



# Exploring life-course trajectories in local spatial contexts across Sweden

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## Abstract

Longitudinal register data makes it possible to analyse how life-course trajectories are formed in local contexts, and also how trajectories are linked to individual spatial mobility. This paper focus on young adults and on how their lives are structured in terms of life-course trajectories with respect to education, employment and establishing a family. We use latent class analysis, and identify seven different trajectories that capture the different life-courses experienced from age 15 to age 30 by individuals in born in 1986: Three trajectory types include post-secondary education. Three trajectory types include the establishment of a family, in one case after post-secondary education. One trajectory type only include employment, and one trajectory type includes neither employment, education, nor the establishment of a family, signalling social vulnerability. The trajectories identified here correspond well with trajectories identified in earlier qualitative studies.

The different trajectories are closely related to different geographical context. As expected, individuals from metropolitan area follow post-secondary education trajectories. Trajectories encompassing the establishment of a family more frequent for individuals from non-metropolitan areas. In addition, the trajectories followed influence where individuals live at age 30. Thus, there is more trajectory-based segregation at age 30 then at age 15. Another finding is that individuals from non-metropolitan areas tend to follow more gender-polarized trajectories. In metropolitan areas there is instead more social polarization: on the one hand trajectories involving post-secondary education, on the other an overrepresentation of the vulnerability trajectory. These geographical patterns to some extent overlap with country background. Individuals with a Swedish background are over-represented in gender-polarized trajectories. Individuals with a non-European background are over-represented in socially-polarized trajectories.

Theoretically, our study give support to the idea that places are structured on the basis of life-course trajectories. Local context influences how individuals are linked into different trajectories and, at the same time, the spatial sorting of trajectories will shape local contexts.

**Keywords:** trajectories, life-course, latent class, geographical context, early adulthood

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## Introduction

A major characteristic of Swedish human geography in the last 25 years has been the increasing importance of a life-course perspective in both qualitative and quantitative research (Abramsson, 2003; Tollefsen Altamirano, 2000; Wimark, 2014). The life-course perspective was introduced as early as in Torsten Hägerstrand's work on migration, and later became an integral aspect of time geography. Building on Hägerstrand, Allan Pred (1984) argued that a life-course, in the sense of biography formation, is closely involved with the processes that shape particular places. Thus, it is possible to consider geographical life-course research in Sweden to be inspired partly by a Hägerstrand tradition. A further impetus to life-course research has been provided by the increasing availability of geo-coded, longitudinal register data, not only in Sweden but also in the other Nordic countries and in the Netherlands (E. K. Andersson & B. Malmberg, 2018; Bäckman & Nilsson, 2010; Billari & Liefbroer, 2010; Browning, Cagney, & Boettner, 2016; Damhuis, van Gent, Hochstenbach, & Musterd, 2019; de Vuijst, van Ham, & Kleinhans, 2016; Cees H Elzinga & Aart C Liefbroer, 2007; Kleinepier, de Valk, & van Gaalen, 2015; Kulu & Steele, 2013). These data make it possible to analyse how life-course trajectories are formed in local contexts, and also how trajectories are linked to individual spatial mobility. This paper will focus on young adults, and on how their lives are structured in terms of life-course trajectories with respect to education, employment and establishing a family.

A statistical method, *latent class analysis*, was used to identify trajectories in register data, as it has recently been demonstrated to be a powerful tool for analysing longitudinal register data. One aspect that makes latent class analysis especially interesting for life-course studies is that life events registered at a specific age are seen as reflecting an underlying biographical script. This script, in turn, influences the probability that an individual at that age will engage in different activities such as education, employment and establishing a family. This can be taken to correspond to a view, expressed in Bourdieu's habitus theory for example, that trajectories are formed in response to normative life patterns into which individuals have socialised (Bourdieu, 2008). An attractive feature of latent class analysis is that, even if variables only indirectly related to different biographical scripts are used, these indicators, measured over time, are still sufficient to identify social groups which follow distinct life-course trajectories.

Thus, the aim of this paper is to explore the segmentation of young adults' life-course trajectories using longitudinal register data, and to analyse how this trajectory segmentation is

linked to spatial differentiation. On the one hand, this involves exploring otherwise hidden geographical patterns in how individual life-course trajectories are sorted, and on the other hand, it involves exploring the influence of local cognitive and motivational structures on individuals' trajectories. This is a socio-spatial dialectic approach—as developed by (Knox & Pinch, 2010) but originally from (Soja, 1980)—to trajectories, where they not only influence local social contexts but are also influenced by them. There are geographical studies which consider how local cognitive and motivational structures differ between places, and thereby also contribute to spatial variation in lifestyles (G. Forsberg, 1998, 2001; S. Forsberg, 2019; Simonsen, 1991). These local cognitive and motivational structures can be described and discussed, but can also be researched in terms of exploring the consequences for individuals growing up in contexts with identified lifestyle patterns. Local cognitive and motivational structures are described and discussed mostly on the basis of qualitative, in-depth studies of local geographical areas and regions. The present study relates these to studies with life-course trajectories identified in register data.

Two rather different approaches have been used in research in terms of describing spatial contexts for individuals. On the one hand, ethnographic studies tend to be used for describing a place or a field in depth (e.g., Waara, 1996). On the other hand, the contrasting approach of factor ecology has been used to analyse spatial differentiation across geographical contexts for many variables at the same time (Murdie, 1969). The approaches are different, but have a common interest in describing complex spatial contexts connected to individuals' lifestyles in these situations.

Ethnographic studies take place within a specific context, which is described thoroughly. Typically, these studies seek a deep and comprehensive understanding of a place. This place is often discussed and described in relation to other places and through a time perspective, but ethnographic studies do not describe a variety of contexts throughout a country. This is a consequence of the methodology. However, many ethnographic studies elaborate on differences between the lifestyle in a rural area and a metropolitan area for instance (e.g. Stockholm in Sweden vs. a rural or peripheral area) (S. Forsberg, 2019). Some of these studies describe the 'othering of the rural' lifestyle (Stenbacka, 2011), through media for example.

Studies in factor ecology have typically made use of the principal factor procedure, in which a large set of data is grouped according to areas displaying the most similarities, and this

allows for a multitude of variables (Murdie, 1969). This approach to classifying data has its roots in the Chicago School of Sociology in the 1920s (McKenzie, Park, & Burgess, 1967), but has lately seen a revival in that multi-scalar and composite spatial contexts can be created with the power of today's computers (E. K. Andersson & Malmberg, 2016; Petrović, 2020). The specific emphasis on spatial context in this approach aims to highlight different living conditions involving local cognitive and motivational structures.

Trajectories give a composite view of a person's life-course, and events which can be said to reflect an individual's direction in life. This is interesting in relation to theories which consider social class to have a structuring influence on the life of individuals which goes beyond their socio-economic situation at a particular point in time. We acknowledge that our quantitative approach has little in common with ethnography, but we propose that latent class/mixed modelling has an advantage in bridging the two disparate approaches if they are described together. Although this approach cannot be said to integrate the two above-mentioned approaches, it can perhaps diminish the distance between them. Both approaches aim to study life courses, using longitudinal statistical indicators in one case and interview information in the other, and both situate life courses in a specific geographical context. The present analyses will interact with our reading and understanding of qualitative studies of life courses in youth and young adults in the Swedish context.

This paper will therefore analyse the extent to which the trajectories identified using latent class analysis have also been observed in qualitative studies of youth and young adults. Such qualitative studies have been carried out in Sweden since at least the 1980s, and many are from the last 15 years. A number of them have been undertaken by geographers, and these studies are of special interest since they tend to focus on particular geographical locations. Others have been conducted in the context of educational research.

In addition, in both the international and the Swedish debates, spatial differences in living conditions have increasingly been identified as one of society's major challenges (Eva K. Andersson & Bo Malmberg, 2018; Marcińczak, Musterd, Tammaru, & Ham, 2016; Regeringskansliet, 2018; Sampson, 2012). While large population groups perhaps enjoy better material living conditions than ever before, other groups, often segregated spatially, are living with economic, social and housing insecurity. Life-course trajectories can help reveal these spatial differences in living conditions.

As stated above, the aim of this paper is to explore whether life-course trajectories identified in register data can be used to reveal otherwise hidden geographical patterns in terms of how individual lives are influenced by local cognitive and motivational structures, the systems of durable, transposable dispositions (through which we act, think, judge and acquire specific tastes) which Bourdieu calls *habitus* (Bourdieu, 2008, p. 19). The study begins by looking at entry into adulthood at 16-30 years. This is a demographically eventful period in terms of education, starting work, leaving the nest, intense residential mobility, early career steps and establishing a family. We study the influence of parental background, but importantly, how the composition of different life paths varies in spatial terms.

## **Theoretical background**

Life-course literature has discussed whether life courses have become less standardised over time (Macmillan, 2005). It can be difficult to determine trends in this regard. However, based on both the results of qualitative studies of life histories and theories about the reproduction of social classes, the starting point for this paper is that clear differentiation in life courses will be highlighted when trajectories are identified in register data. This differentiation reflects existing social inequalities, as well as an occupational structure that divides the work force, for instance, into categories with different status, power and skill requirements. At the same time, it can be argued that geographical factors may contribute to life-course differentiation. Based on a spatial division of labour, different locations will provide structures in terms of opportunity which favour certain types of career over others. But there is also a role for lifestyle factors. Following a specific life-course is a way of expressing identity and demonstrating allegiance to particular norms. It is therefore conceivable that local patterns develop over time in terms of what constitutes an ideal life-course (Cosgrove, 1983; Massey, 1994; Pred, 1984).

Spatial differences in opportunity structures can clearly influence the life courses into which young adults are directed. In metropolitan areas a broad range of education is available, and the occupational structure is highly diversified. Metropolitan areas also have a concentration of upper-middle class families who will encourage and influence their children's ambitions in terms of careers. In contrast, peripheral areas are characterised by less occupational diversity, especially in high-status occupations. They also offer few local options for higher education. Instead, in many cases, they are characterised by sectoral specialisation in terms of agriculture or forestry, mining, specific aspects of manufacturing, and tourism, for example. On the other hand, the opposite is true with respect to the ubiquity of work in schools,

nursing and care (Brandén, 2013). Moreover, in the Swedish context, peripheral areas have fewer upper-middle class families. These differences are likely to influence how young adults who grow up in a geographical context are distributed across life-course trajectories.

Furthermore, irrespective of where people grow up, the life-course trajectory they follow during young adulthood can be expected to influence their geographical career. Taking part in tertiary education will require them to migrate to university and college towns, and the labour market for university graduates will be concentrated in larger cities. On the other hand, affordable housing for individuals who establish a family early will be easier to find in less central locations. It may also be the case that people actively look for residential areas with high concentrations of people in the same trajectory as themselves. These factors will lead to spatial sorting based on a person's life-course trajectory.

Thus, it is not only the case that spatial context influences life-course trajectories. The geographical sorting of these trajectories will also, in turn, shape spatial contexts. A long-standing idea in human geography suggests that spatial contexts can develop special or even unique characteristics. An early formulation of this idea is found in the work of Vidal de la Blache, who suggested that regions could display specific *genres-de-vie* which reflected the local organisation of production, nature and society in general. In his argument for a radical spatial cultural geography, Cosgrove (1983) pointed out that de la Blache's view of the relationship between nature and human life was in many ways similar to that of Marx and Engels. He noted that Marx and Engels acknowledge that a mode of production not only involves material production but is also a mode of life. In his theory of regional geography, which sees place as a historically contingent process, Allan Pred (1984) acknowledges his indebtedness to the Vidalian tradition and its notion of *genres-de-vie*. In a similar way, it is possible to see Doreen Massey's (1994, Ch. 5) arguments in favour of locality studies as a development of de la Blache's ideas, demonstrating that *genres-de-vie* can be transformed into a tool for feminist analysis. The present paper suggests that, by first identifying life-course trajectories in register data, and then exploring how local contexts are constituted as assemblages of life-course trajectories, it becomes possible to provide an analysis of Swedish regions and urban areas based on *genres-de-vie*. We argue that this is possible because the life-course trajectories which can be identified statistically clearly overlap with trajectories that can be demonstrated through qualitative life-history interviews. Qualitative results therefore help to interpret the trajectories and allow them to be seen as an expression of life plans. Moreover, life-course trajectories are linked to specific local understandings of goals in

life, and of normative ideas about how lives should be structured. They also influence the kind of experiences and standards that individuals will acquire through life. This implies that the *genres-de-vie* of particular places can be hypothesised to reflect the types of life-course trajectory represented there. However, additional studies would be required to establish whether this is indeed the case.

