Lifetime internal migration trajectories and social networks: Do repeat migrants fare worst?

Abstract
While the economic benefits of internal migration are widely documented, the social costs of internal migration have received comparatively less attention. In addition, most studies focus on the impact of the last-recorded migration, ignoring the cumulative impact of successive migrations. Grounded in the life-course trajectory approach to migration and the convoy model of social networks, this paper addresses this gap by applying sequence and cluster analysis to retrospective data from the Survey of Health, Ageing and Retirement in Europe (SHARE) in 26 European countries to establish internal migration trajectories based on the timing, frequency, and direction of migration between NUTS-2 regions. The results reveal that differences in social networks between lifetime stayers, childhood migrants and one-time adult migrants are minimal. A more complex picture emerges for repeat migrants who account for half the lifetime migrants and are split between return migrants, serial onward migrants, and circular migrants. Regression results show that repeat migrants – whether onward, return, or circular – display social networks less focused on family and more geographically dispersed, which results in a lower frequency of contact than lifetime stayers. However, repeat migrants report the same level of overall satisfaction with their social networks as lifetime stayers, which suggests that they start with different expectations than stayers or simply adjust their expectations in response to the social costs and benefits of migration.

Keywords: immobility, repeat migration, residential mobility, onward migration, circular migration, life course, Europe, SHARE, sequence analysis

1. Introduction

The economic benefits of internal migration are well-documented and include upward occupational mobility and higher earnings, which are facilitated by residence in escalator regions that provide ample educational and employment opportunities (Fielding, 1992; Van Ham et al., 2012). Recognising the importance of non-economic outcomes, interest has turned to subjective well-being, with a growing body of work documenting the positive effect of both short and long-distance internal migration on happiness (Nowok et al., 2013; Oishi et al., 2012). Yet, the social costs of internal migration have received comparatively less interest despite the severance of social networks often caused by long-distance migration (Sjaastad, 1962). This gap mainly stems from limited data availability as very few nationally representative surveys collect comprehensive data on social networks.

While limited, existing work suggests that internal migrants have smaller social networks centred on friends and siblings, whereas stayers' networks tend to be centred on partners, parents and children (Oishi & Tsang, 2022; Viry, 2012). Such friend-centric networks can be attributed to expected loneliness caused by migration, which leads to greater motivation to expand social ties beyond family ties (Oishi et al., 2013). On the other hand, some scholars argue that individuals migrate back to places they lived before to be closer to non-resident family members (Mulder, 2018), particularly after childbirth, separation or widowhood (Spring et al., 2021; Thomas & Dommermuth, 2020), which is likely to strengthen family ties. These different factors may explain why some studies are inconclusive about the impacts of internal migration on social networks (Drevon et al., 2021a; Magdol, 2000). This is further complicated by the fact that the strength of social networks can in turn influence the duration of residence (Toney, 1976), which is a predictor of migration intentions (Manchin & Orazbayev, 2018) and their realisations (Büchel et al., 2019; Mulder & van der Meer, 2009). These

complex interactions make it difficult to ascertain the links between internal migration and social networks.

A further complication is the fact that most studies rely on cross-sectional data and only a few studies jointly track change in social networks and region of residence. However, such longitudinal datasets are typically from small ad-hoc surveys for sub-population groups (Lubbers et al., 2010) or span short time periods (Magdol, 2000). In addition, internal migration is usually modelled as a single event despite the numerical significance of repeat internal migration (DaVanzo, 1983; Goldstein, 1954, 1964; Kau & Sirmans, 1976; Pourcher, 1966; Rogerson, 1987). In recent years, growing calls have been made to study migration as a life-course *trajectory* where the focus is on long-term migration trajectories that comprise multiple migration events or protracted periods of immobility (Bernard, 2022c; Coulter et al., 2016). This long-term perspective aligns with the convoy model, which views the formation of social networks as a lifetime process shaped by critical life-course events such as union formation and dissolution, childbearing, and transitions in and out of the labour market (Kalmijn, 2012; Volker, 2020). Empirically, this life-course trajectory approach can be deployed by examining social networks at the end of one's migration trajectory to gauge the cumulative long-term influence of successive migrations. An example is Drevon et al. (2021b) who weighted each municipality of residence since birth by duration of residence to create a lifetime typology of the dispersion of residential space for two Swiss cohorts born in 1950-55 and 1970-75. This approach revealed that individuals with spatially dispersed migration trajectories are more likely to have peer-centred social networks.

Advancing understanding of the long-term associations between internal migration and social networks is important because greater distance to the members of one's social networks can lead to a lower frequency of contact. This in turn reduces support provision (Mulder & van der Meer, 2009), an important determinant of subjective well-being and mental wellness (Stansfeld et al., 2013). In that context, this paper combines the life-course trajectory approach to internal migration with the convoy model of social networks to establish the association between internal migration trajectories from birth to the late 50s and social networks in later life. We extend the literature in three principal ways.

First, the paper takes a holistic long-term approach to migration by jointly considering the frequency, order, timing, and direction of internal migration, differentiating between onward migration to a new region of residence and return migration to a previous region of residence. While some studies have explored different impacts on social networks by the frequency of moves (Oishi et al., 2013; Oishi & Tsang, 2022) and the distance moved (Drevon et al., 2021a; Magdol & Bessel, 2003), they have not considered how these different dimensions combine to create unique migration sequences over the life-course. Inter-personal variation in the timing of migration (e.g. childhood migration versus migration in later life) has also been rarely considered, which is recognised as a potential limitation of existing studies (Choi & Oishi, 2020; Oishi & Tsang, 2022). Another important but overlooked dimension is the direction of migration. Despite long-standing knowledge that return migration is in part motivated by location-specific capital that includes homeownership and social networks (DaVanzo, 1981), the distinction between onward and return migration is rare in the literature on social networks, although social isolation and loneliness have been proposed as explanation for return migration (Barrett & Mosca, 2013). In addition, the definition of return migration is often constrained by data collection practices and typically limited to the return to one's region of birth or it is measured over a one or five-year interval (Newbold & Bell, 2001), which underestimates the incidence of return migration. In this paper, we broaden the definition of return migration to encompass the return to any region of previous residence since birth in an effort to fully gauge the impact of different migration pathways on social networks. This approach allows us to capture repeat migration more robustly. This is an important contribution given its numerical significance (Goldstein, 1954; Morrison, 1971) and the recognition that the incidence of repeat migration underpins differences in the aggregate level of

internal migration between countries (Bernard, 2017b; Falkingham et al., 2016) and over time (Bernard, 2017a; Kolk, 2019; Kulu et al., 2018).

Second, the paper expands evidence to 26 European countries by drawing on the Survey of Health, Ageing and Retirement in Europe (SHARE), which collected complete migration histories since birth and contemporaneous information on social networks in 2007 and 2017. Broader social conditions such as poverty level (Böhnke & Link, 2017), family structures and welfare system (van Tilburg & Thomése, 2010) have been shown to influence how social networks are formed and evolve. In a comparison of social network types across European countries, Litwin & Stoeckl (2014) derived six prototypical social networks, which are found in all countries albeit with different incidences. Similarly, the level of internal migration varies between countries because of variations in the function of housing and labour markets (Mulhern & Watson, 2009) and population composition (Vidal & Lersch, 2021). Thus, the links between internal migration and social networks may be country specific. In that context, the use of comparable cross-country data allows us to control for structural macro conditions that may affect the relationship between social networks and internal migration.

Third, we recognise the multifaceted nature of social networks as stipulated by the convoy model, which defines social networks according to their structure, support, and quality (Antonucci et al., 2010). In this paper, we do not only consider the size, composition, and distance of social networks as done in the extant literature, but we also examine emotional closeness and satisfaction to offer a more comprehensive understanding of the links between internal migration and social networks.

The remainder of the paper is structured as follows. Section 2 outlines the theoretical foundation of the paper built on the convoy model of social networks and the life-course trajectory approach to migration, which both call for a long-term perspective. We then review empirical attempts to link social networks with internal migration and formulate research hypotheses to guide our empirical analysis. Section 3 introduces SHARE, presents the variables used to measure migration and social networks and summarises the control variables. It then introduces methods, starting with sequence and cluster analysis, which are used to identify ideal-typical lifetime migration trajectories. The outcome from sequence analysis is then used as a control variable in a series of regression models of social networks. The results are presented in Section 4 in two steps. First, we present results from sequence and cluster analysis by outlying the features of each type of internal migration trajectory. Second, we show results from regression analysis to establish the association between migration trajectories and each aspect of social networks in later life. Section 5 concludes by discussing the theoretical and methodological implications of our findings for future research.

2. Conceptual Framework

This section starts by presenting the convoy model of social networks, which emphasises the multifaceted nature of relational processes over time. We then review empirical studies on the links between social networks and internal migration and introduce the life-course trajectory approach to internal migration. Finally, we draw on these theoretical frameworks to formulate a series of research hypotheses.

2.1. Social networks over the life course

Introduced by Barnes (1954), the concept of social networks has undergone substantial theoretical and empirical development. Perhaps one of the most important theoretical advancements is the convoy model, which envisages interconnections between individuals from a developmental perspective (Antonucci et al., 2010). This model views social relations as linked interactions that evolve and accumulate over time. Empirical studies have affirmed that social networks are maintained over the life course while evolving with age and in response to critical life events.

The convoy model emphasises the multifaceted nature of social networks, which are defined in terms of structure, support and quality (Antonucci et al., 2010). The structure of a social network is the product of its size, composition, proximity and frequency of contact with network members. Social networks tend to diminish in size with age and also change in terms of composition (McDonald & Mair, 2010). During childhood, social networks typically grow in size through both family members and friends. In adolescence and young adulthood, friends and romantic partners gradually become the primary members of one's social networks (Levitt et al., 1993; Takahashi, 2005). In contrast, older adults often report smaller networks with a lower frequency of contact (Lang, 2001). Some of these changes are caused by life-course transitions (McDonald & Mair, 2010) such as cohabitation, which usually results in a reduction in the number of friends for individuals but an increase in the percentage of shared friends within couples (Kalmijn, 2003). Similarly, parenthood initially leads to a decline in the size of the social networks followed by a recovery when children are older (Kalmijn, 2012; Weiss et al., 2022). Conversely, labour market entry typically leads to an expansion of social networks through the inclusion of colleagues and new friends (Morrison, 2002), while contacts with existing friends often decline (Bidart & Lavenu, 2005).

Social networks can also be viewed through the type of support received, which can be informational (e.g., providing information on job opportunities or migration destinations), instrumental (e.g., financial or physical help) or emotional (e.g., empathy and affirmation) (Antonucci et al., 2010; Trepte et al., 2015). The type of support received evolves with age. For example, informational and instrumental support is more prevalent among young adults who require financial support to study and access information to expand their job search, whereas the provision and receipt of emotional support tend to be stable until very old age (Antonucci, 2001; Shaw et al., 2007). Other sources of variation include gender as women provide and receive emotional support after marriage to a greater extent than men and often report more diverse and supportive social networks (Fiori & Jager, 2012).

Structure and support interact to shape the quality of social networks, often measured as satisfaction with support received. For example, individuals with more diverse social networks report higher satisfaction than individuals with limited and restricted social networks. This association is however moderated by age as older adults are more satisfied with smaller but stronger social networks than younger adults (Comi et al., 2022; Luong et al., 2011).

In summary, the convoy model strongly emphasises an age gradient in the structure, support, and quality of social networks. However, disruptive life-course events such as health issues, death of social network members, and migrations (Mollenhorst et al., 2014; Wrzus et al., 2013) can change social networks.

2.2. Social networks and internal migration

The links between social networks and internal migration is a well-established research topic, with studies examining how social networks influence the intention to migrate (Manchin & Orazbayev, 2018), location choices (Büchel et al., 2019), length of residence (Toney, 1976) and rootedness at destination (Büchel et al., 2019). This line of research has also highlighted the role of social networks in finding a new home (Röper et al., 2009) or job (Giulietti et al., 2013) at destinations.

