4.

-----FIGURE 4 ABOUT HERE-----

Relative to the age profile of immigration displayed for Germany in Figure 1, in Figure 4, there is no evidence for a strong shift in the age profile of migration from Poland to Germany during the period. This is altogether surprising because it suggests that the mobility restrictions enacted by Germany were ineffective, perhaps by design (Hess et al. 2011), in lowering the propensities of migration from Poland at each age. That said, it is also consistent with the idea that Germany is heavily dependent on seasonal, particularly farm, labor from Poland (Brenke et al. 2009; Hess et al. 2011). That these flows from Poland to Germany over the period were largely temporary is suggested by the age-specific propensities of migration from Germany to Poland which peak in later life after age 60 and resemble a pattern of family return migration. Without migration flow data cross-classified by previous/next country of residence *and* country of birth, which at present do not exist, one cannot be certain that the intuitions of Hess et al. (2011) are correct. However, it remains that considering migrants' expected time of residence yields insights that foreign-born stocks cannot, particularly with respect to migration from Germany to Poland at older ages.

## ***DISCUSSION***

In this project, I aimed to develop a theoretical and empirical rationale for viewing the temporal dynamics of international migration as a feature of place, particularly in receiving countries. The concept and measure detailed above are unique insofar as they both exploit and summarize the recency, turnover, and age profile of migration. These efforts mark a significant departure from prior research, which tends to envision these dynamics as a characteristic of individual migrants

(Borjas et al. 1992; Klinthäll 2001; Reagan and Olsen 2000; Waldorf 1994). Considering the truly systemic nature of international migration, however, entails theoretical and empirical efforts to explicate these regularities and render them accessible. Among these are countries' age profiles of migration (Castro and Rogers 1981; Raymer and Rogers 2008), which can be tapped to derive a single, summary measure of migrants' expected time of residence in receiving countries, and can be profitably compared in descriptive and more substantive efforts against commonly used compositional measures, e.g. the percent foreign-born.

There are likewise theoretical and policy reasons for separating the temporal and compositional dynamics of international migration. While the latter dynamic is thought to prompt perceptions of ethnic competition and threat among native-born persons (Blalock 1967; Bonacich 1972), the former may remediate these effects given the potential for increasingly constructive intergroup relations to develop over time (Cook 1962; Pettigrew 1998). Of course, distinguishing these two dynamics is not just a theoretical exercise. The European Commission's (2005) Common Agenda for Integration contains numerous references to non-discrimination and equality opportunities. In particular, regular and "frequent interaction between immigrants and Member State citizens is a fundamental mechanism for integration" (European Commission 2005:9). Though migrants' compositional presence in receiving countries is implicated here, so is the temporal *availability* of migrants to regularly engage and maintain these relations over time. This goes hand-in-hand with other integration processes, including employment and human capital acquisitions, access to institutions and services, and participation in the democratic process. In essence, integration policy in the EU already "emphasizes the *time dimension* with different outcomes predicted for

different stages of intergroup contact" (Pettigrew 1998:76, emphasis mine). To date, however, theoretical and empirical research has not fully elucidated the temporal dynamics of migration.

Breaking new ground, I provided some of the first country-level estimates of migrants' expected time of residence in 31 EU/EFTA countries each year during the 2002-2007 period. In comparing these against corresponding figures of the percent-foreign born, I observed little overlap. Larger concentrations of foreign-born stocks do not make for uniformly high or low times of residence in receiving countries. Recalling that the measure developed in this paper captures the recency, turnover and age profile of migration, this finding is perhaps unsurprising. Yet, discrepancies of this sort are exactly the point. The persistent preoccupation with foreign-born stocks in existing research has been largely at the expense of more comprehensive efforts to detail, theoretically and empirically, the many and diverse dynamics of international migration. For example, in this paper, I showed that, while the key receiving countries of France, Germany, Italy, Spain and the UK each experienced gains in the percent foreign-born over the 2002-2007 period, only France and Italy posted increases in migrants' expected time of residence. These countries experienced distinct shifts in their age profiles of migration, with very different implications for the temporal dynamics of migration.

To be clear, I do not intend the concept and measure developed in this project as an alternative to those compositional in nature. In fact, I submit the opposite, namely that any comprehensive account of international migration include both dynamics. Where future descriptive efforts are concerned, this entails the joint treatment of foreign-born stocks, migration rates and migrants'

expected time of residence. More substantive research linking international migration patterns to migrants' social exclusion in receiving countries would also benefit by further considering the temporal dynamics of international migration as a pertinent contextual characteristic in models of anti-foreigner sentiment (Pettigrew et al. 2010; Quillian 1995; Schneider 2008; Semyonov et al 2006). Future research will be significantly aided by concurrent efforts already in progress at the International Institute for Applied Systems Analysis (IIASA) to generate cross-classified data on migration flows by both previous/next country of residence and country of birth. Given that the migration model developed in this paper is effectively a first-order Markov process (Schoen 1988), cross-classified migration data capture the idea that flows have memory, e.g., migration propensities to the country of birth tend to exceed those observed in country-to country flow data (Rogers and Belanger 1990; Rogers and Raymer 2005). While elucidating these features is a "hard task considering the complexity of…economic, social and political interactions" (Bonifazi et al. 2008:123), it is hoped that the current paper provides a starting point for these efforts.

***REFERENCES***


Akresh, I.R. and D.S. Massey. 2004. “Coming to Stay: An Analysis of the Census Question on Year of Arrival.” *Demography*, 41:721-738.

Alba, Richard D. and John R. Logan. 1993. “Minority Proximity to Whites in Suburbs: An Individual-Level Analysis of Segregation.” *American Journal of Sociology*, 98:1388-1427.