### **Life-course trajectories in early adulthood, identified in qualitative studies**

A fundamental difference between longitudinal register data and life-course information derived from interviews is that register data, as such, is silent about motivations, intentions and personal influences which have played a role in individual life stories. Nonetheless, both interview narratives and the records found in register data refer to life-course trajectories in a shared spatio-temporal life world. Therefore, the types of trajectory identified in register data can be expected to correspond to types identified in qualitative research. In the Swedish case, qualitative research carried out during the last decades has produced a valuable set of studies focusing specifically on the transition from adolescence to early adulthood. A selection of these studies will be illustrated below as examples of life-course trajectories which can be expected to appear in register data. Moreover, these studies can be used to link register-based trajectories to life histories provided by interviewees.

Catarina Lundqvist interviewed students from two classes in an upper-secondary school in Stockholm for her PhD dissertation “Horizons of opportunity” (2010). No details are provided on the location of the school, but both classes have a large majority of students with a migrant background, suggesting that this is a school in one of Stockholm’s migrant-dense suburbs. The interview sample consists, on the one hand, of students in a programme with an orientation towards retailing and office work (RO) and, on the other hand, students in a programme oriented towards continued education in social sciences and economics (SE). Both groups have a general idea that further education after upper-secondary school is of value, but the educational plans for the SE group are more concrete and specific, whereas students in the RO group have less detailed plans. Their immediate future is more linked to getting a job. These different orientations are to some extent linked to differences in parental background. The current occupations of parents of the RO and SE students are similar. They often work in the service sector, especially in the restaurant industry. Parents of the SE students, however, tend to be more highly educated, and also tend to be more determined that their children should have a tertiary education. Parents of the RO students acknowledge the



importance of education but, possibly linked to their own lack of tertiary education, are less able to provide their children with more definitive suggestions.

Mikael Palme's dissertation, "Upbringing and social reproduction strategies within the upper-middle class in one of Stockholm's northern suburbs" (2008a, 2008b), is based on interviews with 13 individuals from an affluent area north of central Stockholm. Eight of the interviewees were in upper-secondary, and five in lower secondary (7<sup>th</sup> grade). The interviewees were very much aware of what was expected of them in terms of behaviour and career plans. They would not necessarily go directly into tertiary education after graduating from upper-secondary, and most of them had plans for a gap year. However, at least until they were 25 years old, their life would be dominated by education. Both parents and neighbours had elite occupations: doctors, lawyers, civil engineers, civil servants. The interviewees can be characterised as resourceful individuals with well-developed verbal skills which allowed them to adapt the way they spoke to different circumstances. They greatly valued "culture", and seemed to have a sense of culture that could help them navigate education and careers related to the media, cultural communication or the arts. Their current abilities not only reflected input from parents, but also from parental networks of neighbours and friends.

Lindblad's dissertation, "They never understood my story': young adults with a migrant background on school failure and transitions between school and work" (2016), focuses on migrant youth. In this case, 20 individuals who had failed to graduate from upper-secondary schools were selected for interviews. The sampling was arranged to include representatives from different spatial contexts: metropolitan municipalities, suburban municipalities, major cities, smaller cities, and manufacturing municipalities. Moreover, the selected individuals were from residential areas dominated by rental dwellings, except for those from the manufacturing municipality, who were from a relatively mixed residential area. Three of the selected areas were characterised by high unemployment, low levels of education, high poverty rates, and high proportions of foreign-born residents. Few of the interviewees had moved away from the area where they had grown up, and many were still in their 20s, still living with their parents. The interviews indicate that the areas where they lived had a high concentration of migrants, and that the Swedish language was less well represented there. It was also suggested that the environment had not been helpful, and had offered opportunities to become involved in criminal activities, for example. The first interviews were conducted at age 21, two years after they would have graduated from upper-secondary school. They had

had substantial problems establishing themselves in the labour market, and they were also participating in a variety of programmes aimed at supplementing their education. To some extent, this could reflect the fact that the interviewees were recruited through employment councillors. In general, they emphasised the important role played by their family, but at the same time family obligations in the form of work can be seen as a factor behind their difficulties in finishing school. An interesting contrast is the group interviewed by Palme. This group was characterised by very clearly laid-out life plans, whereas Lindblad's interviewees, especially during their school years, reported that they had difficulties finding their way.

Jonsson's 2010 dissertation is an ambitious attempt to map the outlook on life of young people in a small-medium Swedish city. His theoretical tool is life mode analysis, originally proposed by (Hojrup, 1983) but later developed in a more pragmatic fashion by (Björnberg & Bäck-Wiklund, 1990). Life mode analysis is essentially a class-based scheme which, in this context, distinguishes between career-oriented life modes and wage-labour oriented life modes. To this, Jonsson adds a gender dimension which gives him four modes: female career-oriented, male career-oriented, male wage-labour oriented, and female family-oriented life modes. Jonsson interviewed more than 30 individuals, and his life mode classification works well. Both female and male career-oriented individuals had higher education as an important goal in life, but differed in how education fit into their life plans. For female career-oriented individuals it was important to excel at school, whereas male career-oriented individuals in Jonsson's sample did not strive for the highest grades. Women in this group also expressed less satisfaction than men in terms of the town they were living in. In addition, men with a wage-labour orientation were comfortable with the place they were living in, and were aiming for a relatively rapid transition to full adulthood, with the acquisition of a single family home as an important goal in life. For individuals in the female family-oriented life mode, establishing a family stood out as a life project which was at least as important as education was for career-oriented females. Equally, there were strong contrasts between the groups in terms of their geographical orientation and in patterns of social interaction. Females in this life mode steered away from intensive socialising, and had adopted more adult forms of social interaction. They were also more connected to their parental home than their career-oriented peers.

Peter Waara's dissertation (1996) involved interviews with 26 students in the last year of upper-secondary school in Haparanda, a small-medium city in Northern Sweden on the

border with Finland. They attended a three-year programme with no occupational orientation, implying that the students were expected to move into tertiary education. Instead of individual interviews, Waara used group interviews. In contrast to Jonsson, Waara's analysis was not based on a preconceived theoretical frame. Instead, he used a grounded theory approach, and the class perspective was not emphasised in the study. Moreover, group interviews may move the focus away from how ideas about the life-course are shaped by parental influences towards an interest in shared ideas about possible trajectories in young adulthood. Using group interviews seems to work well for the purposes of exploring these shared ideas. Thus, one finding is that there was a shared understanding of the different phases the students would go through in the years ahead. First, this involved a phase of building competence through education and work, then a phase of establishing a family, and finally a settling-down phase. The geographical dimension is important in the analysis. How did the students relate to and evaluate their local community? What were their plans for moving to other places, and the extent to which they had an interest in returning to their home areas? This analysis also emphasises the gender dimensions. What gender roles were represented in their home area? How did ideas about gender influence the future plans of the students, and how did these conceptions differ between boys and girls? From the text it is clear that the students differed in their plans, but the aim of this analysis was not to trace and contrast their plans systematically. Rather, the aim was to capture differences in world outlook and values, not least in relation to ideas about gender.

Taken together, these studies provide an illuminating account of diversity in the life courses of young Swedish adults. Two interrelated dimensions seem to be the most important: education and establishing a family. Some have a strong orientation towards post-secondary education, where others are more oriented towards obtaining employment and, in time, starting a family. Geography is relevant too, with post-secondary education a more important option in metropolitan areas, where establishing a family is a more central concern in non-metropolitan areas. In addition, outside metropolitan areas post-secondary education is seen as an option, especially in middle-class groups, and is associated with leaving the place where a person has grown up.

### **Motivations from earlier studies on trajectory indicators**

Firstly, over the years people have gradually delayed longer in establishing a family, because labour markets in countries such as Sweden are increasingly requiring young people to study longer than in the past. Longer periods in higher education increase the chances of a job,

reduce the risks of unemployment and significantly increase incomes for individuals. As starting a family early in life significantly increases the risks of being poorer and less educated, this is a useful indicator in terms of studying the relationship between education and employment, and the spatial differentiation in terms of establishing a family (Bo Malmberg & Andersson, 2019). Becoming a parent at an early age increases the risk of depending on income support, which affects the individuals' quality of life (cf. cash for care (CFC) in Norway, where younger individuals receive CFC, mostly in rural areas) (Magnusson Turner & Östh, 2020). From a geographical perspective, it is therefore useful to explore how establishing a family differs between places in Sweden and, alongside earlier available literature and theory, to seek information on how attitudes towards establishing a family differ between regions and areas.

Secondly, the present study uses the indicator 'participation in education'. Education is central if social and economic sustainability are to be maintained and developed in a population. So how does participation in studies fit into an individual's life path? Are trajectories involving an important period of study clustered spatially? Can entry into education and moving into work be better/quicker, timed/sequenced according to spatial context? (Boutin-Martinez, Mireles-Rios, Nylund-Gibson, & Simon, 2019; Pitzalis & Porcu, 2017). We assume that attitudes to education (E. Andersson, Abramsson, & Malmberg, 2020; B. Malmberg, Andersson, & Bergsten, 2014) differ between trajectories and are also spatially influenced.

Third, the employment indicator will show differences in work opportunities, such as how individual trajectories differ. Trajectories leading to employment can be identified, as well as trajectories which are less likely to lead to employment. Life courses with higher degrees of unemployment may be located in less prosperous regions, or this young adult cohort may be more likely to take part in higher education because of attitudes towards moving on into more highly qualified work, or attitudes favouring certain labour market sectors (e.g. young people wanting to leave Kalix to avoid working in the mine, Forsberg S.). The analysis will also consider the extent to which some regions live up to a reputation of being rich in employment, such as the Gnosjö area in Småland, Sweden (Pettersson, 2002).

A general, but important motivation for this study is that the indicators 'establishing a family', 'participation in education' and 'workforce participation' can be studied together over time. They are jointly included in the analyses which show the spatial differentiation in

lifestyle, and also in opportunity structure across regions. Geographers are especially equipped to perform these analyses, and to connect to multi-scalar, composite spatial contexts. They can analyse the extent to which the trajectories are clustered in space (Gruebner et al., 2016), and whether clusters of trajectories show patterns of segregation (Gruebner, Low, Tracy, Joshi, Cerda, Norris, Subramanian, Galea 2016).

### **Earlier quantitative trajectory research; life-course and trajectories in spatial contexts**

Life-course trajectory research in human geography, concerning neighbourhoods, residential mobility and housing, has long been recognised as a fascinating, telling research tool and approach (Damhuis et al., 2019; de Vuijst et al., 2016; Elder, 1985; Hägerstrand, 1970). At the same time, life-course trajectory research is currently becoming important in human geography and related research fields (Almquist & Brännström, 2018; Bäckman & Nilsson, 2010; de Vuijst et al., 2016; Ham, Hedman, Manley, Coulter, & Östh, 2014; Ilmakunnas & Moisio, 2019; Sugahara & Nordvik, 2020; Virtanen et al., 2011; Vogiazides & Chihaya, 2019). Studies use latent class (LC) analysis, but spatial dimensions are included less frequently. This section will discuss a number of studies which have used LC, LCML and sequence analysis, since it is relevant to compare these with our approach of creating life-course trajectories with LC.