An important strand of work has explored the disruptive effect of moving on social networks, but evidence remains inconclusive. On the one hand, internal migration is often associated with the loss of one's social network (Dolberg et al., 2016; Koelet & de Valk, 2016; Oishi & Talhelm, 2012). On the other hand, it can result in the expansion of one's social networks (Oishi et al., 2013), often because of the anxiety and anticipated loneliness caused by a change of location (Oishi & Talhelm, 2012). This suggests that these processes may eventually cancel out the effect of internal migration on social networks in the long term. However, the absence of long-term studies that track individuals over

protracted periods of time makes it difficult to confirm this hypothesis. This is complicated by the fact that the impact of internal migration on social networks is strongly modulated by duration of residence (Magdol, 2000) and distance moved, with long-distance moves bearing greater weight on the disruption of social networks than residential moves (Drevon et al., 2021a; Magdol & Bessel, 2003; Viry, 2012).

Residential mobility research has shown that short-distance moves only have a minor impact on the size of social networks (Viry, 2012), possibly by adding new members to the network from the new environment while losing distant friends at the place of origin. However, much less is known about the effects of long-distance moves on social networks and the mechanisms through which they operate. In addition, while some studies have argued that the frequency of migration might also have a bearing on how social networks are maintained, these studies usually do not rely on the number of moves at the individual level, but use the aggregate level of internal migration at the country level or draw on hypothetical scenarios (Oishi et al., 2013; Oishi & Tsang, 2022). As a result, there is limited empirical evidence of the impact of repeat migration on social networks. Moreover, existing research overlooks the direction of migration (i.e., onward and return) due to data limitations. With the advancement of longitudinal datasets, growing evidence has shown that the direction of migration is linked to one's social networks. For example, family and friends play a more significant role in the decision to return than to migrate onward (Mulder, 2018). Individuals are also more likely to migrate to where their parents or siblings live (Mulder et al., 2020) although the role of family in stimulating return migrations declines over the life course in favour of friends (Gillespie et al., 2022). Thus, a clear distinction between onward and return migrations is needed to fully gauge the association between migration pathways and social networks.

2.3. Internal migration as a life-course trajectory

Existing studies suggest that the impact of internal migration on social networks depends on multiple factors: the frequency of migration, the distance moved, and the timing of migration. However, the joint effect and possible interactions between the frequency, distance, and timing of migration have rarely been considered. This is in part because of the focus on migration at one point in time – the last recorded migration – often using cross-sectional data (Oishi et al., 2013; Viry, 2012). This is a well-recognised limitation that has been proposed as an explanation for inconclusive findings (Magdol & Bessel, 2003; Oishi & Tsang, 2022). However, even studies that draw on longitudinal data focus on short periods of the life course and only provide a snapshot of the links between internal migration and social networks (Magdol & Bessel, 2003). This is a problem as it largely ignores past migration experiences despite well-established evidence of the numerical significance of repeat migration, particularly in high-mobility countries in the North and West of Europe (Bell et al., 2015; Bernard, 2017b; Sánchez & Andrews, 2011).

In a recent effort to take a truly longitudinal perspective, Drevon et al. (2021a) used administrative data to weight each municipality of residence since birth by duration of residence in order to create a lifetime typology of the dispersion of residential space for two Swiss cohorts born in 1950-55 and 1970-75. This approach revealed that individuals with spatially dispersed migration trajectories are more likely to have peer-centred social networks. While an important step forward, this approach did not consider the timing or direction of migration, e.g., whether individuals return to a previous region of residence or move onward to new regions. This is an important limitation that is likely to conceal the diversity of experiences among repeat migrants.

We argue that to fully gauge the implications of internal migration on social networks, migration should be conceptualised as a long-term trajectory that unfolds over the life course (Bernard, 2022b; Coulter et al., 2016; Halfacree & Boyle, 1993; McCollum et al., 2020). This approach goes beyond treating migration as a single event by recognising that migration is a complex, repetitive process that

can result in diverse lifetime trajectories, ranging from lifetime staying to repeat migration and return migration, that are further differentiated by the timing of migration. Thanks to the maturation of longitudinal surveys, increased accessibility of administrative datasets and the growing availability of retrospective surveys, this approach has become increasingly common in the migration literature (Bernard & Kalemba, 2022; Chen et al., 2022; Sesma Carlos et al., 2022; Vidal & Lutz, 2018). It has revealed greater diversity in internal migration than the traditional migrant/non-migrant dichotomy suggests. In particular, it has shown the numerical significance of groups at the end of the migration spectrum: lifetime stayers and repeat migrants.

The life-course trajectory approach has, however, found limited usage in the migration literature on social networks. This approach is ideally suited to examine the long-term implications of internal migration as it focuses on successive migrations or extended periods of immobility, and the timing and direction of these moves. It also strongly resonates with the convoy model of social networks as they both emphasise a developmental and long-term perspective. We expect this approach to provide a more nuanced understanding of the long-term association between internal migrations and social networks. For example, being sedentary over most of adulthood is very different from having been immobile only over the last five years. The timing of migration may also be relevant. Migrating at key junctures and developmental periods of the life course such as childhood and young adulthood may have long-term consequences (Tønnessen et al., 2016; Tseliou et al., 2016) that shape social networks in later lives. The frequency of migration is another important dimension. Migrating repeatedly is qualitatively and quantitatively different than migrating only once or twice in life. Finally, taking a trajectory approach permits us to consider not only the frequency of migration but also its direction. We know that return migration facilitates connections with past social connections, but the impact of circular migration on social networks is largely unknown. By moving repeatedly between origin and destination, circular migrants may maintain existing social networks at the origin while developing new networks at destinations. In contrast, serial onward migrants who keep on migrating to new regions are likely to be greatly affected by the repeated severance of social ties.

2.4. Research hypotheses

We couple the life-course trajectory approach to migration, which recognises diversity in the direction, timing, and frequency of migration, with the convoy model, which emphasises the multifaceted nature of social networks, to propose a series of research hypotheses on the association between internal migration trajectories and social networks.

We expect that one-time migration does not affect the size of social networks in the long term but only its composition in favour of friends **(Hypothesis 1)**. This is because migration disrupts social networks, but it provides a unique opportunity to form and expand social networks at destinations while selectively keeping contact with close family members and friends at origin (Viry et al., 2017). These two mechanisms are likely to cancel each other out and have a limited impact on size. Empirical research also shows that internal migrants tend to have more friend-centric networks than stayers (Viry 2012; Magdol and Bessel 2003; Drevon et al. 2021), and we expect this relationship to persist in the long term for individuals who migrated only once.

These processes are likely to be amplified among repeat migrants who move frequently because of the repeated severance of social ties (Ganjour et al., 2020). Thus, we hypothesise that repeat migration is more strongly associated with friend-centric networks than one-time migration **(Hypothesis 2)**.

We also expect significant differences among repeat migrants based on the direction of their moves. While there is ample evidence that internal migrants are effective in building new relationships, the motivation to build new social ties eventually fades when individuals face repeated changes in social

relationships (Oishi & Talhelm, 2012), which in turn leads to lower commitment. This is especially true for repeat onward migrants who move to new destinations without returning to their place of origin. In addition, repeat relocations to new destinations are likely to continuously disrupt social networks and contribute to greater physical distance from existing network members. Thus, we expect the size of social networks and frequency of contacts to eventually decrease with the number of onward migrations and the physical distance to network members to increase with the number of onward migrations **(Hypothesis 3a)**.

The negative association between the structure of social networks and repeat onward migrations is likely to result in less support provided and received, particularly given that geographic proximity is a prerequisite for face-to-face contact, which is necessary for the maintenance of functional and supportive social ties (Borgatti et al., 2009; Magdol & Bessel, 2003). Therefore, we expect the exchange of support and emotional closeness to one's social networks to decrease with the number of onward migrations **(Hypothesis 3b)**.

As a result of these processes, the repeated severance of social ties is expected to lead to lower satisfaction with social networks among repeat onward migrants **(Hypothesis 3c)**.

In contrast, return migrants are expected to have larger, more diverse social networks characterised by family and friends from both origin and destination, shorter distances to and more frequent contact with social network members, higher levels of support exchange, and greater satisfaction with their social networks than repeat onward migrants **(Hypothesis 4)**. This is because family members play a significant role in stimulating return migrations rather than onward migrations (Mulder et al., 2020). Thus, return migrants can maintain connections with family and friends at the origin, which they eventually return to, while also selectively keeping their expanded social networks formed at previous destinations, enabling them to receive financial and emotional support from diverse social networks.

Lastly, we expect the strength of these associations to be moderated by the timing of migration. The earlier the migration occurs, the less influence it is likely to have an influence on all aspects of social networks by the end of one's migration career **(Hypothesis 5)**. While migrations during childhood or adulthood can have significant effects on one's social networks, the impacts may diminish over time as migrants effectively adjust to their new surroundings and build new relationships.

3. Data and Methods

3.1. The Survey of Health, Ageing and Retirement in Europe (SHARE)

Overview

To test these hypotheses, we draw on survey data from SHARE, which is a series of longitudinal surveys representative of the population aged 50 years and over of each participating country. Initiated in 2004-05 in 11 countries, SHARE now covers all continental Europe and Israel. Wave 3, which was fielded in 2007-08 in 13 countries, included a retrospective module that captured complete educational, employment, marital, parental and migration histories since birth to the time of the survey. This module was repeated in Wave 7 in 2017 for respondents who did not participate in Wave 3. Those are respondents from countries that joined SHARE after Wave 3 and respondents from Wave 3 countries who joined SHARE after 2007-08, including new spouses and respondents from top-up samples. This means that each respondent is surveyed about his or her life history only once. We exclude Israel because it has a different internal migration system (Rebhun, 2020). We are left with 26 countries, namely Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Romania, Slovakia, Slovenia, Spain, Sweden, and Switzerland.

SHARE retrospectively collected life histories using life-history grids, which display years along national and international events in columns and the different life domains against which data are collected in rows. Research on recall has shown that this sequential multidimensional visualisation, which displays both events (i.e. migration) and spells (i.e. duration of residence), facilitates recall (Blane, 1996; Glasner et al., 2012). This is because it limits problems of (1) forward and backward telescoping (Gaskell et al., 2000) when respondents report an event earlier or later than it happened, (2) time expansion that occurs when individuals report an event more or less frequently than the reality and (3) event omission (Glasner & van der Vaart, 2008).

Migration

Using life-history grids, respondents were asked to report each place of residence since birth, up to 30 residences, along with the NUTS-2 region of residence. The Nomenclature of Territorial for Statistics (NUTS) framework offers some degree of spatial and social heterogeneity between the regions of Europe, which limits the problem comparing internal migration between countries (Bell et al., 2002; Courgeau, 1973; Courgeau et al., 2012). NUTS-2 is the second tier of the NUTS framework, with a minimum of 800,000 and a maximum of 3 million inhabitants. They generally mirror the territorial administrative division of the Member States and correspond to regions in France, Hungary and Italy, provinces in Belgium, national areas in Sweden and autonomous communities in Spain. They are the most commonly used administrative geography to study internal migration in Europe, particularly in a cross-national framework (Van Der Gaag & Van Wissen, 2008). Thus, we define internal migration as a change in NUTS-2 region. This approach allows the measurement of long-distance migration as opposed to residential mobility. We then further distinguish between onward migration to a new region of residence and return migration to a previous region of residence. Thus, each year since birth a respondent can either migrate onward, return, or stay put.

To account for the evolution of social networks over the life course, we restrict the analysis to create individual life histories of comparable lengths. Thus, our sample includes individuals who (1) were born in the survey country and (2) were aged 55 to 60 when they responded to the retrospective wave, that is, individuals born between 1947 and 1952 for wave 3 participants 1957 and 1962 for wave 7 participants. We do not consider migration at later ages when retirement migration and moves to institutions occur (Rogers, 1988, 1990). Instead, we examine migration trajectories from birth to the late 50s, which encompasses young adulthood, the period of the life course when migration peaks (Bernard et al., 2014; Rogers & Castro, 1981). This allows us to explore the long-term effect of successive migrations rather than the latest migration as done in most studies. Finally, we exclude individuals who experienced any international migration in their lifetime because this is likely to have a durable influence on social networks (Deléchat, 2001). We also exclude respondents with missing values for any control variables or who have no records on social networks. Our analytical sample comprises 8,172 individuals.

Table 1 provides descriptive statistics and shows that close to 30 per cent of respondents migrated at least once in their lifetime, which is a reminder that migration is a rare event. However, 15 per cent of the sample are repeat migrants. This group includes a mix of repeat onward migrants and return migrants, which highlights the diversity of migration pathways.

