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ORIGINAL ARTICLE

# What if it is not just an additional income? Poverty risks of non-standard employment histories in Germany

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## Abstract

While the poverty risks associated with transitions to and from different forms of non-standard employment (NSE) have been studied extensively, poverty research on NSE histories remains fuzzy. Therefore, this study focuses on persons with NSE histories whose earnings contribute significantly to the household income, asking to what extent they are exposed to income poverty risks during their main career phase and examining the role of employment, family and sociodemographic characteristics. Employment histories were observed over 10 years using German Socio-Economic Panel data from 2001 to 2020. A sequence cluster analysis identified four NSE clusters with increased poverty risks, namely, those with increasing and permanent low-part-time work, those who were mainly temporary agency-employed or had long episodes of fixed-term employment. Multivariate regressions considering employment-specific, care-related and sociodemographic characteristics revealed a network of cumulative disadvantages related to gender, occupational position, care obligations and structural disadvantages for those clusters.

## KEYWORDS

atypical employment, employment history, in-work poverty, labour market deregulation, non-standard employment, part-time employment, temporary employment

## INTRODUCTION

Over the last 30 years, the percentage of the labour force in forms of non-standard employment (NSE)—understood as all forms that do not correspond to the so-called standard employment relationship (a permanent full-time job subject to social insurance)—has increased tremendously in Germany,<sup>1</sup> rising from 27.3% in 1991 to 40.7% in 2022.

<sup>1</sup>Following Keller and Seifert (2013), this study distinguishes between the following forms of NSE: fixed-term, temporary agency-employed, part-time with a low or high volume of work hours, marginal and solo self-employment.

This increase was almost entirely due to the rise (from 19.1% to 32.5%) of dependent employees in NSE in this period, while the percentage of self-employed remained constant (Federal Statistical Office of Germany, 2023). At the same time, the percentage of working poor (Lohmann & Marx, 2018), that is, individuals living in a household with an income below the poverty line (less than 60% of the median equivalised household disposable income), increased, particularly in the 1990s and 2000s, and remained high in the 2010s, accounting for 8.7% of German residents in 2021 (Eurostat, 2023). Numerous studies have linked this development of in-work poverty,

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which is especially challenging for employment-centred societies such as Germany, to the rise in NSE and its limited capabilities to prevent poverty (Brülle et al., 2019; Colombarolli & Lersch, 2023; Giesecke, 2009; Giesselmann, 2015; Horemans, 2018; Westhoff, 2022).

From a life course perspective (Fasang & Mayer, 2020; Mayer, 1998, 2009), the poverty risks of NSE are often interpreted as age effects and particularly emphasised with regard to the entry (NSE as a career stepping stone) and exit (NSE due to health issues) phases of the employment course. In the main employment phase, NSE is not usually accompanied by higher poverty risks, primarily due to traditional gender-specific family arrangements, as in many cases, mostly female persons in NSE are secured by their partners and NSE is a mere addition to the household income (Böhnke et al., 2015; Hackett, 2012). However, it remains unclear to what extent NSE is only an additional earning in the main career phase and, more importantly, what happens when NSE is more than an additional income for the household. As some recent studies have shown a substantial share of precarious employment histories within the main employment phase (Allmendinger et al., 2018; Kottwitz & Goebel, 2019), the question of NSE's responsibility for experiencing poverty is of particular importance.

Therefore, this study asks to what extent *substantial earners* with NSE histories are exposed to income poverty risks during their primary working phase. Unlike previous studies, it aims to shed light on the poverty risks of NSE histories while considering the financial importance of such employment for the household, this being an underexplored subject. Furthermore, it distinguishes between NSE histories in terms of different forms and varying durations of NSE within the employment course. Since poverty research demonstrates that the cumulation of disadvantages (Vandecasteele, 2011) resulting from the complex interplay of employment patterns (e.g., unemployment), critical family events (e.g., divorces) and sociodemographic characteristics (e.g., educational level or ethnic background) particularly increases the risk of poverty, this study also examines the importance of further employment, family and sociodemographic characteristics for the poverty risks of different NSE histories.

The analysis revealed, first, that the poverty risks of specific NSE histories in the main employment phase are obscured by the significant share that only serves to generate additional income. Second, in-work poverty affects substantial earners, and it may be that NSE promotes a lock-in effect resulting in a permanently marginalised employment situation. Third, the gender-specific nature of certain employment histories leads to gender-specific poverty risks, particularly in female part-time employment histories. Fourth, four NSE employment histories

(increasing and permanent low-part-time employment, mainly temporary agency-employed and regular employment with long episodes of fixed-term employment) witness particularly high poverty risks.

## REASONS FOR NSE IN THE MAIN EMPLOYMENT COURSE

This section presents the primary reasons that forms of dependent NSE<sup>2</sup> are adopted during the main working phase from the employees' perspective, then outlines the reasons for the prevalence of NSE relationships from a structural perspective. Both perspectives are necessary to derive assumptions about the poverty risks associated with various NSE trajectories of substantial earners.