#### **Pathways involving establishing a family**

Our study using LC is, in many ways, similar to a study by Amato et al. (2008) on the precursors for young women's pathways in terms of establishing a family. Their study, using the National Longitudinal Study of Adolescent Health 1995 to 2002, studied young women in the US in three waves, when they were between 18 and 23 years of age. Precursors from the study of these women were subjected to a factor analysis in which three factors were extracted: (a) personal and social resources, (b) socio-economic resources in the family, and adolescent academic achievement, and (c) conservative values and behaviour. The issue was then whether the values and parental background precursors in these factors could help explain the pathways of the women in question. For the pathways, the authors used five indicators: cohabitation, marriage, births, education and income from employment. Examples from the seven types of trajectory include one in which women went to college and did not establish a family, another in which women cohabited without children, another involving single mothers, and one in which women were inactive. Lastly, they tested for associations

between the life paths and the background value factors. The above-mentioned class involving college but not establishing a family was the only class to score positive on the factor 'personal and social resources'. In fact, there was a compact advantage to the class involving college but not establishing a family in that it scored highest on the two other factors as well (according to the authors, all factors were associated with privilege, including the factor 'conservative values and behaviour') (Amato et al., 2008). By way of comparison, our study will add a geographical perspective, and will not use as many indicators for the trajectories. Instead, it will use a total cohort with more available years.

Some studies have analysed partnerships and establishing a family in association with gender structures in geographical contexts (G. Forsberg, 1998, 2001; Haandrikman, Webster, & Duvander, 2019). Forsberg's article (2001, p. 161) notes: "*Gender contracts are unwritten rules that regulate relations between sexes, and re-create and reform relations as everyday actions within the framework of these local structures. Together these various local contracts construct a regional structure.*" Forsberg (1998) identifies three gender contracts in principle. The first is the traditional gender contract, common in forestry and industrial areas, with high gender labour market segregation and in which families play an important role. The second is the modernised gender contract in metropolitan areas, with integrated labour markets and more women in public life. Regions with modernised gender contracts are dominated by the service sector. According to Forsberg, these regions are sometimes 'escalator regions' for women. The third, involving non-traditional gender contracts, is prevalent in some peripheral and rural areas in which there is a traditional economic base but where gender relations are more equal (in politics, the labour market and everyday life) than in other, similar regions (G. Forsberg, 1998). Forsberg's work is interested in the specifics of reproduction and care across space in Sweden, and she maps indicators from social life, work places and households to conclude the above-mentioned gender contracts. What, therefore, can be learned about spatial variation in life events in life-course trajectories which take gender contracts into consideration? Forsberg writes that age-specific fertility rates are highest in Småland for women under 25 years (compare LC 4 below), and that mothers in the north of Sweden in general are older than in the south. In addition, commuting areas with high rates of higher education show the lowest fertility rates for women under 25 (G. Forsberg, 1998, p. 200). Regarding the various local contracts which shape a regional structure, this study anticipates that gender contracts will help form life-course trajectories.

More recent work by Haandrikman et al. (2019) tests regions as a geographical unit for gender contracts. Using a geographical multi-scalar approach, they argue that local gender contracts vary substantially, and that there are no dominant regional gender contracts. However, they highlight *local variance* in gender contracts (Haandrikman et al., 2019). Nevertheless, even with their improved multi-scalar approach and several measures of gender relations in a cluster analysis, the spatial patterns they produce do not, in essence, contradict the less developed/coarser spatial patterns in Forsberg (1998).

As a response to the idea that transitions to adulthood could show more complex patterns with time, Elzinga and Liefbroer analysed the life-course trajectories of young adults in 19 European countries (2007). They used sequence analysis and concluded that the family-life trajectories of young adults had not become more complex or turbulent. However, they found that the life courses were less similar to one another, and that there were more types of family trajectory than before. On the other hand, the geographical analysis, which in this case was country-wide, did not show clear differences (C. H. Elzinga & A. C. Liefbroer, 2007).

## **Education**

Lorentzen et al. (2019) analysed pathways to adulthood using sequences in the school-to-work transition in Finland, Norway and Sweden. Since the Nordic welfare states are fairly similar, only small differences were detected in the school-to-work trajectories. One difference involved a fairly strong link between early parenthood and workforce exclusion for Finnish women (see below, comparable to our LC 4). The idea of sequencing school-to-work trajectories was to examine and relate these to gender and establishing a family. The authors state that school-to-work trajectories and related events have generally become more diversified, and that young people delay the events and change the order in which they take place. According to the authors, events which have tended to take place in a certain order, such as “leaving school, entering the workforce, leaving one’s family, marrying and having children”, now take place in a different order (Lorentzen et al., 2019, p. 1286). Interestingly, the authors illustrate Swedish trajectories in relation to other countries with an example found in the literature: “*What the authors define as postmodern sequences of transitions to adulthood are more common in Sweden than they are in the UK and Italy. Individualistic and gender-sensitive cultural systems and liberal attitudes towards out-of-wedlock cohabitation alongside a more generous welfare system explain the Swedish exceptionalism*” (Lorentzen et al., 2019, p. 1288-1289). However, in line with our study, they found for individuals born in

Sweden in 1975 that the most common sequencing of school-to-work was ‘Short Education into Work’ (see below, LC 5 in our study). Moreover, this trajectory was dominated by men (35%, with women at 11%). The second most common (and the most common sequencing for individuals born in Norway and Finland in 1977) was ‘Medium Education into Work’ (Lorentzen et al., 2019). The authors also indicate a trajectory of ‘Long Period of Education into Work’, in which individuals remain in education for a long time, but interrupted by periods of work until their mid-late 20s (compare our LC 7 below). Finally, and in line with our study, they also found an ‘Exclusion Trajectory’, which involves 13-15% of Swedes and Norwegians but fewer Finns, although Finns appear to be further away from the labour market (compare our inactive LC 3 below).

A study by Pitzalis and Porcu uses latent class analysis to reveal cultural capital and educational attainment in terms of choice of school. The hypothesis is that cultural capital along the lines of Bourdieu will be revealed, and that it will play a central role in the explanation of social reproduction in families. Indeed, four latent classes were found in Italian school survey data, indicating different types of upper-secondary education (Pitzalis & Porcu, 2017). In a study of young people in Sweden, Lundahl and Olofsson analysed youth trajectories and school-to-work transition policies in the country. They found differences in the transition from education to work across types of municipality. Young people in rural and peripheral areas were more likely to drop out of education in upper-secondary school, which would consequently mean they were more likely to leave school after compulsory education (Lundahl & Olofsson, 2014).

### **Labour market and poverty**

Virtanen et al. (2011) followed individuals of 30 to 42 years of age, and applied trajectory analysis to their attachment to the labour market (Swedish data). The authors performed a latent class growth analysis. According to the information criteria (BIC, AIC, adjusted BIC) they discerned six latent classes following different tracks ranging from low attachment to high attachment to the labour market. These also indicated increasing or decreasing labour market attachment with time (Virtanen et al., 2011) (Mplus). Their study is comparable to ours in that they were able to show hidden classes in the data.

Using LC growth analysis, Ilmakunnas and Moisio (2019) found six different trajectories in terms of whether individuals received social assistance in Finland: (1) no receipt; (2) transitory; (3) slow exit; (4) occasional; (5) increase and (6) dependency. They showed that



around 35% received social assistance at least once between the ages of 19 and 25, and that 2.5% received social assistance each year. They also analysed possible associations with background variables to explain the different paths taken by recipients of social assistance. The dependency class was common among those with low education and those whose parents had also received social assistance. Analyses of poverty and receipt of social assistance are well represented within the field of LC analysis and sequence models (Almquist & Brännström, 2018; Bäckman & Nilsson, 2010; Mood, 2013; Vandecasteele, 2010). The studies link biography and history, and show the interplay between individual lives, structural context and societal change. However, like most LC analyses, they do not include spatial context background or geography per se to explain the different paths taken.

### **Geographical aspects, multi-level modelling**

Henry and Munthén write that in LC analysis, variables have been considered independent and not nested (2010). In their 2010 study, however, they analysed nested data on smoking in different communities. Their assumption was that smoking would vary not only between individuals but also spatially between communities. This spatial variation often leads researchers to use multi-level modelling. In this case, the authors discussed the advantage of controlling for individual-level variables (all indicators deciding the LC), to analyse the effects of a poor community versus a richer community, for instance, on smoking behaviour. They used latent class multi-level modelling in MPlus.

The idea of mapping clusters of trajectories is not entirely new, but is arguably dependent on the availability of quality individual, longitudinal data. An interesting example is a study by Gruebner et al. in 2016, which set out to map concentrations of post-traumatic stress and depression trajectories following Hurricane Ike in Texas in 2008. The study used trajectory groups following a group-based mixture model, where each participant was assigned a probability of being in each trajectory. This was used to determine their most likely trajectory. Most participants were assigned to a resilience trajectory, but some were classified in delayed symptoms, recovery and chronic trajectories. The analyses used these four classes to make geographical clusters (SaTScan) in two ways, using unadjusted trajectories and then predictor-adjusted trajectories. In both analyses, significant geographical clusters were found. The clusters were studied in order to identify ways in which they differed from the total sample. For instance, there were clusters where the population was at many times greater

relative risk of chronic post-traumatic stress. There were also areas where collective community efficacy was associated with resilience (Gruebner et al., 2016).

## Methods and data

The present study design follows three analytical steps. First, latent classes are described and analysed. Second, these classes are mapped to highlight possible geographical patterns (genres-de-vie), and third, multinomial regression analyses are performed with the latent classes as dependent variables, in order to explore explanations for the trajectories found in the cohort.

### Latent class analysis

LC analysis is a useful method for discovering patterns, and for reducing a large number of life courses to a smaller number which capture variability in the timing and sequencing of life-course transitions (Amato et al., 2008). Transitions during the life-course can occur in different orders and at different ages, and this yields a considerable number of possible life courses. Henry and Munthén describe this as follows: “*The classes are latent in that the subtypes are not directly observed; rather they are inferred from the multiple observed indicators*” (2010).<sup>1</sup>

The analytical tool applied to analyse multi-dimensional, longitudinal data is finite mixture modelling and, more specifically, latent class analysis or LCA, fitted using the expectation-maximisation algorithm. The idea of finite mixture modelling dates back to (Pearson, 1894). With finite mixture modelling, longitudinal data can be used across different life domains to identify typical life-course trajectories followed by different individuals.

### Data

The analysis focuses on the 1986 birth cohort, which is followed from age 16 to age 30. The data consist of a collection of longitudinal register data, released for research through Statistics Sweden’s platform for access to microdata, MONA. This collection encompasses the years 1990-2016, and contains detailed individual-level information on family status,

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<sup>1</sup> LC vs. Sequence (Barban and Billari 2012). LC can show several states at the same time, e.g. studying and being married with a child. “*Note that actually, the indicators of the latent class do not have to be categorical. They can be continuous—usually, people will call the model latent profile analysis in this case. They can even be mixed continuous and categorical. Typically, the continuous indicators are modelled as Gaussian, but they do not have to be modelled thus; Stata’s gsem command and the R package flexmix both can model indicators with any distribution supported by standard GLMs (e.g. Poisson, negative binomial, Gaussian with a log link).*” <https://stats.stackexchange.com/questions/395180/why-covariates-are-used-in-latent-class-analysis-lca>  
/Variables can be used as indicator or predictors/

household composition, country of birth, education, employment, different components of income and different types of social benefit. The data also include information such as the geo-coordinates of dwelling places (250x250m squares in built-up areas and 1000x1000m squares outside built-up areas). Other registers are linked via anonymised personal identification numbers, including a register which allows the identification of parents.

