1220 2025

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ISSN: 1864-6689 (online)

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The interplay of poverty and employment trajectories in couples around the transition to parenthood in Germany

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Abstract

The transition to parenthood is a critical period that exacerbates gendered economic inequality, with mothers more likely than their partners to experience employment disruptions and income losses. This study examines individual poverty risk among partnered indivduals (N=1,237) in Germany from a life course perspective, analyzing how gendered career patterns around first births between 1992 and 2013 intersect with changes in individual poverty risk, i.e. under the assumption of no income pooling. Applying multichannel sequence analysis (MCSA) to data from the Socio-Economic Panel, the findings reveal substantial heterogeneity in how poverty–employment trajectories unfold after childbirth, both between genders and among women.

Men's employment and financial stability remain largely unchanged after parenthood, whereas women's economic trajectories vary widely. While most women are financially stable before childbirth, their post-birth pathways diverge. Some return to work quickly with minimal poverty risk, while others take extended parental leave and face prolonged risks. A smaller group is persistently vulnerable even before childbirth, with consistently weak labor market attachment. Over time, the share of women in financially stable trajectories has increased, likely reflecting policy changes that support earlier labor market reintegration. However, a subset of women remains at high risk, particularly those with lower pre-birth earnings. The findings highlight the necessity of long observation periods, as poverty risks evolve beyond the initial years of parenthood, and demonstrate the utility of MCSA in describing these dynamics.

Keywords: poverty, employment, childbirth, motherhood, life course, sequence analysis

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1 Introduction

While men's and women's careers tend to follow similar paths before parenthood, the first birth leads to a sharp divergence as the gendered division of paid and unpaid work takes shape. (Evertsson & Boye, 2016; Kühhirt, 2012). Across Western countries, women experience significant declines in labor supply, occupational status, and earnings (Cukrowska-Torzewska & Matysiak, 2020; Ishizuka & Musick, 2021; Kleven et al., 2019), with a greater impact than at subsequent births (Abendroth et al., 2014; Adda et al., 2017; Hsu, 2021). In contrast, men's employment (Bünning & Pollmann-Schult, 2016; Zwier et al., 2024) and income (Kleven et al., 2019; Mari, 2019) remain largely stable. As a result, mothers typically face significant income losses, whereas fathers maintain financial stability, reinforcing traditional breadwinner roles (Machado & Jaspers, 2023; Musick et al., 2020; Steiber et al., 2024). This paper explores how these gendered career patterns go along with divergent poverty trajectories for partnered men and women around the transition to parenthood.

Poverty risk is a relative income measure that reflects whether an individual's income is significantly below the national average. It is typically assessed using equivalised household income, assuming that all members of a household, especially co-residential partners, share economic resources and risks equally (Western et al., 2012). While this assumption poses few challenges for single-adult households, it obscures individual vulnerabilities that arise within co-residential couples (Siegert, 2024). Specifically, the economic risks associated with mothers' employment patterns—such as career interruptions or shifts to part-time work—are often masked by assuming household income pooling, because the primary earner (typically the man) plays a disproportionate role in securing the household's financial stability (Bane & Ellwood, 1986; DiPrete & McManus, 2000). Consequently, women's weaker labor market attachment does not directly translate into increased household poverty risk but contributes to long-term earnings gaps and limits women's career growth, creating long-term financial

dependency on their partner (DiPrete & McManus, 2000; Halleröd et al., 2015) and lowering economic well-being later in life (Madero-Cabib & Fasang, 2016; Möhring & Weiland, 2022; Muller et al., 2020; Shapiro & Mott, 1994).

Recent research has increasingly adopted an individual approach to defining (in-work) poverty risk in order to better reflect the extent of gendered economic vulnerability in the population (Meulders & O'Dorchai, 2011; Filandri & Struffolino, 2019; Peña-Casas & Ghailani, 2011; Schwarz, 2023). In couple households, this approach assesses whether each partner's income alone is sufficient for economic security, highlighting that economic risks may not be equally shared even when couples fully pool their resources. However, studies on individual poverty risk in couples during parenthood remain limited. They either rely on cross-sectional data capturing a single point in time (Siegert, 2024) or focus on average trends around the first birth (Siegert, 2025), failing to account for the heterogeneity of individual poverty trajectories and their link to gendered work patterns.

This paper addresses this research gap from a life course perspective (Levy & Bühlmann, 2016) by characterizing combined individual poverty risk and employment trajectories among partnered men and women during eight years around the transition to parenthood. Using data from the German Socio-Economic Panel (SOEP v38.1, Goebel et al., 2023), the analysis tracks 650 women and 587 men who had their first child between 1992 and 2013. In Germany, the assumption of full income pooling reflects the normative ideal of a modified male breadwinner model, where the father works full-time and the mother part-time to supplement household income–an arrangement reinforced by joint taxation for couples with unequal earnings (Althaber et al. 2023). The case study illustrates that, especially in contexts that normatively and politically support the idea of couples as one single economic unit, it is essential to examine individual economic vulnerability without access to the partner's income. While high poverty rates among mothers after separation already point to these hidden risks (Spini et al., 2017),

economic vulnerability typically begins much earlier. This study focuses on the transition to parenthood—a critical phase that reinforces income inequality within different-sex couples—to examine how economic risks emerge within stable relationships. Identifying these early patterns sheds light on how economic vulnerability develops over the life course.

The analysis begins with a descriptive overview of men's and women's individual poverty risk (defined by personal resources, excluding partner income) and employment trajectories (distinguishing between full-time and part-time work, parental leave, and inactivity) from two years before to six years after childbirth. The main analysis focuses on women's trajectories, given the greater volatility in their income and career paths during this life stage. It first applies multichannel sequence and cluster analysis (Gauthier et al., 2010) to identify and characterize distinct patterns in women's poverty-employment trajectories. Given Germany's significant social changes after reunification, namely the changes in family policies since the 1990s (Zoch & Heyne, 2023), the second part of the analysis examines cluster characteristics and how typical patterns vary across birth cohorts (defined by the year of first birth) using multinomial logit models.

In doing so, this study enhances the understanding of how economic vulnerability evolves over the life course and how typical trajectories changed over time. It explores whether individual poverty risk during the transition to parenthood is temporary or persistent and examines the sequencing and timing of employment transitions as critical factors. These insights are relevant for policymakers and scholars seeking to promote sustainable employment pathways and economic well-being independent of partner presence, particularly in households with children.

2 Background

2.1 Poverty risk around childbirth

Childbirth increases income needs due to higher consumption costs (=direct child costs), while often reducing disposable income when at least one parent (usually the mother) exits the labor market or reduces working hours to care for the newborn (=indirect child costs). If public transfers do not compensate for these losses, the risk of poverty may increase. Yet, the impact of (in)direct child costs on poverty risk depends on how they are included in poverty risk assessments (see Siegert, 2024 for a review).

Direct child costs are typically accounted for using equivalence scales that adjust household disposable income (for household poverty risk) or the national poverty threshold (for individual poverty risk). This study applies the widely-used OECD-modified equivalence scale, which assigns a weight of 1.0 to the first adult, 0.5 to each additional adult, and 0.3 to children under 14 (Mack et al., 2020). This means that during early childhood, the scale remains fixed, representing baseline costs, even though families may invest in their children differently over time. In contrast, indirect child costs are reflected in a household's or individual's disposable income, which can rise or fall depending on changes in employment and public transfers.

Existing research on poverty risk around childbirth has largely focused on the household level, assuming shared economic resources and risks, including the (in)direct costs of children. While studies show that childbirth increases household poverty risk across European countries, especially for single parents and couples with weak labor market attachment (Barbieri & Bozzon, 2016; Mussida & Sciulli, 2023; Vandecasteele, 2011), many couples mitigate mothers' income losses through income pooling (Alm et al., 2020; Harkness, 2022; Zagel & Van Lancker, 2022). However, most of these studies examine only the first two years postpartum, overlooking longer-term poverty dynamics. This is a critical gap, given evidence that parents' labor market attachment evolves over time (Killewald & Zhuo, 2019; Langner, 2015).

Struffolino and Van Winkle (2023) addressed this by analyzing in-work poverty risk up to six years after the transition to parenthood in Germany and the US. They found that childbirth led to an immediate rise in in-work poverty—by up to ten percentage points in the US and five in Germany—without medium-term recovery. While their study considers a longer time frame, by focusing on the working poor, i.e. working individuals living in a household below the poverty line, it excludes those who left the labor market, a key factor in in-work poverty transitions (Hick & Lanau, 2018), and a common response to childbirth among women. This leaves an open question about how employment trajectories shape gendered poverty risks beyond the early postpartum period, highlighting the need for a life course approach to better understand these dynamics.

2.2 A life course perspective on individual poverty dynamics

Instead of treating the household as a single economic unit, the concept of individual poverty risk within couples measures a person's financial vulnerability without relying on their partner's income. While income pooling with the partner can help prevent immediate financial hardship (Harkness, 2022), this protection may be lost if the relationship ends (Hogendoorn et al., 2020; Vandecasteele, 2011). Additionally, it can lead to financial dependency, which is particularly dangerious for individuals facing intimate partner violence (Kim & Gray, 2008). In short, household poverty risk measures whether a household's total income is enough to ensure financial security for all members, while individual poverty risk examines whether each partner's personal income is sufficient for their own economic independence.

Studies on individual poverty risk emphasize the disproportionate economic burden on partnered mothers, noting that while direct child costs are shared, indirect costs—lower income because of career breaks and orientation towards part-time work—are primarily borne by mothers (Siegert, 2024). Examining individual poverty risk trajectories around first births in Germany, Siegert (2025) found that many partnered mothers remain financially vulnerable for

at least six years postpartum and that employment status mediates poverty risk. However, by focusing on average trends controlling for being in paid work, the study does not fully capture *how* individual poverty risk unfolds over time or the employment *patterns* going along with these trajectories. In particular, it overlooks the role of return-to-work patterns, which are key to understanding mothers' economic risks over the life course: What may appear as identical labor market positions from a static perspective can, in fact, represent very different trajectories when viewed over time (Halleröd et al., 2015).

A life course perspective on poverty dynamics is essential to differentiate between short-term and longer-term vulnerability – a crucial distinction, because temporary income losses are less harmful than prolonged or repeated poverty, which significantly undermines life chances and exacerbates material deprivation (Cappellari & Jenkins, 2002). Since the 1980s, poverty research has shifted from static assessments to a dynamic perspective, analyzing transitions into and out of poverty as well as the duration of poverty spells across the life course (Bane & Ellwood, 1986; Duncan et al., 1993; Stevens, 1999). Studies show that while short-term household poverty risk is common across European countries (Andriopoulou & Tsakloglou, 2011; Fouarge & Layte, 2005; Sandoval et al., 2009), persistent household poverty risk—though less frequent—deepens economic precarity and limits recovery (Biewen, 2009; Mood, 2015). Despite these insights, dynamic approaches have yet to be applied to individual poverty trajectories around childbirth and the interplay between poverty and employment trajectories more broadly.

Against this backdrop, this paper applies multichannel sequence analysis (Gauthier et al., 2010) to panel data from the German Socio-Economic Panel (SOEP) to examine the interaction of partnered individuals' labor market participation and individual poverty trajectories over eight years around first birth, disaggregated by gender. This method tracks transitions across multiple states, linking household composition changes (i.e., first birth) and employment patterns as key

drivers of (gendered) poverty dynamics (Polizzi et al., 2022; Ruspini, 1999; Vandecasteele & Giesselmann, 2018). By analyzing trajectories from two years before to six years after birth, the study distinguishes between short-term poverty spells and more persistent vulnerabilities.

2.3 The German Case

Gendered life courses are shaped by institutional and social norms (Levy & Bühlmann, 2016). This analysis examines Germany over a 30-year period (1990–2019), offering insight into a conservative welfare state where the first birth typically widens income inequality between partners, largely driven by shifts in women's employment behavior (Musick et al., 2020). In Germany, couples with unequal earnings typically pool their resources, a practice reinforced by joint taxation and co-insurance for married couples, which incentivizes the lower-earning spouse (usually the woman) to reduce work hours or exit the labor market (Althaber et al., 2023). Although many women exit the labor market after the transition to parenthood at least temporarily (Aisenbrey et al., 2009; Fauser et al., 2024), the household poverty rate among couples remains stable at around 5%, as most men maintain full-time employment and offset economic risks through income pooling. While partnered men face similarly low individual poverty risks during this period, women's individual poverty rate surges, peaking at 59% one year after childbirth and remaining at a high level for up to five years (Siegert, 2025).

Ultimately, the German case highlights that in contexts where couples are treated as a single economic unit—both normatively and politically—it is crucial to assess individual economic vulnerability independent of a partner's income. This study contributes to the literature by describing more closely how gender-specific employment trajectories around the first birth typically interact with the simultaneous development of individual poverty risk.

Building on Siegert (2025), I expect partnered men to maintain stable full-time employment with minimal poverty risk throughout the eight years around their first birth. In contrast, women's employment and poverty trajectories are likely more varied. Before childbirth, 90%

of women in Germany work full-time (Arntz et al., 2017), with a relatively low individual poverty rate of around 11% (Siegert, 2025), indicating that poverty transitions primarily begin around childbirth. While a small subgroup is already distant from the labor market and at risk of poverty before childbirth, the main focus is on financially stable women pre-birth—distinguishing between those who remain financially stable and those who experience short-term or prolonged individual poverty risk after childbirth.