### Taking up NSE: A life course perspective

From a life course perspective, the *normal life course* (Kohli, 1985) is framed by a preceding phase of qualification (education), an active phase (employment) and a subsequent phase of rest (retirement). Individuals organise their life courses according to this institutionalised norm, which is anchored in society through legal requirements (e.g., retirement ages) and values. For men, in particular, the main employment phase is normally characterised by stable standard employment relationships and wage increases as professional experience grows. Given the traditional gender-specific division of labour, women's main employment phases usually deviate from the male pattern: for them, phases of inactivity and part-time employment due to family care responsibilities are the norm in the main employment phase, making an NSE history more likely for women (Moen, 2016).

There are reasons other than family care responsibilities for taking up NSE. As shown in Figure 1, this study differentiates between the primary and secondary functions of various forms of employment in the main employment phase. The primary function concerns financial resources. If the NSE serves only as additional income and a larger share of the household income is earned by another employed household member, usually in regular employment, financial resources from the NSE play a minor role. These variants of the dual breadwinner model (Lewis, 2001) represent a significant share of those in NSE, mostly in part-time and

<sup>2</sup>Solo self-employed individuals are included in the analysis but are not the focus of this study.

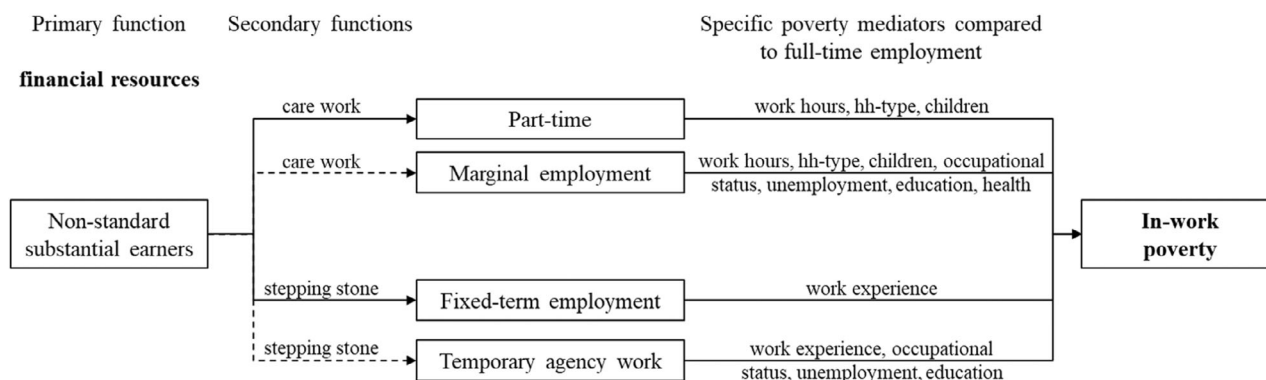


FIGURE 1 Functions of non-standard employment and specific poverty mediators within the employment course.

marginal<sup>3</sup> employment, in the main employment phase in Germany (Böhnke et al., 2015). In contrast, if the NSE is of high financial importance for the household, it must fulfil similar financial functions to those traditionally attributed to regular employment. However, as wage levels and employment security are highest for the standard employed, it is assumed that *substantial earners* strive for this employment form. Therefore, people take up NSE only if alternatives are lacking on the labour market or for reasons—referred to here as secondary functions—that make a specific form of NSE necessary.

As depicted in Figure 1 via the two upper paths, one secondary function of NSE in the main employment phase is care work. Reducing working hours makes it possible to reconcile employment and care work, such as raising children and caring for elderly. When children are very young, in particular, many family care responsibilities cannot be satisfied externally. Therefore, part-time and marginal employment in the main employment phase often fulfil a care function and is predominantly taken up by women. Cohort comparative analyses confirm the increasing importance of NSE's reconciliation function for women (Bachmann et al., 2020).

NSE can be a career stepping stone in the main employment phase for those experiencing unemployment interruptions or with little experience in their professional field. For substantial earners in NSE, transitions into regular employment (bridging effect) are desirable when functions such as care work decrease or work experience increases. Bridging effects are highest for fixed-term employees, followed by part-time employees and temporary agency-employed workers, and least likely

for those in marginal employment (Brülle, 2013; Kvasnicka, 2009). Apparent differences exist regarding education level and ethnic background. Bridging effects are primarily limited to university graduates and non-migrants, while low-educated individuals and migrants disproportionately remain in forms of NSE (Schmelzer et al., 2015). When no transition to regular employment occurs, this is referred to as an NSE lock-in effect. Such effects exist for all NSE types; hence, part-time and marginal jobs often become permanent (Bachmann et al., 2020). Temporary agency-employed workers are especially exposed to lock-in effects in economically challenging times (Jahn & Rosholm, 2018).

## Structural aspects of NSE in Germany

From the perspective of neoclassical labour market theory, the *erosion of the standard employment relationship* (Mückenberger, 2010) in terms of the deregulation and flexibilisation of employment forms is necessary since a greater differentiation of employment forms in the context of employment stability favours a dynamic labour market that can react quickly to economic crises. Forms of NSE with less employment protection are particularly fixed-term employment, temporary agency work, marginal employment and pseudo self-employment (Keller & Seifert, 2013). While fixed-term contracts are intended for project work, parental or sick leave replacement or as an implicit extension of the probationary period, employees in these employment forms fulfil permanent work activities that fluctuate in volume with the business cycle and therefore require quick adaptability by the company in terms of volume requirements.