From this data, we constructed three life-course indicators: In education, Employed and Family. The In-education indicator is based on the variable *study participation* (StudDelt) contained in the annual LISA register (Longitudinal Integration Database for Health Insurance and Labour Market Studies). This variable is based on reported registration or participation in 10 different forms of education during the autumn semester, including schools, universities, second-chance education, etc. The ‘in-education’ variable is coded 1 for taking part in any education and 0 for not doing so.

The Employed indicator is based on reported *earned income* (Forvink), where an income above 40% of the median earned has been used as the cut-off value for employment. Finally, the Family indicator is based on the *family type* and *family position* variables (FamTypF and FamStl) in the LISA register. This ‘partner with child’ variable, 1 or 0, is a combination of FamTyp codes, involving at least one child of less than 18 years of age in the household, and FamForm codes, including only adults with children who are married or have partners. The family indicator is coded as 1 if the family type involves a husband and wife with children, or cohabiting partners with children, where the individual is a married or cohabiting partner. This implies that single parents do not fall into the family category, and makes this an indicator of the normative family. The three binary variables registered for 15 years make 45 indicators for the latent class analysis.

The 1990-2016 database includes a total of 147,826 unique individuals born in 1986. Of these, there are full records for 93,355 individuals for the 2002 to 2016 period. Reasons for an absence of full records could involve emigration or death before 2016, or immigration after 2002. In other words, the study population consists of individuals who lived in Sweden without interruption from 2002 to 2016.

*Table 1. Descriptive statistics, indicators 2002-2016 for latent class analysis (a) and mixed linear model variables for the individual and for the parental household in 2001 (b).*

(a)

| Variable                                            | Obs.  | Mean | Std. Dev. | Min   | Max |
|-----------------------------------------------------|-------|------|-----------|-------|-----|
| <b>In education</b>                                 | 93355 |      |           | 11%   | 96% |
| <b>Employed, &gt;40% of median income from work</b> | 93355 |      |           | 6%    | 84% |
| <b>Married/partnered with child/ren</b>             | 93355 |      |           | 0.02% | 37% |

(b)

| Variable                                                    |                 |                 |                        |
|-------------------------------------------------------------|-----------------|-----------------|------------------------|
| <b>Latent class, dependant variable</b>                     | 7               |                 |                        |
| <b>Geographical background</b>                              | Sweden (70,852) | Europe (12,698) | Outside Europe (6,561) |
| <b>Gender</b>                                               | Male (45,543)   | Female (44,568) |                        |
| <b>Single-mother household (2001)</b>                       | Yes (18,755)    | No (71,356)     |                        |
| <b>Social allowance household (2001)</b>                    | Yes (5,447)     | No (84,664)     |                        |
| <b>Employed parents (2001)</b>                              | Two (53,836)    | One (29,181)    | None (7,094)           |
| <b>Parents with tertiary education (2001)</b>               | Two (13,719)    | One (23,477)    | None (52,915)          |
| <b>Disposable income per consumption weight (1000 Euro)</b> | 0 to 2809       |                 |                        |
| <b>Deso</b>                                                 | 5908            |                 |                        |

The multinomial regression analysis, illustrated below, used seven explanatory variables (see Table 1, part (b)). These variables were sex, parents' geographical background, whether their parents were single mothers in 2001, whether either parent had a social allowance and, if not, whether one or both parents were in employment, or if not, whether one or both parents had a tertiary education. One variable was the parents' equalised disposable income as a mean to the nearest 1000 euros. Lastly, the geographical analysis used data for so-called Deso areas, or Demographic statistical areas, from 2018. Desos are created by Statistics Sweden. They are more or less equal in population size and follow the borders of municipalities and regions.

## Results

### Number of clusters

How many different classes are needed in order to describe the trajectories followed by the 1986 cohort from 16 years of age to age 30? We ultimately agreed on seven different classes. In order to arrive at this number, we tested models with two, four, six, seven, eight, 10, 12 and 20 different latent classes. Going from two classes to four classes greatly reduces the

AIC, and an increase from four to six also appreciably reduces the AIC (Figure 1). From six to eight classes the reduction in AIC is smaller, and going from eight to more classes yields even lower changes in the AIC, indicating that there is less to be gained from increasing the number of classes (see Figure 1). As a result, we chose to work with seven classes. With this number of classes, the posterior probabilities are all above 0.9, and we deem the number to be manageable.

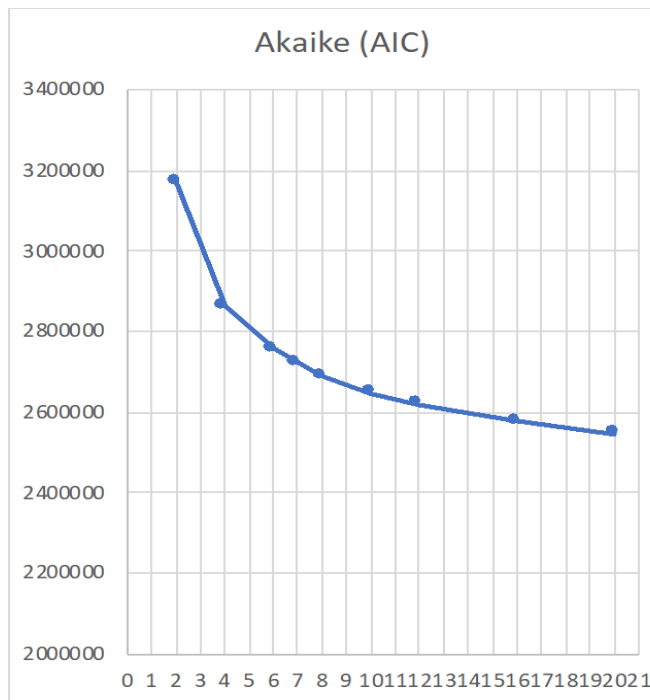


Figure 1. Akaike information criteria for different numbers of latent classes

### Presentation of trajectory classes

The trajectory classes identified are presented in Figure 3 and Table 2. Figure 2 shows the probabilities for the seven classes as graphs or so-called trajectory profiles, whereas Table 2 provides short-hand descriptions of the profiles and reports the size of the different classes.

Based on the estimated latent class model, the probability that observations belong to a certain latent class can be computed. Using this information, observations were assigned to the most likely class. The average posterior probability of belonging to this class gives an indication of how precise the assignment is (see the last column of Table 2). Thus, it can be seen that assignment to class 7 is the least precise, as is assignment to classes 6 and 1. There is a 4.6% probability that observations assigned to class 1 actually belong to class 7. Conversely, there is a 5.3% probability that observations assigned to class 7 belong to class 1. This signals that these two classes are closely related.

*Table 2. Latent classes identified*

| Latent class | Description                                                 | No. of individuals | Proportion of cohort | Average posterior probability (most likely LC) |
|--------------|-------------------------------------------------------------|--------------------|----------------------|------------------------------------------------|
| Class 1      | Post-secondary education after a gap year                   | 17382              | 19.3%                | 91.4%                                          |
| Class 2      | Secondary education, employment, then establishing a family | 9348               | 10.4%                | 93.5%                                          |
| Class 3      | Little activity                                             | 7551               | 8.4%                 | 94.8%                                          |
| Class 4      | Establishing a family early                                 | 6904               | 7.7%                 | 94.2%                                          |
| Class 5      | Employment only                                             | 24564              | 27.3%                | 94.9%                                          |
| Class 6      | Post-sec. education, work, family                           | 10624              | 11.8%                | 91.8%                                          |
| Class 7      | Mix of post-sec. education and work                         | 13738              | 15.2%                | 90.3%                                          |
|              |                                                             | 90111              | 100.0%               |                                                |

Note: Latent class analysis is based on 93,355 observations, but for 3,244 of these, information on covariates is lacking.

The largest latent class is class 5, to which 27% of the cohort were assigned. Figure 3 indicates that this class is characterised by high levels of employment after the end of secondary school, with very little participation in post-secondary education, and very few in this class establish families.

The second largest class is class 1. Close to 20 percent of the cohort were assigned to this class. Class 1 starts post-secondary education relatively soon after the age of 18, and finishes before or around age 25, after which they are in employment. Class 7, the third largest class, also takes part in post-secondary education. Those in class 7 start their post-secondary education somewhat later, and their studies go on for longer. In addition, there is around a 50% probability that they will be employed while they are studying. Together, classes 5, 1 and 7 make up more than 60% of the cohort.

The next largest classes, 6 and 2, both constitute around 10% of the cohort, and both are characterised by establishing a family. Class 6 follows what could be called a normative pattern, with employment and post-secondary education after secondary school, a transition to employment and then starting a family after the age of 25. Those in class 2 make the transition to starting a family somewhat earlier, after 5-6 years of employment, and they do not participate in post-secondary education (see Figure 2).

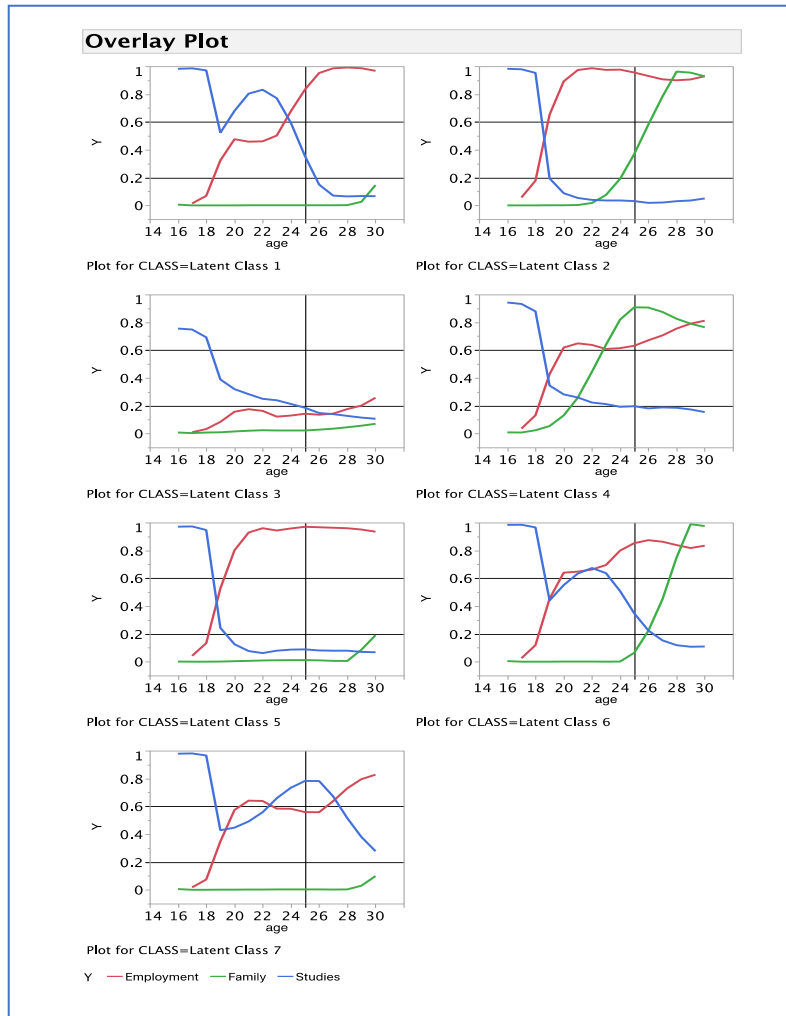


Figure 2. Trajectory profiles for latent classes.

Latent classes 3 and 4 are the smallest, each with around 8% of the cohort. Class 3 follows a trajectory known in labour market-oriented studies as NEET, or no employment, education or training (Lorentzen et al., 2019). In this case, family could be added to this list. Class 4, involving childbearing before 25 years of age, also represents an outlier to some extent in the Swedish context, where having children is postponed until well after 25 years of age for the majority of people. The marginality of class 3 is evidenced by the high proportion of this group receiving a social allowance at 30 years of age (see Table 3). The only other class worth mentioning in terms of social allowance is class 4, the trajectory in which people start a family early, and which is characterised by low levels of education and about 60 percent in employment.