Allison, P.D. 1990. "Change Scores as Dependent Variables in Regression Analysis." Pp. 93-114 *Sociological Methodology*. Edited by C. Clogg. Oxford: Basil Blackwell.

Allport, G. 1954. *The Nature of Prejudice*. Malden, MA: Blackwell Publishing.

Andrienko, Y. and S. Guriev 2004. “Determinants of Interregional Mobility in Russia.” *Economics of Transition*, 12:1-27.

Barrell, R., J. FitzGerald, and R. Riley. 2007. “EU Enlargement and Migration: Assessing the Macroeconomic Impacts.” NIESR Discussion Paper No. 292. National Institute of Social and Economic Research, London.

Bauer, T. K. and K. F. Zimmermann. 1999. “Assessment of Possible Migration Pressure and its Labour Market Impact Following EU Enlargement to Central and Eastern Europe.” ZA Research Report No. 3. Institute for the Study of Labor, Bonn.

Beggs, J.J., W.J. Villemez and R. Arnold. 1997. “Black Population Concentration and Black-White Inequality: Expanding the Consideration of Place and Space Effects.” *Social Forces*, 76: 65-91.

Bilsborrow, R.E., G. Hugo, A.S. Oberai and H. Zlotnik. 1997. *International Migration Statistics: Guidelines for Improving Data Collection Systems*. International Labour Office. Geneva.

Blalock, H.M. 1967. *Toward a Theory of Minority Group Relations*. New York: Wiley.

Bonacich, E. 1972. "A Theory of Ethnic Antagonism: The Split Labor Market." *American Sociological Review*, 37:547-559.

Bongaarts, J. 2004. "Population Aging and the Rising Cost of Public Pensions." *Population Development Review* 30:1-23.

Bonifazi, C., M. Okólski, J. Schoorl, and P. Simon. 2008*. International Migration in Europe: New Trends and New Methods of Analysis*. Amsterdam: Amsterdam University Press.

Borjas, G.J., S.G. Bronars and S.J. Trejo. 1992. "Self-Selection and Internal Migration in the United States." *Journal of Urban Economics*, 32:159-185.

Brenke, K., M. Yuksel, and K.F. Zimmermann. 2009. "EU Enlargement Under Continued Mobility Restrictions: Consequences for the German Labor Market." IZA DP No. 4055. Institute for the Study of Labor, Bonn.

Castles, S. and M. Miller. 2003. *The Age of Migration: International Population Movements in the Modern World*. 3rd edition. New York: The Guilford Press.

Citrin, J. and J. Sides. 2006. "European Immigration in the People's Court." Pp. 327-361 in *Immigration and the Transformation of Europe*. C.A. Parsons and T.M. Smeeding (eds.). Cambridge: Cambridge University Press.

Cohen, J.E., M. Roig, D.C. Reuman and C. GoSwilt. 2008 "International Migration Beyond Gravity: A Statistical Model for Use in Population Projections." *Proceedings of the National Academy of Sciences of the United States of America*, 105:15269-15274.

Commission of the European Communities. 2005. "A Common Agenda for Integration

Framework for the Integration of Third-Country Nationals in the European Union." COM(2005) 389. Brussels.

Cook, Stuart W. 1962. "The Systematic Analysis of Socially Significant Events: A Strategy for Social Research." *Journal of Social Issues*, 18:66-84.

de Beer J., J. Raymer, R. van der Erf and L. van Wissen. 2010. "Overcoming the Problems of Inconsistent International Migration Data: A New Method Applied to Flows in Europe." *European Journal of Population*, 26:459-481.

DeWaard, J., K. Kim and J. Raymer. Forthcoming. "Migration Systems in Europe: Evidence from Harmonized Flow Data." *Demography*.

DeWaard, J. and J. Raymer. 2011. "The Permanence of International Migration: A Multistate Analysis of European Flows, 2002-2007." Working Paper 2011-5. Center for Demography and Ecology, University of Wisconsin Madison.

European Commission. 2005." A Common Agenda for Integration Framework for the Integration of Third-Country Nationals in the European Union." COM(2005) 389 final. Commission of the European Communities, Brussels.

Greenwood, M.J. 1997. "Internal Migration in Developed Countries." Pp. 647-720 in *Handbook of Population and Family Economics*, Volume 2. Edited by M.R. Rozenzweig and O. Stark. New York: Elsevier.

Halaby, Charles N. 2004. "Panel Models in Sociological Research: Theory Into Practice." *American Sociological Review*, 30:507-544.

Herting, J.R., D.B. Grusky and S.E. Van Rompaey. 1997. "The Social Geography of Interstate Mobility and Persistence." *American Sociological Review*, 62:267-287.

Hess, S., S. von Cramon-Taubadel, U. Zschache, L. Theuvsen, and D. Kelinschmit. 2011. "Explaining the Puzzling Persistence of Restrictions on Seasonal Farm Labor in Germany." *European Review of Agricultural Economics*, doi:10.1093/erae/jbr057: 1-22.

Kaczmarczyk, P. and M. Okólski. 2008. "Demographic and Labour-Market Impacts of Migration on Poland." *Oxford Review of Economic Policy*, 24:599–624.

Kahanec, M., A. Zaiceva, and K.F. Zimmermann. 2009. "Lessons from Migration after EU Enlargement." IZA DP No. 4230. Institute for the Study of Labor, Bonn.

Keyfitz, N. and H. Caswell. 2005. *Applied Mathematical Demography*, 3rd edition. New York: Springer.

Kim, K. and J.E. Cohen. 2010. "Determinants of International Migration Flows to and from Industrialized Countries: A Panel Data Approach beyond Gravity." *International Migration Review*, 44:899-932.

Klinthäll, M. 2006. "Retirement Return Migration from Sweden." *International Migration* 44:153-180.