Parallel to the increasing flexibility requirements of the labour market, female labour force participation rose sharply in the second half of the 20th century (Lewis, 2001). Goldin (2006) mentions the following main

<sup>3</sup>Marginal employment refers to a specific form of employment in Germany (mini-jobs) that is not subject to social security contributions and is either very limited temporally (seasonal work) or financially (€520 per month).

reasons for this. First, the male breadwinner model became increasingly insufficient to meet the financial needs of families. Second, women were able to participate more as the contraceptive pill made it possible to plan and delay family formation. Moreover, technological change has reduced the time required for housework. Finally, due to educational expansion and individualisation, women were progressively questioning patriarchal gender norms, consequently advocating for enhanced participation in the workforce (see also Rubery et al., 1999). However, the consequent dissolution of traditional gender roles concerning paid employment was only partial, as gender role attitudes with respect to care work remained (Cotter et al., 2011; Lois, 2020). Therefore, care work is still predominantly carried out by women, which is why they often work in more flexible employment forms like part-time or marginal employment.

In the 2000s, the implementation of the so-called ‘Hartz reforms’ aimed to rapidly reintegrate the (long-term) unemployed and inactive into the labour market in times of high unemployment. Therefore, temporary agency employment was deregulated, particularly through the abolition of the maximum duration of assignment and the lifting of the ban on synchronisation, the ban on fixed-term contracts and the ban on re-hiring. Regarding marginal employment, the monthly salary cap was raised to €400 (€520 in 2024), the restriction on weekly working hours to 15 h was lifted and the possibility to have a mini-job as a second job was given again (Eichhorst & Tobsch, 2015). These flexibilisations led to a massive increase in marginal employment and temporary work (Weinkopf, 2009).

The increase in forms of NSE due to these structural changes in the labour market and households is concentrated in certain groups. Women are clearly over-represented in part-time and marginal jobs, while migrants and low-educated people are over-represented in all forms of NSE. NSE is below average in male-dominated sectors and above average in female-dominated sectors (Federal Statistical Office of Germany, 2023).

## POVERTY RISKS OF NSE HISTORIES

Forms of NSE can be functional in fulfilling employees’ demands and beneficial to employers’ requirements, potentially resulting in contradictory needs and thus higher labour market risks. Various labour market polarisation approaches (e.g., Doeringer & Piore, 1971; Kalleberg, 2009; Lindbeck & Snower, 1988; Rueda, 2005) address the risks of insecure employment forms. The increase of such forms in Germany favoured a broader low-wage sector and promoted labour market dualisation between core workers in

regular jobs and peripheral workers in flexible forms of employment (Eichhorst & Kendzia, 2016; Eichhorst & Marx, 2011; Emmenegger et al., 2012). Consequently, individuals in NSE experience job-specific disadvantages compared to the standard employed. Employers less often promote non-standard employees, which is also reflected in a lower perceived labour market attachment (Gundert & Hohendanner, 2014). Moreover, as chances of participating in on-the-job training depend highly on employment-specific characteristics, they are lower for non-standard employees (Lischewski et al., 2020).

The extent and causes of poverty risks differ substantially among the various forms of NSE in Germany. However, before addressing the poverty risks of specific forms of NSE, some generalising assumptions can be drawn. Women, low-educated and single-parent households—all with high shares of NSE relationships—experience higher in-work poverty risks (Giesselmann, 2015; Jaehrling et al., 2014). Regarding employment-specific events, employment histories characterised by interruptions have high poverty risks (Kohler et al., 2012). Therefore, NSE can be beneficial in reducing future poverty risks due to a better occupational perspective regarding future earned income (Gebel, 2013). However, re-entry into employment after unemployment is associated with lower wages (Gangl, 2006). This linkage intensified after the labour market reforms in the 2000s (Gerlitz, 2018; Woodcock, 2023). Additionally, working-class families face growing challenges in their ability to buffer phases of low earnings and interruptions (Brülle, 2016; Gerlitz, 2023). Furthermore, inactivity due to care work also significantly decreases household income for substantial earners. In the long term, shorter career breaks and continuous employment phases for women in their main employment phase reduce, while family-related career interruptions increase the poverty risk in old age (Möhring, 2018; Möhring, 2021).

## Part-time employment

Part-time employment is predominantly performed during the main employment phase to meet family care obligations, such as for children or older adults. The differences in the poverty risks between part- and full-time employees are relatively small, as a large share of part-time employees gains security from the income of a partner or spouse (Colombaroli & Lersch, 2023; Horemans, 2018). However, the poverty risks of permanent part-time employment among substantial earners should increase for several reasons. First, working fewer hours directly affects wages (Paul, 2016). If part-time wages are a substantial income, poverty risks are higher



due to lower financial resources. Second, although full-time and permanent part-time workers have similar qualifications, the latter have a higher risk of de-skilling, which affects future earnings (Dütsch & Struck, 2014). Furthermore, part-time work occurs more often in the service economy and in jobs that require fewer qualifications (Brülle et al., 2019). Thus, the poverty risks of part-time employment histories among substantial earners are assumed to be higher than of standard employment histories, largely due to the number of working hours, household type, amount of childcare, and economic sector.