Table 3. Proportion with social allowance at age 30.

|                                            | <i>Trajectory type</i>              |                                        |                 |                        |                 |                               |                                     |          |
|--------------------------------------------|-------------------------------------|----------------------------------------|-----------------|------------------------|-----------------|-------------------------------|-------------------------------------|----------|
|                                            | <b>Class 1</b>                      | <b>Class 2</b>                         | <b>Class 3</b>  | <b>Class 4</b>         | <b>Class 5</b>  | <b>Class 6</b>                | <b>Class 7</b>                      |          |
|                                            | Post-second. educat. after gap year | Secondary edu., employment then family | Little activity | Establish family early | Employment only | Post-sec. educ., work, family | Mixed post-second. educat. and work | Over all |
| Proportion with social allowance at age 30 | 0.4%                                | 0.2%                                   | 18.4%           | 2.4%                   | 0.7%            | 0.2%                          | 1.5%                                | 2.3%     |

Table 4 shows the demographic characteristics of the trajectory classes. The column on the far right shows that women are over-represented in class 4 (early childbearing) and class 6 (establishing a family after post-secondary education), but under-represented in class 2 (establishing a family around age 25) and in class 5 (employment only). A characteristic of these classes is therefore that they are gender-polarised. On the other hand, classes 1 and 7 (post-secondary employment without establishing a family) have near equal representation of men and women, and therefore involve a gender-neutral trajectory.

The first three columns of Table 4 show the proportion of individuals in each trajectory class with a Swedish background, a European background and a non-European background. These proportions can be compared to the overall proportions in the sample to identify patterns of over-representation and under-representation. One observation here is that individuals with a Swedish background are over-represented in three of the gender-polarised trajectory classes: classes 2, 5 and 6 (bold). Class 2 shows the largest proportion of Swedish-born individuals with Swedish parents, at 84.5%. On the other hand, individuals with a Swedish background are under-represented in class 3 (little activity). In contrast, individuals with a non-European background are over-represented in the gender-neutral trajectory classes and under-represented in the gender-polarised classes, with the exception of class 4 (establishing a family early). Individuals with a non-European background are also heavily over-represented in the ‘little activity’ trajectory (class 3), and individuals with a European background are over-represented in class 3.



*Table 4. Demographic characteristics of trajectory classes*

| Latent class | Description                       | Swedish background % | European background % | Non-European background % | Women %      |
|--------------|-----------------------------------|----------------------|-----------------------|---------------------------|--------------|
| Class 1      | Post-sec. education, work         | 76.8%                | 13.9%                 | <b>9.4%</b>               | 51.6%        |
| Class 2      | Work, then starting a family      | <b>84.5%</b>         | 11.9%                 | 3.5%                      | 42.3%        |
| Class 3      | Little activity                   | 67.1%                | <b>20.7%</b>          | <b>12.2%</b>              | 44.1%        |
| Class 4      | Establishing a family early       | 77.4%                | 15.1%                 | 7.5%                      | <b>78.0%</b> |
| Class 5      | Employment only                   | <b>81.5%</b>         | 13.2%                 | 5.4%                      | 33.3%        |
| Class 6      | Post-sec. education, work, family | <b>80.8%</b>         | 13.0%                 | 6.3%                      | <b>70.3%</b> |
| Class 7      | Mixed post-sec. educ. and work    | 77.2%                | 14.2%                 | <b>8.6%</b>               | 52.9%        |
|              | Overall proportion                | 78.6%                | 14.1%                 | 7.3%                      | 49.5%        |

Table 5 provides information about the socio-economic characteristics of the different trajectory classes using family and parental background variables. It shows that parental background strongly influences the trajectory to which individuals are allocated. Thus, individuals who have parents with post-secondary education have a strong tendency to follow trajectory classes 1 and 7. Overall, 41% of the individuals in our sample have at least one parent with post-secondary education, but the proportion is much higher in classes 1 and 7. In contrast, individuals who follow trajectory classes 2 and 4, establishing a family relatively early, are less likely to have parents with tertiary education.

The last three columns of Table 5 show that individuals from households with a single-mother, households without employment and households receiving a social allowance are over-represented in the ‘little activity’ type of trajectory (class 3). They are also over-represented in trajectory type 4, involving individuals who establish a family early. In both cases the over-representation is strongest for households without employment and those receiving a social allowance. Over-representation is more modest for individuals from single-mother households. Individuals from single-mother households are also similar to the overall sample in other respects, for example in relation to class 7 (mixing of post-secondary education and work) and class 5 (employment only).

*Table 5. Socio-economic characteristics of individuals in trajectory classes at age 15.*

| Latent class       | Description                       | Family/parental background at age 15                |                                          |                                               |                                                         |
|--------------------|-----------------------------------|-----------------------------------------------------|------------------------------------------|-----------------------------------------------|---------------------------------------------------------|
|                    |                                   | Proportion from post-secondary education households | Proportion from single-mother households | Proportion from households without employment | Proportion from households receiving a social allowance |
| Class 1            | Post-sec. education, work         | <b>57.7%</b>                                        | 16.1%                                    | 5.9%                                          | 4.2%                                                    |
| Class 2            | Work, then establishing a family  | 22.8%                                               | 19.6%                                    | 6.5%                                          | 5.1%                                                    |
| Class 3            | Little activity                   | 33.8%                                               | <b>31.1%</b>                             | <b>17.2%</b>                                  | <b>13.9%</b>                                            |
| Class 4            | Establishing a family early       | 24.3%                                               | <b>25.1%</b>                             | <b>13.1%</b>                                  | <b>11.3%</b>                                            |
| Class 5            | Employment only                   | 29.7%                                               | 21.9%                                    | 6.9%                                          | 5.3%                                                    |
| Class 6            | Post-sec. education, work, family | <b>47.8%</b>                                        | 17.7%                                    | 6.2%                                          | 5.0%                                                    |
| Class 7            | Mixed post-sec. educ. and work    | <b>61.5%</b>                                        | 20.2%                                    | 6.5%                                          | 4.3%                                                    |
| Overall proportion |                                   | 41.3%                                               | 20.8%                                    | 7.9%                                          | 6.0%                                                    |

Tables 6 and 7 below present data showing how allocation to different trajectory classes is related to educational category at age 19 (age 18 for individuals who have entered post-secondary education at 19). Because of a gendered pattern of participation in different forms of upper-secondary education, the results for women (Table 6) and men (Table 7) are presented separately. The rows in Tables 6 and 7 have been arranged so that education categories linked to post-secondary education trajectories appear in the upper part of the table, and education categories linked to not attending post-secondary education appear in the lower part. At the very bottom of the tables are education categories linked to the ‘little activity’ trajectory class.

The tables show that by age 19 a large proportion of the study cohort has completed upper-secondary school. There is, however, a substantial proportion—22.7% of the men and a 19.7% of women—who have completed the nine years of compulsory education or less (three last rows in Tables 6 and 7). In this group a large proportion are in class 3 (little activity), 24.5% of the men, 21.3% of the women. Recruitment into the “little activity” class is especially large from those with no record of education at age 19. A large proportion of those who have not finished upper-secondary education at age 19, will eventually follow a post-secondary education trajectory, and are therefore in classes 7, 1 and 6 (around 35% of women and 27% of men). Among women in this group, many will start a family early.

Tables 6 and 7 also show that allocation to post-secondary trajectories is strongly linked to specific upper-secondary education categories, especially preparatory studies, but also general programmes and programmes oriented towards engineering and the natural sciences. In contrast, individuals who follow vocational programmes and programmes oriented towards specific sectors and industries are largely channelled into non post-secondary education trajectories (classes 2-5). This implies that they are also largely found in trajectories associated with starting a family early. In terms of men, this is especially true for programmes oriented towards manual occupations, such as the heating-ventilation programme, the motor-vehicles programme, the building programme and the transportation-services programme. These are also programmes with more than 90% men. In terms of women, a similar tendency is found for child-care programmes, nursing programmes, food-processing programmes and all programmes with a high proportion of women.

Instead, if the focus is on men and women who fall into educational categories where their own gender is under-represented, there seems to be a tendency for women to continue with trajectories which are atypical for their educational category, whereas men following programmes where they are in a minority to some extent follow similar trajectories to women in these programmes. For example, 66% of women in vocational mechanical-engineering programmes will follow post-secondary education trajectories (classes 7, 1 and 6) compared to only 24% of men in the same programmes. In contrast, 5.7% of men in child-care programmes (78% females) and 8.6% of men in nursing programmes (89% female) will go into a trajectory where they start a family very early, compared to only 3.3% for men overall. These results show, on the one hand, that gender norms are strong with respect to upper-secondary education but that, on the other hand, it is possible to find forerunners who follow existing norms.

Table 6. Distribution across trajectory classes for different educational categories at age 19 (age 18 for individuals with post-secondary education at age 19): females.

| Educational category                                        | Percentage in trajectory class |                          |                                  |                 |                             |                        |                 | Total number of individuals in educational category, females | Proportion women in educational category |
|-------------------------------------------------------------|--------------------------------|--------------------------|----------------------------------|-----------------|-----------------------------|------------------------|-----------------|--------------------------------------------------------------|------------------------------------------|
|                                                             | Class 7                        | Class 1                  | Class 6                          | Class 5         | Class 2                     | Class 4                | Class 3         |                                                              |                                          |
|                                                             | Mix post sec educ. and work    | Post-sec. education work | Post-sec education, work, family | Employment only | Work, then family formation | Early family formation | Little activity |                                                              |                                          |
| Upper secondary, preparatory, natural science               | 25.8%                          | 37.8%                    | 21.2%                            | 6.4%            | 1.8%                        | 4.3%                   | 2.8%            | 4733                                                         | 45%                                      |
| Upper secondary, vocational, mechanical engineering         | 12.4%                          | 36.0%                    | 17.4%                            | 18.0%           | 6.2%                        | 6.2%                   | 3.7%            | 161                                                          | 13%                                      |
| Upper secondary, other engineering                          | 16.2%                          | 33.8%                    | 19.7%                            | 15.7%           | 6.1%                        | 6.9%                   | 1.6%            | 376                                                          | 12%                                      |
| Upper secondary, preparatory, social science and humanities | 19.8%                          | 28.9%                    | 21.4%                            | 14.2%           | 6.0%                        | 6.6%                   | 3.2%            | 13469                                                        | 63%                                      |
| Upper secondary, unknown orientation                        | 19.4%                          | 21.6%                    | 17.7%                            | 17.3%           | 8.0%                        | 9.2%                   | 6.8%            | 862                                                          | 50%                                      |
| Upper secondary, vocational, electricity and computer       | 16.0%                          | 27.0%                    | 12.9%                            | 20.9%           | 11.7%                       | 9.2%                   | 2.5%            | 163                                                          | 4%                                       |
| Upper secondary, art                                        | 20.7%                          | 18.2%                    | 16.4%                            | 21.4%           | 8.4%                        | 9.1%                   | 5.8%            | 4023                                                         | 75%                                      |
| Upper secondary, media production, general programme        | 16.3%                          | 19.1%                    | 16.4%                            | 24.8%           | 9.4%                        | 10.0%                  | 4.0%            | 1868                                                         | 59%                                      |
| Upper secondary, agriculture and forestry                   | 12.4%                          | 12.9%                    | 14.2%                            | 28.9%           | 14.0%                       | 13.4%                  | 4.2%            | 1328                                                         | 65%                                      |
| Upper secondary, child care and youth services              | 7.1%                           | 12.2%                    | 18.5%                            | 21.8%           | 16.2%                       | 20.0%                  | 4.1%            | 2129                                                         | 78%                                      |
| Upper secondary, other services                             | 9.3%                           | 11.6%                    | 13.7%                            | 30.3%           | 17.0%                       | 15.1%                  | 3.2%            | 571                                                          | 81%                                      |
| Upper secondary, vocational, business and administration    | 7.6%                           | 9.0%                     | 12.7%                            | 31.5%           | 19.8%                       | 15.4%                  | 4.0%            | 1528                                                         | 65%                                      |
| Upper secondary, nursing and social work                    | 6.3%                           | 7.5%                     | 16.5%                            | 25.3%           | 19.8%                       | 22.7%                  | 2.0%            | 1895                                                         | 89%                                      |
| Upper secondary, vocational, food processing                | 4.7%                           | 5.6%                     | 13.6%                            | 36.9%           | 14.5%                       | 19.6%                  | 5.1%            | 214                                                          | 70%                                      |
| Upper secondary, hotel, restaurants and catering            | 7.5%                           | 5.3%                     | 10.2%                            | 34.1%           | 22.8%                       | 17.0%                  | 3.2%            | 2000                                                         | 61%                                      |
| Primary and lower sec, 9 years                              | 14.2%                          | 10.3%                    | 10.7%                            | 18.7%           | 7.3%                        | 21.6%                  | 17.2%           | 7785                                                         | 46%                                      |
| Unknown                                                     | 3.5%                           | 2.7%                     | 4.1%                             | 6.8%            | 1.4%                        | 12.0%                  | 69.5%           | 912                                                          | 50%                                      |
| Primary and lower sec, < 9 years                            | 2.2%                           | 1.1%                     | 3.3%                             | 6.7%            | 3.3%                        | 21.1%                  | 62.2%           | 90                                                           | 43%                                      |
| All educational categories (8 not shown above)              | 16.3%                          | 20.1%                    | 16.7%                            | 18.4%           | 8.9%                        | 12.1%                  | 7.5%            | 44568                                                        | 50%                                      |