In Germany, women's labor force participation rate drops by half in the year of first birth (Arntz et al., 2017; Filser et al., 2024). Mothers are entitled to 14 weeks of maternity leave and up to 36 months of job-protected parental leave. However, economic security during this period depends on benefit structures, which changed significantly over time (for a review: Mari & Cutuli, 2021). From 1992 to 2006, parental leave was extended to 24 months with flat-rate or means-tested payments (around 300 EUR). Within this period, a policy change in 2001 introduced an incentive for earlier return to work: mothers who resumed paid employment after 12 months instead of taking the full 24 months became eligible for a higher flat-rate payment of 450 EUR. In 2007, paid leave was shortened to 12–14 months, with earnings-related benefits covering 65% of pre-birth income (around 300–1,800 EUR). Research suggests that long leave hinders labor market reintegration, while shorter, well-compensated leave supports economic stability and a faster return to work (Aisenbrey et al., 2009; Boeckmann et al., 2015; Evertsson, 2016). Thus, parental leave can help maintain employment and occupational status, but its effectiveness depends on benefit levels and leave duration. Studies show that the 2007 parental leave reform reduced wage penalties for new mothers, particularly those with high income and education, suggesting that especially those with higher opportunity costs may return to work faster. After the reform, they were found to take shorter leaves after childbirth and re-enter the workforce sooner, often part-time (Mari & Cutuli, 2021; Milewski & Brehm, 2023).

After parental leave, women's labor market return varies—some resume full- or part-time work, while others exit the workforce or extend leave by having another child. Mothers with higher pre-birth earnings and higher educational attainment are more likely to return to work earlier and show greater career continuity (Arntz et al., 2017; Drasch, 2013). Returns typically peak at the time of entitlement exhaustion (Ziefle & Gangl, 2014). Most women return to work part-time, especially in West Germany, while a return to full-time work is less common (Dotti Sani & Scherer, 2018; Drasch, 2013; Kluve & Schmitz, 2018). In East Germany, part-time work is often a stepping stone to full-time employment (Milewski & Brehm, 2023), though continuous part-time work has also become a more prevalent employment pattern over time (Kelle et al., 2017). At the same time, mothers may exit the labor market or extend their parental leave due to the arrival of a second child (Arntz et al., 2017)—a common occurrence given the prevailing two-child norm and the typical two- to three-year gap between the first and second birth in Germany (Kreyenfeld et al., 2023).

In summary, the employment trajectories of partnered women in Germany typically follow a pattern of full-time work in the two years before childbirth, followed by one to three years of parental leave (or longer if a second child is born). They usually return to work part-time, less frequently full-time, or remain inactive. I expect differences in poverty trajectories to be primarily driven by the timing and type of labor market return.

As previously discussed, women's employment patterns in Germany have evolved over time. Research using sequence analysis has documented a shift away from traditional "housewife" trajectories toward more work-oriented patterns (Fauser et al., 2024; Simonson et al., 2011). These changes align with major family policy reforms in recent decades, which have influenced women's labor market participation (Milewski & Brehm, 2023) and, in turn, likely their economic risks around childbirth. Zoch and Heyne (2023) identify three key policy phases relevant to first births during the observation period: (1) the promotion of a modernized male-

breadwinner model (1992–1999), (2) a shift toward greater defamilialization with increased maternal part-time employment and shared parental care (2000–2006), and (3) a move toward optional familialism following major parental leave and childcare reforms (2007–2013). Given these shifts, this analysis considers how typical employment and poverty risk patterns have evolved across these phases.

3 Data and Methods

3.1 Data, Sample and Calendar

This study analyzes 30 waves of longitudinal data from the Socio-Economic Panel (SOEP v38.1; Goebel et al., 2023), covering the post-reunification period in Germany (1990–2019). The SOEP is representative of the resident population and includes detailed fertility histories and socioeconomic data on adult respondents (Goebel et al., 2019), making it possible to track how poverty and employment trajectories evolve around first birth.

The sample includes partnered men and women under 50 who had their first child between 1992 and 2013 while living with their partner. To capture employment and poverty trajectories from before pregnancy until the first child reached school age, individuals were continuously observed from two years before to six years after birth. While a selective group, the research interest lies in stable couple dynamics. Hence, the sample is limited to those who remained with the same partner throughout. The final sample consists of 650 women and 587 men, covering 5,200 and 4,696 person-years, respectively. Although couples were included regardless of marital status, 94% of them were married at their last observation. Details on the sample selection process are provided in Appendix B.

The sequence calendar tracks family formation over an eight-year period, centered on the transition to parenthood. It divides the observation window into annual intervals based on the birth month of the first child. For instance, if a child was born in November 1996, the year before birth spans November 1995 to October 1996. This approach standardizes timelines across the sample, offering a more accurate view of the pre- and post-birth periods compared to using calendar years. While the analytical focus lies on the time around the first birth, the calendar also includes subsequent births. 55% (8%) of the sample had two (three) children by the end of the observation period, providing a more comprehensive picture of family formation (see Appendix C for details).

3.2 Analytical strategy

The analysis adopts a life course perspective to explore how individual poverty risk and employment trajectories jointly evolve for partnered men and women around the transition to parenthood. It first describes these trajectories separately by gender, but the main analysis focuses on partnered women and proceeds in two steps, while men's trajectories are detailed in Appendix A. First, multichannel sequence and cluster analyses (Ritschard et al., 2023; Gauthier et al., 2010) are used to identify and characterize common patterns in women's individual poverty risk (channel 1) and employment (channel 2) trajectories over eight years around the first birth. This approach captures how interconnected states on both channels evolve over time, offering a detailed view of this life course stage. Finally, they serve as outcomes in a multinomial logistic regression to assess whether these patterns have changed over historical time, defined by the year of the first birth. Data manipulation and regression analyses were conducted using Stata 18.0, while multichannel sequence and cluster analyses were conducted using R packages, including TraMineR, TraMineRExtras, and WeightedCluster (Gabadinho et al., 2011; Studer, 2013).

Channel 1: Individual poverty risk

The poverty sequences are based on a two-state alphabet: (1) not at risk of poverty and (2) at risk of poverty. Individuals are at risk of poverty if their annual personal income falls below the equivalised national poverty threshold. The income components are the same as those typically used in European official statistics and research to measure household poverty risk. However, unlike official measures, this analysis assumes no income pooling between partners (see Siegert, 2024 for a discussion). Personal earnings and benefits (e.g., maternity benefits) are attributed exclusively to the recipient, while household-level income components (e.g., housing benefits) are divided equally between partners. Due to Germany's household taxation system, SOEP tax data are only available at the household level. Therefore, I consider individual

poverty risk based on gross income as the lower bound of the potential poverty risk. Sensitivity analyses using alternative definitions of the poverty risk indicator—such as allocating household taxes based on each partner's relative share of household income or assigning all family transfers to the mother—revealed similar poverty trajectory patterns (not shown).

The national poverty threshold, set at 60% of the national median household income, is equivalised to account for economies of scale and the costs of children despite focusing on personal incomes. It is adjusted using the household's OECD-modified equivalence scale and then halved to represent the income level each partner must surpass to lift the household out of poverty, assuming equal contributions (Knittler & Heuberger, 2018). The threshold recalculates with each new birth, capturing monthly changes in household size and income needs beyond the first birth. A step-by-step example of reconstructing the individual poverty trajectories is provided in Appendix D (contrasting it with the typically used household poverty measure).

Channel 2: Employment

Employment sequences are based on a five-state alphabet: (1) full-time work, (2) part-time work (including marginal employment[i]), (3) parental leave (including maternity/paternity leave), (4) inactivity (covering education/training, unemployment, retirement, and homemaking) and (5) other. The "other" category includes individuals with unspecified activities, but this group plays a minimal role in the overall employment histories of the sample (see Figure 1). Note that employment sequences were constructed using respondents' self-reported monthly activity during the observation period (Schmelzer et al., 2020). A mismatch between the reference periods of these retrospective employment records and other survey data—snapshots of the situation at the time of the survey—limits the inclusion of more detailed information on employment, such as actual working hours or contract type. This means that the part-time category particularly includes a wider range of contractual working hours, which should be considered when interpreting the results.

To align with the sequence calendar, employment information was aggregated into yearly intervals, using the most frequent activity state for each yearly interval. A comparison of yearly and monthly trajectories confirms that this retains essential information while improving analytical efficiency. For further details, see Appendix E.

Multichannel Sequence and Cluster Analysis

Focusing on women's trajectories, optimal matching (OM) was applied with a constant substitution cost of 2 and indel costs of 1 to identify similarities between poverty–employment sequences (Piccarreta, 2017), emphasizing the duration spent in different states (Studer & Ritschard, 2016). The algorithm computed a distance matrix for each channel, and the final distance matrix was obtained by summing the distances across the poverty and employment channels. Essentially, this approach identifies which women are similar on both channels, meaning they share comparable poverty and employment trajectories. Given the paper's focus on understanding individual poverty trajectories, I prioritized differences in poverty trajectories over employment (2:1) in the process.[ii]

Using the generated distance matrix, I applied partitioning around medoid (PAM) clustering initialized by Ward hierarchical clustering (Studer, 2013). This algorithm grouped sequences based on prominent patterns in trajectories to reduce complexity. Guided by multiple cluster cut-off criteria, I retained a four-cluster solution, which showed an average silhouette value of 0.35 and was substantively the most meaningful (for details, see Appendix F). The four-cluster solution was robust across different dissimilarity measures, such as dynamic hamming distance. By focusing on variations within and between sequences in both channels, these clusters illustrate how women's individual poverty risk evolves (poverty channel) during the transition to parenthood and one of its key underlying mechanisms (employment channel), without making causal claims.

Multinomial logistic regression

Finally, to examine how prevailing patterns changed over time, I conducted multinomial logistic regressions with cluster membership as the outcome and the year of the first birth (1992–1999/2000–2006/2007–2013) as the main predictor. I also included a set of socio-demographic controls: In addition to age at first birth (under 31/31 and older) and migration background (born in Germany/born elsewhere), I included potentially time-varying variables measured at baseline, i.e. two years before the first birth. These include region of residence (East/West), educational background (non-tertiary/tertiary), the woman's relative share of household income (in %), and previous labor market experience (years spent in full-time, part-time, and unemployment). Given that prior work experience and age at first birth may be correlated, I ran a robustness check excluding previous work experience, but the results remained essentially unchanged.

Because clusters are time-constant objects, the model could not include time-varying covariates (Piccarreta & Studer, 2019), such as the transition to a second birth. Although the focus of the analysis is on poverty–employment dynamics around the transition to parenthood rather than the number of children, the latter still likely influences these trajectories. The present analysis accounts for the number of children in both channels–additional births are reflected in later parental leave periods, and the poverty measurement adjusts for family size–yet future research should explore this in more depth.

In addition to characterizing the groups, the regression analysis helps validate the clustering by showing that the groups align with key characteristics in the sample (Gauthier et al., 2010). Following Jalovaara and Fasang (2020), to ensure that deviant sequences (with low silhouette values) do not distort the cluster characterization in the multinomial regression, I assessed clustering quality by excluding cases with silhouette values below 0.00 and 0.25 (Appendix F).

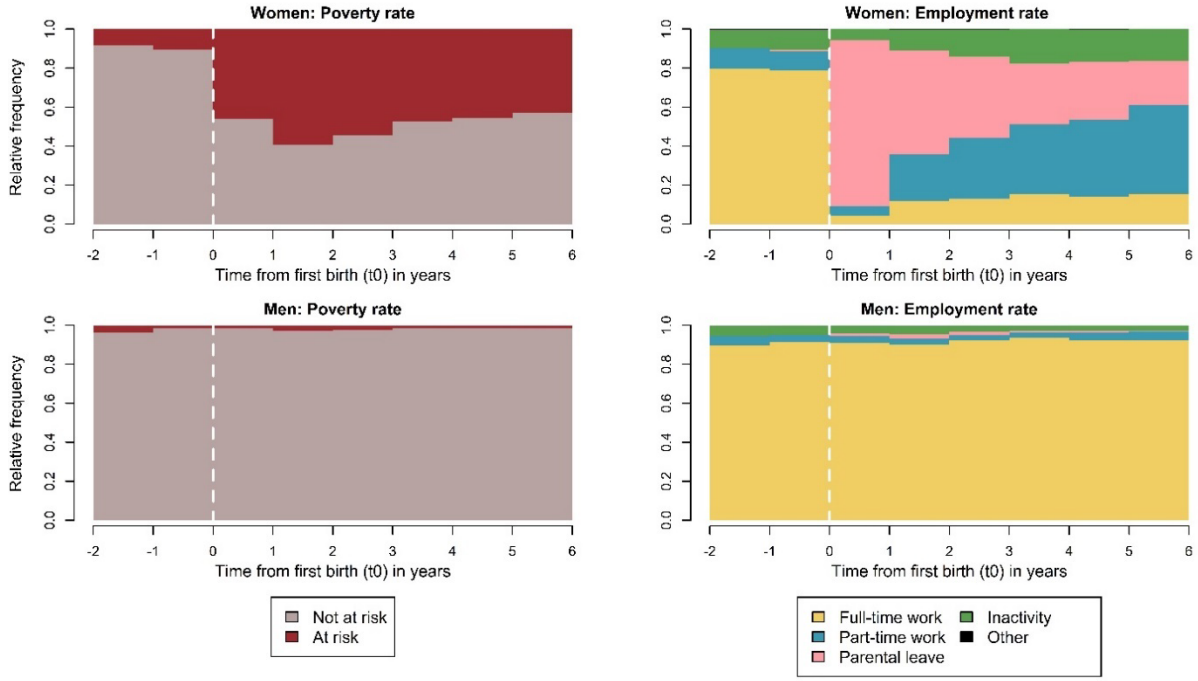
4 Results

4.1 Individual poverty and employment trajectories within couples around first birth

Figure 1 presents the yearly trends in poverty (left) and employment (right) for both women (top panel) and men (bottom panel), highlighting key gender differences in their trajectories. Men consistently experience high rates of full-time employment and low poverty risk, spending an average of 0.2 years at risk of poverty and 0.7 years out of full-time employment (bottom panel). In contrast, women face greater vulnerability to poverty and show more varied employment patterns, particularly directly after the birth of their first child. On average, they spend 3.1 years at risk of poverty and 5.7 years out of full-time employment (top panel).