Table 1 Internal migration, descriptive statistics

		Percentage (%)
Frequency	Never migrated	71.13
	Migrated only once	13.77
	Migrated twice or more	15.10

Direction	Migrated onward once	20.61
	Migrated onward twice or more	7.55
	Engaged in return migration once	9.60
	Engaged in return migration twice or more	2.69

Source: Authors' calculations from waves 3 and 7 of SHARE for individuals born between 1947 and 1952 and 1957 and 1962 aged 55 to 60 in the survey countries. Migration trajectories up to age 60. Weighted results, n=8,172.

Social networks and control variables

SHARE collected detailed information on respondents' social networks in waves 4, 6 and 8 across multiple dimensions. Respondents were asked to list up to seven people with whom they have meaningful relationships, that is people with whom they have discussed important things and concerns over the last 12 months. The module contains a range of information on the size and composition, residential proximity, frequency of contact, exchange of social support, level of emotional closeness, and overall satisfaction with social networks. We use this information to derive variables that align with the three facets of social networks (i.e., structure, support, and quality) as proposed by the convoy model. Specifically, the composition of social networks is measured by the proportion of family members and friends within one's social networks, as well as a measure of network diversity, which is defined as the number of different types of relationships (spouse, other family members including siblings, children and parents, friends and others). Additionally, we calculate the proportion of one's social network members residing within 5km to reflect residential proximity, and the proportion of one's social network members with daily contact and weekly contact to capture the frequency of contact. Finally, we construct binary variables to indicate whether individuals both provided and received different types of support in the last 12 months, including general assistance, financial aid, and gifts.

A growing number of papers have used SHARE social network modules to explore diverse issues including the links to mental health (Santini et al., 2021), life satisfaction (Tomini et al., 2016), subjective well-being (Becker et al., 2019) and cognitive functioning (Miceli et al., 2019). To the best of our knowledge, SHARE has not been used to explore the links between social networks and internal migration. We use data on social networks from Wave 4 for individuals who participated in the Wave 3 life history module and data from Wave 8 for those who participated in the Wave 7 retrospective life history module. As many as 70 per cent of Wave 8 respondents were surveyed between October 2019 and March 2020 via a face-to-face computer-assisted personal interview (CAPI). Fieldwork was paused with the onset of the COVID-19 pandemic. The remaining 30 per cent of the sample was interviewed in June and July 2020 via a computer-assisted telephone interview (CATI) and a new COVID-19 questionnaire. Hence, we restrict the analysis to individuals surveyed up to March 2020 and use a calibrated cross-sectional weighted designed by the SHARE time for that sample to be representative of the population of each country (SHARE, 2022).

Table 2 lists in summary form each of the variables used to measure social networks in the analysis along with descriptive statistics. Where possible we use multiple variables per facet of social networks - size, composition, distance, frequency of contact, exchange of support, emotional closeness, and satisfaction - for robustness. Results show that the average social network comprises 2.79 people of which close to 80 per cent are family members and 18 per cent are friends, with an average of 1.82 different types of relationships. Over 67 per cent of respondents' social network members are on average within 5 km, which highlights the importance of face-to-face contact. This echoes the view

that, despite the growing role of telecommunications in maintaining connections with friends and family (Dekker & Engbersen, 2014; Dekker et al., 2016; Wilding, 2006), in-person contacts cannot be substituted by virtual connectedness (Hawkley et al., 2021). Respondents report daily contact with 55 per cent of their social network and weekly contact with 88 per cent. It is also more common for respondents to give help or gifts to others than receive support from their social networks. Mean emotional closeness sits at 3.40 out of 4 and mean overall satisfaction is close to 9 out of 10, which is very high. We use each of these 20 variables as dependent variables to establish which facets of social networks have an association with internal migration.

Table 2 Descriptive statistics of social network variables

Facets of the convoy model		Variables	Categories	Mean	Standard deviation
Structure	Size	Number of people in SN	1 to 7	2.79	1.53
	Composition	% of SN who are friends	0 to 100	18.32	28.74
		% of SN who are family members	0 to 100	76.66	31.61
		Number of different types of relationships (spouse, other family members, friends, and others)	0 to 4	1.82	0.75
	Distance	Mean distance to SN members	1=Same household 2=same building 3=less than 1 km 4=to 4km 5=5 to 25km 6=25 to 99km 7=100 to 500km 8=500km+	3.45	1.66
		Distance to closest SN member		1.91	1.53
		% of SN within 5km	0 to 100	67.24	33.98
	Frequency of contact	Average frequency of contact with SN members	1=daily 2=several times a week 3=time a week 4=every two weeks 5=once a month 6= less than once a month 7= never	2.12	1.04
		Frequency of contact with the most contacted SN member		1.26	0.66
		Average frequency of contact with family		2.20	1.61
		Average frequency of contact with friends		5.57	2.06
		% of SN with daily contact	0 to 100	55.29	37.45
		% of SN with weekly contact	0 to 100	88.49	22.03
Support	Exchange of support	Whether gave help to others	0=No 1=Yes	0.35	0.48
		Whether received help from others		0.16	0.37
		Whether gave financial help or gifts to others		0.36	0.48
		Whether received financial help or gifts from others		0.18	0.38
Quality	Emotional closeness	Mean emotional closeness to SN members	1=not very close 2=somewhat close 3=very close 4= extremely close	3.40	0.63
		Emotional closeness to the closest SN member		3.49	0.63
	Satisfaction	Overall satisfaction with SN	from 0 completed dissatisfied to 10 completed satisfied	8.90	1.22

Source: Author's calculations from waves 4 and 8 of SHARE for individuals born between 1947 and 1952 and 1957 and 1962, aged 55 to 60, and participated in waves 3 and 7 in the survey countries. Weighted results.

3.2. Methods

The first part of the analysis consists of identifying ideal-typical migration trajectories based on the frequency, direction, and timing of migration events from birth to the late 50s. To that end, we use

sequence analysis, a data mining approach that provides a long-term holistic approach to migration by classifying individuals based on similarities and differences in the combination of migration events over the life course. Since its popularisation by Abbott and Tsay (2000), sequence analysis has been widely used in social sciences, but it remains rare in migration research (Stovel & Bolan, 2004). It is only in the last few years that it has been increasingly adopted with applications seeking to describe the sequencing of internal and international migration (Zufferey et al., 2020), rural-to-urban migration patterns (Chen et al., 2022), reasons for migrating (Bernard & Kalemba, 2022) and changes between birth cohorts (Vidal & Lutz, 2018). In some studies, migration sequences are then used as determinants of a range of life outcomes such as mental health (Yang et al., 2020) and occupational achievement and social mobility (Impicciatore & Panichella, 2019). To our knowledge, sequence analysis has not been used to examine the association between internal migration trajectories and social networks.

We restrict sequence analysis to individuals who migrated internally at least once in life. Those who did not – lifetime stayers – are used as reference category in regression (see Section 3.3). The dataset is organised into a matrix format where each respondent falls into 7 possible states each year: never migrated, first onward migration, second onward migration, third onward migration, first return migration, second return migration and third return migration. Some observations are right censored because of differences in age at the time of the survey. As a result, some respondents were observed up to age 55, while others were observed up to age 60. To ensure that all migration trajectories are of equal length for sequence analysis, we create an additional category "censored". This approach serves to increase our sample size without impacting the results because migration in this age group is rare.

We then group individual migration trajectories into distinct clusters in two steps. First, a modified optimal matching (OM) dissimilarity measure (OMspell), which consistently accounts for differences in the time spent in each state, is employed to compute optimal matching distances between each respondent's migration sequence and that of all other respondents (Abbott & Forrest, 1986; Studer & Ritschard, 2016). We use the Needleman and Wunsch algorithm (1970) based on constant substitution costs and default insertion/deletion costs. As a robustness check, we compute a correlation matrix between OMspell and a range of dissimilarity measures. Results in Appendix A show that correlation coefficients range from 0.94 to 1 and are all statistically significant at 1% significant level, which indicates that our results are not sensitive to the choice of dissimilarity measure. Second, we perform Ward's hierarchical cluster analysis on the resulting dissimilarity matrix. We select a six-cluster solution as it provides an optimal empirical fit while offering sufficiently large cluster sizes for statistical inference. This solution is supported by four partition quality measures: weighted Average Silhouette Width (ASWw), Hubert's Gamma (HG), Point Biserial Correlation (PBC), and Hubert's C (HC) as shown in Appendix B.

To understand the association between migration trajectories and social networks, we then run a series of regression models. This approach does not permit to quantify the impact of migration on social networks but simply to establish whether there is a link between the two. This is because self-selection is one of the mechanisms through which migration histories may affect social networks. Migrants are well-known to be a selected group (Etzo, 2008), with different personality traits (Bernard, 2022a; Shuttleworth et al., 2021) and life ambitions (Green, 2018; Greenwood, 2014). Some migrants may be eager to form new relationships or reunite with kins (Mulder, 2018), while others may want to escape existing relationships (Cooke et al., 2016) or simply lack the social ties that root them in a place. So, migration may be an instrument to achieve or a response. With the exception of forced migration, it is not possible to disentangle these different mechanisms. Thus, strictly speaking, our regression models are not casual, and should simply be seen as sophisticated descriptive statistics (Mulder & van Ham, 2005).

The social network measures listed in Table 2 are used as dependent variables in 21 separate regressions. For continuous variables (proportions) we run linear regressions. For ordinal variables (distance, frequency of contact, emotional closeness and satisfaction), we run ordered logistic regressions. For count variables (size of social network and number of types of relationship), we run negative binomial regressions. For binary variables (whether exchanged social support), we run binomial logistic regressions. For frequency of contact measures, we run additional regression in which we control for average distance to social network members. This is to estimate the effect of migration trajectories on frequency of contact net of distance.

In all models, we control for migration pathways. Lifetime stayers represent the reference category compared to the six migration clusters identified with sequence analysis. Other control variables include sex, birth cohorts (1947-52 and 1962-67), current conditions such as marital status, employment status, highest level of education attainment, homeownership status, urban status of place of residence, number of grandchildren and a range of indicators of health conditions. This is because health conditions play a crucial role in social networks at older ages (Li & Zhang, 2015). Empirical evidence has shown that lower self-perceived health tends to be associated with more family-focused social networks (Li & Zhang, 2015), while more severe chronic diseases are associated with fewer friends and less support (Qu, 2023). Mental health problem such as depression among older adults is also associated with a decline in social support and the diversity of social networks (Fiori et al., 2006). Thus, we control for self-perceived health conditions (from poor to very good), the number of chronic disease and depression levels on a 13-point scale. We also include variables that summarise past life-course events including marriage history (lifetime single, ever married and ever divorced), number of jobs ever had, and number of children ever had, because those events can have a long-lasting impact on social networks (Alwin et al., 2018). Finally, to control for fixed structural conditions such as kinship systems that may affect the relationship between internal migration and social networked, we use a country-fixed effect. We elected a country-fixed effect instead of a multi-level framework because the number of countries is below 30, which can lead to unreliable country effects (Bryan & Jenkins, 2016; Möhring, 2012). We also chose not to replicate the analysis for each country separately because of the small size of national samples, which carries the risk of Type II error. Detailed categories and descriptive statistics for all control variables can be found in Appendix D.

Sequence and cluster analysis is implemented with the TraMineR package (Gabadinho et al., 2011) and the WeightedCluster package (Studer, 2013). Regression models are estimated using STATA 16 (StataCorp, 2019).

4. Results

4.1. Lifetime internal migration pathways

Sequence and cluster analysis reveals six distinct migration pathways as shown in Figure 1, which is restricted to individuals who migrated internally at least once. Each line represents an individual while colours represent that migration status at each age. We find that around 50 per cent of lifetime migrants migrated only once. This group is further distinguished into three clusters based on the timing of migration: (1) childhood migrants (12.69%) who migrated only once in childhood, (2) one-time migrants (30.72%) who typically migrated in their early twenties, and (3) delayed migrants who engaged in internal migration for the first time in their later 30s or early 40s, which is a less common pathway (6.79%).