Table 7. Distribution across trajectory classes for different educational categories at age 19 (age 18 for individuals with post-secondary education at age 19): males.

| Educational category                                             | Percentage in trajectory class |                          |                                  |                 |                             |                        |                 | Total number of individuals in educational category, males | Proportion men in educational category |
|------------------------------------------------------------------|--------------------------------|--------------------------|----------------------------------|-----------------|-----------------------------|------------------------|-----------------|------------------------------------------------------------|----------------------------------------|
|                                                                  | Class 7                        | Class 1                  | Class 6                          | Class 5         | Class 2                     | Class 4                | Class 3         |                                                            |                                        |
|                                                                  | Mix post sec educ. and work    | Post-sec. education work | Post-sec education, work, family | Employment only | Work, then family formation | Early family formation | Little activity |                                                            |                                        |
| Upper secondary, preparatory, natural science                    | 28.5%                          | 42.0%                    | 11.1%                            | 9.8%            | 1.7%                        | 1.4%                   | 5.5%            | 5694                                                       | 55%                                    |
| Upper secondary, preparatory, social science and humanities      | 21.6%                          | 27.1%                    | 9.8%                             | 27.9%           | 6.5%                        | 1.6%                   | 5.4%            | 7799                                                       | 37%                                    |
| Upper secondary, vocational, natural sciences, mathematics, ICT  | 21.8%                          | 29.6%                    | 8.6%                             | 29.4%           | 3.2%                        | 1.4%                   | 6.0%            | 432                                                        | 82%                                    |
| Upper secondary, art                                             | 23.1%                          | 19.7%                    | 8.1%                             | 30.2%           | 7.8%                        | 2.6%                   | 8.4%            | 1326                                                       | 25%                                    |
| Upper secondary, other engineering                               | 15.9%                          | 29.2%                    | 11.5%                            | 30.5%           | 7.6%                        | 1.4%                   | 3.9%            | 2859                                                       | 88%                                    |
| Upper secondary, diploma, engineering                            | 14.6%                          | 27.0%                    | 9.3%                             | 35.4%           | 9.3%                        | 0.9%                   | 3.4%            | 322                                                        | 82%                                    |
| Upper secondary, unknown orientation                             | 17.2%                          | 17.9%                    | 6.5%                             | 36.5%           | 12.1%                       | 4.0%                   | 5.8%            | 857                                                        | 50%                                    |
| Upper secondary, media production, general programme             | 16.8%                          | 17.9%                    | 7.8%                             | 40.7%           | 7.7%                        | 2.6%                   | 6.6%            | 1274                                                       | 41%                                    |
| Upper secondary, child care and youth services                   | 9.5%                           | 10.6%                    | 7.4%                             | 44.4%           | 18.3%                       | 5.7%                   | 4.1%            | 611                                                        | 22%                                    |
| Upper secondary, vocational, electricity and computer            | 10.7%                          | 15.1%                    | 5.7%                             | 46.3%           | 14.8%                       | 2.5%                   | 4.9%            | 4421                                                       | 96%                                    |
| Upper secondary, nursing and social work                         | 6.0%                           | 9.5%                     | 7.8%                             | 48.7%           | 19.0%                       | 8.6%                   | 0.4%            | 232                                                        | 11%                                    |
| Upper secondary, other services                                  | 14.6%                          | 6.9%                     | 6.9%                             | 50.0%           | 13.1%                       | 2.3%                   | 6.2%            | 130                                                        | 19%                                    |
| Upper secondary, vocational, mechanical engineering              | 6.8%                           | 12.5%                    | 4.7%                             | 50.3%           | 18.7%                       | 3.9%                   | 3.0%            | 1121                                                       | 87%                                    |
| Upper secondary, vocational, business and administration         | 8.0%                           | 10.0%                    | 5.1%                             | 51.9%           | 15.3%                       | 3.7%                   | 5.9%            | 836                                                        | 35%                                    |
| Upper secondary, vocational, heating, ventilation and sanitation | 2.0%                           | 3.5%                     | 2.5%                             | 54.6%           | 30.5%                       | 4.2%                   | 2.7%            | 403                                                        | 100%                                   |
| Upper secondary, vocational, food processing                     | 2.2%                           | 7.6%                     | 4.3%                             | 55.4%           | 19.6%                       | 4.3%                   | 6.5%            | 92                                                         | 30%                                    |
| Upper secondary, agriculture and forestry                        | 4.2%                           | 5.4%                     | 4.2%                             | 56.7%           | 23.6%                       | 3.6%                   | 2.2%            | 716                                                        | 35%                                    |
| Upper secondary, hotel, restaurants and catering                 | 6.3%                           | 4.8%                     | 3.3%                             | 57.5%           | 19.9%                       | 3.9%                   | 4.3%            | 1271                                                       | 39%                                    |
| Upper secondary, vocational, motor vehicles, ships and aircraft  | 1.6%                           | 3.2%                     | 2.2%                             | 58.0%           | 26.9%                       | 5.1%                   | 3.0%            | 1601                                                       | 96%                                    |
| Upper secondary, vocational, building                            | 2.8%                           | 1.5%                     | 2.0%                             | 58.1%           | 28.4%                       | 4.4%                   | 2.7%            | 2318                                                       | 97%                                    |
| Upper secondary, transport services                              | 0.7%                           | 1.0%                     | 1.1%                             | 58.9%           | 30.7%                       | 5.7%                   | 1.9%            | 827                                                        | 94%                                    |
| Primary and lower sec, 9 years                                   | 10.6%                          | 10.7%                    | 5.4%                             | 37.0%           | 11.8%                       | 5.8%                   | 18.7%           | 9028                                                       | 54%                                    |
| Unknown                                                          | 1.5%                           | 3.1%                     | 1.5%                             | 19.3%           | 4.9%                        | 3.9%                   | 65.7%           | 1180                                                       | 56%                                    |
| Primary and lower sec, < 9 years                                 | 1.7%                           | 0.0%                     | 3.4%                             | 17.8%           | 5.9%                        | 8.5%                   | 62.7%           | 118                                                        | 57%                                    |
| All educational categories (2 not shown above)                   | 14.2%                          | 18.5%                    | 6.9%                             | 36.0%           | 11.8%                       | 3.3%                   | 9.3%            | 45542                                                      | 50%                                    |

## Multinomial multi-level models

These descriptions involve geographical patterns, but the process of allocation to classes and the influence of the place where individuals grow up are not the only sources which explain life-course trajectories for the cohort. The bivariate tables above indicate that there could be

associations between Table 8 tests these associations all together, with the trajectory classes as dependent variables. The geography of Swedish DeSo areas is also included as a level of analysis.

Class 5, the largest class employment only, is largely dominated by employment, and is associated with male individuals and individuals who do not have parents with tertiary education. Instead, this class is positively associated with Swedish-born parents and employed parents. For class 1 there is a positive association with tertiary-educated parents and parents with employment. A negative association in class 1 involves individuals with Swedish-born parents compared to parents born in a non-European country.

Class 7, where tertiary education dominates, is associated with being female and with individuals with tertiary-educated parents. Also, living in a single-mother family at age 15 has a positive association with trajectory class 7. In class 6, involving the order of events in primary studies, being female is strongly associated with moving into employment, and then marrying or cohabiting, and having children after the age of 25. Significant variables and positive associations in class 6 also involve one or both parents being employed in the family when the individual is 15 years of age. Class 2 describes a trajectory of graduation from compulsory schooling at age 18, which then transcends into employment and later, around age 27, into marriage or a partner and having children. This class is negatively associated with tertiary education in parents, and positively associated with Swedish-born parents. For class 2, a Swedish and European background is more common. Class 3 is the most ‘inactive’ class, and is associated with unemployed parents and parents receiving a social allowance. It is associated positively with being male, and a greater proportion had unemployed parents. Here, parental geographical background is largely European and non-European, and involves less of a Swedish background. Finally, class 4, the trajectory involving early parenthood, is associated with being female, and with low education and occupation in parents of the cohort. Also, parents of individuals following this trajectory were more likely to be receiving a social allowance when the individuals were 15 years old.

Table 8 Estimates from multi-level models with latent classes as dependent variables.