A comparison between individual poverty trajectories and household poverty trajectories (see Appendix D) suggests that for men, there is little difference in whether poverty risk is measured at the household or individual level. However, for women, individual poverty rates are much higher, especially in the years following the first birth. Therefore, the primary focus of the analysis is on women's individual trajectories.

Figure 1. Poverty and employment trends by gender (row) and channel (column)



Source: SOEP, first births to couples 1992–2013. Notes: For summary statistics and additional details on men's employment and poverty patterns, see Appendix A.

4.2 Partnered women's typical poverty–employment trajectories around first birth

Four ideal-typical trajectory patterns

How do partnered women's poverty and employment trajectories evolve around the transition to parenthood? Four distinct patterns emerge, as summarized in Table 1. The majority of women (Clusters 1–3) work full-time and are not at risk of poverty before childbirth but take different paths afterward. Women who return to work quickly experience brief to no poverty spells (Clusters 1 and 2), whereas those who remain out of the labor market longer (Cluster 3) face prolonged poverty risks. In contrast, a smaller group (Cluster 4) is already at persistent risk of poverty before childbirth and has low labor market attachment throughout.

Figure 2 visually represents these cluster patterns, showing individual poverty risk (left panel) and employment status (right panel) over time. Each cluster is labeled based on its defining characteristics in both channels. While individual trajectories vary, the consistency within each cluster suggests these groups effectively capture the diversity of experiences (see Appendix F).

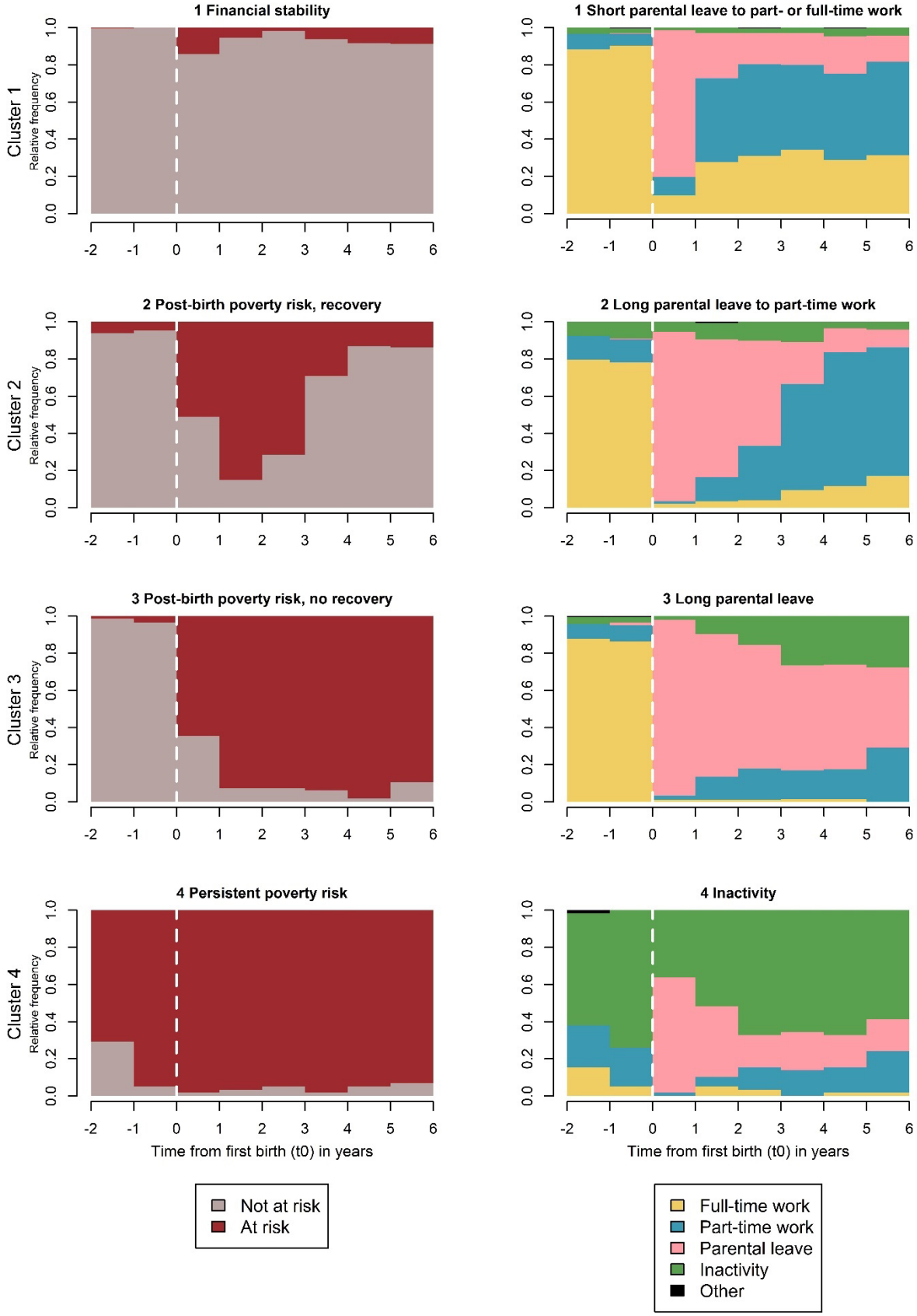
First, 36% of women (*Cluster 1*) remain financially stable throughout the eight-year period. They work full-time before their first birth and usually return to work part-time, less often full-time, after a short parental leave (1.7 years on average). Inactivity spells are rare.

Table 1. Overview of the four typical pathways on both channels

Cluster	**Idealtypical Trajectory Pattern**	
Group Size[1]	Individual poverty risk	Employment status
Cluster 1 36%	Persistently low poverty risk before and after childbirth.	Short parental leave, followed by a return to part-time or full-time work.
Cluster 2 23%	Increased poverty risk immediately after childbirth, but gradual recovery.	Long parental leave, followed by a gradual transition to part-time work.
Cluster 3 32%	Sharp rise in poverty risk immediately after childbirth, with no recovery.	Long parental leave, with limited re-entry into the labor market.
Cluster 4 9%	Persistently high poverty risk before and after childbirth.	Predominantly inactive, with minimal labor market participation before and after childbirth.

Notes:[1] Relative share of the sample in %.

Figure 2. Women's poverty and employment trends by channel (column) and cluster (row)



Source: SOEP, first births to couples 1992–2013. Notes: While the chronograms describe the overall pattern of clusters, Appendix A additionally offers summary statistics and shows women's individual trajectories as relative frequency sequence plots.

Second, 23% of women (*Cluster 2*) experience poverty risk after childbirth but generally recover, spending about 2.7 years of the period at risk. They take longer parental leaves (2.7 years on average) and predominantly return to part-time work, with fewer resuming full-time employment and some experiencing brief inactivity. Extended parental leave is particularly linked to increased poverty risk.

Third, 32% of women (*Cluster 3*) remain at persistent risk of poverty after childbirth, spending 5.4 years of the period at risk. Most do not return to full-time, and few resume part-time work. This cluster is defined by labor market exit, extended parental leave (4.0 years on average), and frequent inactivity spells. About half remain continuously on parental leave after their first birth, suggesting many go on to have a second child during the observation period.

Finally, 9% of women (*Cluster 4*) remain at persistent poverty risk throughout the observation period. Unlike the first three clusters, which follow similar pre-birth patterns before diverging, this group stands out with consistently low labor market attachment even before childbirth, making them particularly vulnerable.

The role of labor market attachment

The cluster patterns—particularly the differences between Clusters 1, 2, and 3—highlight the strong link between employment trajectories and individual poverty risks. Two key factors shape economic vulnerability after childbirth: (1) the length of parental leave and (2) the timing of re-entry into the labor market.

First, while all working women in the study were entitled to up to 36 months of job-protected parental leave from 1992 onward, how long they actually took varied across clusters. Women in Cluster 1 generally took shorter leaves and maintained financial stability, likely benefiting from higher replacement rates introduced in 2001 for one-year leaves, which encouraged a quicker return to work. In contrast, women in Clusters 2 and 3 took longer leaves, increasing their risk of poverty. Cluster 4 had the lowest overall leave take-up, with leave periods spread

over time rather than concentrated immediately after childbirth—possibly due to different entitlement rules and lower replacement rates for women who were already inactive pre-birth.

Second, the timing and type of labor market re-entry also differed. Women in Clusters 1 and 2 were most likely to return to work, with those in Cluster 1 typically resuming employment soon after childbirth. In contrast, women in Cluster 2 returned more gradually, with lower overall full-time employment rates. Part-time work was common in both groups, but detailed differences—such as the number of hours worked—could not be analyzed. Meanwhile, many women in Cluster 3 extended their parental leave, likely due to the birth of a second child, delaying their return to work further. Longer observation periods would be needed to determine if and when they eventually re-enter the labor market.

Looking at family size, a closer look at how individual trajectories unfold (see relative frequency sequence plots in Appendix A) show that later parental leave periods in Clusters 1 and 2 often points to second births. However, even after having additional children, mothers in these clusters return to work more quickly than those in Cluster 3. On average, six years after their first birth, women in Clusters 1 and 2 have 1.5 children (SD = 0.6), compared to 1.9 children (SD = 0.6) in Cluster 3 and 1.8 children (SD = 0.7) in Cluster 4. The fact that Clusters 1 and 2 have similar family sizes but different poverty trajectories suggests that employment strategies—rather than the number of children alone—play a critical role in shaping poverty risks after childbirth.

Interestingly, while the labor market positions of Clusters 1–3 may appear similar when viewed at a single point in time—especially during the child's first year, or even up to the second year for Clusters 2 and 3—their long-term employment trajectories are quite different. This underscores the importance of analyzing labor market attachment over longer periods to fully understand how employment patterns shape economic vulnerability from a life course perspective.

Cluster characteristics

Using multinomial logit models, I analyzed which (pre-birth) characteristics are linked to cluster membership. Consistent with previous research, a woman's pre-birth earnings—measured as her relative share of household earnings—plays a key role in cluster assignment. Women with higher earnings before childbirth, as well as those with a tertiary degree or living in East Germany, are more likely to belong to the financially stable group with strong labor market attachment (Cluster 1) and less likely to fall into clusters with higher poverty risk and weaker labor market participation (Clusters 3 or 4). Women in Cluster 3 tend to be younger and are more often from West Germany. In contrast, those in Cluster 4—who face persistent poverty risk and low labor market attachment—are more likely to have a migration background and lower pre-birth earnings, forming a residual category across social groups. The full results of the multinomial logit model can be found in Appendix F, which remain robust against potential classification errors in cluster assignment.

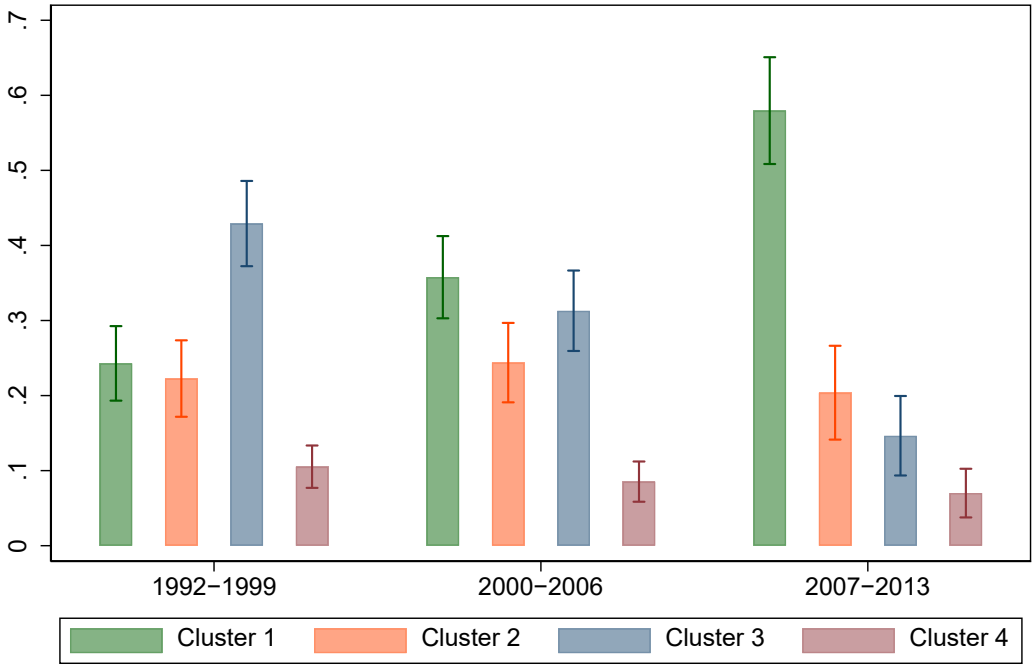
Cluster membership over time

The long observation period makes it possible to track how cluster membership has changed over time. Examining trends by birth cohort (Figure 3) reveals a significant shift in women's economic trajectories. In the 1990s, a large share of women belonged to Cluster 3—characterized by higher economic vulnerability and lower labor market attachment after childbirth. However, this group steadily declined from 43% in the 1992–1999 cohort to 31% in the early 2000s and just 15% in the 2007–2013 cohort. Meanwhile, Cluster 1, representing women with greater financial stability and strong labor market attachment, grew substantially, increasing from 24% in the 1992–1999 cohort to 36% in the early 2000s, and reaching 58% in the 2007–2013 cohort.