Kritz, M. M., L.L. Lim and H. Zlotnik. 1992. *International Migration Systems: A Global Approach*. Oxford: Clarendon Press.

Kupiszewska, D., and J. Bijak. 2008. "Methodology for the Estimation of Population Stocks by Country of Birth, Sex and Age." MIMOSA Project Report, Netherlands Interdisciplinary Demographic Institute, The Hague.

Kupiszewska, D., and B. Nowok. 2008. "Comparability of Statistics on International Migration Flows in the European Union." Pp. 41-72 in *International Migration in Europe: Data, Models and Estimates*. Edited by J. Raymer and F. Willekens. Chichester: Wiley.

Kupiszewska, D., A. Wiśniowski, and J. Bijak. 2009. “Estimation of Population Stocks by Country of Birth, Sex and Age for 1st January 2002-2007.” MIMOSA Project Report, Netherlands Interdisciplinary Demographic Institute, The Hague.

Mahía, R. and E. Thielemann. 2009. “Immigration Policy and its Impact: A Comparative Study with a Focus on Spain.” LSE Migration Studies Unit and CIEES. London School of Economics, London.

Massey, Douglas S. 1985. “Ethnic Residential Segregation: A Theoretical Synthesis and Empirical Review.” *Sociology and Social Research*, 69:315-350.

Massey, D.S., J. Arango, G. Hugo, A. Kouaouci, A. Pellegrino and J.E. Taylor. 1998. *Worlds in Motion: Understanding International Migration at the End of the Millennium*. Oxford: Clarendon Press.

Massey, Douglas S. and Brendan P. Mullan. 1984. “Processes of Hispanic and Black Spatial Assimilation.” *American Journal of Sociology*, 89:836-873.

Mayda, A.M. 2005. “International Migration: A Panel Data Analysis of Economic and Non-Economic Determinants.” IZA Discussion Paper No. 1590. Institute for the Study of Labor, Bonn.

Mullen B., R. Brown, and C. Smith. 1992. “Ingroup Bias as a Function of Salience, Relevance, and Status : An Integration.” *European Journal of Social Psychology*, 22:103-122.

Palloni, A. 2001. “Increment-Decrement Life Tables.” Pp. 256-273 in *Demography: Measuring and Modeling Population Processes*. Edited by S. Preston, P. Heuveline and M. Guillot. Oxford: Blackwell Publishers.

Pedersen, P.J., M. Pytlikova and N. Smith. 2008. “Selection and Network Effects: Migration Flows into OECD Countries 1990-2000.” *European Economic Review,* 52:1160-1186.

Pérez, N.O. 2003. “Spain: Forging and Immigration Policy.” Country Profiles, Migration Information Source. Migration Policy Institute, Washington D.C.

Pettigrew, T.F. 2008. “Future Directions for Intergroup Contact Theory and Research.” *International Journal of Intercultural Relations*, 32:187–199.

Pettigrew, T.F. 1998. “Intergroup Contact Theory.” *Annual Review of Psychology*, 49:65- 85.

Pettigrew, T.F., L.R. Tropp, U. Wagner, and O. Christ. 2011. “Recent Advances in Intergroup Contact Theory.” *International Journal of Intercultural Relations*, 35:271-280.

Pettigrew, T.F., U. Wagner and O. Christ. 2010. “Population Ratios and Prejudice: Modelling Both Contact and Threat Effects.” *Journal of Ethnic and Migration Studies*, 36:635-650.

Plümper, Thomas and Vera E. Troeger 2007. “Efficient Estimation of Time-Invariant and Rarely Changing Variables in Finite Sample Panel Analyses with Unit Fixed Effects.” *Political Analysis*, 15:124-139.

Poulain M., N. Perrin and A. Singleton. 2006. *THESIM: Towards Harmonized European Statistics on International Migration.* Louvain-la-Neuve: UCL Presses Universitaires de Louvain.

Preston, S.H., P. Heuveline, and M. Guillot. 2001. “*Demography: Measuring and Modeling Population Processes*. Oxford: Blackwell Publishers.

Quillian, L. 1995. “Prejudice as a Response to Perceived Group Threat: Population Composition and Anti-Immigrant and Racial Prejudice in Europe.” *American Sociological Review*, 60:586-611.

Raymer, J., J. de Beer and R. van der Erf. 2011. “Putting the Pieces of the Puzzle Together: Age and Sex-Specific Estimates of Migration amongst Countries in the EU/EFTA, 2002-2007.” *European Journal of Population* 27:185-215.

Raymer, J. and A. Rogers. 2008. “Applying Model Migration Schedules to Represent Age-Specific Migration Flows.” Pp. 175-192 in *International Migration in Europe: Data, Models and Estimates*. Edited by J. Raymer and F. Willekens. Chichester: Wiley.

Reagan, P.B. and R.J. Olsen. 2000. “You Can Go Home Again: Evidence from Longitudinal Data.” *Demography*, 37:339-350.

Rogers, A. 1995. *Multiregional Demography: Principles, Methods and Extensions*. London: Wiley.

Rogers, A. 1975. *Introduction to Multiregional Mathematical Demography*. New York: Wiley.

Rogers, A. and A. Belanger. 1990. “The Importance of Place of Birth in Migration and Population Redistribution Analysis.” *Environment and Planning A*, 22:193-210.

Rogers, A. and L.J. Castro. 1981. “Model Migration Schedules.” RR-81-30, International Institute for Applied Systems Analysis, Laxenburg, Austria.

Rogers, A. and J. Raymer. 2005. “Origin Dependence, Secondary Migration, and the Indirect Estimation of Migration Flows from Population Stocks.” *Journal of Population Research*, 22:1-19.

Saguy, T., J.F. Dovidio and F. Pratto. 2008. “Beyond Contact: Intergroup Contact in the Context of Power Relations.” *Personality and Social Psychology Bulletin*, 34:432-445.