| Estimates of Fixed Effects                              | LC 1                 |       | LC 2                 |       | LC 3                 |       | LC 4                 |       | LC 5                 |       | LC 6                 |       | LC 7                 |       |
|---------------------------------------------------------|----------------------|-------|----------------------|-------|----------------------|-------|----------------------|-------|----------------------|-------|----------------------|-------|----------------------|-------|
| Parameter                                               |                      | t     |                      | t     |                      | t     |                      | t     |                      | t     |                      | t     |                      | t     |
| Intercept                                               | <b>0.206</b>         | 31.4  | <b>0.063</b>         | 12.4  | <b>0.153</b>         | 33.2  | <b>0.152</b>         | 34.6  | <b>0.140</b>         | 19.3  | <b>0.132</b>         | 24.8  | <b>0.154</b>         | 25.8  |
| Man                                                     | <b>-0.019</b>        | -7.2  | <b>0.030</b>         | 14.9  | <b>0.019</b>         | 10.2  | <b>-0.087</b>        | -50.3 | <b>0.177</b>         | 62.0  | <b>-0.098</b>        | -46.4 | <b>-0.022</b>        | -9.2  |
| Female                                                  | <b>0<sup>a</sup></b> |       | <b>0<sup>a</sup></b> |       | <b>0<sup>a</sup></b> |       | <b>0<sup>a</sup></b> |       | <b>0<sup>a</sup></b> |       | <b>0<sup>a</sup></b> |       | <b>0<sup>a</sup></b> |       |
| Swedish background                                      | <b>-0.090</b>        | -16.9 | <b>0.063</b>         | 15.3  | <b>-0.032</b>        | -8.5  | <b>0.020</b>         | 5.5   | <b>0.080</b>         | 13.7  | <b>0.007</b>         | 1.7   | <b>-0.048</b>        | -10.0 |
| European background                                     | <b>-0.075</b>        | -12.5 | <b>0.040</b>         | 8.6   | <b>0.005</b>         | 1.1   | <b>0.017</b>         | 4.1   | <b>0.054</b>         | 8.1   | <b>-0.001</b>        | -0.2  | <b>-0.039</b>        | -7.1  |
| Non-European background                                 | <b>0<sup>a</sup></b> |       | <b>0<sup>a</sup></b> |       | <b>0<sup>a</sup></b> |       | <b>0<sup>a</sup></b> |       | <b>0<sup>a</sup></b> |       | <b>0<sup>a</sup></b> |       | <b>0<sup>a</sup></b> |       |
| Single mother parent 2001                               | <b>-0.007</b>        | -1.7  | <b>-0.019</b>        | -6.2  | <b>0.007</b>         | 2.7   | <b>-0.016</b>        | -5.9  | <b>0.012</b>         | 2.7   | <b>-0.005</b>        | -1.7  | <b>0.026</b>         | 7.4   |
| Social allowance parents 2001                           | <b>-0.031</b>        | -5.3  | <b>-0.010</b>        | -2.2  | <b>0.062</b>         | 14.7  | <b>0.047</b>         | 11.8  | <b>-0.033</b>        | -5.0  | <b>0.001</b>         | 0.1   | <b>-0.034</b>        | -6.4  |
| Employed parents 2001                                   | <b>0.016</b>         | 5.8   | <b>0.007</b>         | 3.3   | <b>-0.039</b>        | -20.1 | <b>-0.019</b>        | -10.5 | <b>0.022</b>         | 7.2   | <b>0.015</b>         | 6.8   | <b>-0.002</b>        | -0.6  |
| Tertiary edu. parents 2001                              | <b>0.089</b>         | 48.8  | <b>-0.059</b>        | -41.8 | <b>-0.006</b>        | -4.8  | <b>-0.031</b>        | -25.0 | <b>-0.102</b>        | -50.7 | <b>0.016</b>         | 10.5  | <b>0.093</b>         | 55.8  |
| Income, mean disposable per consumption unit (1000Euro) | <b>0.001</b>         | 7.5   | <b>0.000</b>         | -3.1  | <b>0.000</b>         | 3.6   | <b>0.000</b>         | -3.9  | <b>0.000</b>         | -3.3  | <b>0.000</b>         | -1.7  | <b>0.000</b>         | -0.1  |

Taken together, the background variables used in these models account for around 50% of the spatial variation in trajectory composition across small-scale neighbourhoods. This should be borne in mind in the following analysis of geographical patterns. It implies that these spatial patterns reflect underlying socio-economic structures to a considerable extent.

## Geographical patterns

The spatial allocation to these trajectory classes across municipality types, across counties (NUTS-3 regions) and across individualised neighbourhoods is analysed below based on where a subject lived at age 15. There will also be a short discussion on how individuals are allocated during early adulthood, based on the trajectory they follow.

## Types of municipality

Table 10 below shows geographical patterns in the distribution across trajectory classes. The table uses the SALAR municipality-type classification (Swedish Association of Local Authorities and Regions, 2016). To facilitate interpretation of the table, the columns have been arranged so that trajectory types which are over-represented in the more metropolitan municipalities appear on the left, and trajectory types which are over-represented in the more peripheral municipalities appear on the right. For some of the trajectories, centre-periphery patterns are quite evident. For example, classes 1 and 7, with high rates of educational participation, involve higher proportions in Sweden's metropolitan areas and larger cities, but lower proportions in more peripheral municipalities. A converse pattern is found for latent class 4, early childbearing, where the highest proportion is in sparsely populated

municipalities and the lowest proportions are in the metropolitan areas. This is also the case for latent class 2, childbearing in the mid-20s, with much higher proportions in more peripheral municipalities and lower proportions in the metropolitan regions and larger cities. In latent class 5, high employment, proportions are more similar across different geographical regions, but there are higher values in suburban municipalities compared to large urban-centre municipalities, to some extent reflecting a gradient in educational participation. Latent class 6, which involves individuals who start a family in their late 20s, has an even more uniform representation across the different types of municipality. This is also true of latent class 3, 'little activity', with the exception of metropolitan municipalities where the proportion of individuals following trajectories involving little activity is much higher.

At the bottom of Table 10, two auxiliary rows have been inserted: the proportion of women and the proportion of Swedish-born individuals in each trajectory class. Here, it can be observed that gender-marked trajectory classes tend to be over-represented in more peripheral areas. On the other hand, more metropolitan municipalities are characterised by trajectory classes directed towards post-secondary education, classes 7 and 1, and the 'little activity' class 3, a trajectory with underprivileged individuals. There is also a tendency for metropolitan areas to involve latent classes where individuals with a Swedish background are under-represented, whereas trajectories with high proportions of individuals with a Swedish background tend to be found in more peripheral municipalities. Class 4 is, however, an exception to this pattern.

Taken together, this suggests that Sweden is characterised by gendered patterns of polarisation, linked to different geographical and ethnic contexts. On the one hand, this involves gender differentiation, which is more clearly seen in the population with a Swedish background and in more peripheral areas (Waara, 1996, p. 220). On the other hand, it involves a relatively gender-neutral pattern in metropolitan areas, larger cities and suburbs of metro areas, characterised by higher proportions of individuals with a migrant background.

Table 9. Distribution of sample individuals across trajectory classes, by type of municipality.

| Municipality type                         | Class 7      | Class 1      | Class 3      | Class 5             | Class 6             | Class 2             | Class 4      |
|-------------------------------------------|--------------|--------------|--------------|---------------------|---------------------|---------------------|--------------|
| Metropolitan cities                       | <b>20.2%</b> | <b>22.7%</b> | <b>11.6%</b> | 24.0%               | 10.1%               | 6.0%                | 5.4%         |
| Suburbs of metropolitan cities            | 16.6%        | <b>21.5%</b> | 7.8%         | 28.4%               | 11.1%               | 9.0%                | 5.7%         |
| Major cities                              | <b>16.7%</b> | 20.3%        | 8.3%         | 25.3%               | 12.5%               | 9.5%                | 7.4%         |
| Suburbs of major cities                   | 13.3%        | 16.5%        | 7.6%         | <b>29.9%</b>        | 11.4%               | <b>12.4%</b>        | 9.0%         |
| Commuting                                 | 12.5%        | 17.0%        | 7.8%         | <b>29.3%</b>        | 11.8%               | <b>12.6%</b>        | 9.0%         |
| Tourism                                   | 13.4%        | 15.2%        | 7.8%         | <b>31.7%</b>        | 10.3%               | <b>13.4%</b>        | 8.3%         |
| Manufacturing                             | 10.7%        | 16.7%        | 7.1%         | <b>29.3%</b>        | 13.0%               | <b>13.4%</b>        | <b>10.0%</b> |
| Low density                               | 11.0%        | 15.4%        | 8.5%         | <b>29.4%</b>        | 11.9%               | <b>13.6%</b>        | <b>10.3%</b> |
| In dense regions                          | 12.8%        | 17.6%        | 8.1%         | 27.9%               | 12.1%               | <b>12.8%</b>        | 8.7%         |
| In low-density regions                    | 13.3%        | 16.6%        | 7.8%         | 28.2%               | 12.8%               | <b>11.5%</b>        | <b>9.8%</b>  |
| <i>Overall</i>                            | <i>15.2%</i> | <i>19.3%</i> | <i>8.4%</i>  | <i>27.3%</i>        | <i>11.8%</i>        | <i>10.4%</i>        | <i>7.7%</i>  |
| <i>Proportion of women in class</i>       | <i>53.0%</i> | <i>52.0%</i> | <i>44.0%</i> | <i>33.0%</i>        | <i>70.0%</i>        | <i>42.0%</i>        | <i>78.0%</i> |
| <i>Proportion with Swedish background</i> | <i>77.2%</i> | <i>76.8%</i> | <i>67.1%</i> | <b><i>81.5%</i></b> | <b><i>80.8%</i></b> | <b><i>84.5%</i></b> | <i>77.4%</i> |

### NUTS3 regions

The geographical distribution of trajectory classes across NUTS3 regions or so-called counties, is presented in Table 11. The column on the far right contains the share of the sample population living in the county in 2001. The counties have been arranged so that those with an over-representation of individuals in trajectories involving starting a family early appear at the lower end of the table, and counties with an over-representation of post-secondary education trajectories appear at the upper end of the table.

The table shows that counties can be broadly divided into five groups. First, at the lowest end of the table, are seven counties with a clear over-representation of individuals who start a family very early. These are counties with some areas which are quite a long way from major urban areas. Second, there are five counties with an over-representation of trajectory class 2, involving starting a family around age 25. This is possibly a result of slightly stronger urban influences on rural areas. The third group consists of four counties with over-representation of trajectory class 6, involving starting a family after post-secondary education. These are counties with major universities or, in the case of Halland, major adjacent universities. In two to three counties belonging to the fourth group, in the uppermost part of the table, there is under-representation of trajectories involving establishing a family. In Stockholm and



Uppsala, and possibly Jämtland (note Jämtland with non-traditional gender contract according to Forsberg (1998)), this can be linked to the over-representation of post-secondary education trajectories (classes 7 and 1). In Skåne, along with Värmland, trajectory class 3, ‘little activity’ is over-represented. One reason for this could be a combination of a weak local labour market and opportunities for working in neighbouring Denmark or Norway.

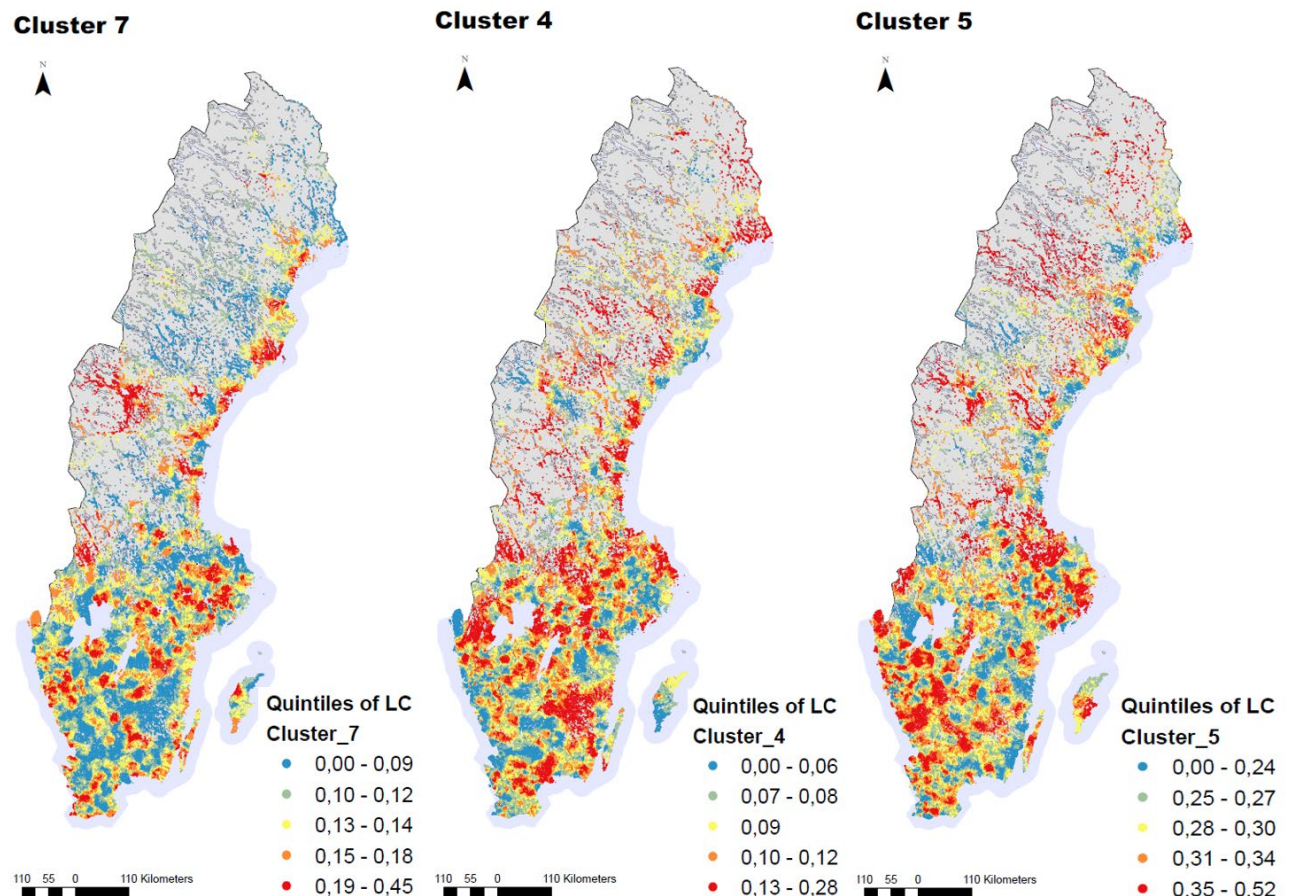
*Table 10. Proportion of different latent classes in counties. Red shading indicates over-representation; blue shading shows under-representation.*