## Marginal employment

The marginally employed face higher poverty risks than those in regular jobs, irrespective of the financial significance of the job for the household (Eichhorst & Tobsch, 2015). In addition to low labour market attachment regarding working hours, marginally employed individuals are more affected by unemployment and job changes during their employment history although evidence also suggests an integrative function, as marginal employment increases job seekers' chances of finding a job (Caliendo et al., 2016; Freier & Steiner, 2007; Lietzmann et al., 2017). Qualification-specific differences also exist, as marginally employed workers have significantly fewer qualifications than regular employees (Brady & Biegert, 2017). Therefore, substantial earners who are mainly marginally employed during their employment history are expected to witness the highest poverty risks. The poverty risks of marginal employment histories can be explained by those of part-time employment histories and additionally by education and health. However, since maintaining a decent living standard with marginal employment alone is difficult, this group should only make up a small share of substantial earners.

## Fixed-term employment

Compared to part-time and regular employment, fixed-term employment is often associated with higher poverty risks (Giesecke, 2009) and wage penalties (Fauser, 2020; Janietz et al., 2023; Westhoff, 2022) which is not due to differences in qualification levels (van Lancker, 2012). Gebel and Gundert (2023) showed that starting fixed-term instead of regular employment after a period of unemployment leads to a similar reduction in the risk of poverty in both the short and medium terms. Nevertheless, if a transition into regular employment fails, fixed-term employed individuals are likely to have

unstable employment histories, including job changes and phases of unemployment (Allmendinger et al., 2018). The higher poverty risks of fixed-term employment are mainly explicable by the duration of the employment, the occurrence of the bridging effect and work experience (see also Latner & Saks, 2022 for an overview).

## Temporary agency employment

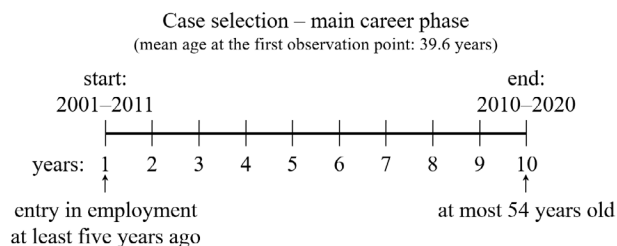
Temporary agency-employed workers run specific employment and income risks, reflected in lower wages and higher risks of unemployment compared to regular employed (Dütsch, 2011; Giesecke, 2009). Recent findings stress that the wage gap is mainly driven by sociodemographic differences as well as varying working hours (Bachmann et al., 2024). Temporary agency workers also have qualification-specific disadvantages, as they are less likely to possess a vocational qualification and are often employed as helpers (Federal Employment Agency, 2023). They often live in financially insecure households, a high proportion is directly dependent on basic security benefits after losing their job, and an above-average number receives supplementary benefits (Federal Employment Agency, 2023). Therefore, temporary agency-employed workers are assumed to have substantially higher poverty risks, largely explained by their occupational status, work experience, education and household type.

In summary, the poverty risks among substantial earners with different employment histories are assumed to depend substantially on their form of NSE and corresponding household constellation. Substantial earners who have caring responsibilities need high labour market participation to prevent poverty risks. If NSE is seen as a stepping stone, a longer stay in insecure employment relationships, such as fixed-term or temporary agency employment, is assumed to be related to higher unemployment and poverty risks.

## DATA AND METHODS

### Sample

The study used data from the longitudinal sample of the German Socio-Economic Panel (SOEP, version v37). The same individuals and households have been surveyed annually since 1984 (Goebel et al., 2019). Figure 2 visualises the case selection. The survey data ranged from 2001 until 2020, since a differentiated query of NSE was only included in the SOEP questionnaire from 2001 onwards. The individuals had been observed for 10 years consecutively in their main career phase. Individuals



**FIGURE 2** Case selection. Individuals were observed 10 years in a row in their main career phase.

were excluded from the analysis if information on their employment status during this period was missing or the observation period was under 10 years. The main career phase was defined as having been in employment for at least 5 years and being no more than 54 years old.<sup>4</sup> If more than 10 continuous survey periods were available, the most recent waves were used.

To focus on substantial earners, all employment histories were excluded from the analysis in which the wage merely functioned as additional household income. Employment histories were excluded if the net employment income contributed less than one third of the net household income during the observed period. I argue that in these cases, financial security is primarily not provided by one's own employment but by other household members or social security benefits. Years with no employment income were treated as missing in the calculation of the share. It was decided not to focus on main earners for reasons of gender-specific selectivity and because NSE histories in couple households often represent the second income.

The study focused on the part of the main employment phase that can be regarded as the most stable phase of working life. Respondents at the time of the first survey were 39.6 years old on average. Interruptions due to childbirth were infrequent and occurred in only 16.4% of female employment histories. Thus, in most of the observed employment histories, intensive early childhood education, often occurring within the family, no longer played a role. Moreover, informal elderly care was not performed frequently on working days, although it increased from 2.9% during the first survey to 6.3% during the last. The final sample contained 47,350 observation points from 4735 substantial earners in the main employment phase.

<sup>4</sup>As the time spent in the German education system varies greatly depending on the educational pathway, the start of the main employment phase was not determined by an age threshold.