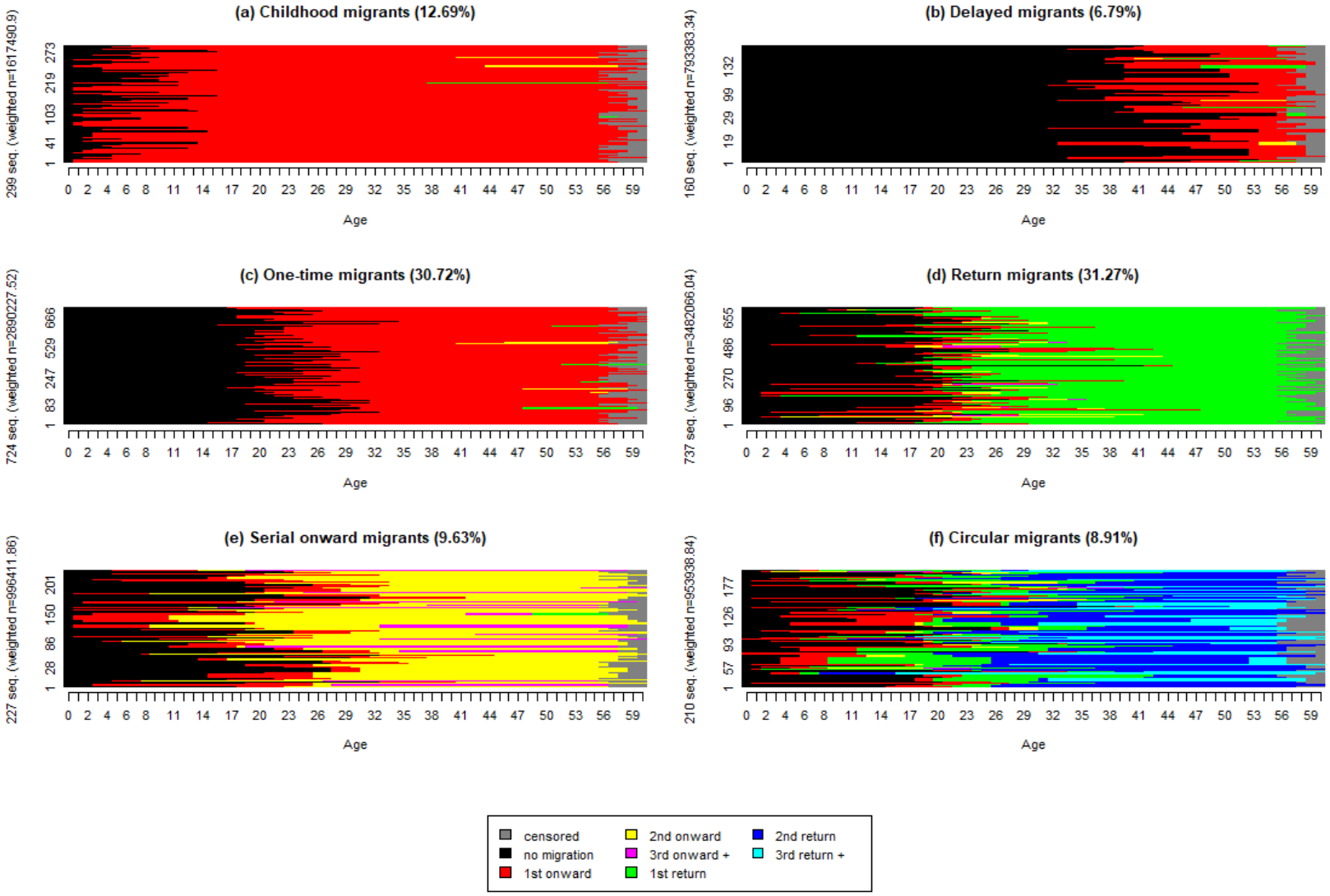


Figure 1 Migration pathways from birth to the late 50s

Source: Authors' calculations for individuals born between 1947 and 1952 and 1957 and 1962, aged 55 to 60, and participated in waves 3 and 7 in the survey countries. Weighted results. Weighted results.

The remainder of the sample migrated multiple times. The most common trajectory is return migration (31.27%), which corresponds to one migration followed by a return migration to origin between the mid-20s to the early 40s. The other two clusters comprise highly mobile individuals: (1) serial onward migrants who migrated at least twice to new regions (9.63%) and (2) circular migrants who migrated back and forth between origin and destination (8.91%). This is the smallest cluster but by far the most mobile with an average of 4.45 migrations compared with 1.93 for the whole migrant sample. These internal migration pathways not only highlight the complexity of some migration trajectories but also align with findings regarding the diversity of internal migration trajectories in Europe (Sesma Carlo et al. 2022, Vidal & Lutz 2022) and the growing evidence on the numerical significance of repeat migration (Gillespie & al. 2022), which is typically missed when individuals are classified as migrants or non-migrants. As shown in Table 1, around 70% of the sample are lifetime stayers, which we included as the reference category in the regression analysis in the next section.

4.2. Migration pathways and social networks

We now seek to explore the association between these six migration pathways and social networks in later life. Table 3 reports key regression results focusing on the focal variable of interest: migration pathways. Full regression results can be found in Appendix E, which shows that control variables exhibit the expected signs. Particularly, females report larger, more diverse, and geographically dispersed networks with more focus on friends than family. Individuals who are married but not living with their spouses, never married, divorced or separated have less diverse and more friend-focused networks with a lower frequency of contact and less emotional closeness with network members, which is in line with literature on the impact of family events on social network's size and composition (Wrzus et al., 2013). We also observe a moderate socio-economic gradient. Tertiary-educated individuals tend to have larger and more diverse social networks that are further spread out geographically, particularly family members with whom they maintain a lower frequency of contact. The higher the education level individuals attained, the more financial support they received. This finding is in line with earlier studies which have shown a positive impact of education in maintaining social ties, especially over long distances (Drevon et al., 2021a; Viry, 2012). An important finding is that health conditions are significantly negatively associated with social networks in terms of diversity, frequency of contact, emotional closeness, and satisfaction with social networks. Individuals not living in big cities have fewer friends and are less satisfied with their social networks. Past life experience also has a significant association with social networks. Individuals tend to have more dispersed but closer social networks if they have experienced multiple partnerships. Finally, being employed and having multiple employment experiences result in a more diverse and geographically dispersed network with less frequent contacts. These results highlight the importance of controlling for a wide range of socio-demographic characteristics when analysing the relationship between migration and social networks.

We now turn our attention to the role of migration pathways. Because different regression models are used depending on the outcome, the value of regression coefficients cannot be compared across models. Instead, regression coefficients should be compared for each migrant group against the reference category (lifetime stayers) for that particular regression. The results in Table 3 show that migration does not impact the size of social networks (regression 1), but its composition (regressions 2 and 3), in line with Hypothesis 1. Repeat migration is not associated with a decrease in the size of social networks, as indicated by the lack of statistical significance, but is associated with social networks with a higher share of friends and a lower share of family members compared with lifetime stayers, in line with Hypothesis 2 but partially contradicts Hypothesis 3a. This suggests that migrants, even if they move repeatedly, are able to create new relationships at destinations. There is also no statistically significant association between repeat migration and the diversity of social networks (regression 4), which suggests that while repeat migrants have more friend-focused networks, they are still able to maintain diverse social networks that extend to family members and colleagues. To

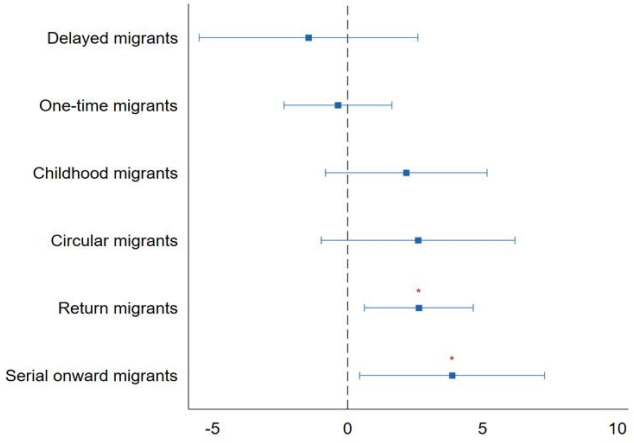
establish differences among migrant groups, Figure 2 reports regression coefficients along with 95 per cent confidence intervals. Contrary to Hypothesis 4, confidence intervals for return and serial onward migrants in Figure 2a show that the difference between these two groups is not statistically significant.

Table 3 Key regression results

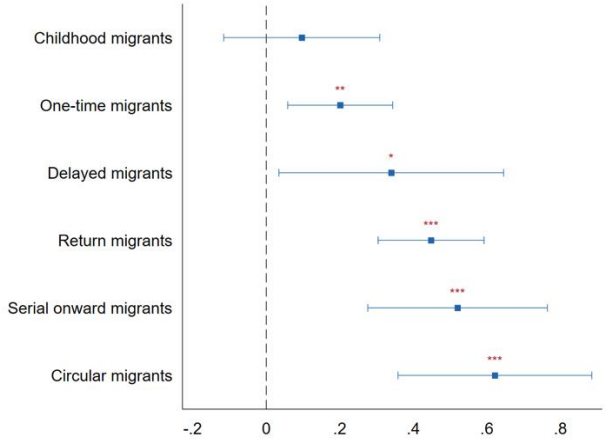
	Regression number	Dependant variable	Key explanatory variable					
			Childhood migrants	**Delayed migrants**	**One-time migrants**	**Return migrants**	**Serial onward migrants**	**Circular migrants**
Size	1	Number of people in SN	0.013	-0.048	-0.029	0.003	0.036	-0.003
Composition	2	% of SN who are friends	2.173	-1.448	-0.358	2.638*	3.873*	2.612
	3	% of SN who are family members	-2.559	3.639	0.031	-2.735*	-2.076	-2.887
	4	Number of different types of relationship	0.177	-0.009	-0.078	0.039	0.110	-0.036
Distance	5	Mean distance to SN members	0.097	0.340*	0.201*	0.448***	0.520***	0.862***
	6	% of SN within 5km	-2.590	-8.368***	-4.727***	-8.348***	-8.136***	-9.810***
	7	Distance to closest SN member	0.158	-0.119	0.025	0.235*	0.007	0.316
Frequency of contact	8	Average frequency of contact with SN members	0.175	0.145	0.043	0.248***	0.337**	0.337*
	9	Average frequency of contact with SN members *(conditional on mean distance to SN members)*	0.236	0.0650	-0.0226	0.0306	0.135	0.144
	10	Frequency of contact with the most contacted SN member	-0.116	-0.278	0.129	-0.189	-0.170	0.367
	11	Frequency of contact with the most contacted SN member *(conditional on mean distance to SN members)*	0.0488	-0.679*	-0.0547	-0.0780	-0.175	0.0249
	12	Average frequency of contact with family SN	0.049	0.059	0.039	0.164*	0.248*	0.087
	13	Average frequency of contact with friend SN	-0.217	0.005	0.160	-0.114	-0.167	-0.115
	14	% of SN with daily contact	-2.218	1.594	-1.056	-4.212**	-4.845*	-4.828**
	15	% of SN with daily contact *(conditional on mean distance to SN members)*	-1.002	3.795*	0.269	0.0888	0.442	-0.431
	16	% of SN with weekly contact	-1.322	-4.181*	-1.121	-1.643*	-3.263*	-6.027***
	17	% of SN with weekly contact *(conditional on mean distance to SN members)*	-0.947	-3.138*	-0.306	-0.0994	-1.097	-3.831**
Support	18	Whether gave help to others	0.152	-0.015	-0.120	-0.102	0.023	-0.047
	19	Whether received help from others	-0.053	0.088	0.007	-0.008	0.004	-0.013
	20	Whether gave financial help or gifts to others	-0.101	-0.010	-0.029	0.106	0.278	0.157
	21	Whether received financial help or gifts from others	0.111	0.168	0.182	0.251**	0.632***	0.372*
Emotional closeness	22	Mean emotional closeness to SN members	-0.065	0.114	0.011	-0.034	0.049	-0.007
	23	Emotional closeness to the closest SN member	-0.001	0.133	0.075	0.058	0.161	-0.076
Satisfaction	24	Overall satisfaction with SN	0.171	-0.021	0.038	0.035	0.159	0.021

Statistical significance: * p<0.05, ** p<0.01, *** p<0.001
Source: Authors' calculations from waves 4 and 8 of SHARE for individuals born between 1947 and 1952 and 1957 and 1962, aged 55 to 60, and participated in waves 3 and 7 in the survey countries. Weighted results. Full results can be found in Appendix E.
Note: The definition of each dependent variable can be found in Table 2. For dependent variables that are not normally distributed, we have taken natural logarithms on these variables and run additional regression in Appendix F. The results are consistent.