This shift suggests that over time, more women have been able to maintain stable employment and financial security after childbirth, likely reflecting broader societal and policy changes

(Zoch & Heyne, 2023). In contrast, Clusters 2 and 4 remained relatively stable across cohorts. Cluster 2 appears to represent an intermediate trajectory between Clusters 1 and 3, while Cluster 4 remains a smaller, more vulnerable group with consistently high poverty risk and low labor market attachment.

Figure 3. Predicted probabilities of cluster membership by year of first birth



Source: SOEP, first births to couples 1992–2013, own estimations. Predicted probabilities (with 95%-CI) of belonging to each cluster.

5 Conclusion

A growing body of research highlights that the transition to parenthood exacerbates gendered economic inequality, with mothers more likely than their partners to experience employment disruptions and income losses. This study contributes to this literature by examining economic risks within couples from a life course perspective, focusing on how gendered career dynamics around the first birth intersect with changes in individual poverty risk, characterizing typical poverty risk dynamics of first-time parents under the assumption of no income pooling between partners. Using multichannel sequence and cluster analysis on longitudinal SOEP data, the findings reveal substantial heterogeneity in how economic vulnerability unfolds after childbirth, both between genders and among women.

Men's employment and poverty trajectories remain largely stable, with full-time work and low poverty risk as the dominant pattern. This suggests that the transition to parenthood has little impact on their economic stability. By contrast, women tend to face greater economic vulnerability after childbirth, though their individual trajectories are quite heterogeneous: Whereas most women are employed full-time and financially stable before childbirth, their post-birth trajectories vary widely. Some (Clusters 1 and 2) return to work relatively quickly, experiencing no or only short episodes of poverty risk, while others (Cluster 3) take extended parental leave and do not re-enter the labor market, facing prolonged poverty risk. A small group (Cluster 4) is persistently economically vulnerable even before childbirth and remains detached from the labor market throughout. At the same time, the consistently low household poverty rates across clusters suggest that women may not face immediate financial hardship when at risk of individual poverty, but rely on their partner's income to avoid poverty instead. While short-term vulnerability can potentially be managed, long-term vulnerability, as seen in clusters 3 and 4, tends to be more problematic.

Women's pospartum poverty trajectories vary widely by labor market attachment. Women in financially stable trajectories (Clusters 1 and 2) typically take shorter parental leaves and return to work sooner, whereas those in more vulnerable trajectories (Clusters 3 and 4) either delay their return or had limited employment opportunities even before childbirth. In line with previous research (Bian et al., 2024; Dunatchik, 2023), those with stronger labor market opportunities and higher relative earning power even before their first birth are more likely to follow financially stable trajectories. Notably, the share of women in financially stable trajectories has increased over time, suggesting that policy changes, particularly those supporting earlier labor market reintegration, may have improved economic stability. However, a subset of women remains persistently vulnerable, particularly those with lower pre-birth earnings or weaker labor market ties.

Interestingly, although different types of part-time employment could not be distinguished in the sequences, the presence of part-time working mothers in clusters with low poverty risk suggests a potential area for further investigation. Discussions surrounding poverty risk frequently assume that full-time employment is the ideal or most secure option for mothers (Filandri & Struffolino, 2019). However, fostering a more equitable division of labor—where economic risks are shared and adequate financial resources are provided for both mothers and their families—might position part-time work with longer hours as a viable alternative for fathers and mothers.

A key takeaway from the analysis is that women experience more volatile poverty trajectories than men after the first birth, and that longer observation periods are essential for fully capturing women's dynamics. Their poverty risks do not always appear immediately but unfold over time. While previous studies have often focused on cross-sectional outcomes or short-term patterns, leveraging the long panel structure of the German SOEP reveals that poverty-employment trajectories continue to evolve beyond the first few years. This suggests that examining only

one or two years after childbirth is insufficient to understand the longer-term interplay between employment trajectories and individual poverty risk. However, future studies would benefit from incorporating even longer time windows to better understand whether initial employment and poverty trajectories result in lasting economic disparities (Langner, 2015; Van Winkle & Fasang, 2020).

Additionally, multichannel sequence analysis offers a comprehensive approach to examining these dynamics, allowing for a deeper understanding of poverty duration and mobility patterns over time rather than focusing solely on individual poverty spells or transitions. Although this method demands a robust data structure, requiring a balanced panel over an extended period, trajectory-based approaches that link labor market attachment and poverty risk provide a valuable addition to the typically used in-work poverty measures, as they more effectively capture the complexity of this relationship (see also Halleröd et al., 2015).

Finally, this study raises important questions about the factors driving changes in employment and poverty trajectories over time. The observed improvements in women's economic situation may be influenced by various factors, including shifts in family policies and broader changes in family structures. While a more detailed investigation was beyond the scope of this study due to sample size limitations, future research should examine these developments more closely, particularly to understand *how* and *why* trajectory patterns have changed over time.

In conclusion, this study highlights that gendered economic risks after childbirth are dynamic, evolving over time based on both institutional contexts and individual employment trajectories. It underscores the value of a life course perspective in examining these risks and the necessity of policies that promote sustainable labor market participation. Ensuring that mothers, regardless of their pre-birth employment status, have access to stable job opportunities and financial security independent of their partner's income is crucial for long-term economic stability – ensuring greater stability for both mothers and their children. Because ultimately,

high individual poverty risks among mothers can have broader implications beyond their own financial well-being, potentially affecting their children's life chances (Vandecasteele & Giesselmann, 2018). Given that mothers often become the primary caregivers following separation, protecting them from poverty also serves to safeguard their children's economic security (Hogendoorn et al., 2020).

[i] Marginal employment (so-called "mini-jobs") involves very few working hours and is exempt from social security contributions up to a certain earnings limit (EUR 400 until 2013, and EUR 450 thereafter). In the SOEP, marginal employment was initially categorized as part-time work and only became a separate category in 2005. Therefore, it cannot be treated as a distinct category in the analysis covering first births since 1992.

[ii] When the trajectories are instead weighted 1:1, similar results are observed but with a stronger emphasis on differences in employment than poverty trajectories (not shown). However, since the employment information is not sufficiently differentiated (e.g. regarding varying part-time working hours), greater emphasis is put on patterns in poverty trajectories.

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APPENDIX

A Results

A.1 Individual poverty and employment trajectories within couples around first birth

Table A1. Mean time spent in each state in years, by channel and gender

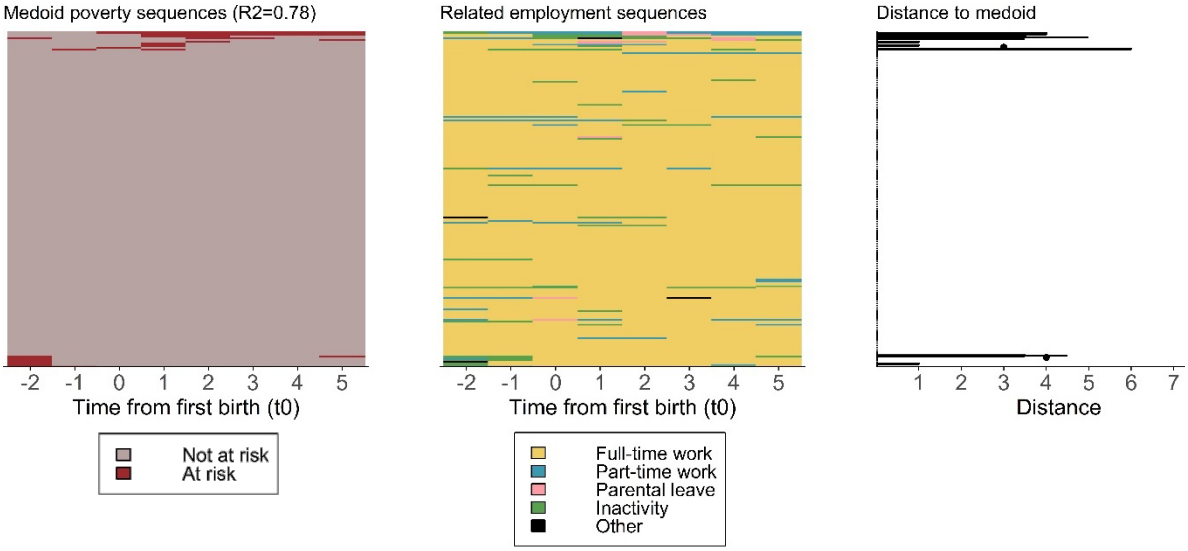
	Partnered men (N=587)		Partnered women (N=650)	
	Years (M/SD)	% of time	Years (M/SD)	% of time
(1) Poverty risk status				
Not at risk	7.8/0.7	0.98	4.9/2.6	0.61
At risk	0.2/0.7	0.02	3.1/2.6	0.39
(2) Employment Status				
Full-time employment	7.3/1.5	0.92	2.3/1.7	0.29
Part-time employment	0.3/1.0	0.04	2.0/1.9	0.25
Inactivity	0.3/1.0	0.04	1.1/1.8	0.13
Parental leave	0.1/0.4	0.01	2.6/1.7	0.33
Other	0.0/0.1	0.00	0.0/0.1	0.00

Source: SOEP, first births to couples 1992–2013, unweighted summary statistics.

Figure A1 shows the 200 most common poverty trajectories for men (first column) and their corresponding employment trajectories (second column) as relative frequency sequence plots (Fasang & Liao, 2014), and their distance from the medoid poverty sequence (third column). These 200 trajectories represent about 78% of the variation in poverty patterns among the 587 men in the sample. Overall, men's poverty and employment trajectories show little variation beyond the dominant pattern of full-time work without poverty risk. Only 9% of men experienced at least one poverty spell. The prevailing employment trajectory is full-time work (yellow), with occasional shorter periods in other statuses, such as part-time work (blue), being inactive (green), or on parental leave (pink). Even brief interruptions in full-time work rarely coincide with poverty risk. Poverty spells are mostly linked to extended periods of inactivity, such as unemployment or time in education at the start of the observation period. Unlike women's trajectories, men's poverty and employment patterns show no significant changes around the time of the first birth (t_0). An attempt at clustering using optimal matching did not

reveal distinct groupings (results not shown), and due to the small sample size, further analysis of divergent patterns in men's trajectories was not feasible.

Figure A1. Men's representative sequences (k=200)



Source: SOEP, first births to couples 1992–2013. Notes: The figure shows the poverty (left) and employment (middle) sequences of representative individuals per line, ordered by multidimensional scaling of poverty sequences. The right panel reports the box-and-whisker plot for dissimilarities to the medoid poverty sequence within each frequency group; employment trajectories may be more diverse.