## Operationalisation

To identify NSE history types, the employment status was differentiated into 10 categories: inactive,<sup>5</sup> unemployed, regularly employed, self-employed, and six forms of NSE. Based on Keller and Seifert (2013) and Böhnke et al. (2015), the latter were categorised as fixed-term full- or part-time employed, marginally employed, with a permanent contract part-time employed on less than 28 h per week (low-part-time employed) or at least 28 h per week (high-part-time employed), temporary agency-employed and solo self-employed. All persons who indicated they were employed full-time with a permanent contract were considered regularly employed.

Income poverty was derived from net equivalised household income. Individuals were considered income-poor if they lived in households with an income below 60% of the median household net equivalised (use of the modified OECD scale) income. In the analysis, the term *poverty risk* referred to the percentage of individuals experiencing income poverty. Furthermore, based on previous research, the study considered central factors affecting the poverty risks of NSE trajectories. Regarding employment-specific life events and characteristics, it considered previous unemployment experience, primary occupational status (manual labourers, employees and others), number of job changes (none, one and at least two) and average weekly working hours. Concerning care-specific events, the analysis considered births during the observation period, daily childcare on working days (in hours) and household type (single, couple without children, single parent, couple with one child, couple with two or more children and other). Additionally, the study considered sociodemographic characteristics and events, such as partnership changes (separations and moves-in, recorded through changes in household type), gender (male, female), education (Casmin-level 1a–c = low; 2a–c = medium and 3a–b = high), health status (bad, okay and good) region (eastern, western Germany), migration background (none, direct or indirect migration background) and age.

## Analytical strategy

The study applied sequence pattern analysis to investigate similarities and differences in employment histories (Brzinsky-Fay et al., 2006). Considering the distance matrix obtained from the sequence analysis, a cluster analysis was performed to typify the employment

<sup>5</sup>Persons who are not employed and not registered as unemployed or persons in training or military/civilian service.

histories. The goal was to distinguish various NSE trajectories based on the type and duration of employment and frequency of transitions to other employment statuses. The computation of distances between individual sequences followed an optimal matching algorithm (Abbott & Tsay, 2000). The analysis used STATA with the *ados sq* (Brzinsky-Fay et al., 2006) and *sadi* (Halpin, 2017). The Needleman–Wunsch algorithm was employed to calculate the smallest Levenshtein distances between sequences. Substitution costs were determined based on the transition probabilities of different employment status changes. Therefore, employment status changes that occur more frequently in sequence have higher similarity, resulting in lower substitution costs. The indel costs were set to 1. The lower the costs required for two sequences to be similar, the smaller the distance between them. Distances were calculated for 1930 different sequences (40.8%).

The hierarchical cluster analysis aimed to group similar employment trajectories and highlight the differences between clusters. The clusters were formed using the Ward method, which typically generates internally homogeneous clusters (Scherer & Brüderl, 2010). Thereafter, the NSE clusters were thoroughly described, and gender-specific multivariate logistic regression models were estimated to analyse the relevance of employment—as well as care-specific and sociodemographic factors on the poverty risk of different NSE clusters.

## RESULTS

### Sample descriptives: Employment histories of substantial earners

Table 1 shows the gender share as well as the poverty risks and mean years in different employment statuses for women, men and in total among substantial earners, those excluded as additional earners and the total sample. Focusing on substantial earners led to a gender-specific selection. While the overall proportion of female employment histories was 50.1%, it decreased to 40.2%, as 91.4% of additional earners were female. Among substantial earners, men had lower poverty risks than women, both in regular employment as well as in NSE. Female substantial earners in NSE had higher poverty risks than female additional earners in NSE (11.2 vs. 6.4). However, among males in NSE, substantial earners had lower poverty risks than additional earners (9.6 vs. 24.1).

Regarding the mean years in employment status, the differences for substantial and additional earners were striking for both males and females. Of the observed 10 years, female substantial earners were, on average, in

regular employment for 4.6 years longer, in NSE for an average of 3.1 years fewer and inactive or unemployed for 1.6 years fewer. Male substantial earners were, on average, in regular employment for 5 years longer, in NSE for 2.2 years fewer and inactive or unemployed for 2.9 years fewer. Therefore, substantial earners were, on average, not employed for less than 1 year and, particularly for women, NSE remained important.

### Sequence cluster analysis: NSE histories and their poverty risks

The number of clusters was determined graphically using sequence index and percentage plots (Supporting Information: Figures A1 and A2).<sup>6</sup> Sequence index plots represent all employment histories in horizontal lines, indicating the respective employment status for 10 consecutive sequences. High homogeneity within a cluster was observed when the individual sequences within that cluster showed strong similarities. The aim was to extract NSE histories with similar persistence or transition patterns. This approach led to a cluster solution of 17 clusters, of which nine represented NSE trajectories relevant to this study.