Scheepers, P., M. Gijsberts, and M. Coenders. 2002. "Ethnic Exclusionism in European Countries: Public Opposition to Civil Rights for Legal Migrants as a Response to Perceived Ethnic Threat." *European Sociological Review*, 18:17-34.

Schlueter, E. and P. Scheepers. 2010. "The Relationship between Outgroup Size and Anti-Outgroup Attitudes: A Theoretical Synthesis and Empirical Test of Group Threat and Intergroup Contact Theory." *Social Science Research*, 39:285-295.

Schneider, S.L. 2008. "Anti-Immigrant Attitudes in Europe: Out-Group Size and Perceived Ethnic Threat." *European Sociological Review*, 24:53-67.

Schoen, R. 1988. *Modeling Multigroup Populations*. New York: Pleneum.

Semyonov, M., R. Raijman, and A. Gorodzeisky. 2006. "The Rise of Anti-Foreigner Sentiment in European Societies, 1988-2000." *American Sociological Review*, 71:426-449.

Stein, R.M., S.S. Post, and A.L. Rinden. 2000. "Reconciling Context and Contact Effects on Racial Attitudes." *Political Research Quarterly*, 53:285-303.

Tropp, L.R. 2008. "The Role of Trust in Intergroup Contact: Its Significance and Implications for Improving Relations between Groups." Pp. 91-106 in *Improving Intergroup Relations: Building on the Legacy of Thomas F. Pettigrew*. Edited by U. Wagner, L.R. Tropp, G. Finchilescu and C. Tredoux. Oxford, UK: Blackwell Publishing Ltd.

United Nations. 1998. Recommendations on Statistics of International Migration. Statistical Papers Series M, No. 58, Rev. 1. Statistics Division, Department of Economic and Social Affairs, United Nations, New York.

Wagner, U., O. Christ, H. Wolf, R. van Dick, J. Stellmacher, E. Schlüter, and A. Zick. 2008. "Social and Political Context Effects on Intergroup Contact and Intergroup Attitudes." Pp. 195-

209 in *Improving Intergroup Relations: Building on the Legacy of Thomas F. Pettigrew*. Edited by U. Wagner, L.R. Tropp, G. Finchilescu and C. Tredoux. Oxford, UK: Blackwell Publishing Ltd.

Waldorf, B.S. 1994. "Assimilation and Attachment in the Context of International Migration: The Case of Guestworkers in Germany." *Papers in Regional Science*, 73:1-26.

Waldorf, B.S. and A. Esparza. 1991. "A Parametric Failure Time Model of International Return Migration." *Papers in Regional Science*, 70:419-438.

Wilkes, R., N. Guppy, and L. Farris. 2008. "'No Thanks, We're Full': Individual Characteristics, National Context, and Changing Attitudes toward Immigration." *International Migration Review*, 42:302-329.

Willekens, F. and A. Rogers. 1978. "Spatial Population Analysis: Methods and Computer Programmes." Research Report RR-78-18, International Institute for Applied Systems Analysis, Laxenburg, Austria.

World Bank. 2006. "International Migration, Remittances and the Brain Drain." Washington D.C.

Zipf, G.K. 1946. "The P1 P2/D Hypothesis: on the Intercity Movement of Persons." *American Sociological Review*, 11:677-686.

**Table 1. Migrants' Expected Time of Residence in 31 EU/EFTA Countries: 2002-2007**

| | | Average Years of Residence | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Receiving Country** | | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **Δ 2002-2007** |
| AT | Austria | 1.47 | 1.52 | 1.77 | 1.85 | 1.47 | 1.46 | -0.01 |
| BE | Belgium | 1.50 | 1.51 | 1.50 | 1.60 | 1.64 | 1.63 | 0.12 |
| BG | Bulgaria | 0.50 | 0.54 | 0.52 | 0.54 | 0.49 | 0.50 | -0.01 |
| CH | Switzerland | 2.61 | 2.67 | 2.48 | 2.25 | 2.17 | 2.49 | -0.13 |
| CY | Cypress | 0.28 | 0.30 | 0.37 | 0.40 | 0.27 | 0.29 | 0.02 |
| CZ | Czech Republic | 1.02 | 1.10 | 1.07 | 1.25 | 1.34 | 1.77 | 0.75 |
| DE | Germany | 10.36 | 8.69 | 8.46 | 7.66 | 6.41 | 6.49 | -3.87 |
| DK | Denmark | 0.84 | 0.74 | 0.74 | 0.74 | 0.72 | 0.77 | -0.07 |
| EE | Estonia | 0.15 | 0.14 | 0.17 | 0.17 | 0.17 | 0.17 | 0.02 |
| ES | Spain | 4.43 | 5.78 | 5.52 | 5.97 | 6.31 | 6.59 | 2.16 |
| FI | Finland | 0.66 | 0.60 | 0.64 | 0.66 | 0.63 | 0.66 | 0.01 |
| FR | France | 4.21 | 4.21 | 4.35 | 4.71 | 4.88 | 4.79 | 0.58 |
| GR | Greece | 1.07 | 0.97 | 0.97 | 0.97 | 0.89 | 0.84 | -0.22 |
| HU | Hungary | 0.73 | 0.65 | 0.89 | 0.85 | 0.76 | 0.73 | 0.01 |
| IE | Ireland | 0.74 | 0.72 | 0.79 | 0.85 | 0.95 | 0.94 | 0.20 |
| IS | Iceland | 0.14 | 0.14 | 0.15 | 0.17 | 0.17 | 0.18 | 0.04 |
| IT | Italy | 5.15 | 6.69 | 6.13 | 4.95 | 5.05 | 4.67 | -0.48 |
| LI | Liechtenstein | 0.08 | 0.08 | 0.09 | 0.08 | 0.09 | 0.09 | 0.00 |
| LT | Lithuania | 0.30 | 0.27 | 0.29 | 0.33 | 0.33 | 0.34 | 0.04 |
| LU | Luxembourg | 0.51 | 0.48 | 0.48 | 0.51 | 0.41 | 0.40 | -0.10 |
| LV | Latvia | 0.17 | 0.16 | 0.20 | 0.23 | 0.31 | 0.36 | 0.19 |
| MT | Malta | 0.12 | 0.12 | 0.11 | 0.12 | 0.12 | 0.12 | 0.00 |
| NL | Netherlands | 2.04 | 1.66 | 1.56 | 1.54 | 1.52 | 1.60 | -0.43 |
| NO | Norway | 0.80 | 0.66 | 0.63 | 0.67 | 0.69 | 0.87 | 0.06 |
| PL | Poland | 2.33 | 2.27 | 2.78 | 2.66 | 3.30 | 4.16 | 1.82 |
| PT | Portugal | 0.91 | 0.88 | 0.87 | 0.93 | 0.92 | 0.88 | -0.03 |
| RO | Romania | 1.17 | 1.28 | 1.25 | 1.35 | 1.27 | 1.28 | 0.11 |
| SE | Sweden | 1.52 | 1.36 | 1.30 | 1.36 | 1.63 | 1.65 | 0.14 |
| SI | Slovenia | 0.22 | 0.18 | 0.20 | 0.20 | 0.18 | 0.19 | -0.04 |
| SK | Slovakia | 0.37 | 0.34 | 0.57 | 1.05 | 1.14 | 0.84 | 0.47 |
| UK | United Kingdom | 4.94 | 4.22 | 4.92 | 4.76 | 4.75 | 4.40 | -0.54 |