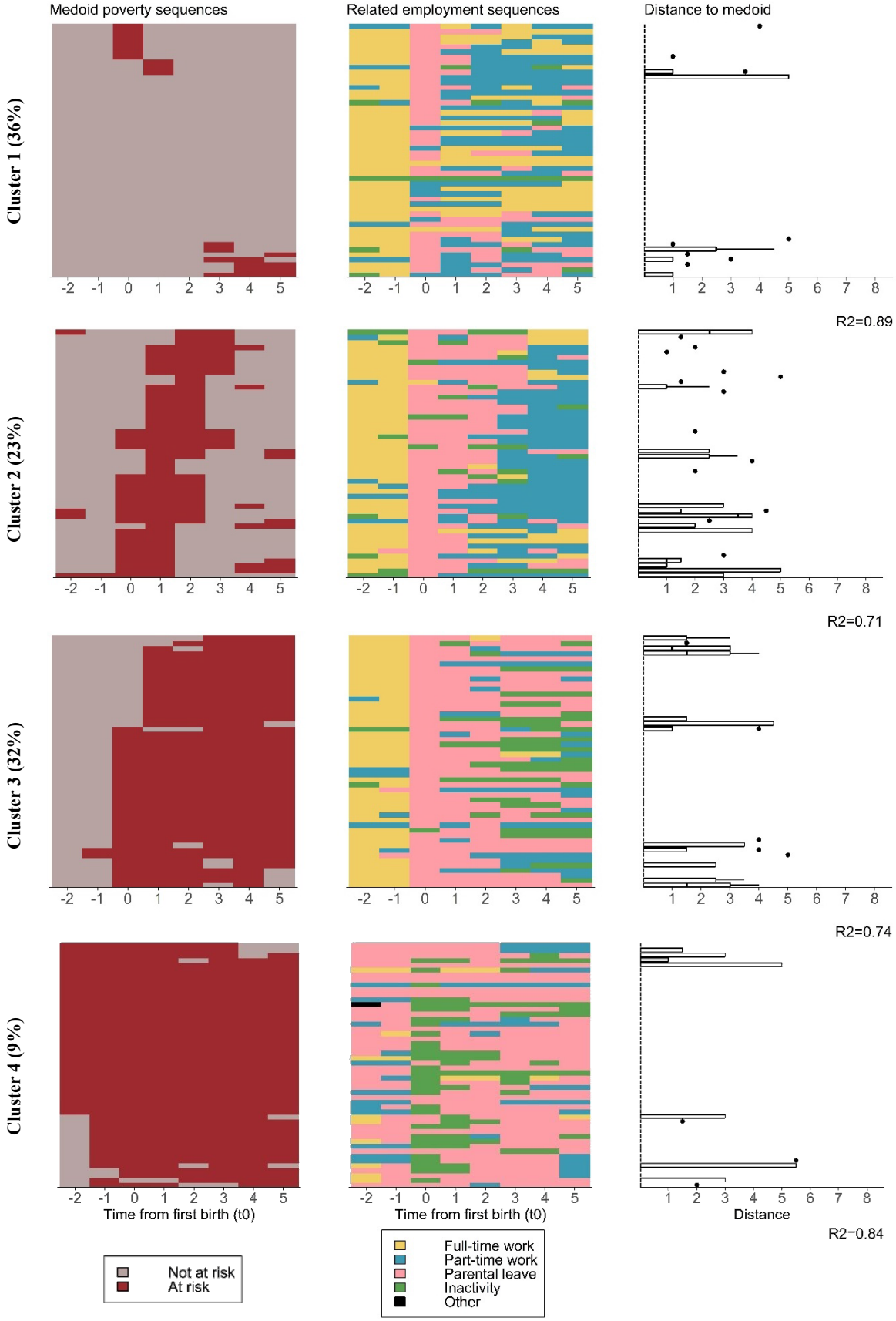
A.2 Partnered women's typical poverty–employment trajectories around first birth

Table A2. Mean time spent in each state in years, by channel and cluster

	Cluster 1		Cluster 2		Cluster 3		Cluster 4	
	Years (M/SD)	% of time	Years (M/SD)	% of time	Years (M/SD)	% of time	Years (M/SD)	% of time
Poverty risk status								
Not at risk	7.5/0.7	**0.94**	5.3/1.0	**0.66**	2.6/0.8	0.33	0.6/0.9	0.07
At risk[a]	0.5/0.7	0.06	2.7/1.0	0.34	5.4/0.8	**0.67**	7.4/0.9	**0.93**
Employment Status								
Full-time employment	3.4/2.1	**0.43**	2.1/1.1	0.26	1.8/0.7	0.23	0.3/0.8	0.04
Part-time employment	2.6/2.0	0.33	2.7/1.6	**0.33**	1.1/1.5	0.14	1.1/1.7	0.14
Inactivity	0.2/0.8	0.03	0.6/1.1	0.07	1.1/1.4	0.14	4.8/2.2	**0.60**
Parental leave	1.7/1.2	0.21	2.7/1.1	**0.33**	4.0/1.6	**0.49**	1.7/1.5	0.22
Other	0.0/0.1	0.00	0.0/0.	0.00	0.0/0.1	0.0	0.0/0.1	0.00
N	239		147		206		58	

Source: SOEP, first births to couples 1992–2013, unweighted summary statistics. Notes: The modal state in each channel is highlighted in bold. [a]Among those at risk of individual poverty in Clusters 1–3, almost none are also at risk at the household level (Cluster 1: 0%, Clusters 2 and 3: 2% of time). In contrast, women in Cluster 4 face poverty risk at both levels 13% of the time.

Figure A2. 50 representative sequences per cluster, by channel (N=650 partnered women)



Source: SOEP, first births to couples 1992–2013. Notes: The figure shows the poverty (left) and employment (middle) sequences of representative individuals per line, ordered by multidimensional scaling of poverty sequences. The right panel reports the box-and-whisker plot for dissimilarities to the medoid poverty sequence within each frequency group; employment trajectories within clusters may be more diverse.

Table A3. Sample characteristics per cluster (N=650 partnered women)

	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Level of education (%) at t_{-2}				
Non-tertiary (ISCED 0–4)	54.0	70.3	83.9	84.5
Tertiary (ISCED 5–6)	46.0	29.7	16.1	14.5
Migration background (%)				
Born in Germany	92.5	91.9	86.8	69.0
Born elsewhere	7.5	8.1	13.2	31.0
Region of residence (%) at t_{-2}				
West Germany	72.8	78.4	97.1	82.8
East Germany	27.2	21.6	2.9	17.2
Year of first birth (%)				
1992–1999	25.1	37.8	51.2	44.8
2000–2006	36.8	40.5	37.6	36.2
2007–2013	38.1	21.6	11.2	19.0
Age at first birth in years (M/SD)	30.5/4.1	29.8/4.2	28.6/3.9	27.2/4.6
%-share of household income at t_{-2}	48.5/17.1	41.6/16.1	43.3/16.9	16.2/18.7
Working experience in years at t_{-2} (M/SD)				
Full-time employment	7.0/4.2	6.7/4.8	6.8/4.5	2.5/3.3
Part-time employment	1.1/2.2	0.9/1.8	0.6/1.4	0.9/1.6
Unemployment	0.2/0.5	0.2/0.7	0.2/0.4	0.8/1.5
N	239	147	206	58

Source: SOEP, first births to couples 1992–2013. Summary statistics.

Table A4. Multinomial logistic regression models predicting cluster assignment (N=650)

	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Tertiary education	0.16***	-0.03	-0.11**	-0.02
(Ref= Non-tertiary)	(0.05)	(0.04)	(0.04)	(0.02)
Migrant background	0.00	-0.03	-0.02	0.05
(Ref= Born in Germany)	(0.06)	(0.05)	(0.05)	(0.03)
Living in East Germany	0.26***	0.07	-0.31***	-0.02
(Ref= West Germany)	(0.05)	(0.05)	(0.03)	(0.02)
Years 2000–2006	0.05	-0.01	-0.03	-0.01
(Ref= 1992–1999)	(0.04)	(0.04)	(0.04)	(0.02)
Years 2007–2013	0.21***	-0.05	-0.18***	0.02
(Ref= 1992–1999)	(0.05)	(0.05)	(0.05)	(0.03)
Age at first birth in years	0.01	0.01	-0.02*	0.00
(continuous)	(0.01)	(0.01)	(0.01)	(0.00)
%-share of household	0.49***	-0.11	0.06	-0.43***
income (continuous)	(0.09)	(0.09)	(0.09)	(0.06)

Source: SOEP, first births to couples 1992–2013, own estimations. Average marginal effects with standard errors in parentheses. The model controls for previous work experience. * p<0.05, ** p<0.01, *** p<0.001

B Sample Description

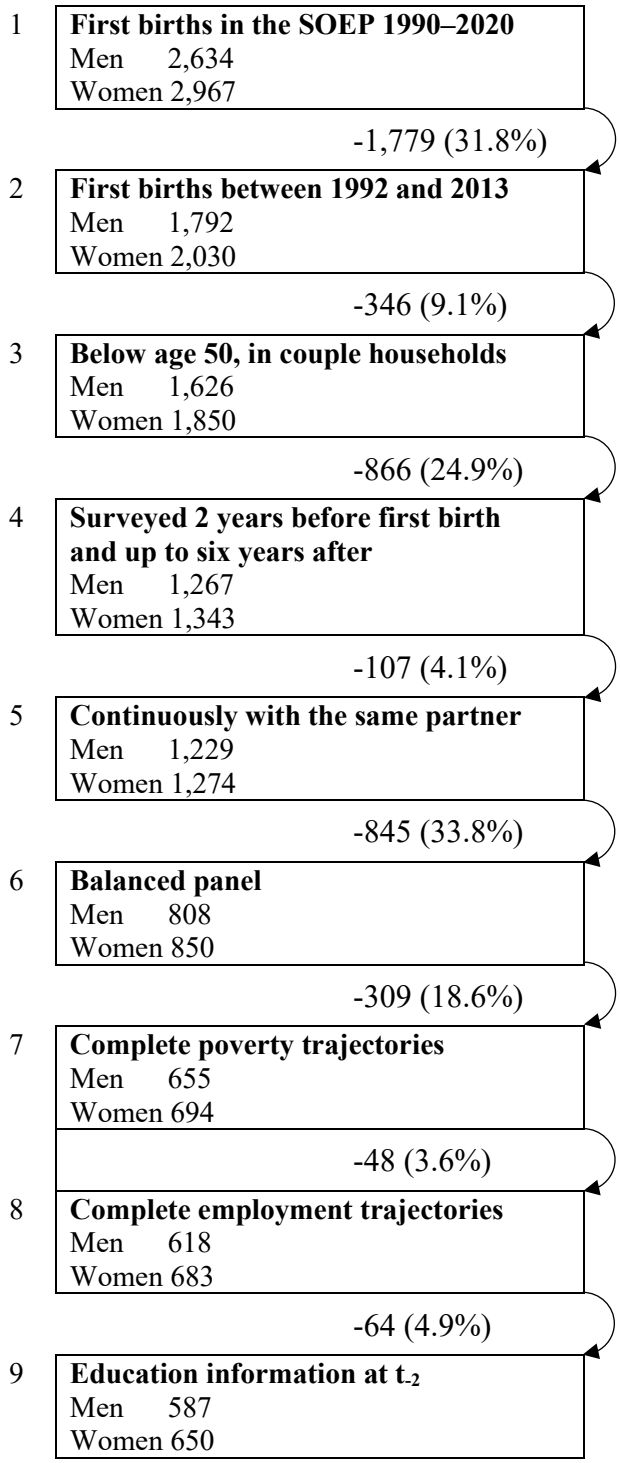


Figure A3. Sample Selection Flowchart

Figure A3 describes the sample selection process step by step. As a starting point, the sample was restricted to people who had experienced the birth of their first child since the year of German reunification and before the COVID-19 pandemic (1990 to 2019). The sample was then restricted to first births to couples between 1992 and 2013 (steps 2 and 3), as only these cohorts allow the entire life stage from two years before to six years after the first birth to be covered (step 4). In step 5, the sample was restricted to people who were living with the same partner for the whole period to display stable couple dynamics. To capture dynamics around the first birth, the final sample included individuals with a balanced panel interviewed every year from two years before to six or seven years after the birth (step 6). Note that synchronising income and fertility trajectories sometimes required nine survey waves to cover eight years around the first birth.

Creating the balanced panel lost about 34% of the sample, which may introduce attrition bias. For those observed at step 5 (N=2,503), Table A5 shows how the sample size changes from 2 years before the first birth to 6 years after. As the trends are similar for men and women, the development over time is shown for the whole sample, showing that around 67% of the individuals observed at t_{-2} have a balanced panel.

Next, I dropped those with incomplete poverty trajectories (step 7). To do this, I dropped those who had missing income information in at least one wave. Some missing information has already been imputed by the DIW (Frick et al., 2012). Individuals with remaining missing information were excluded from the analysis. Income information was usually missing for all relevant income variables at the same time, typically when no or only partially successful interviews were conducted in the corresponding survey year.

In step 8, monthly employment histories from the artkalen file were merged with the sample, supplemented by annual employment trajectories from the pbiospe file to fill potential gaps. When respondents first join the SOEP, they report their monthly activity statuses starting from age 15. In subsequent years, they update their activity histories since the previous interview

(Schmelzer et al., 2020). In cases of overlapping spells, the state higher in the following hierarchy was selected: unemployment, parental leave, part-time job, full-time job, homemaking, education/training, retirement, and other (following Nutz & Gritti, 2021). The focus was on monthly employment status to better capture changes around the month of birth, aligning with the sequence calendar structure. Both files used the extended alphabet (see online appendix, section D). Initially, gaps in employment histories were identified. Due to annual gaps in both files, 37 men and 11 women were dropped from the sample. Smaller gaps (up to 5 months per year) were filled using information from adjacent months, as employment status is generally stable within a year. This stability was higher for men (87% had one employment state per year) than for women (62%). Remaining gaps were filled with information from the annual employment histories, which were largely consistent with the monthly data.

Finally, in step 9, cases with missing covariate information were dropped. There were virtually no missing values except for the education variable. Individuals without education data at time t_{-2} were excluded. Notably, in the final sample of 650 women and 587 men, many belong to the same households, providing insights into gender dynamics within 534 actual couples.

Comparing unweighted and weighted poverty and employment rates over time, correcting for unequal selection probabilities and sample attrition (using the person-weight phrf) reveals only minor differences between the calculated shares (not shown). Sample characteristics at the first and last observation are shown in Table A6.

Table A5. Change in sample size between waves from t_{-2} to t_{+5}

	Time from first birth (t0) in years							
	t_{-2}	t_{-1}	t_0	t_{+1}	t_{+2}	t_{+3}	t_{+4}	t_{+5}
N	2,501	2,480	2,415	2,261	2,063	1,924	1,789	1,665
Share in %	100.0	99.1	96.5	90.3	82.4	76.9	71.5	66.5
Change in %-points		-0.9	-2.6	-6.2	-7.9	-5.5	-5.4	-5.0

Source: SOEP, first births to couples 1992–2013. Notes: Change between years in percentage points.