|                         | Proportion of latent class in county |         |         |         |         |         |         | Overall |
|-------------------------|--------------------------------------|---------|---------|---------|---------|---------|---------|---------|
|                         | Class 7                              | Class 1 | Class 3 | Class 5 | Class 6 | Class 2 | Class 4 |         |
| 01 Stockholms län       | 22.1%                                | 21.8%   | 19.0%   | 18.7%   | 15.7%   | 14.2%   | 13.3%   | 18.6%   |
| 03 Uppsala län          | 4.3%                                 | 3.8%    | 3.2%    | 3.7%    | 3.4%    | 3.4%    | 3.6%    | 3.7%    |
| 23 Jämtlands län        | 1.9%                                 | 1.1%    | 1.6%    | 1.7%    | 1.5%    | 1.6%    | 1.6%    | 1.6%    |
| 12 Skåne län            | 12.1%                                | 12.9%   | 16.5%   | 11.9%   | 13.0%   | 11.9%   | 12.9%   | 12.7%   |
| 17 Värmlands län        | 2.8%                                 | 2.5%    | 3.8%    | 2.9%    | 3.1%    | 3.4%    | 3.4%    | 3.0%    |
| 13 Hallands län         | 2.9%                                 | 3.3%    | 2.8%    | 3.6%    | 3.6%    | 3.4%    | 2.6%    | 3.3%    |
| 14 Västra Götalands län | 17.1%                                | 16.2%   | 16.2%   | 17.2%   | 17.5%   | 17.2%   | 16.2%   | 16.9%   |
| 24 Västerbottens län    | 3.3%                                 | 2.8%    | 2.8%    | 3.1%    | 3.3%    | 3.0%    | 3.2%    | 3.0%    |
| 05 Östergötlands län    | 4.5%                                 | 5.1%    | 5.2%    | 4.3%    | 5.3%    | 5.1%    | 5.2%    | 4.8%    |
| 08 Kalmar län           | 2.3%                                 | 2.6%    | 2.4%    | 2.6%    | 3.4%    | 3.5%    | 3.3%    | 2.8%    |
| 07 Kronobergs län       | 1.9%                                 | 2.1%    | 1.4%    | 2.3%    | 2.3%    | 2.5%    | 2.1%    | 2.1%    |
| 09 Gotlands län         | 0.7%                                 | 0.5%    | 0.7%    | 0.7%    | 0.7%    | 0.9%    | 0.6%    | 0.7%    |
| 06 Jönköpings län       | 3.4%                                 | 3.9%    | 2.4%    | 4.4%    | 4.9%    | 5.6%    | 4.9%    | 4.2%    |
| 04 Södermanlands län    | 3.0%                                 | 2.9%    | 2.8%    | 3.0%    | 2.8%    | 3.5%    | 3.4%    | 3.0%    |
| 18 Örebro län           | 3.0%                                 | 3.0%    | 3.2%    | 3.1%    | 3.0%    | 3.4%    | 3.6%    | 3.1%    |
| 19 Västmanlands län     | 2.6%                                 | 2.7%    | 2.9%    | 2.5%    | 2.7%    | 3.1%    | 3.6%    | 2.7%    |
| 20 Dalarnas län         | 2.8%                                 | 3.2%    | 3.3%    | 3.7%    | 3.2%    | 3.6%    | 3.9%    | 3.4%    |
| 21 Gävleborgs län       | 2.7%                                 | 2.6%    | 3.0%    | 3.1%    | 3.1%    | 3.2%    | 3.8%    | 3.0%    |
| 10 Blekinge län         | 1.6%                                 | 1.8%    | 1.5%    | 1.6%    | 1.8%    | 1.8%    | 2.2%    | 1.7%    |
| 22 Västernorrlands län  | 2.6%                                 | 2.6%    | 2.8%    | 2.7%    | 2.7%    | 2.7%    | 3.2%    | 2.7%    |
| 25 Norrbottens län      | 2.5%                                 | 2.7%    | 2.5%    | 3.1%    | 3.1%    | 3.0%    | 3.6%    | 2.9%    |

## Individualised k=100 neighbourhoods

Spatial sorting of trajectories is shown in Figure 3 for the cohort born in 1986. It illustrates the proportion of long post-secondary education trajectory class 7, early childbearing trajectory class 4, and trajectory class 5 (employment) among the 100 nearest members of the age cohort in relation to where they lived at age 15. At age 15, individuals following long post-secondary education trajectories were already heavily concentrated in metropolitan areas and in college towns. On the other hand, at the same age, individuals following early childbearing trajectories (class 4) were concentrated in peripheral, rural areas. The same is the case with class 5 (employment). Note that the gender balance of these two classes is different. Class 4 (early childbearing) is dominated by women, and class 5 (employment) by men. With this in mind, the maps therefore illustrate a gender-based polarisation between trajectories in the countryside. At the same time, there are differences in the geographical

pattern of classes 4 and 5, in that class 5 (employment) is better represented in peri-metropolitan areas, in other words non-metropolitan areas relatively close to the major metropolitan centres, such as Stockholm, Göteborg and Malmö. High concentrations of class 4 (establishing a family early), are found instead in locations which are relatively distant from the metropolitan centres. A possible interpretation of this is that metropolitan influences can deter individuals from starting a family early.



*Figure 3. Proportion in quintiles of trajectory class 7 (post-secondary), trajectory class 4 (establishing a family early), and trajectory class 5 (employment) among the 100 nearest cohort peers at age 15.*

### How much sorting?

The above analysis shows patterns in how the trajectory classes are linked to specific geographical contexts. This makes it possible to consider the forces which influence the spatial sorting of the trajectories. However, it is also interesting to consider the strength of the sorting. Is it the case that individuals who follow different trajectories grow up in different

places, or are life-course trajectories mixed in a local area? The answer, illustrated in Table 12, is that there are substantial differences but there is no complete segregation. Some trajectory classes are relatively well represented in most neighbourhoods, such as classes 1, 5 and 6. Here, the contrast between the 25<sup>th</sup> percentile and the 75<sup>th</sup> percentile is relatively small. The differences are greater for classes 2, 3, 4 and 7. One way to summarise this is to say that the different trajectories are represented to some extent in most spatial contexts, but in some cases a certain trajectory is in a relative minority, and in other contexts the same trajectory is more dominant.

*Table 11 Proportion of different trajectory classes among the 100 nearest cohort peers, at age 15 at different percentile values.*

| Latent class | Description                       | 10 <sup>th</sup> percentile | 25 <sup>th</sup> percentile | 75 <sup>th</sup> percentile | 90 <sup>th</sup> percentile |
|--------------|-----------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| Class 1      | Post-sec. education, work         | 13%                         | 15%                         | 23%                         | 27%                         |
| Class 2      | Work, then starting a family      | 5%                          | 7%                          | 13%                         | 16%                         |
| Class 3      | Little activity                   | 4%                          | 6%                          | 11%                         | 14%                         |
| Class 4      | Establishing a family early       | 3%                          | 5%                          | 10%                         | 13%                         |
| Class 5      | Employment only                   | 19%                         | 23%                         | 31%                         | 35%                         |
| Class 6      | Post-sec. education, work, family | 8%                          | 9%                          | 14%                         | 17%                         |
| Class 7      | Mixed post-sec. educ. and work    | 8%                          | 11%                         | 19%                         | 24%                         |

Table 13 illustrates spatial sorting of trajectories at age 30, and indicates a strong pattern of increased sorting for most of the trajectories. For classes 1, 2, 4 and 7, the 10<sup>th</sup> and 25<sup>th</sup> percentile values have declined substantially from the context at age 15 to the context at age 30. This implies that these trajectories are poorly represented in a substantial proportion of the k=100 neighbourhoods. The trajectories involving establishing a family early are particularly poorly represented in 10-25% of the neighbourhoods, but post-secondary education trajectories are poorly represented in the lower part of the distribution. Instead, many individuals who follow trajectory class 1 and trajectory class 7 are found in a spatial context where there are large concentrations of individuals following the same trajectories.

*Table 12 Proportion of different trajectory classes among the 100 nearest cohort peers, at age 30. Percentile values*

| Latent class | Description                       | 10 <sup>th</sup> percentile | 25 <sup>th</sup> percentile | 75 <sup>th</sup> percentile | 90 <sup>th</sup> percentile |
|--------------|-----------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| Class 1      | Post-sec. education, work         | 8%                          | 11%                         | 28%                         | 36%                         |
| Class 2      | Work, then starting a family      | 1%                          | 3%                          | 15%                         | 20%                         |
| Class 3      | Little activity                   | 3%                          | 5%                          | 12%                         | 15%                         |
| Class 4      | Establishing a family early       | 1%                          | 2%                          | 11%                         | 15%                         |
| Class 5      | Employment only                   | 18%                         | 23%                         | 33%                         | 37%                         |
| Class 6      | Post-sec. education, work, family | 4%                          | 7%                          | 15%                         | 19%                         |
| Class 7      | Mixed post-sec. educ. and work    | 5%                          | 8%                          | 23%                         | 30%                         |

## Concluding discussion

According to Simonsen (2016), “places are meeting points, moments or conjunctures, where social practices and trajectories, spatial narratives and moving or fixed materialities meet up and form configurations that are continuously under transformation and negotiation” (2016, p. 22). Similarly, according to Paasi and Metzger, regions are “envisaged as complicated constellations of materiality, agency, social relations and power; as institutional structures and processes that are continuously ‘becoming’ instead of just ‘being’”. They are based on a complex interplay between non-discursive and discursive practices and patterns” (2017). These statements can be seen as developments of Allan Pred’s conception of places and regions as contingent processes (1984).

This paper has explored the extent to which life-course trajectories identified in register data can be used as a means of capturing the role played by biography formation in the processes that give rise to regions and places. The analysis has shown that the trajectories identified using latent class analysis correspond well to life courses found in interview-based studies on the transition to early adulthood. Moreover, we have found that life-course trajectories are closely linked to local contexts in a way that current theories of geographical differentiation would lead us to expect.

This can be seen as a partial confirmation of Allan Pred’s idea that biography formation is a key process in the production of spatial configurations. Perhaps surprisingly, given the sometimes antagonistic relations between quantitative and qualitative research in human geography, the conclusion is that there seem to be openings for a beneficial exchange of ideas between theoretically oriented human geographers and geographers exploring the possibilities offered by the increasing availability of geo-coded longitudinal data.

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