Source: Author's calculations using data from the MIMOSA Project (see de Beer et al. 2010; Raymer et al. 2011)

Notes:

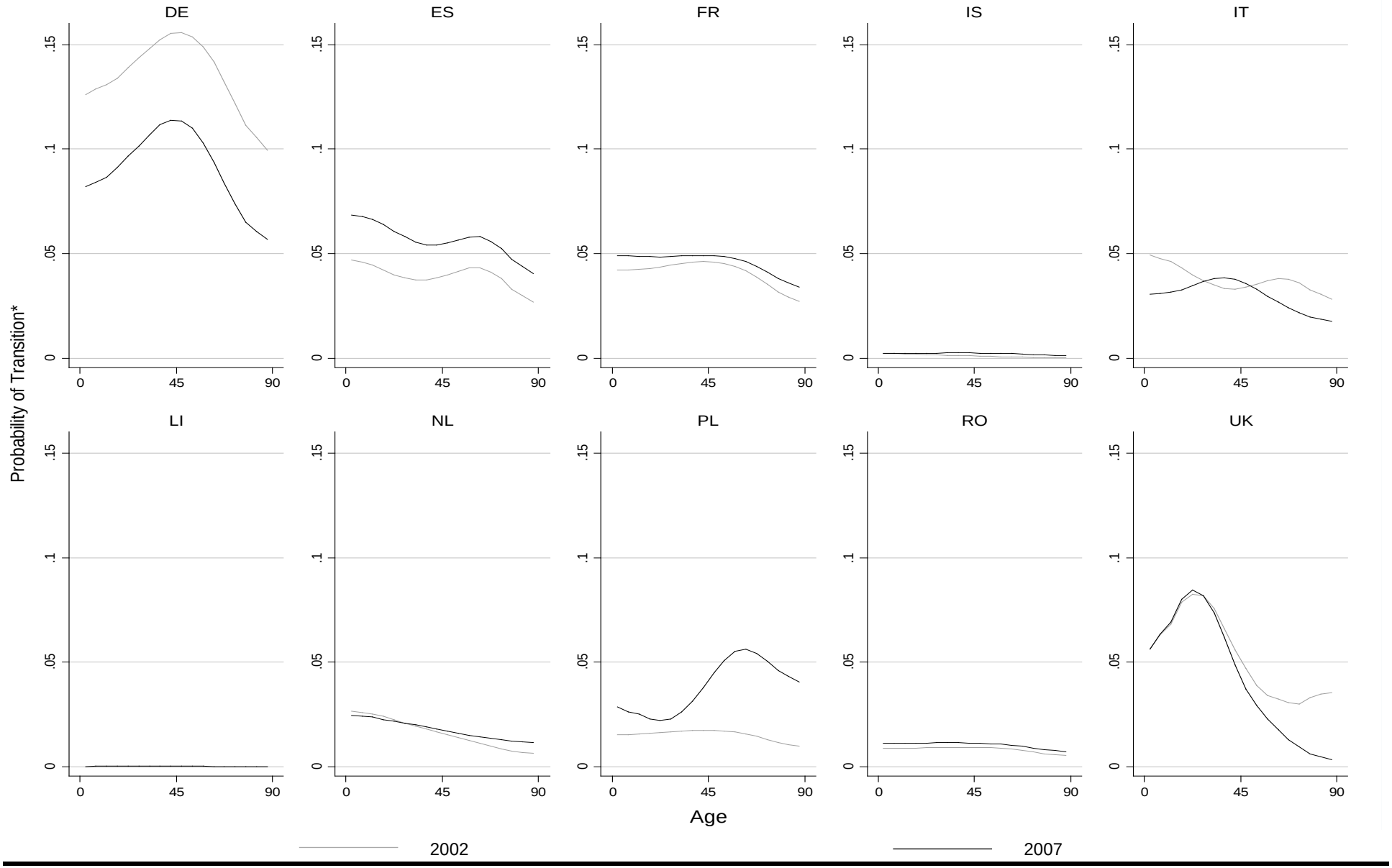
The expected time of residence is a conditional life expectancy at age zero, defined as the average number of years that a migrant is expected to live in receiving country *j* above age zero given previous residence outside of country *j* at exact age zero (Willekens and Rogers 1978).