Table 2 provides an overview of all clusters regarding size, poverty risk at the end of the observation period, sex ratio and share of trajectories, including NSE and average years in different employment status, ranked by the poverty risk. Employment clusters where non-standardisation due to part-time employment patterns (2, 6, 7, 8 and 15) or temporary forms of employment (4, 5, 13 and 14) occurred were grouped and made up 39.1% of all employment histories. The largest cluster was that of permanent regular employees (39%). A further seven clusters (21.9%) were characterised by (solo) self-employment, inactivity or unemployment, or transitions from regular employment to inactivity or unemployment or vice versa. Clusters labelled *permanent* had this employment status almost without exception. The label *mainly* means that status changes took place, but one employment status clearly dominated. When an employment status increased over time within a cluster, the label *increasing* was used; when a clear transition between two employment status occurred, the clusters were labelled *transitions*. The following cluster description of part-time and temporary clusters also refers to further characteristics regarding employment, family status, health

<sup>6</sup>In life course analyses, it is uncommon to determine the cluster solution purely statistically (Aisenbrey & Fasang, 2010). Nevertheless, the cluster solution was validated using statistical procedures such as the Calinski–Harabasz and Duda–Hart indexes.



**TABLE 1** Gender share, as well as the poverty risk and mean years in different labour market statuses for women, men and in total among substantial earners, additional earners and the total sample (longitudinal weighted).

	Substantial earners			Additional earners			Total sample		
	Women	Man	Total	Women	Man	Total	Women	Man	Total
<b><i>N (not weighted):</i></b>	<b>19,020</b>	<b>28,330</b>	<b>47,350</b>	<b>15,910</b>	<b>1140</b>	<b>17,050</b>	<b>34,930</b>	<b>29,470</b>	<b>64,400</b>
Gender share	40.2	59.8		91.4	8.6		50.1	49.9	
Poverty risk	8.6	5.9	7.0	8.3	30.7	10.2	8.5	6.7	7.6
Poverty risk, regular empl.	4.0	2.7	3.1	0.7	1.0	0.8	3.8	2.6	3.0
Poverty risk, NSE	11.2	9.6	10.6	6.4	24.1	7.3	8.8	10.8	9.2
Mean years, regular empl.	5.2	7.3	6.5	0.6	2.3	0.7	3.6	7.1	5.4
Mean years, NSE	3.6	1.4	2.3	6.7	3.6	6.4	4.7	1.5	3.1
Mean years, not empl.	1.0	0.7	0.8	2.6	3.6	2.7	1.6	0.8	1.2

Abbreviation: NSE, non-standard employment.

**TABLE 2** Cluster descriptives, grouped by forms of NSE and ranked by the poverty risk in year 10 within the subgroups. For cluster sizes, longitudinal weights were applied.

Clusters	N	Cluster size	Poverty risk in year 10	Share of women	Trajectories incl. NSE (%)	Years in NSE	Years in regular empl.	Years inactive/unempl.
<i>Part-time (PT) clusters</i>	845	16.9						
Increasing low PT (2)	154	4.8	24.7	89.0	100.0	6.4	1.7	1.9
Permanent low PT (8)	145	2.2	11.7	93.8	100.0	9.4	0.3	0.3
Mainly high PT (6)	250	4.3	7.6	89.6	100.0	7.1	2.0	0.9
Transitions: PT into reg. (15)	167	2.8	5.4	79.0	100.0	3.3	6.4	0.2
Permanent high PT (7)	129	2.8	2.3	93.0	100.0	9.3	0.4	0.3
<i>Temporary employment clusters</i>	996	22.2						
Mainly temporary agency empl. (5)	46	1.1	28.3	19.6	100.0	6.5	2.4	1.0
Regular, long fixed-term (14)	210	4.6	11.0	24.3	91.0	2.5	6.1	1.1
Mainly fixed-term (4)	127	2.5	6.3	56.7	100.0	6.1	2.6	1.3
Regular, short fixed-term (13)	613	14.0	3.8	30.5	76.3	1.2	8.3	0.5
<i>Other clusters</i>	1059	21.9						
Transitions: unempl. into empl. (3)	132	3.0	52.3	47.0	87.9	2.6	1.4	6.1
Mainly inactive (1)	142	2.8	20.4	65.5	78.9	2.3	1.5	6.1
Transitions: reg. into inact./unempl. (16)	159	3.3	17.0	47.2	42.1	0.7	6.4	2.9
Increasing (solo) self-empl. (9)	112	1.8	13.4	32.1	86.6	4.9	2.7	1.2
Permanent solo self-empl. (10)	117	2.9	5.1	34.2	100.0	9.0	0.2	0.1
Permanent self-empl. (11)	235	4.7	2.6	23.4	45.1	1.1	0.5	0.2
Transitions: inactivity into reg. (12)	162	3.5	1.9	40.7	33.3	0.5	7.4	2.1
Permanent regular (17)	1835	39.0	2.0	22.2	0.0	0.0	10.0	0.0
Total	4735	100.0	7.3	40.2	49.5	2.3	6.4	0.8

Abbreviation: NSE, non-standard employment.

and sociodemographic characteristics (see Supporting Information: Table A1).

## Part-time employment clusters

The poverty risks of part-time employment histories in year 10 differed significantly, ranging from 2.3% in the permanent high-part-time cluster (7) to 24.7% in the increasing low-part-time cluster (2). Women were clearly overrepresented in all five part-time clusters, accounting for between 79% and 94%, while the cluster where part-time employment transitioned to regular employment (15) had the lowest female share. In the latter cluster, the bridging effect was clearly visible and in line with rather low poverty risks. Similarly, cluster 7 can be labelled *secure high-part-timers*: permanently employed with low poverty risks comparable to the permanently regularly employed. In this cluster, highly educated individuals were clearly overrepresented, and these employment trajectories were more common in eastern Germany.