Table A6. Sample characteristics at first (t_{-2}) and last observation (t_{+5}), by gender

	Partnered women (N=650)		**Partnered men (N=587)**	
	at t_{-2}	at t_{+5}	at t_{-2}	at t_{+5}
At risk of individual poverty (%)	8.3	43.1	3.7	1.7
Employment Status (%)				
Full-time employment	78.8	14.8	88.8	91.7
Part-time employment	10.6	44.3	4.8	4.9
Parental leave	10.2	17.5	0.0	2.9
Inactivity	0..0	23.4	6.1	0.5
Other	0.5	0.0	0.3	0.0
Level of education (%)				
Non-tertiary (ISCED 0–4)	69.2	64.7	63.7	56.2
Tertiary (ISCED 5–6)	30.8	35.3	36.3	43.8
Region of residence (%)				
West Germany	82.5	82.0	81.6	81.6
East Germany	17.5	18.0	18.4	18.4
Marital status (%)				
Married	65.1	93.5	65.4	94.2
Cohabiting	34.9	6.5	34.6	5.8
Migration background (%)				
Born in Germany	88.5	88.5	89.1	89.1
Born elsewhere	11.5	11.5	10.9	10.9
Age at first birth (M/SD)	29.5/4.3	29.5/4.3	31.6/4.4	31.6/4.4
Year of first birth (%)				
1992–1999	38.0	38.0	40.9	40.9
2000–2006	37.8	37.8	37.0	37.0
2007–2013	24.2	24.2	22.1	22.1

Source: SOEP, first births to couples 1992–2013, own calculations. Unweighted summary statistics.

C Family formation

While the sequence calendar is centred on the first birth, it also includes higher parity transitions. Fertility data from the Biobirth file (Zimmermann & SOEP Group, 2022), which records month-specific birth dates of all biological children, was used to identify births around the observation window. Missing birth months (N=2) were set to January. The third observation year marks the transition to parenthood, with a mean age at first birth of 29.5 years (SD = 4.2) for women and 31.6 years (SD = 4.4) for men.

Figure A4 provides an overview of family formation among partnered women, showing the number of children for each year of the calendar. By the end of the observation period, 38% of the women had one child, 54% had two children, and 8% had three or more children, including one woman with four. This figure aligns with German fertility trends, where about half of women have a second child within five years of the first (Arntz et al., 2017; Fitzenberger et al., 2013). Additionally, 21 women had twins (10 at first birth, 11 at second). These patterns are consistent for partnered men.

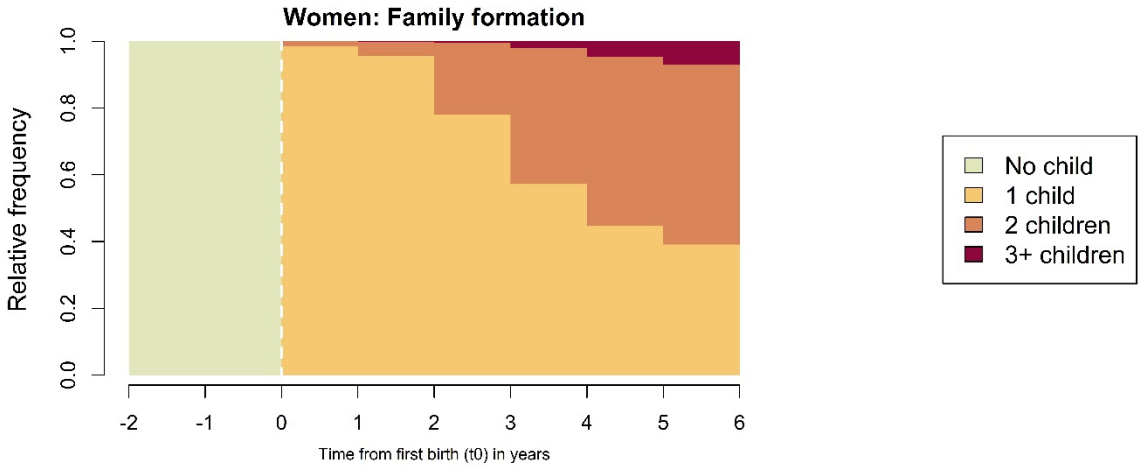


Figure A4. Family formation trends, partnered women (N=650)

D Individual and household poverty risk

While the analysis focuses on individual poverty risk trajectories, the measurement used in this paper is adapted from the household poverty indicator used in European official statistics, defining at-risk individuals as those with equivalised household income below the poverty threshold, set at 60% of the national median (Eurostat, 2020). The first part of this section describes how to reconstruct both the individual and household indicators for the sequence calendar, using the fictitious example of Claudia, a partnered mother in Germany.

While household poverty risk assesses whether the household's combined income provides financial security for all its members, individual poverty risk assesses whether each partner's personal income is sufficient for his or her own economic security, regardless of how couples actually manage their resources (for a discussion, see Siegert, 2024). Partners always share their household poverty risk, but their individual poverty risk may differ. In the second part of this section, therefore, I combine both indicators to describe whether and how gendered poverty trajectories overlap between the two concepts.

D.1 A step-by-step example of calculating both indicators

Data on the national poverty threshold, annual income, and household composition are required to construct the poverty indicators for each interval t_i. Figure A5 illustrates this process by focusing on Claudia, who remained with the same partner throughout the 8-year observation period and had her first child in May 2002. For Claudia, intervals t_i cover May to April of the following year. For example, t_{+2} ranges from May 2004 to April 2005.

The **national poverty threshold** is set at 60% of the national median household income. It is calculated per calendar year, using the full SOEP sample (N=151,828), as it applies to the entire population and not only couples entering parenthood. The poverty threshold was 10,122 EUR in 2004 and 10,104 EUR in 2005.

I calculated **annual income** in three steps. First, I synchronized fertility histories with the income reference year (Debels & Vandecasteele, 2008). Second, I converted annual incomes into monthly incomes by dividing by twelve. Finally, I calculated the annual income for each 12-month interval t_i by summing all monthly incomes within each interval. I did this once for Claudia's household income (=29,600 EUR) and once for her personal income (=9,840 EUR).

To account for changes in **household composition** and the resulting changes in income needs over time, I used the OECD-modified equivalence scale, adjusting either income (household poverty risk) or the national poverty threshold (individual poverty risk). The scale accurately reflects the varying income needs of different household types in Germany (Dudel et al., 2021), accounting for couples' shared living costs (economies of scale) and the additional income parents need to maintain the same standard of living as childless couples (Letablier et al., 2009). In the first two years, couples have a factor of 1.5, which increases by 0.3 for each additional child. For example, until her first birth in May 2002, Claudia had a factor of 1.5, which then changed to 1.8. After her second birth in July 2004, her factor changed to 2.1. Her household income (household poverty risk) and poverty threshold (individual poverty risk in intervals t_i are adjusted monthly with the scale to reflect month-specific changes in household composition, including those beyond the first birth.

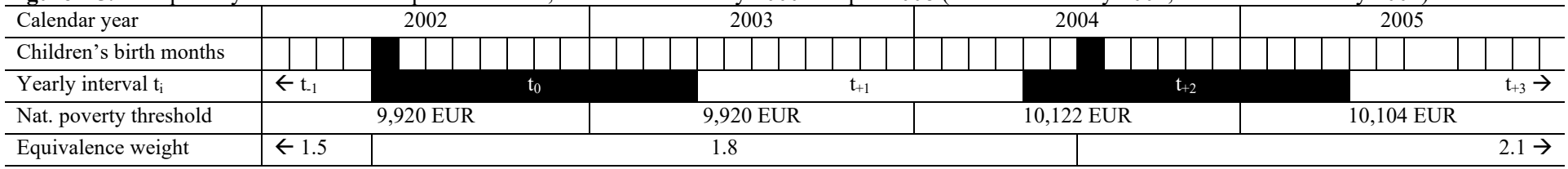
Household poverty risk. Someone is at risk of household poverty if their equivalised household income is below 60% of the national median income. As it is a household level indicator, partners always bear this risk together. Claudia and her partner received a combined annual income of 29,600 EUR. The household income is equivalised, dividing it by the OECD-adjusted weight for her household type (29,600 / monthly equivalence weight), which means that in June 2004, each household member has around 16,444 EUR (29,600 / 1.8). In July 2004, the equivalised household income was reduced to 14,095 (29,600 / 2.1) because of the birth of the second child, which changed the equivalence weight. In both months, Claudia's equivalised

household income exceeds the national poverty threshold, meaning that she and her family are not at risk of household poverty.

Individual poverty risk. Someone is at risk of individual poverty if their individual income is below the equivalised national poverty threshold. As it is a person level indicator, partners can have distinct poverty statuses. Claudia has an annual income of 9,840 EUR. To account for economies of scale despite studying individual incomes, I equivalised the national poverty threshold and divided it by the number of adults in the household ([Threshold * monthly equivalence weight] / 2). In June 2004, the poverty threshold is at 9,110 EUR ([10,122 * 1.8] / 2) and changes to 10,628 EUR ([10,122 * 2.1] / 2) because of the second birth. Claudia's personal income (EUR 9,840) is therefore above the threshold in June, but falls below the threshold in July, putting her at risk of individual poverty.

Both indicators were constructed using monthly information on household composition but aggregated into the yearly intervals of the sequence calendar. For each interval t_i, a person is considered at risk of individual or household poverty if they are at risk for at least six months. However, there are virtually no differences between the trends at annual and monthly granularity (not shown).

Figure A5. Two poverty indicators: Example of Claudia, followed from May 2000 to April 2008 (first birth in May 2002, second birth in July 2004)



Individual poverty risk

Annual personal income (in EUR), calculated in three steps:

1. Annual $Income_{2004}$= 11,040
   Annual $income_{2005}$= 7,440
2. Monthly $Income_{2004}$= 920 (11,040/12)
   Monthly $Income_{2005}$= 620 (7,440/12)
3. Annual income at t_{+2}=9,840 (920*8+620*4)

Equivalised poverty threshold (calculated monthly, changes with calendar years and changes in household composition):

05 to 06/2004: 9,110 EUR ([10,122 * 1.8] / 2]); 07 to 12/2004: 10,628 EUR ([10,122 * 2.1] / 2); 01 to 04/2005: 10,609 ([10,104 * 2.1] / 2)

Poverty risk, calculated monthly (Personal income below the equivalised poverty threshold):

06/2004: 9,840 EUR above 9,110 EUR → Not at risk of poverty
07/2004: 9,840 EUR below 10,628 EUR → At risk of poverty

Household poverty risk

Annual household income (in EUR), calculated in three steps:

1. Annual $Income_{2004}$= 28,800
   Annual $income_{2005}$=31,200
2. Monthly $Income_{2004}$=2,400 (28,800/12)
   Monthly $Income_{2005}$=2,600 (31,200/12)
3. Annual income t+2=29,600 (2,400*8+2600*4)

Equivalised household income (calculated monthly, changes with yearly intervals and changes in household composition):

05 to 06/2004: 16,444 (29,600 / 1.8); 07/2004 to 04/2005: 14,095 (29,600 / 2.1)

Poverty risk, calculated monthly (Equivalised household income below the national poverty threshold):

06/2004: 16,444 EUR above 10,122 EUR → Not at risk of poverty
07/2004: 14,095 EUR above 10,122 EUR → Not at risk of poverty

Monthly information is aggregated in yearly intervals t_i: If someone is at risk of poverty for at least six months of yearly interval t_i, they are considered at risk of poverty.

Note: This scenario is fictional.

D.2 Combined Alphabet: Household and individual poverty sequences

The combination of both indicators results in an alphabet with four states: (0) No poverty risk at either level, (1) Poverty risk at the household level only, (2) Poverty risk at the individual level only, (3) Poverty risk at both levels. This combined alphabet allows us to see how much individual and household poverty risks overlap for each person. When there is no poverty risk at either level, it means that a person has sufficient resources regardless of whether they share income with others. Being at risk at the household level only suggests that a person's own income is enough to secure themselves individually but not enough to support the entire household. Conversely, being at risk at the individual level only means that a person's income is insufficient for their own security, but they can avoid poverty by relying on their partner's income. Finally, being at risk at both levels indicates that a person cannot make ends meet regardless of income pooling; both their individual income and the shared household income are inadequate for economic security.

Table A7 summarizes the average time men and women spent in each state over the eight-year period, revealing a significant gender gap. Men faced poverty risk only 4% of the time, while women faced it 39% of the time, primarily at the individual level (37%). This suggests that partnered men typically have sufficient resources, whether or not they share income, whereas women often depend on their partner's income to avoid poverty.

Table A7. Average time at risk of poverty at the household and/or individual level

	Partnered men (N=587)		Partnered women (N=650)	
	Years (M/SD)	% of time	Years (M/SD)	% of time
Poverty risk status				
Not at risk of poverty	7.7/1.0	**0.96**	4.8 (2.6)	**0.60**
Only at the household level	0.2/0.6	0.02	0.0 (0.2)	0.00
Only at the individual level	0.1/0.6	0.02	2.9 (2.5)	0.37
At both levels	0.0/0.2	0.00	0.2 (0.8)	0.02

Source: SOEP, first births to couples 1992–2013, unweighted summary statistics. Notes: The modal state is highlighted in bold.