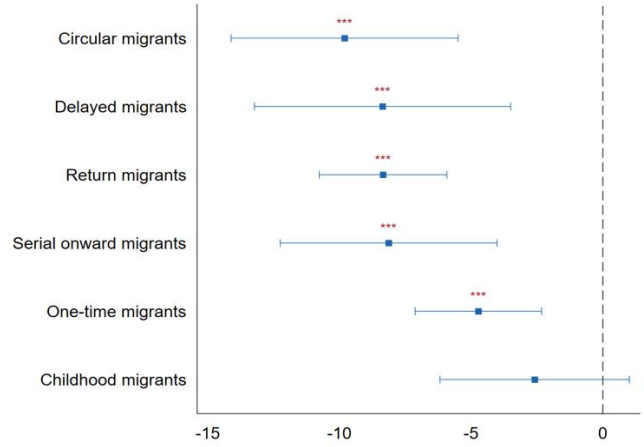
2a. Share of SN who are friends
(Regression 2 in Table 3)



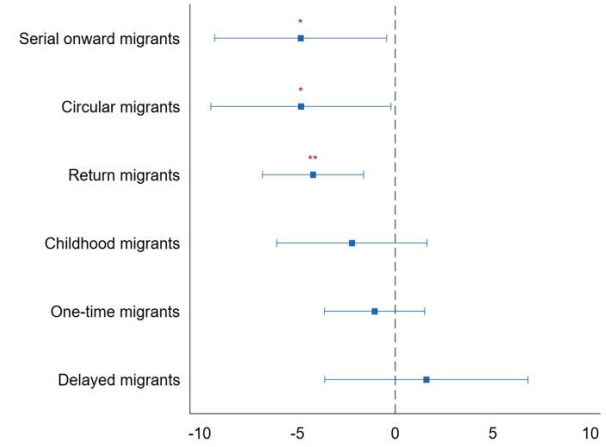
2b. Mean distance to SN members
(Regression 5 in Table 3)



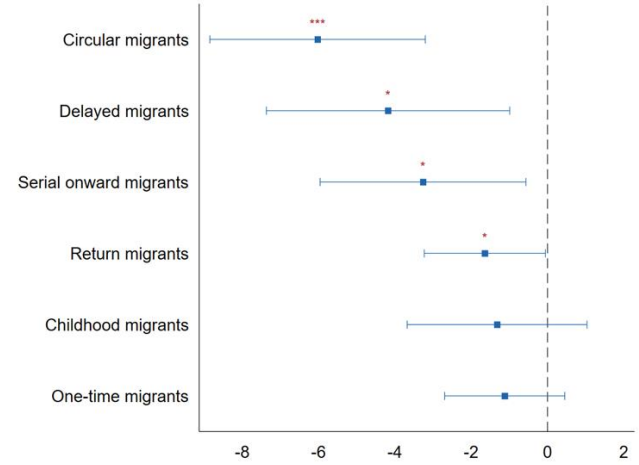
2c. Share of SN within 5 km
(Regression 6 of Table 3)



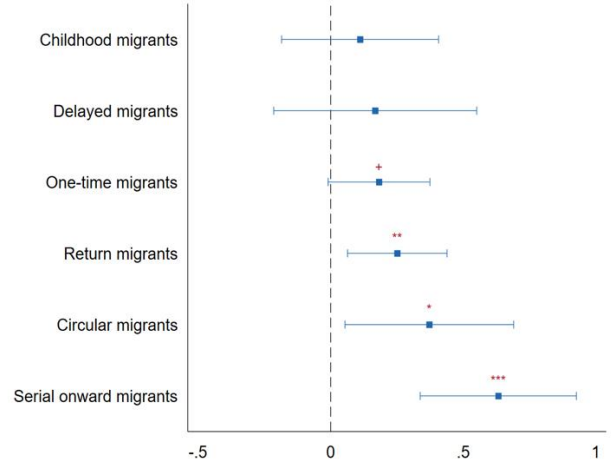
2d. Share of SN with daily contact
(Regression 14 of Table 3)



2e. Share of SN with weekly contact
(Regression 16 of Table 3)



2f. Whether received financial help or gifts from others (Regression 21 of Table 3)



Statistical significance: + p < 0.10, * p < 0.05 ** p < 0.01, *** p < 0.001

Figure 2 Regression coefficients with 95 % confidence interval of selected SN variables

Note: All figures present selective regression results from corresponding regression in 3. Figures 2a, 2c, 2d, and 2e presents results with linear regressions, 2b presents results with ordered logistic regression, and 2f presents results with binomial logistic regression. Regression coefficients are ranked in increasing order for each figure. The reference category is lifetime stayers.

We now explore differences in terms of distance in regressions 5 to 7. We find that, except for childhood migrants, all migrant groups report a higher mean distance to members of their social networks (Regression 5). This is not surprising because the child migrants cluster moved early in life and had ample time to adjust to migration and build social networks similar to lifetime stayers, in line with Hypothesis 5. Significant differences can be observed among other migrant groups. Figure 2b shows that the negative association between migration and mean distance is twice as high for serial onward and circular migrants as it is for delayed and one-time migrants, and confidence intervals show that the difference between these groups is statistically significant. The result for serial onward migrants is in line with theoretical expectations and Hypothesis 3a: the repeat severance of social ties leads to more distant social networks, but it typically does not affect the distance to the closest member (regression 7).

By leaving and returning to the place(s) of origin, circular migrants might potentially be able to maintain social networks similar to that of return migrants, and thus, it would be reasonable to expect them to occupy an intermediary position between return and serial onward migrants. Although Figures 2b and 2c show that the difference between these three groups is not statistically significant as their confidence intervals coincide with each other, regression results show that circular migrants maintain social networks that are geographically more spread out than return migrants.

We now turn our attention to the frequency of contact, which is an important indicator of the strength of social networks in regressions 8 to 17. The results show that return migrants, serial onward migrants, and circular migrants tend to have a lower frequency of contact on multiple indicators: average frequency of contact with social network members in general and with family members in particular (regressions 8 and 12), as well as the proportions of social networks with daily and weekly contact (regressions 14 and 16). In particular, we find that weekly contact deteriorates significantly when migration trajectories become more complex (regression 13) and the difference between circular and return migrants is statistically significant as shown in Figure 2e. However, once distance to social networks is controlled (regressions 9, 11, 15, and 17), most of the negative associations disappear, especially for repeat migrants. This means that a lower frequency of contact among repeat migrants is simply the product of having geographically dispersed networks. However, a few differences remain. In particular, we find that delayed migrants have a significantly higher frequency of daily contacts but a lower frequency of weekly contacts after controlling for distance (regressions 15 and 17). We also find that circular migrants still have weekly contact with a significantly lower share of their network, distance being equal (regression 17). Overall, these results indicate that the timing, frequency, and direction of migration, as well as their combinations, have distinct associations with the structure of social networks.

Despite these variations, we do not observe significant differences in terms of exchange of support (regression 18 to 21), emotional closeness (regressions 22 and 23) or overall satisfaction with social networks (regression 24) for repeat migrants, in contradiction with Hypotheses 3b and 3c. Specifically, we find that repeat migrants, especially serial onward migrants, tend to receive more financial support than lifetime stayers, contradicting Hypothesis 3b. This means that despite greater physical distance and lower frequency of contact, repeat migrants are not negatively affected in these aspects of social networks compared with lifetime stayers. There are two possible explanations for this. Either repeat migrants adjust their expectations based on their migration trajectory or have different expectations to start with. While the data does not permit testing these mechanisms, our results show that despite the repeated severance of social ties over the life course, repeat internal migrants are not adversely affected in later life.

Compared with previous studies, these findings provide a more nuanced understanding of the links between migration and social networks. In particular, we find that repeat migrants display different social networks than one-time migrants. Serial onward migrants are significantly affected and more

so than circular and return migrants in terms of distance and frequency of contact. This suggests that it is the cumulative impact of successive migrations that leads to differences in social networks. This interpretation is supported by the fact that individuals who migrated only once – child migrants, one-time and delayed migrants – have social networks whose composition is comparable to lifetime stayers. It is important to note, however, that delayed migrants are more affected in terms of distance and frequency of contact than those who moved only once but earlier, which speaks to the adoption process and the ability of migrants to rebuild their social networks as suggested by Hypothesis 5.

5. Discussion and conclusion

This paper has sought to contribute to a burgeoning literature on the links between internal migration and social networks by deploying a series of theoretical, methodological, data-related and substantive innovations. From a theoretical perspective, we have extended the literature by combining two theoretical models – the convoy model from the social networks literature and the life-course trajectory approach from the migration literature – and have emphasised the need to adopt a long-term perspective in understanding the association between internal migration and social networks. While increasingly common in migration studies (Bernard, 2022b; Chen et al., 2022; Coulter et al., 2016; Coulter & Van Ham, 2013), it has been rarely adopted in social network research (Drevon et al., 2021a). From a methodological perspective, our contribution is the use of sequence and cluster analysis to identify how differences in the frequency, direction and timing of internal migration intersect to generate ideal-typical lifetime migration from birth to the late 50s. This approach serves to obtain a more nuanced view of migration behaviour than the traditional migrants/non-migrants dichotomy by revealing more diverse and complex migration trajectories, including among repeat migrants. In terms of data, our contribution has been the use of a rich retrospective dataset, SHARE, which captures the multifaceted features of social networks proposed by the convoy model, namely size, composition, distance, frequency of contact, exchange of support, emotional closeness, and satisfaction. Collectively, these innovations have permitted a more holistic and nuanced understanding of the links between internal migration and social networks, which in turn has led to new substantive insights.

We have found limited differences in the social networks of one-time migrants compared with lifetime stayers. However, among one-time migrants, those who migrated more recently report a greater distance to members of their social networks than those who migrated earlier in adulthood. This suggests that the effect of past migrations diminishes with time as migrants effectively adjust to their new surroundings and build new friendships, whether they migrated in childhood or adulthood. Conversely, it is successive migrations that cumulatively contribute to more distant social networks in later life.

Our results also confirmed that repeat internal migrants have more geographically dispersed and less family-focused social networks. They also have a lower frequency of contact than lifetime stayers. which is particularly pronounced for repeat migrants – both onward migrants who keep on moving to new regions and circular migrants who move back and forth between origin and destination. This is an important finding because a lower frequency of contact has been shown to reduce support provision (Mulder & van der Meer, 2009), which is an important determinant of subjective well-being and mental wellness (Stansfeld et al., 2013). However, this does not translate into lower emotional closeness or satisfaction as repeat migrants report the same level of overall satisfaction with their social networks as lifetime stayers. This suggests that internal migrants may have different expectations in terms of social networks or simply adjust their expectations in response to the social costs and benefits of migration. This warrants further research to understand whether these

individuals embark on their migration career with different social expectations or whether their expectations change over time as they face and learn to adjust to the social cost of migrating.

An unexpected result is the position of circular migrants who – like serial onward migrants and return migrants – report more dispersed networks, lower frequency of contact, and receive more financial support from their social networks. Circular migrants were expected to occupy an intermediary position between return and serial onward migrants as they might potentially be able to maintain social networks similar to that of return migrants while expanding social networks like serial onward migrants, but this is not the case. Instead, circular migrants report the most dispersed network and the lowest frequency of contact among repeat migrants, suggesting that the repeated departure from the place of origin can be detrimental to the maintenance of social ties even when individuals eventually return. This is significant because there is growing evidence that circular migration is associated with adverse economic circumstances (White & Lindstrom, 2005) which could compound the higher social costs circular migrants face, leading them to be doubly disadvantaged.