Individuals within the mainly high-part-time employment cluster (6) with changes from or into regular or low-part-time employment, as well as inactivity, had slightly higher poverty risks (7.6%). These individuals were comparable to those in permanently high-part-time work as regards median working hours, occupational status, educational level and amount of childcare. However, a higher unemployment experience, particularly before the observation period, job changes and raising children alone were more likely in this cluster.

The cluster of permanent low-part-time employed was one of two part-time clusters with a poverty risk clearly above the average (11.7%). Regarding job-specific characteristics, previous unemployment experience did not substantially differ from those in permanent high-part-time. However, those in low-part-time employment worked 10 h fewer per week (21.6 h) and were less likely to be salaried employees and more likely to experience household separations and lone parenthood (23% vs. 12% and 29% vs. 12%, respectively). Initially, the extent of childcare among permanent low-part-time employed was highest (6.0 h per workday) and decreased substantially to the end (2.1 h). Furthermore, individuals in this cluster had an average level of education, and, in contrast to the mainly high-part-time cluster, women from western Germany were overrepresented. Finally, this cluster had the highest increase of people with bad health during the observation period: from an average share of 10%, almost every fifth individual in this cluster ultimately reported bad health (19%).

With every fourth individual living in a household below the poverty line, the increasing low-part-time

cluster had the highest poverty risk and was the largest (4.8%) of the five part-time clusters. While regular employment and inactivity were initially more prevalent, low-part-time employment increased. Marginal employment was prevalent throughout the 10 years but to a small extent. This cluster accumulated job- and care-related disadvantages and burdens as well as poor preconditions; for example, it had the highest unemployment experiences before the observation period and over the 10 years of the part-time clusters. The share reporting bad health in Year 1 was clearly the highest (19%), although individuals were 2.7 years younger than the sample average. However, this is the only cluster in which health did not worsen. Becoming parents was frequent (36%); thus, daily childcare remained at a high level (3.5 h). Both household separations and moves-in occurred more frequently than average, and the proportion of single parents was more than three times higher than average (32%). During the observation period, 86% of people had job changes, the highest proportion among the part-time clusters, and they worked an average of 24.7 h weekly, 3.2 h more than those in permanent low-part-time. Like the latter, the cluster with transitions to low-part-time work was clearly more prevalent in western Germany (88%), while highly educated individuals were underrepresented.

As expected, part-time employment histories among substantial earners were predominantly female and there was no cluster in which marginal employment dominated; nor did it play a major role in the transition clusters to regular employment. Clusters with a higher work volume and less childcare duties had lower poverty risks.

## Temporary employment clusters

The four temporary employment clusters also significantly differed in their poverty risks, ranging from 3.8%, when temporary employment was a very short episode in a regular employment course (13), to 28.3% among the mainly temporary agency-employed (5). Three clusters were predominantly male, with proportions ranging from 69% to 80%; 43% of the mainly fixed-term employment cluster (4) were males. In the temporary employment cluster with the lowest poverty risk, individuals only spent an average of 1.2 years in forms of NSE, mostly fixed-term, followed by temporary agency employment. Approximately one fourth (23.7%) were not involved in NSE at any time; in these cases, the breaks in regular employment biographies mainly represented short periods of inactivity. Except that job changes occurred much more frequently during the observation period (66% vs. 25%) and there were slightly more unemployment experiences before the observation period, this

cluster differed very little from the permanent regularly employed. The similarity increased further when only the NSE trajectories in this cluster were considered. As phases of unemployment were infrequent, job changes are assumed to be more likely due to choice and the risk of fixed-term employment to be calculated.

Poverty risks were significantly higher in cluster 14 (11.0%), where the mean duration in temporary employment was longer (2.5 years) and regular employment was shorter (6.1 years). Phases of unemployment or inactivity during the observation period and job changes were more frequent, as were prior unemployment experiences. Regarding care-specific characteristics, births and childcare duties during the observation period and lone-parent status were slightly more frequent. Furthermore, individuals with migration backgrounds and persons from eastern Germany were overrepresented.

The clusters with mainly temporary agency work (5) and mainly fixed-term employment (4) had quite similar employment course patterns but varied significantly in their poverty risks (28.3% vs. 6.3%). In the former, individuals spent 0.4 more years in NSE (6.5), 0.2 years fewer in regular employment (2.4) and 0.3 years fewer unemployed or inactive (1.0). At the end of the observation period, in both clusters, almost half of individuals (43%) were regularly employed. Caregiving-related characteristics, with

fewer births and childcare duties on average, were less pronounced in the temporary agency-employed cluster, in which single households were also significantly overrepresented (33%). Previous unemployment experiences were slightly higher for those mainly in temporary agency employment but above average for both clusters. Significant differences were observed in the dominant occupational position during the observation period. In the temporary agency-employed cluster, 74% of individuals were manual labourers in comparison to 28% in the mainly fixed-term cluster. The average proportion of manual labourers across all clusters was 23%. Those mainly in temporary agency employment were more frequently low-educated (46% vs. 25%) and more likely to have a migration background (33% vs. 13%).