**Table 2. Foreign-Born Population Stocks in 31 EU/EFTA Countries: 2002-2007**

| | | Percent Foreign-Born | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Receiving Country** | | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **Δ 2002-2007** |
| AT | Austria | 12.75 | 13.17 | 13.57 | 13.98 | 14.38 | 14.80 | 2.04 |
| BE | Belgium | 10.79 | 11.12 | 11.40 | 11.68 | 12.07 | 12.51 | 1.72 |
| BG | Bulgaria | 0.55 | 0.55 | 0.54 | 0.54 | 0.53 | 0.53 | -0.02 |
| CH | Switzerland | 21.42 | 21.59 | 21.75 | 21.90 | 22.04 | 22.19 | 0.76 |
| CY | Cypress | 12.81 | 13.06 | 13.34 | 13.63 | 13.90 | 14.12 | 1.30 |
| CZ | Czech Republic | 4.47 | 4.45 | 4.43 | 4.42 | 4.40 | 4.38 | -0.09 |
| DE | Germany | 12.81 | 12.89 | 12.71 | 12.84 | 12.85 | 12.84 | 0.03 |
| DK | Denmark | 7.29 | 7.47 | 7.59 | 7.69 | 7.84 | 8.04 | 0.74 |
| EE | Estonia | 17.98 | 17.65 | 17.31 | 16.97 | 16.62 | 16.25 | -1.73 |
| ES | Spain | 6.20 | 7.73 | 8.55 | 9.90 | 11.26 | 11.56 | 5.36 |
| FI | Finland | 2.79 | 2.92 | 3.04 | 3.18 | 3.36 | 3.56 | 0.77 |
| FR | France | 10.36 | 10.53 | 10.70 | 10.85 | 10.85 | 10.85 | 0.49 |
| GR | Greece | 10.36 | 10.47 | 10.58 | 10.68 | 10.79 | 10.89 | 0.53 |
| HU | Hungary | 2.82 | 2.77 | 2.72 | 2.68 | 2.63 | 2.58 | -0.24 |
| IE | Ireland | 10.37 | 9.10 | 8.91 | 9.88 | 14.67 | 13.93 | 3.56 |
| IS | Iceland | 6.40 | 6.61 | 6.72 | 7.04 | 8.23 | 9.88 | 3.48 |
| IT | Italy | 4.02 | 4.46 | 4.91 | 5.35 | 5.78 | 6.21 | 2.19 |
| LI | Liechtenstein | 38.81 | 38.43 | 38.03 | 37.68 | 37.31 | 36.93 | -1.87 |
| LT | Lithuania | 6.10 | 6.36 | 6.89 | 6.61 | 6.61 | 6.56 | 0.46 |
| LU | Luxembourg | 32.72 | 33.03 | 33.35 | 33.64 | 33.96 | 34.27 | 1.55 |
| LV | Latvia | 18.04 | 17.24 | 16.96 | 16.65 | 16.34 | 16.11 | -1.93 |
| MT | Malta | 5.55 | 5.69 | 5.83 | 5.96 | 6.06 | 6.04 | 0.49 |
| NL | Netherlands | 10.40 | 10.59 | 10.65 | 10.65 | 10.62 | 10.59 | 0.19 |
| NO | Norway | 6.96 | 7.33 | 7.59 | 7.84 | 8.20 | 8.65 | 1.69 |
| PL | Poland | 2.08 | 2.01 | 1.94 | 1.88 | 1.81 | 1.75 | -0.32 |
| PT | Portugal | 6.40 | 6.53 | 6.66 | 6.78 | 6.89 | 7.00 | 0.60 |
| RO | Romania | 0.61 | 0.62 | 0.62 | 0.62 | 0.63 | 0.64 | 0.02 |
| SE | Sweden | 11.54 | 11.78 | 12.01 | 12.21 | 12.44 | 12.90 | 1.36 |
| SI | Slovenia | 10.89 | 10.92 | 11.00 | 10.87 | 11.10 | 11.31 | 0.42 |
| SK | Slovakia | 2.83 | 3.49 | 4.14 | 4.05 | 4.15 | 4.31 | 1.47 |
| UK | United Kingdom | 8.40 | 8.50 | 8.83 | 9.26 | 9.96 | 9.97 | 1.57 |