Chronograms of poverty trajectories (Figure A6) reveal that household poverty rates remain below 10% around the first birth for both genders. Men exhibit consistent patterns at both the individual and household levels. Women, however, display stable household poverty rates but greater fluctuations in individual poverty rates, particularly around the first birth (t0). Women are predominantly individually at risk of poverty (red). In contrast, men are more likely to experience household poverty while maintaining sufficient personal income (white). When women face household poverty, their personal income is typically insufficient as well (green).

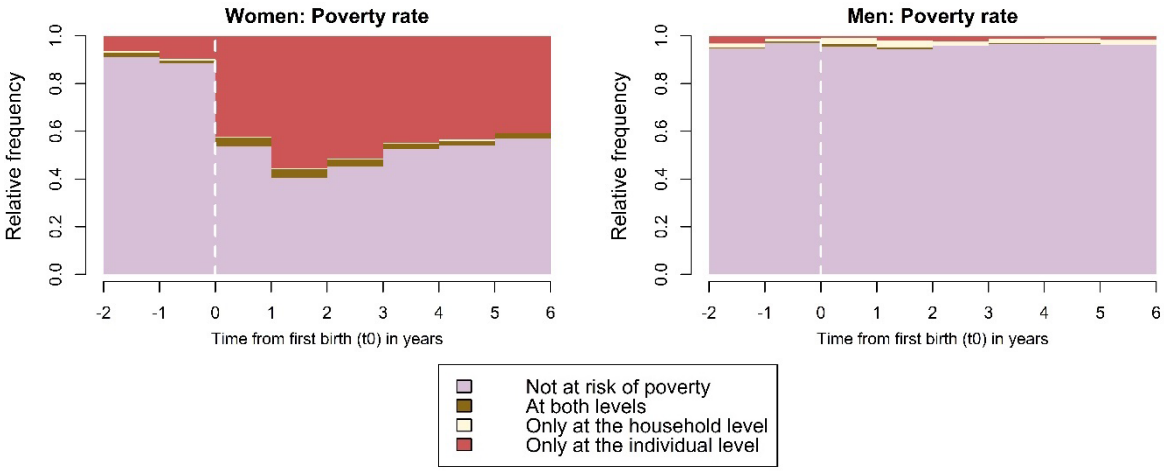


Figure A6. Poverty trends by gender, combined alphabet

E Employment

E.1 Yearly vs. monthly granularity

Figure A7 shows the gender-specific employment trends based on yearly (left) and monthly (right) data, separately by gender. By switching from monthly to yearly granularity, I only retained the modal state each year. A comparison of the chronograms shows that no substantial information is lost by aggregating the data at the annual level for either women (top) or men (bottom). Looking at individual trajectories (not shown), it appears that aggregating the data at the annual level mainly ignores shorter periods of inactivity and parental leave.

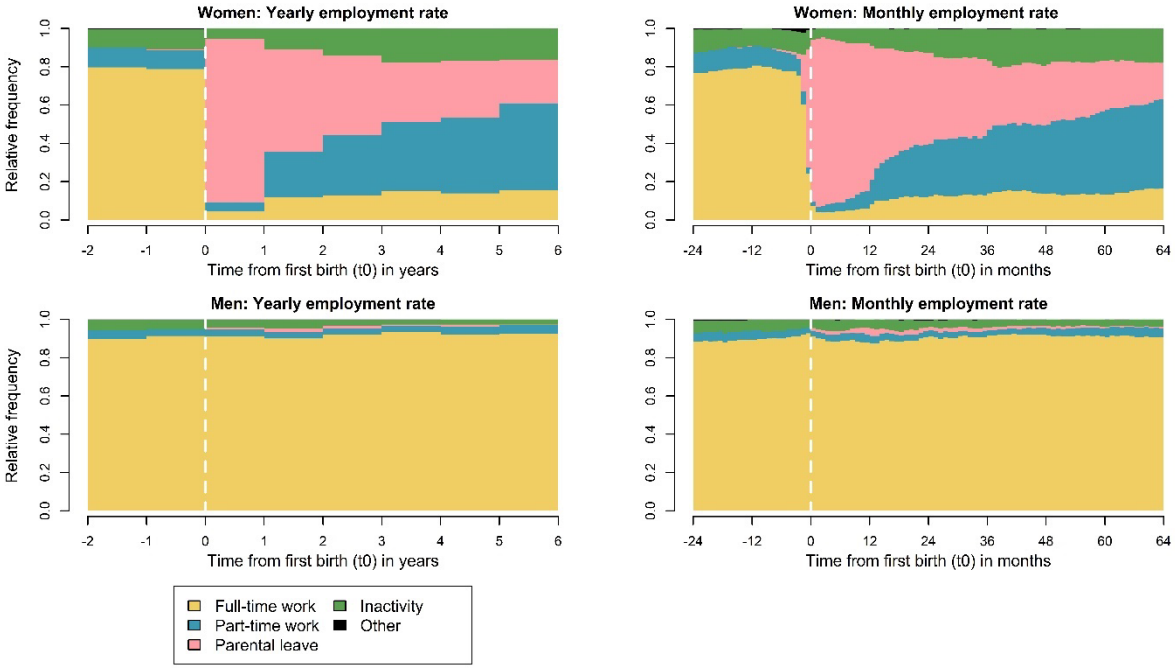


Figure A7. Employment trends by gender: Yearly vs. monthly granularity

E.2 Reduced vs. Extended Alphabet

Acknowledging that different types of inactivity may have different meanings (Cabello-Hutt, 2020), figure A8 shows the employment trends also with an extended alphabet (right panel), including all categories that are subsumed under inactivity (education/training, unemployment, homemaking and retirement). For men, being inactive usually means being unemployed (white), while for women it primarily means being a homemaker (red). Being in education/training (greyish brown) is usually observed at the beginning of the observation period, but only for a small proportion of the sample. Retirement (greyish teal) is not relevant for the selected sample. For women, using the extended alphabet did lead to the same clustering solution as the reduced alphabet (not shown).

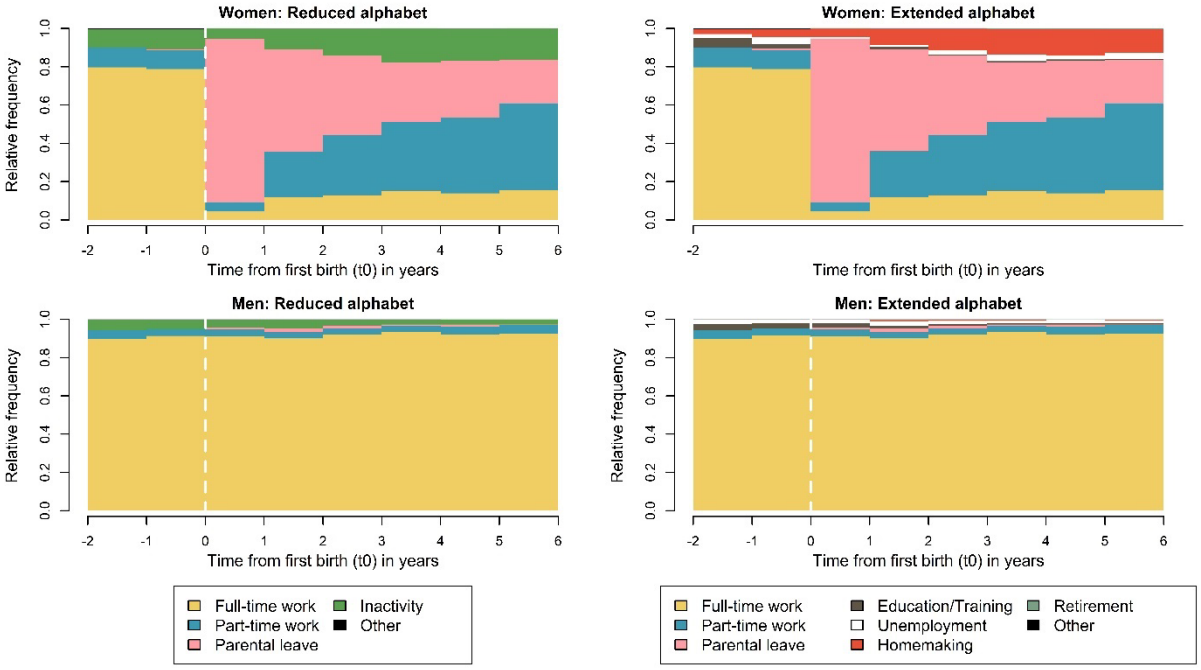


Figure A8. Employment trends by gender: Reduced vs. extended alphabet

F Clustering quality: Between- and within-cluster heterogeneity

While each cluster exhibits a general pattern, individual trajectories within clusters may vary. This section describes the heterogeneity between and within clusters, critically evaluating the coherence of the obtained four-cluster solution. Ideally, clusters should be homogeneous and clearly distinct from one another (Studer, 2021). However, cluster typologies are prone to classification error, with some individuals closely matching the main pattern of their assigned cluster, while others may fall between two groups or not fit strongly into any group (Helske et al., 2024). Cluster quality indices (CQI) are commonly used tools to validate typologies (for a comprehensive review, see Studer, 2013). These indices assess clustering quality from a statistical perspective, combining measures of within-cluster homogeneity and between-cluster separation. Moreover, to check the robustness of the clustering, I excluded cases that do not fit strongly in their cluster from the regression analysis to see whether this distorts the results.

F.1 Between-cluster heterogeneity

Figure A9 compares CQI across cluster solutions–Average Silhouette Width (ASW), Hubert's C (HC) and Point Biserial Correlation (PBC)–using standardised scores (Z-scores) on the left and original values on the right. ASW und PBC range from -1 to 1, with higher values indicating better partitions. Conversely, on a range from 0 to 1, a smaller HC value suggests a better partition. Based on these criteria and substantive interpretation, I chose a four-cluster solution for the female sample. This is the best solution according to HC (=0.06) and the second best according to ASW (=0.35) and PBC (=0.63), following the two-cluster solution (which is usually preferred by these measures, cf. Studer, 2021). However, a two-cluster solution would not distinguish between those with no or short-term poverty spells (Cluster 1+2) and those experiencing longer-term or persistent poverty spells (Cluster 3+4).

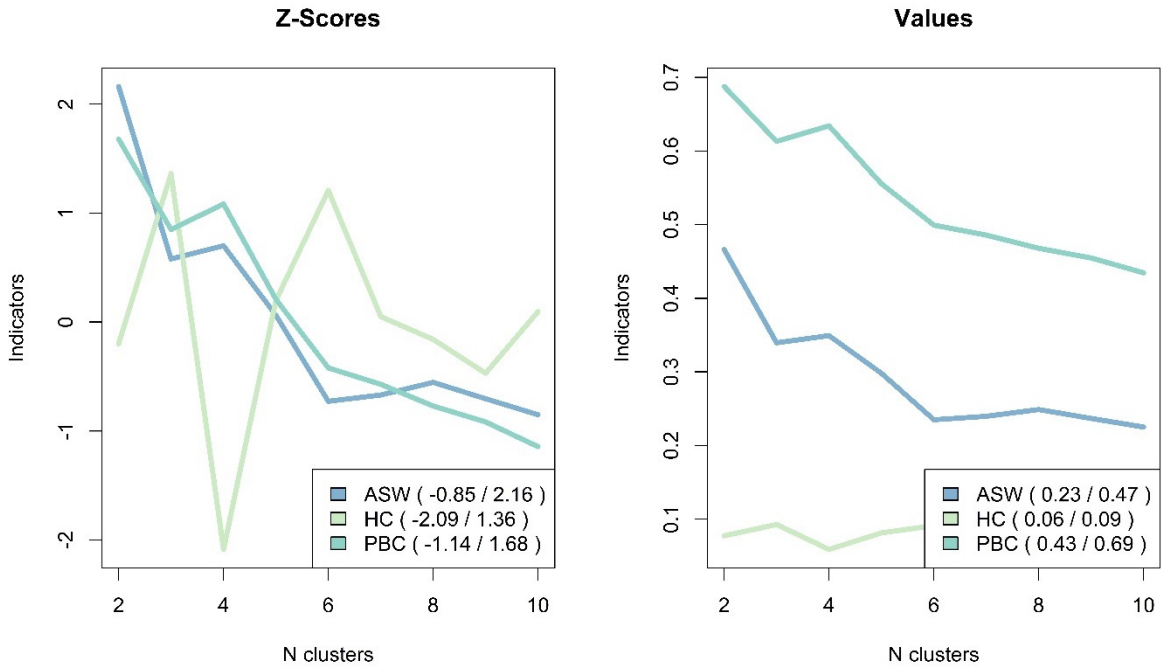


Figure A9. Quality Statistics by cluster solution: Standardised scores (Z-scores) and original values.

F.2 Within-cluster heterogeneity

The PAM+Ward clustering algorithm assigns sequences to the nearest medoid (Studer, 2013). Even if a sequence appears quite different from others in its cluster, it is still more similar to them than to sequences in other clusters. Figure A10 displays silhouette values per cluster, measuring how far each sequence is from its cluster's medoid. The small number of sequences with negative values suggests that the clustering algorithm effectively partitioned the data.