Despite its contributions, our paper faces the limitations inherent to the use of retrospective survey data. Chief of these is the issue of recall of past migration events that may lead to biased estimates. As explained in the Data and Method Section, a growing body of research has demonstrated how life history grids facilitate recall, including events in the distant past (Blane, 1996), but there is always a risk of some migration events being missed when collected retrospectively. It is also important to bear in mind that our modelling approach does not permit establishing causal links but simply serves to identify associations between internal migration and social networks. This is an important first step that can be complemented with data from longitudinal panel surveys, such as the Household, Income and Labour Dynamics in Australia (HILDA) survey and the United Kingdom Longitudinal Survey (UKHLS), which have collected social networks and migration data over multiple decades. These surveys also offer an opportunity to advance comparative research to explore the role of broader societal conditions in shaping the association between internal migration and social networks, something we could not do because of the size of national samples.

Nevertheless, our findings highlight the importance of considering different internal migrant groups when seeking to understand the links between migration and social networks. Going beyond a migrant/non-migrant classification has provided a more nuanced understanding by showing that it is the cumulation of successive migrations that leads to differences in various facets of social networkConverselysly, the consequences of a single migration on social networks, especially if it happened at an earlier stage of the life course, is negligible in the long-term. This may explain why some studies are inconclusive (Drevon et al., 2021a; Magdol, 2000). By grouping different migrant groups, they obscure the diversity of migration behaviour and thus possibly mask the impact of repeat migration. Thus, future studies should endeavour to take a long-term perspective and fully recognise the diversity of migration behaviour and its complex interactions with social networks.

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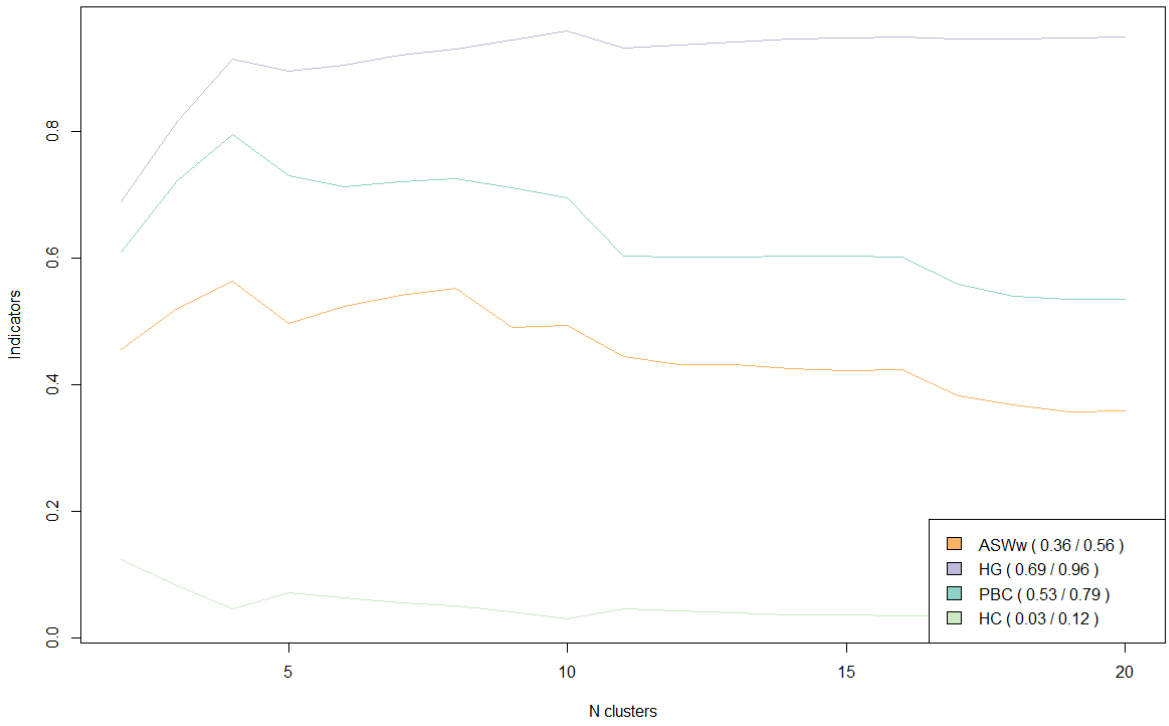
Appendix A Correlations between different dissimilarity measures

	OM	OMloc	OMslen	OMspell	OMstran	HAM	DHD	TWED	LCS	Euclid
OM	1									
OMloc	1	1								
OMslen	0.96	0.96	1							
OMspell	1	1	0.97	1						
OMstran	1	1	0.97	1	1					
HAM	0.97	0.97	0.95	0.97	0.97	1				
DHD	0.97	0.97	0.95	0.97	0.97	1	1			
TWED	0.96	0.96	0.96	0.96	0.96	1	1	1		
LCS	1	1	0.96	1	1	0.97	0.97	0.96	1	
Euclid	0.96	0.96	0.94	0.96	0.96	0.98	0.98	0.98	0.96	1

Source: Author's calculations from wave 4 and 8 of SHARE for individuals born between 1947 and 1952 and 1957 and 1962 in the survey countries and who participated in wave 3 and 7. Weighted results.

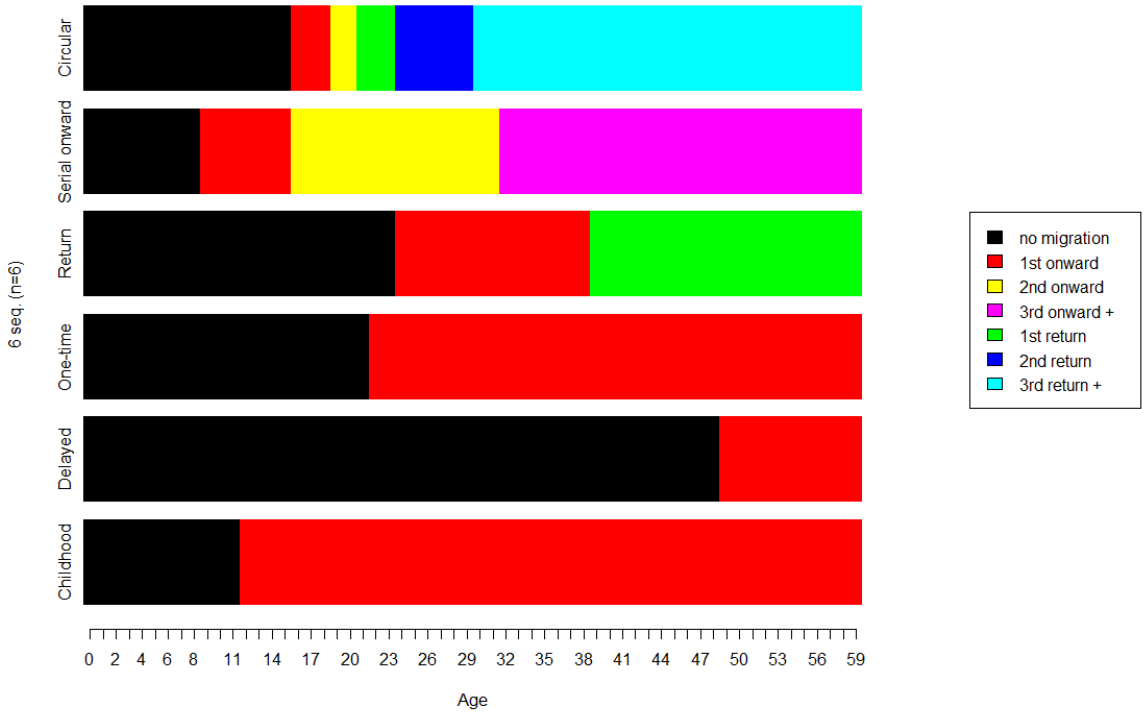
Note: OM = optimal matching (Abbott & Forrest, 1986); OMloc = localized OM (Hollister, 2009); OMslen = spell-length sensitive OM (Halpin, 2010); OMspell = OM between sequences of spells (Studer & Ritschard, 2016); OMstran = OM between sequences of transitions (Studer & Ritschard, 2016); HAM = generalised Hamming distance (Hamming, 1950); DHD = dynamic Hamming distance (Lesnard, 2010); TWED = time warp edit distance (Marteau, 2008). LCS = length of the longest common subsequence(Deville & Saporta, 1983) ; Euclid = Euclidean distance between state distribution (Bergroth et al., 2000). See Studer and Ritschard (2016) for a detailed description and comparison of the above dissimilarity measures. P-values for all correlation coefficients are 0.



Appendix B Cluster quality measures

Source: Author's calculations from wave 4 and 8 of SHARE for individuals born between 1947 and 1952 and 1957 and 1962 in the survey countries and who participated in wave 3 and 7, using the WeightedCluster Package in R (Studer, 2013). Weighted results.

Appendix C Representative migration trajectory of the six clusters



Appendix D Weighted descriptive statistics of explanatory variables

Variables		Mean (SD) /Percent	Range
Female		50.24	[1,2]
Birth cohorts		46.21	[1947-1952]
		53.79	[1957-1962]
Current conditions			
Marital status			[1, 6]
	Married living with spouse	68.31	
	Registered partnership	1.45	
	Married, living apart	2.12	
	Never married	9.90	
	Divorced	11.73	
	Widowed	6.48	
Educational attainment			[1, 6]
	Pre primary	3.36	
	Primary	9.61	
	Lower secondary	15.74	
	Upper secondary	43.57	
	Post-secondary non-tertiary	3.89	
	Tertiary	23.83	
Employment status			[1, 6]
	Retired	30.50	
	Employed	47.15	
	Unemployed	5.37	
	Permanently sick	6.08	
	Homemaker	9.29	
	Other	1.60	
Urban status of place of residence			[1, 5]
	A big city	11.32	
	Suburbs or outskirts of a big city	9.50	
	A large town	13.61	
	A small town	30.35	
	A rural area or village	35.22	
Homeownership status			[1, 5]
	Owner	79.84	
	Member of a cooperative	1.12	
	Tenant	16.01	
	Subtenant	0.25	
	Rent free	2.78	
Self-perceived health conditions			[1, 5]
	Excellent	6.92	
	Very good	20.32	
	Good	42.63	
	Fair	23.43	
	Poor	6.70	
Number of chronic diseases		1.38 (1.34)	[0, 11]
Depression level		2.31 (2.15)	[0, 12] (from not depressed to very depressed)
Life histories			
Marriage history			[0,4]
	Lifetime single	37.92	
	Ever married	34.22	
	Ever partnered	9.93	
	Ever separated	7.75	
	Ever divorced	10.18	
Number of jobs ever had		2.39 (1.65)	[0, 14]
Number of children ever had		1.96 (1.25)	[0, 13]
Number of grandchildren ever had		1.67 (2.22)	[0, 20]