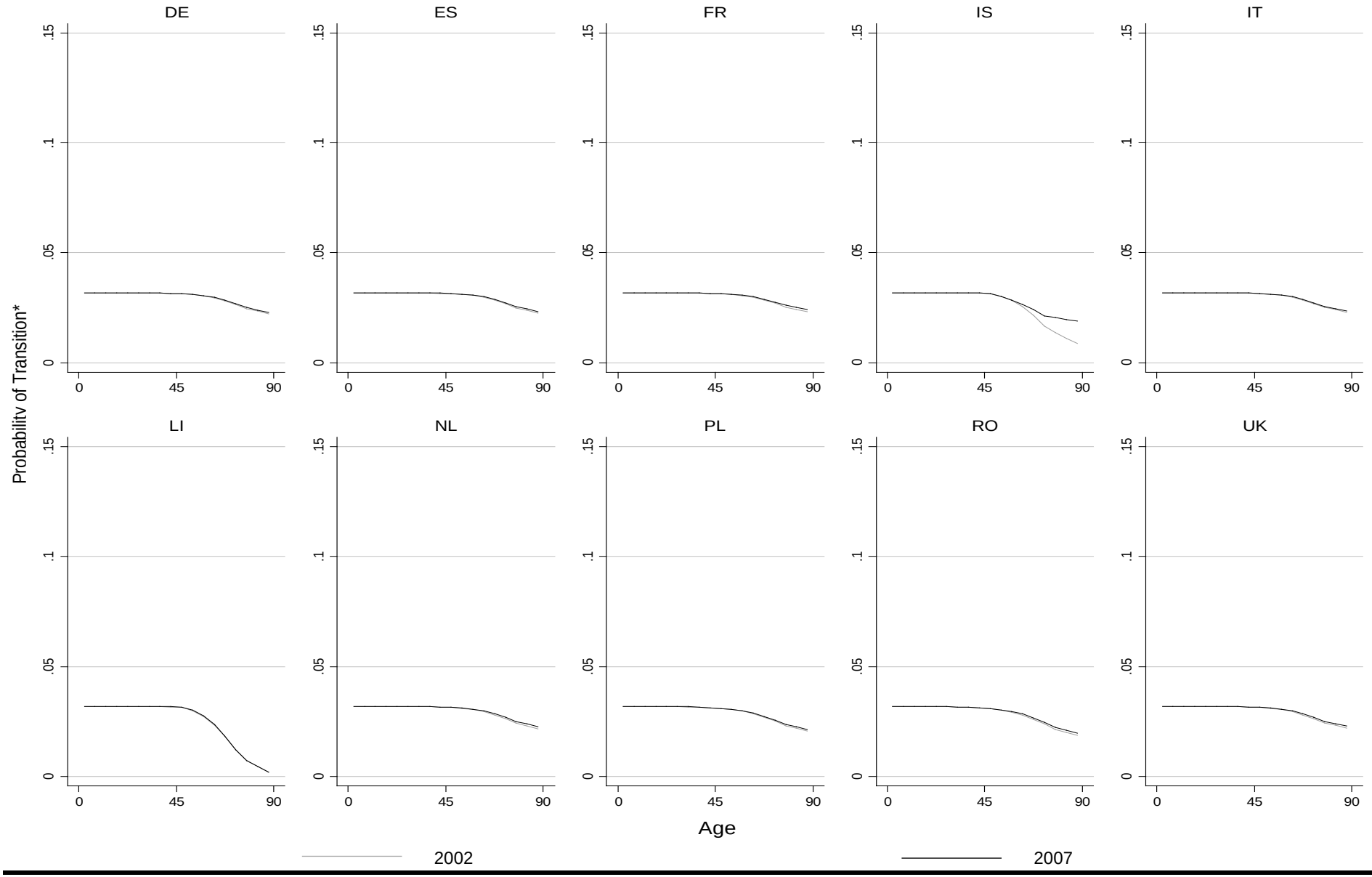
Source: Author's calculations using data from the MIMOSA Project (see Kupiszewska et al. 2009)

**Figure 1. Mean Age-Specific Probability of Immigration to Ten Selected EU/EFTA Countries: 2002 & 2007**




* Proportion of all migrants from sending country *i* at exact age *x* who transitioned to receiving country *j,* averaged across all *sending* countries.

**Figure 2. Mean Age-Specific Probability of Emigration from Ten Selected EU/EFTA Countries: 2002 & 2007**




* Proportion of all migrants from sending country *i* at exact age *x* who transitioned to receiving country *j,* averaged across all *receiving* countries.

**Figure 3. Change in Foreign-Born Population Stocks by Migrants' Expected Time of Residence in 31 EU/EFTA Countries: 2002-2007**