An average ASW of 0.25 is typically considered the threshold for a reasonable cluster structure (Studer, 2013). Most clusters perform well, with ASW values around 0.40, indicating a well-defined structure. However, the second cluster has an ASW of just 0.18, suggesting lower coherence. From a substantive point of view, this lower coherence is expected, as the cluster represents an intermediate group between those experiencing no poverty and those facing longer poverty spells after their first birth. Figure A11 further illustrates this pattern using sequence index plots sorted by individual silhouette values. The most representative sequences appear at the top, while those with lower silhouette values—deviating more from their assigned cluster's pattern—are at the bottom. Some sequences at the bottom cannot be clearly assigned to a specific cluster. Section F.3 addresses their potential impact on regression results.

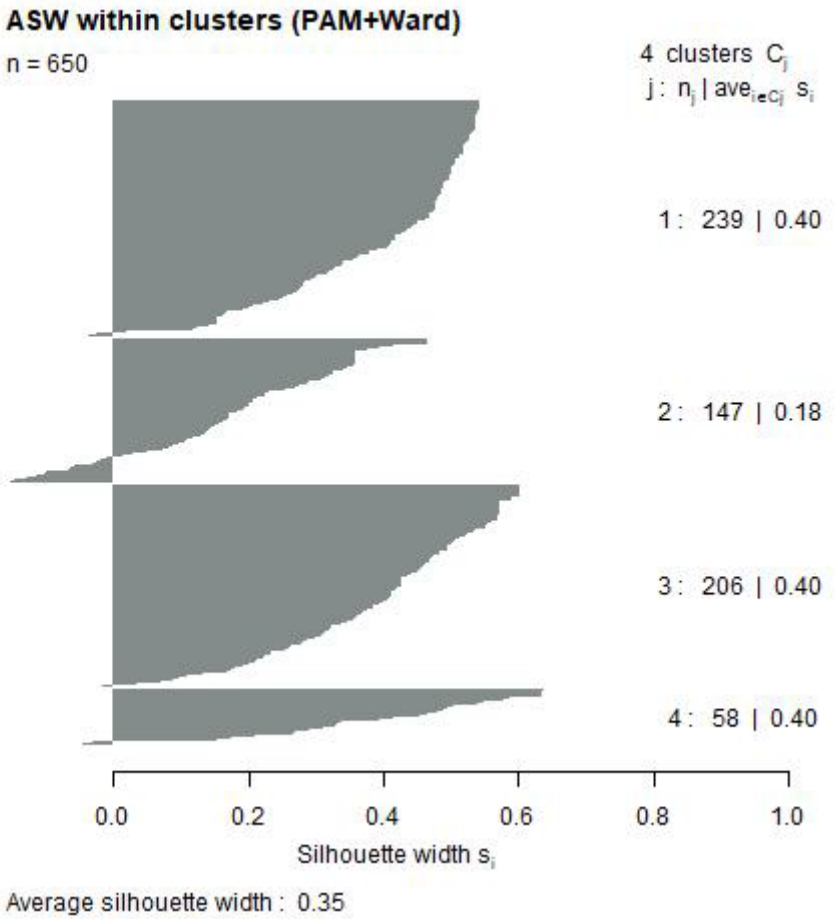


Figure A10. Cluster-specific average silhouette values

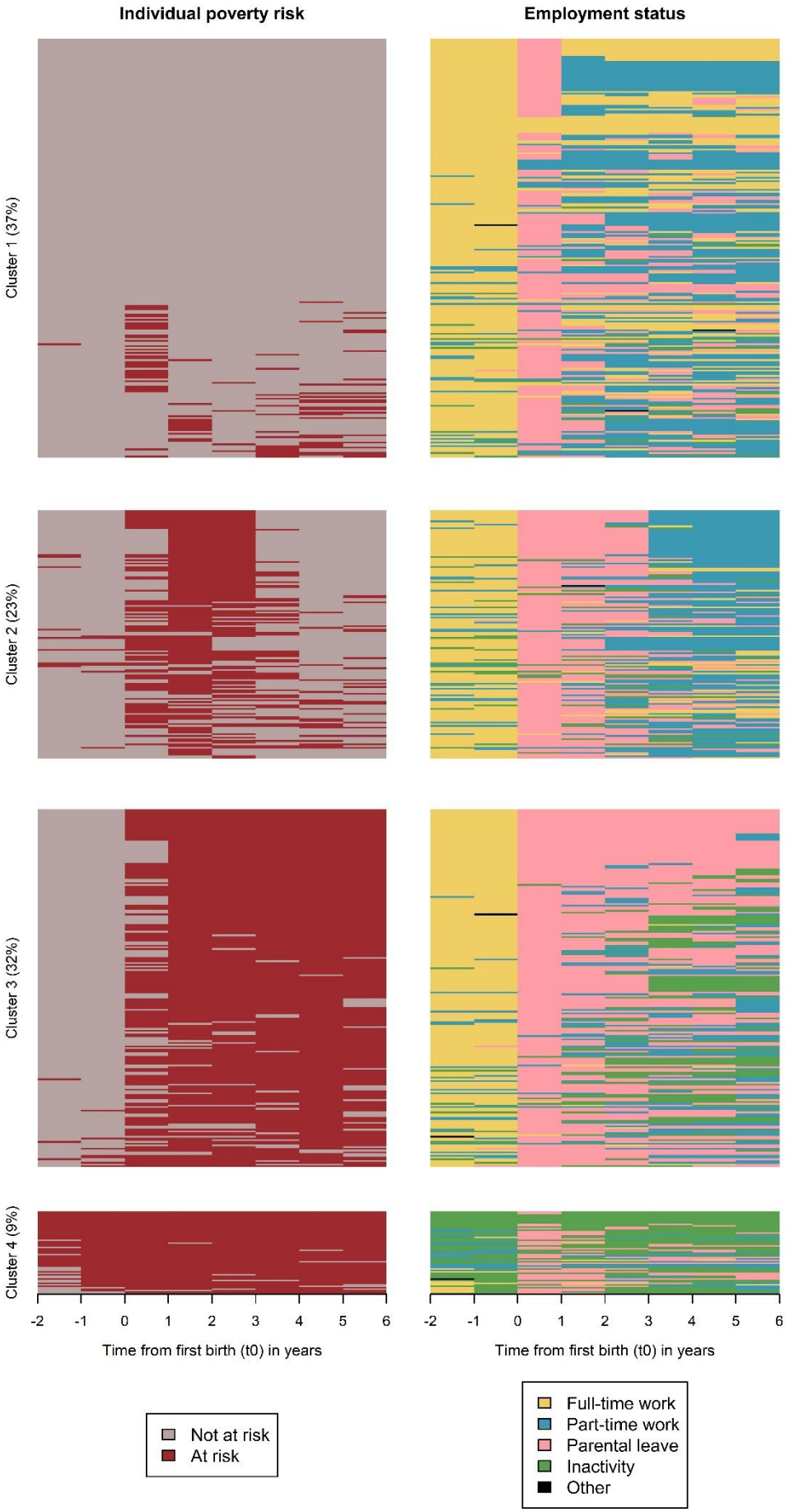


Figure A11. Sequence index plots by cluster, sorted by the silhouette values

F.3 Robustness check: Accounting for within-cluster heterogeneity in the regression analysis

I assess whether the heterogeneity within each cluster systematically affects the analysis or is simply random noise by excluding deviant sequences from the regression (following Jalovaara & Fasang, 2020). I first exclude sequences with silhouette values below 0.00 (5% of cases), and then those with values below 0.25 (28% of cases).

Figure A12 shows a comparison of the average marginal effects from the main model (left panel), the model excluding sequences with ASW below 0.00 (center panel), and the model excluding sequences with ASW below 0.25 (right panel). The results reveal that excluding sequences with silhouettes below 0.00 causes only minor deviations. However, excluding sequences with silhouettes below 0.25 increases standard errors due to the significant reduction in cases, particularly in the second cluster, though the results remained qualitatively similar to the main model. Thus, I conclude that the estimates are reasonably stable to classification errors in the sequence clusters, and I retain the model with the full sample and lower standard errors in the main results.

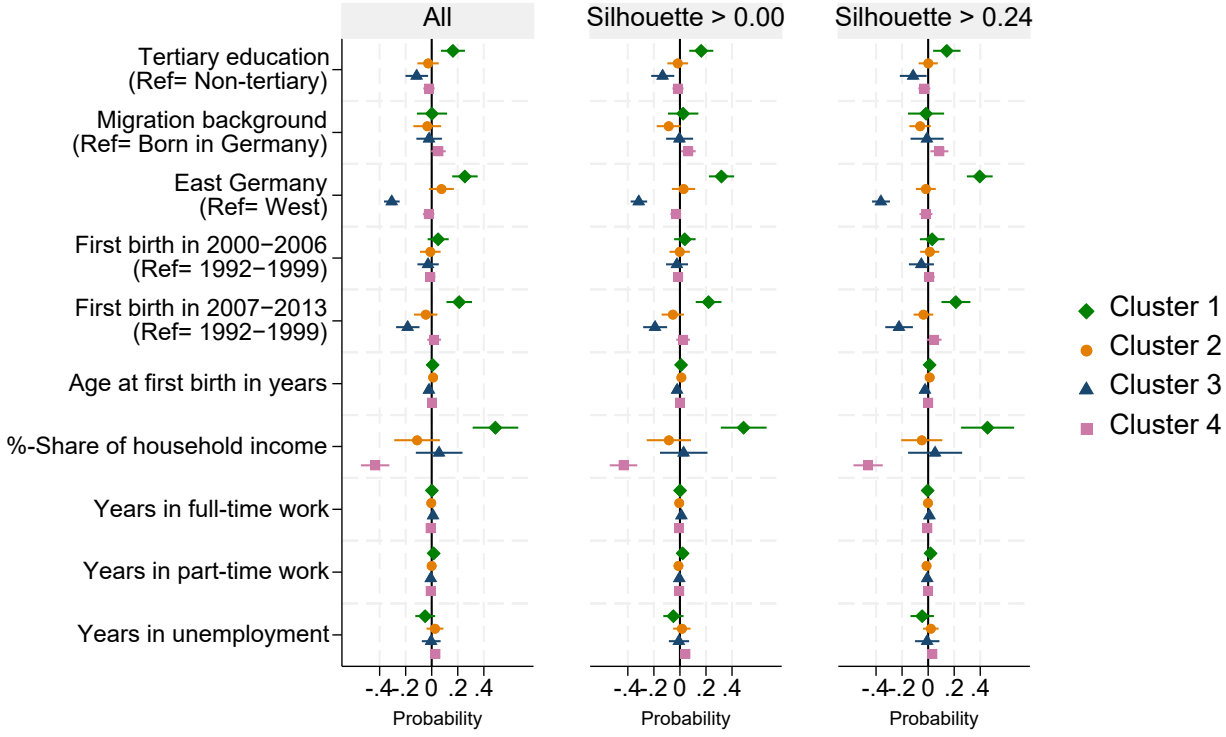


Figure A12. Average marginal effects of cluster assignment, full results in tables A4 and A8.

Table A8. Predicted cluster assignment excluding deviant cases

	Cluster 1	Cluster 2	Cluster 3	Cluster 4
excluding cases with silhouette values below 0.00, N=613				
Tertiary education (Ref= Non-tertiary)	0.16*** (0.05)	-0.02 (0.04)	-0.13** (0.05)	-0.02 (0.02)
Migrant background (Ref= Born in Germany)	0.02 (0.06)	-0.09 (0.05)	-0.00 (0.05)	0.06* (0.03)
Living in East Germany (Ref= West Germany)	0.32*** (0.05)	0.03 (0.05)	-0.32*** (0.03)	-0.03 (0.02)
Years 2000–2006 (Ref= 1992–1999)	0.04 (0.04)	-0.00 (0.04)	-0.02 (0.04)	-0.01 (0.02)
Years 2007–2013 (Ref= 1992–1999)	0.22*** (0.05)	-0.05 (0.04)	-0.19*** (0.05)	0.02 (0.03)
Age at first birth in years (continuous)	0.01 (0.01)	0.01 (0.01)	-0.02* (0.01)	0.00 (0.00)
%-share of household income (continuous)	0.49*** (0.09)	-0.09 (0.09)	0.03 (0.09)	-0.43*** (0.05)
excluding cases with silhouette values below 0.25, N=471				
Tertiary education (Ref= Non-tertiary)	0.14** (0.05)	0.00 (0.04)	-0.11* (0.05)	-0.03 (0.02)
Migrant background (Ref= Born in Germany)	-0.02 (0.07)	-0.06 (0.04)	-0.01 (0.06)	0.09* (0.04)
Living in East Germany (Ref= West Germany)	0.40*** (0.05)	-0.02 (0.04)	-0.36*** (0.04)	-0.02 (0.03)
Years 2000–2006 (Ref= 1992–1999)	0.03 (0.05)	0.01 (0.04)	-0.05 (0.05)	0.01 (0.02)
Years 2007–2013 (Ref= 1992–1999)	0.21*** (0.06)	-0.04 (0.04)	-0.22*** (0.05)	0.05 (0.03)
Age at first birth in years (continuous)	0.01 (0.01)	0.01 (0.01)	-0.02** (0.01)	0.00 (0.00)
%-share of household income (continuous)	0.46*** (0.10)	-0.05 (0.08)	0.05 (0.11)	-0.46*** (0.06)

Source: SOEP, first births to couples 1992–2013, own estimations. Average marginal effects with standard errors in parentheses. Models control for previous work experience. * p<0.05, ** p<0.01, *** p<0.001