Appendix E: Full regression results

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Number of people in SN	% of SN who are friends	% of SN who are family members	Number of different types of SN	Mean distance to SN members	% of SN within 5km	Distance to closest SN member
Migration pathway (ref.cat. lifetime stayers)								
	Childhood migrants	0.0133	2.173	-2.559	0.177	0.0966	-2.590	0.158
	Delayed migrants	-0.0480	-1.448	3.639	-0.009	0.340*	-8.368***	-0.119
	One-time migrants	-0.0286	-0.358	0.0310	-0.0777	0.201**	-4.727***	0.0252
	Return migrants	0.0025	2.638*	-2.735*	0.0394	0.448***	-8.348***	0.235*
	Serial onward migrants	0.0359	3.873*	-2.076	0.110	0.520***	-8.136***	0.00719
	Circular migrants	-0.003	2.612	-2.887	-0.0359	0.622***	-9.810***	0.316
Female		0.197***	5.823***	-5.447***	0.518***	0.730***	-8.625***	0.561***
Birth cohorts (ref.cat. 1947-1952)								
	1957-1962	0.0185	-2.845*	3.851**	0.191*	-0.0632	-0.913	-0.320**
Current conditions								
Marital status (ref.cat. Married, living with spouse)								
	Registered partnership	-0.110*	5.494*	-2.865	-0.314	0.163	-4.710	0.474*
	Married, not living with spouse	0.0211	13.12***	-16.35***	-0.788***	0.974***	-8.633**	1.983***
	Never married	-0.0522	13.52***	-17.71***	-0.910***	0.977***	-10.99***	2.208***
	Divorced	-0.0450	11.99***	-13.93***	-0.841***	1.235***	-13.97***	2.482***
	Widowed	-0.0271	8.748***	-10.63***	-1.164***	1.028***	-11.05***	2.277***
Education level (ref.cat. Pre-primary)								
	Primary	0.0089	0.975	-0.369	-0.00545	-0.173	5.007	0.0447
	Lower secondary	0.0915	3.069	-2.355	0.175	0.0677	-0.0183	0.218
	Upper secondary	0.0593	2.080	-1.118	0.0958	0.0728	-0.451	0.142
	Post-secondary	0.112	4.447	-3.143	0.286	0.225	-4.596	0.118
	Tertiary	0.173**	4.245*	-3.647	0.406*	0.418**	-6.111*	0.127
Employment status (ref.cat. Retired)								
	Employed or self-employed	-0.0150	-0.285	-1.645*	0.206***	0.123*	-2.823**	0.0443
	Unemployed	-0.00884	0.703	-1.976	-0.0204	-0.0403	2.162	0.0532
	Permanently sick	0.0198	-2.055	2.007	-0.00819	-0.0102	-0.567	-0.225
	Homemaker	-0.0240	-2.071	1.526	-0.0253	-0.0656	3.123*	0.141
	Other	0.0289	2.507	-4.254	0.181	0.0559	-0.655	-0.0341
Urban status of place of residence (ref. cat. A big city)								
	The suburbs or outskirts of a big city	0.00899	-4.845***	3.444*	0.171	-0.115	0.819	-0.287*
	A large town	-0.0283	-4.015***	3.760**	-0.0911	-0.0263	2.972*	-0.0663
	A small town	0.00213	-3.780***	3.246**	-0.00860	0.0507	-0.415	-0.0609
	A rural area or village	-0.0327	-5.726***	4.258***	-0.142	-0.0423	-2.319	-0.0294
Homeownership (ref.cat. Owner)								
	Member of a cooperative	0.0422	1.543	-0.728	0.170	0.214	-5.425*	0.347
	Tenant	-0.0400	0.0284	-0.950	-0.231**	-0.0669	1.325	0.140
	Subtenant	0.0290	9.575	-12.66*	-0.263	0.257	1.221	0.596

	Rent free	0.0456	-3.038	4.355*	0.0277	-0.189	2.795	-0.316
Self-perceived health conditions (ref.cat. Excellent)								
	Very good	-0.0105	0.556	0.251	-0.0271	-0.181*	4.779***	-0.0706
	Good	-0.0437	-0.702	1.738	-0.175*	-0.203*	4.470**	0.0101
	Fair	-0.0973**	0.877	0.398	-0.359***	-0.265**	4.979**	0.166
	Poor	-0.157***	-0.00379	1.436	-0.444***	-0.450***	7.296***	0.143
Number of chronic diseases		0.0249***	0.0316	-0.170	0.0990***	0.0544**	-0.647*	-0.0158
Depression level		-0.00185	0.489**	-0.871***	-0.00992	0.0296**	-0.294	0.0801***
Life histories								
Marriage history (ref.cat. Lifetime single)								
	Ever married	0.0114	-0.808	1.731	-0.0460	-0.231**	3.262*	-0.306**
	Ever partnered	-0.00707	-2.975**	4.777***	0.0829	-0.189*	1.674	-0.387***
	Ever separated	0.0314	0.777	0.121	0.157	0.181	-2.783	0.0307
	Ever divorced	0.0114	-0.728	1.990	-0.0265	-0.222*	1.222	-0.203
Number of jobs ever had		0.0119**	0.684***	-0.727***	0.0554***	0.0509***	-0.848***	0.0114
Number of children		0.0465***	-0.784**	0.885**	0.0637**	0.0152	-0.329	-0.104***
Number of grandchildren		-0.0071*	-0.607***	0.624***	-0.0305**	0.000428	0.127	0.00296
Constant		0.398***	1.631	93.78***			93.45***	
N		8172	8172	8172	8172	8172	8172	8172
Log likelihood		-14362.3	-38064.1	-38874.3	-8487.5	-12862.9	-39565.7	-6819.8
AIC		28822.5	76226.3	77846.6	17078.9	25835.8	79229.5	13749.7
BIC		29165.9	76569.7	78190.0	17443.4	26221.3	79572.9	14135.2
r2			0.133	0.150			0.148	

Statistical significance: * p<0.05, ** p<0.01, *** p<0.001

Appendix E: Full regression results, continuation

	(8)	(9)	(10)	(11)	(12)
	Average frequency of contact with SN members		Contact with most contacted SN member		Average frequency of contact with family SN
		Conditional on average distance to SN		Conditional on average distance to SN	
Migration pathway (ref.cat. lifetime stayers)					
Childhood migrants	0.175	0.236	0.116	0.0488	0.0490
Delayed migrants	0.145	0.0650	-0.278	-0.679*	0.0593
One-time migrants	0.0434	-0.0226	0.129	-0.0547	0.0387
Return migrants	0.248***	0.0306	0.189	-0.0780	0.164*
Serial onward migrants	0.337**	0.135	0.170	-0.175	0.248*
Circular migrants	0.337*	0.144	0.367	0.0249	0.0864
Female	0.449***	-0.162**	0.323***	-0.0273	0.339***
Birth cohorts (ref.cat. 1947-1952)					
1957-1962	-0.241**	-0.327***	-0.496***	-0.502***	-0.214*
Marital status (ref.cat. Married, living with spouse)					
Registered partnership	-0.0720	-0.252	0.138	0.0215	0.0973
Married, not living with spouse	0.649***	0.115	1.599***	1.124***	1.171***
Never married	0.830***	0.358**	1.822***	1.402***	1.048***
Divorced	0.714***	0.0276	1.909***	1.372***	0.969***
Widowed	0.410***	-0.317**	1.647***	1.136***	0.633***
Education level (ref.cat. Pre-primary)					
Primary	0.207	0.373	0.0426	0.268	0.0569
Lower secondary	0.390*	0.375	0.337	0.426	0.178
Upper secondary	0.333*	0.356	0.194	0.176	0.115
Post-secondary	0.538**	0.545*	0.333	0.233	0.167
Tertiary	0.745***	0.675*	0.309	0.105	0.321
Employment status (ref.cat. Retired)					
Employed or self-employed	0.0508	-0.0175	-0.0169	-0.117	0.0417
Unemployed	0.0561	0.110	0.207	0.302	0.176
Permanently sick	0.0691	0.0918	-0.155	-0.166	-0.0212
Homemaker	-0.0795	-0.0934	-0.0562	-0.0926	-0.152
Other	0.0645	0.0465	-0.108	-0.160	-0.302
Urban status of place of residence (ref. cat. A big city)					
The suburbs or outskirts of a big city	-0.115	-0.104	-0.356*	-0.267	-0.0416
A large town	-0.171*	-0.284**	-0.203	-0.187	-0.0218
A small town	-0.102	-0.181*	-0.0666	-0.113	0.00790
A rural area or village	-0.275***	-0.317***	-0.157	-0.185	-0.0830
Homeownership (ref.cat. Owner)					
Member of a cooperative	0.215	0.150	0.288	0.146	0.368*
Tenant	-0.0963	-0.0775	0.0899	0.150	0.0888
Subtenant	0.336	0.216	0.427	0.322	0.649
Rent free	-0.248*	-0.180	-0.433*	-0.260	-0.301*

Self-perceived health conditions (ref.cat. Excellent)						
	Very good	-0.0353	0.128	0.0612	0.163	-0.0194
	Good	-0.135	0.0312	0.0852	0.216	-0.0284
	Fair	-0.236*	-0.0620	0.208	0.340*	-0.0716
	Poor	-0.419**	-0.0983	-0.0584	0.153	-0.0513
Number of chronic diseases		0.0495**	0.0000571	-0.0225	-0.0427	-0.00180
Depression level		0.0287*	0.0165	0.0641***	0.0471*	0.0264*
Marriage history (ref.cat. Lifetime single)						
	Ever married	-0.109	0.0390	-0.147	-0.0401	-0.102
	Ever partnered	-0.210**	-0.124	-0.361**	-0.312*	-0.153*
	Ever separated	0.0765	0.00128	-0.0475	-0.158	-0.0143
	Ever divorced	-0.0713	0.218	-0.194	-0.168	-0.253*
Number of jobs ever had		0.0737***	0.0627***	0.0293	0.00663	0.0451***
Number of children		0.0336	0.0416	-0.125***	-0.145***	0.00188
Number of grandchildren		-0.0135	-0.0337**	-0.00239	0.0160	0.00830
Constant						
N		8172	8172	8172	8172	8172
Log likelihood		-9916.0	-7142.0	-3872.1	-3386.1	-10318.2
AIC		19938.0	14404.1	7850.2	6892.2	20744.4
BIC		20309.5	14824.6	8221.6	7312.7	21122.8
r2						

Statistical significance: * p<0.05, ** p<0.01, *** p<0.001

Appendix E: Full regression results, continuation 2

		(13)	(14)	(15)	(16)	(17)
		Average frequency of contact with friend SN	% of SN with daily contact		% of SN with weekly contact	
				Conditional on average distance to SN		Conditional on average distance to SN
Migration pathway (ref.cat. lifetime stayers)						
	Childhood migrants	-0.217	-2.218	-1.002	-1.322	-0.947
	Delayed migrants	0.00484	1.594	3.795*	-4.181*	-3.138*
	One-time migrants	0.160	-1.056	0.269	-1.121	-0.306
	Return migrants	-0.114	-4.212**	0.0888	-1.643*	-0.0994
	Serial onward migrants	-0.167	-4.845*	0.442	-3.263*	-1.097
	Circular migrants	-0.115	-4.828*	-0.431	-6.027***	-3.831**
Female		-0.631***	-8.660***	0.777	-0.769	1.837***
Birth cohorts (ref.cat. 1947-1952)						
	1957-1962	0.166	5.160***	4.456***	1.012	0.829
Marital status (ref.cat. Married, living with spouse)						
	Registered partnership	-0.283	1.569	2.173	0.956	1.922
	Married, not living with spouse	-0.586**	-13.25***	-2.511	-5.867**	-2.324
	Never married	-0.619***	-19.49***	-8.211***	-5.776***	-2.059*
	Divorced	-0.669***	-20.04***	-6.802***	-5.319***	-0.816
	Widowed	-0.618***	-15.02***	-2.481*	-1.261	2.658**
Education level (ref.cat. Pre-primary)						
	Primary	-0.205	-2.864	-3.437	1.886	1.041
	Lower secondary	-0.394	-6.535*	-3.928*	-0.0318	0.129
	Upper secondary	-0.345	-5.006	-3.083	-0.364	-0.0558
	Post-secondary	-0.541*	-7.197*	-3.557	-3.368	-2.292
	Tertiary	-0.447*	-10.80***	-5.142**	-4.584**	-2.861
Employment status (ref.cat. Retired)						
	Employed or self-employed	-0.0809	-0.568	0.593	0.115	0.693
	Unemployed	-0.0486	-1.496	-1.922	0.460	0.343
	Permanently sick	0.161	0.389	0.302	-0.732	-0.437
	Homemaker	0.0739	1.274	0.453	0.00495	-0.230
	Other	-0.271	-1.081	-0.572	-0.289	0.136
Urban status of place of residence (ref. cat. A big city)						
	The suburbs or outskirts of a big city	0.315**	1.719	0.495	-0.162	-0.393
	A large town	0.255**	1.688	1.625	1.103	1.016
	A small town	0.253**	0.787	0.902	0.648	0.826
	A rural area or village	0.455***	3.567**	2.282*	1.828*	1.741*
Homeownership (ref.cat. Owner)						
	Member of a cooperative	-0.0289	-6.372*	-3.682	-2.164	-1.342
	Tenant	0.0107	0.584	-0.334	0.158	-0.0217
	Subtenant	-0.305	-4.099	-0.775	-8.380*	-8.227*