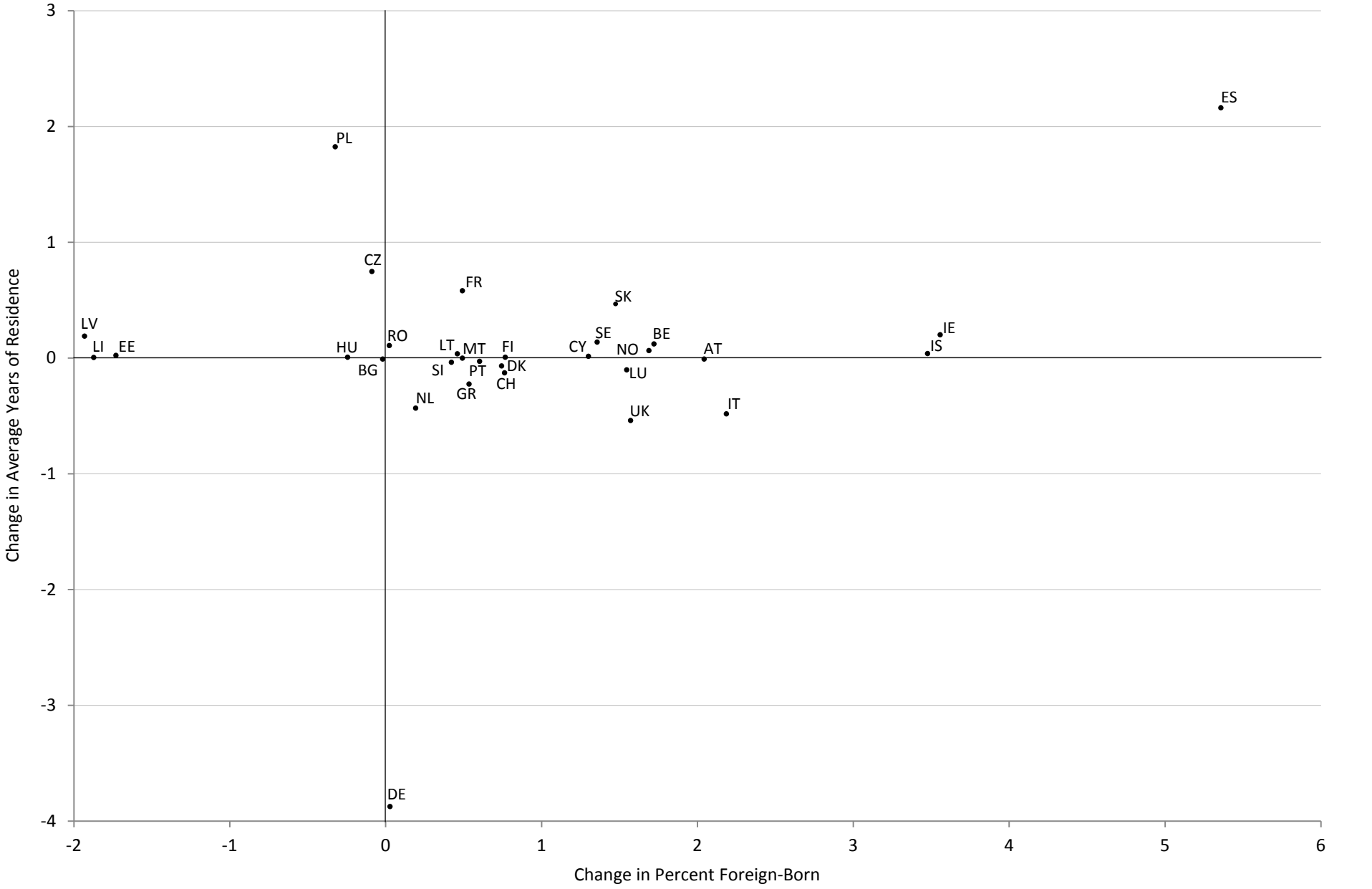
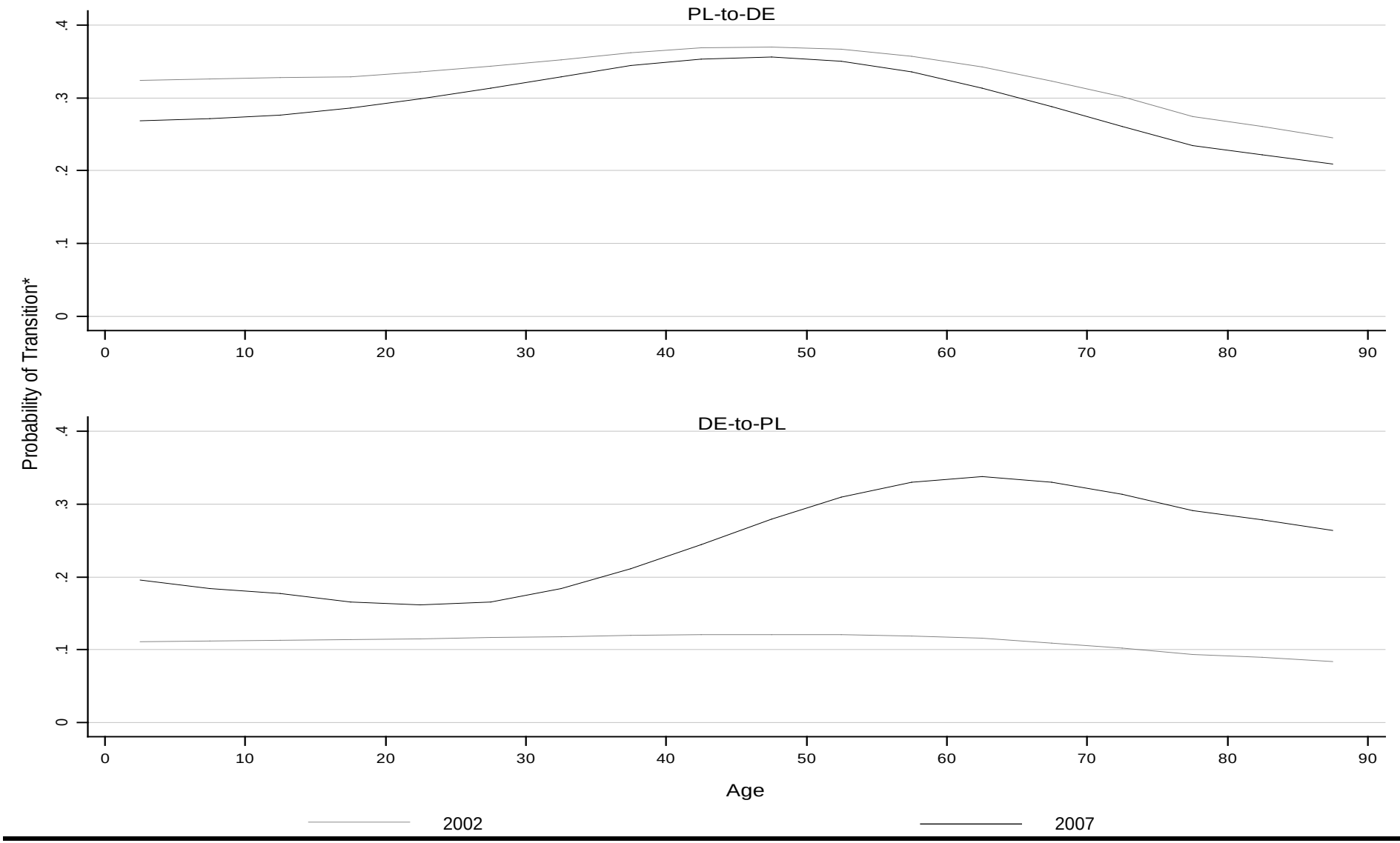


**Figure 4. Age-Specific Probability of Emigration from Poland to Germany and from Germany to Poland: 2002 & 2007**




* Proportion of all migrants from sending country *i* at exact age *x* who transitioned to receiving country *j*

Notes:

Scale of vertical axis differs from that in Figures 1 and 2.