	Rent free	0.0997	5.086*	2.467	0.975	0.0121
Self-perceived health conditions (ref.cat. Excellent)						
	Very good	-0.0148	-0.468	-2.575*	0.163	-0.580
	Good	0.136	1.630	-0.978	0.839	0.00536
	Fair	0.0550	2.274	-1.064	0.838	-0.168
	Poor	0.110	4.956*	-0.832	1.836	0.0218
Number of chronic diseases		-0.0436*	-0.467	0.356	-0.0229	0.145
Depression level		-0.0398**	-0.512**	-0.147	-0.387**	-0.261*
Marriage history (ref.cat. Lifetime single)						
	Ever married	0.0906	2.158	-0.618	1.648	0.792
	Ever partnered	0.160	4.646***	2.552**	1.054	0.322
	Ever separated	-0.0135	-1.624	0.479	-0.553	0.0724
	Ever divorced	0.0159	3.640	0.728	0.327	-0.516
Number of jobs ever had		-0.0629***	-1.122***	-0.503**	-0.673***	-0.462***
Number of children		0.0428	0.229	0.325	-0.183	-0.0787
Number of grandchildren		0.0574***	0.175	0.291*	0.162	0.136
Constant			86.31***	100.5***	96.77***	98.70***
N		8172	8172	8172	8172	8172
Log likelihood		-9003.4	-40119.4	-37429.2	-36110.1	-35602.5
AIC		18114.8	80336.9	74970.4	72318.2	71317.0
BIC		18493.2	80680.3	75362.9	72661.7	71709.4
r2			0.211	0.591	0.102	0.207

Statistical significance: * p<0.05, ** p<0.01, *** p<0.001

Appendix E: Full regression results, continuation 3

	(18)	(19)	(20)	(21)	(22)	(23)	(24)
	Whether gave help to others	Whether received help from others	Whether gave financial help or gifts to others	Whether received financial help or gifts from others	Mean emotional closeness to SN members	Emotional closeness to closest SN member	Overall satisfaction with SN
Migration pathway (ref.cat. lifetime stayers)							
Childhood migrants	0.152	-0.0531	-0.101	0.111	-0.0650	-0.00143	0.171
Delayed migrants	-0.0152	0.0882	-0.0104	0.168	0.114	0.133	-0.0208
One-time migrants	-0.120	0.00745	-0.0291	0.182	0.0109	0.0751	0.0372
Return migrants	-0.102	-0.00760	0.106	0.251**	-0.0342	0.0576	0.0351
Serial onward migrants	0.0225	0.00410	0.278	0.632***	0.0487	0.161	0.159
Circular migrants	-0.0469	-0.0129	0.157	0.372*	-0.00741	-0.0760	0.0206
Female	0.171**	-0.167*	-0.00653	-0.0254	0.184***	0.141**	0.200***
Birth cohorts (ref.cat. 1947-1952)							
1957-1962	0.597***	0.154	-0.209*	0.367**	-0.0444	0.0486	0.121
Current conditions							
Marital status (ref.cat. Married, living with spouse)							
Registered partnership	-0.471*	-0.0383	-0.177	-0.0586	-0.329	-0.570**	-0.0698
Married, not living with spouse	0.269	0.296	-0.171	-0.615*	-0.276	-0.511**	-0.0238
Never married	0.311**	0.424**	-0.645***	-0.424**	-0.630***	-0.729***	-0.236*
Divorced	0.197*	0.470***	-0.353***	-0.0790	-0.397***	-0.515***	-0.107
Widowed	0.245*	0.480***	-0.362**	0.0594	-0.272**	-0.315**	0.0412
Education level (ref.cat. Pre-primary)							
Primary	0.00132	0.282	0.0248	0.734*	0.0806	0.110	-0.0473
Lower secondary	0.0641	0.196	0.151	0.786**	0.166	0.180	-0.187
Upper secondary	0.202	0.360	0.299	0.808**	0.0783	0.136	-0.228
Post-secondary	0.244	0.222	0.409	1.186***	-0.189	-0.0995	-0.208
Tertiary	0.438*	0.381	0.761***	1.074***	0.0830	0.199	-0.368*
Employment status (ref.cat. Retired)							
Employed or self-employed	-0.0245	-0.0851	-0.0608	0.0428	-0.0488	-0.0375	-0.0616
Unemployed	-0.105	-0.131	-0.558***	-0.00591	-0.0398	-0.0726	-0.269**
Permanently sick	-0.115	0.455***	-0.417***	-0.0395	0.0474	0.00764	-0.0325
Homemaker	0.111	-0.0851	-0.326**	0.0165	0.0997	0.114	0.0381
Other	0.218	-0.0296	-0.0892	0.435*	-0.230	-0.265	-0.0158
Urban status of place of residence (ref. cat. A big city)							
The suburbs or outskirts of a big city	0.0135	-0.0403	0.149	0.0911	0.161	0.226*	-0.132
A large town	0.00811	-0.227	-0.0738	-0.189	0.0960	0.108	-0.111
A small town	-0.00184	0.000765	-0.0128	-0.115	0.0486	0.0740	-0.164*
A rural area or village	-0.00434	-0.130	-0.111	-0.161	0.0210	0.0330	-0.132
Homeownership (ref.cat. Owner)							
Member of a cooperative	0.292	0.162	-0.281	-0.0370	0.0773	0.271	-0.156
Tenant	0.0553	0.0581	-0.448***	-0.501***	0.0322	0.000961	0.0200

	Subtenant	0.541	-0.795	-0.790	0.136	0.0755	0.197	0.0688
	Rent free	-0.100	0.00379	0.0420	-0.147	0.207	0.376**	0.182
Self-perceived health conditions (ref.cat. Excellent)								
	Very good	-0.0353	-0.0412	0.0476	0.0695	-0.357***	-0.491***	-0.393***
	Good	-0.135	0.0238	-0.106	-0.00536	-0.744***	-0.918***	-0.546***
	Fair	-0.236*	0.188	-0.276*	0.0148	-0.861***	-1.063***	-0.606***
	Poor	-0.419**	0.776***	-0.326*	-0.0958	-0.766***	-0.999***	-0.285*
Number of chronic diseases		0.0528*	0.116***	0.0113	0.00845	0.0395*	0.0687***	-0.00762
Depression level		0.0351**	0.0604***	0.0375**	0.0601***	-0.0691***	-0.0577***	-0.0944***
Life histories								
Marriage history (ref.cat. Lifetime single)								
	Ever married	-0.0163	-0.140	0.0150	-0.255*	0.308**	0.150	0.0809
	Ever partnered	-0.250**	-0.0721	-0.0549	0.0205	0.435***	0.358***	-0.0645
	Ever separated	0.0548	0.162	0.0353	0.0746	0.246*	0.187	-0.00263
	Ever divorced	-0.146	-0.0783	-0.0130	0.0322	0.425***	0.359**	-0.00182
Number of jobs ever had		0.0557***		0.0370*	0.0505***	0.00951	-0.00347	0.0123
Number of children		0.0272		-0.0334	0.141***	0.0677*	0.0388	0.0545*
Number of grandchildren		-0.0265*		0.0254	-0.0487***	-0.0236	0.0181	0.0104
Constant		-1.990***	-2.357***	-1.187***	-2.782***			
N		8172	8172	8172	8172	8172	8172	8172
Log likelihood		-5004.8	-3352.9	-4983.4	-3945.7	-6908.3	-6495.8	-10565.7
AIC		10107.6	6803.9	10064.8	7989.3	13918.5	13093.5	21247.4
BIC		10451.0	7147.3	10408.2	8332.7	14276.0	13450.9	21653.9
r2								

Appendix F: Regression results for log transformation of continuous variables

	(3)	(2)	(6)	(14)	(16)
	Log % of SN who are family	Log % of SN who are friends	Log % of SN within 5km	Log % of SN with daily contact	Log % of SN with weekly contact
Migration pathway (ref.cat. lifetime stayers)					
Childhood migrants	-0.0386	0.0117	-0.0173	-0.0313	-0.00784
Delayed migrants	0.0339	-0.0756	-0.0967*	0.0131	-0.0333
One-time migrants	-0.000584	0.0444	-0.0656***	0.000135	-0.0137
Return migrants	-0.0334*	0.0485	-0.107***	-0.0753***	-0.0344**
Serial onward migrants	-0.00957	0.0415	-0.130***	-0.0694	-0.0353
Circular migrants	-0.0429	0.0312	-0.115***	-0.0731	-0.0762***
Female	-0.0694***	-0.0555**	-0.113***	-0.139***	-0.00924
Birth cohorts (ref.cat. 1947-1952)					
1957-1962	0.0431**	-0.00790	-0.0379	0.0265	0.00870
Current conditions					
Marital status (ref.cat. Married, living with spouse)					
Registered partnership	-0.00549	0.255***	-0.0538	0.0455	0.0115
Married, not living with spouse	-0.0850*	0.313***	-0.0737	-0.0596	-0.0449
Never married	-0.137***	0.208***	-0.0266	-0.0410	-0.0735***
Divorced	-0.0917***	0.199***	-0.0491*	-0.0510	-0.0517***
Widowed	-0.0841***	0.133***	-0.0409	-0.0116	0.00144
Education level (ref.cat. Pre-primary)					
Primary	-0.00941	-0.0561	0.0298	-0.0349	0.0146
Lower secondary	-0.0451	-0.0460	-0.0202	-0.0829	-0.00613
Upper secondary	-0.0407	-0.0990	-0.0278	-0.0680	-0.0156
Post-secondary	-0.0743*	-0.134	-0.107*	-0.116*	-0.0465
Tertiary	-0.0893**	-0.134	-0.137***	-0.196***	-0.0776***
Employment status (ref.cat. Retired)					
Employed or self-employed	-0.0221*	-0.0659**	-0.0380**	-0.00607	-0.00316
Unemployed	0.00521	0.0210	0.0335	0.0162	0.00343
Permanently sick	0.0157	-0.0822	-0.0195	-0.0197	-0.0230
Homemaker	0.00263	-0.0575	0.0515*	0.0105	-0.0102
Other	-0.0967**	-0.0301	-0.0229	-0.0333	-0.0216
Urban status of place of residence (ref. cat. A big city)					
The suburbs or outskirts of a big city	0.0339	-0.0883*	-0.0193	-0.0272	-0.00631
A large town	0.0482**	-0.0388	0.0392*	0.00328	0.00843
A small town	0.0466**	-0.0473	-0.00734	0.00154	0.00303
A rural area or village	0.0663***	-0.0494	-0.0264	0.0528*	0.0210*
Homeownership (ref.cat. Owner)					
Member of a cooperative	0.00890	-0.0122	-0.0896*	-0.113*	-0.0247
Tenant	-0.00188	-0.0105	0.0157	0.0315	0.00946
Subtenant	-0.0418	0.474**	0.0967	0.0816	-0.109*
Rent free	0.0346	-0.129*	0.0442	0.0583	0.0238
Self-perceived health conditions (ref.cat. Excellent)					

	Very good	0.0288	0.00824	0.0585**	-0.00562	0.00407
	Good	0.0543***	0.0237	0.0685***	0.0406	0.0151
	Fair	0.0481**	0.0771	0.0872***	0.0846**	0.0185
	Poor	0.0851***	0.111	0.127***	0.102**	0.0278
Number of chronic diseases		-0.0102**	-0.0205*	-0.0128**	-0.0133*	-0.000545
Depression level		-0.00874***	0.00778	-0.000149	-0.00199	-0.00382*
Life histories						
Marriage history (ref.cat. Lifetime single)						
	Ever married	0.0135	-0.0480	0.0439*	0.0361	0.0165
	Ever partnered	0.0523***	-0.0414	0.00691	0.0430	0.00769
	Ever separated	-0.0252	-0.0285	-0.0187	-0.0313	-0.0157
	Ever divorced	-0.0106	-0.0456	0.0267	0.0473	-0.0121
Number of jobs ever had		-0.0105***	-0.00112	-0.0158***	-0.0191***	-0.00905***
Number of children		0.00704	-0.0369***	-0.0139**	-0.0131*	-0.00260
Number of grandchildren		0.0100***	-0.00641	0.000512	0.00234	0.00247
Constant		4.563***	4.081***	4.588***	4.529***	4.590***
N		7659	2687	7558	7019	8058
Log likelihood		-2718.6	-1816.4	-4510.4	-5137.3	-786.1
AIC		5535.3	3730.7	9118.8	10372.6	1670.1
BIC		5875.5	4019.7	9458.4	10708.6	2012.8
r2		0.141	0.101	0.130	0.187	0.102

Statistical significance: * p<0.05, ** p<0.01, *** p<0.001