### Poverty risks over time

Figure 3 shows the employment clusters according to their average poverty risk (horizontal) and average number of years in NSE (vertical) at the first and last observation. The poverty risks of the NSE clusters in the first year varied substantially, ranging from 4.7% for permanent high-part-time employed to 23.9% in the mainly temporary agency-employed cluster. All clusters apart

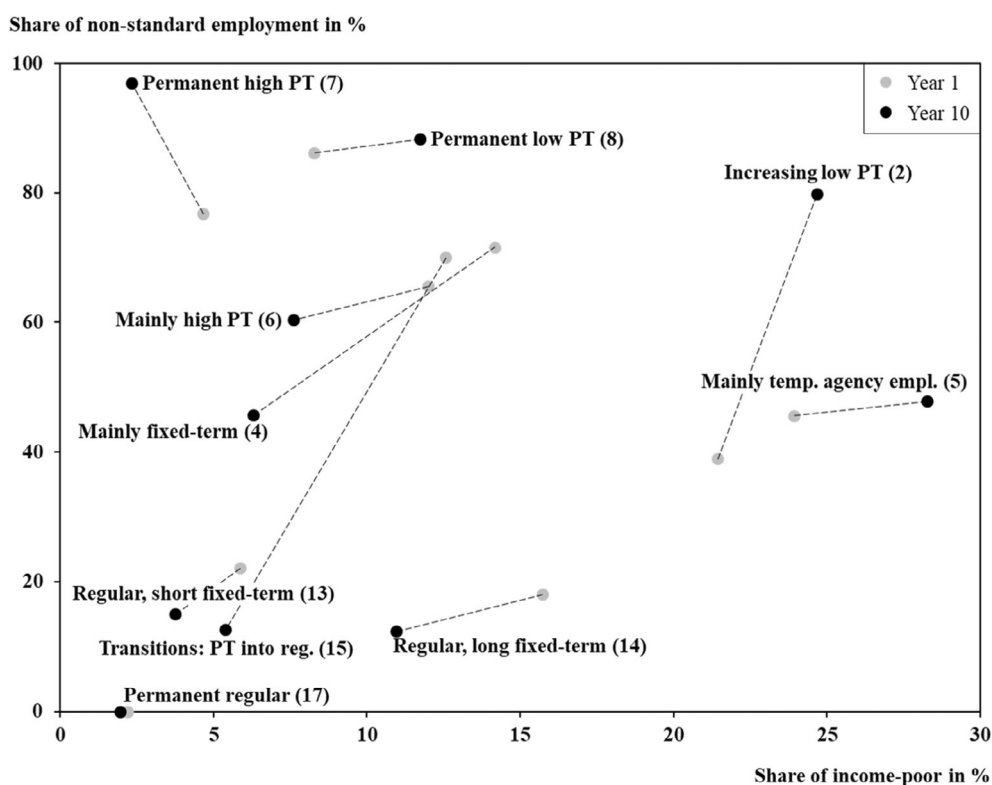


FIGURE 3 Share of non-standard employment (vertical) and income poverty (horizontal) within the clusters at the first and final point of observation.

from 2, 5 and 8 had a lower poverty risk at the end. Substantial reductions particularly occurred in two clusters. The part-time cluster with transitions into regular employment had a poverty risk reduction of 57% or 7.2 percentage points, indicating that the bridging effect of part-time employment clearly reduced poverty risks. Those mainly in fixed-term employment also had a high poverty risk reduction (56% and 7.9 percentage points), corresponding with a lower share of NSE. The two other fixed-term employment clusters with short- or long-fixed-term phases had lower poverty reductions. Furthermore, the permanent high-part-time employment cluster was the only cluster in which an increase in NSE (from 77% to 97%) corresponded with a poverty reduction (from 4.7% to 2.3%).

Besides those in permanently low-part-time employment, poverty risks increased for the two clusters that had the highest poverty risks initially. Mainly temporary agency-employed had the highest increase (4.3 percentage points), followed by permanent low-part-time employed (3.4) and increasing low-part-time employed (3.2). In summary, very different poverty risk dynamics could be observed among the NSE clusters. Some had high poverty risks initially, and there were substantial differences in whether these risks remained stable, decreased or increased. The following multivariate analysis has taken this into account.

## Multivariate analysis

Logistic regressions were conducted to estimate the probability of income poverty for different employment clusters at the end of the observation period. Due to strong gender-specific selections in part-time and some temporary employment clusters, gender-specific models were estimated. Initially, a regression was performed including only the clusters variable (M1). Subsequently, four additional regressions were computed in which the poverty risk in year 1 (M2.1), employment-specific (M2.2), care-specific (M2.3) and sociodemographic (M2.4) characteristics were added. Finally, a full model included all factors (M3). According to pseudo- $R^2$ , the initial model (M1) explained 17.7% for females and 19.1% for males of the variance in income poverty. While care-related characteristics (M2.3) led to the highest increase for females (+7.2%), employment-specific (M2.2) and sociodemographic (M2.4) characteristics had the highest increase for males (+8.3% and +8.1%). The full model (M3) explained 33.5% for females and 36.8% for males of the variance in income poverty (see Supporting Information: Table A2).

Figure 4 summarises the results regarding the NSE histories for women, men and the total sample. Average

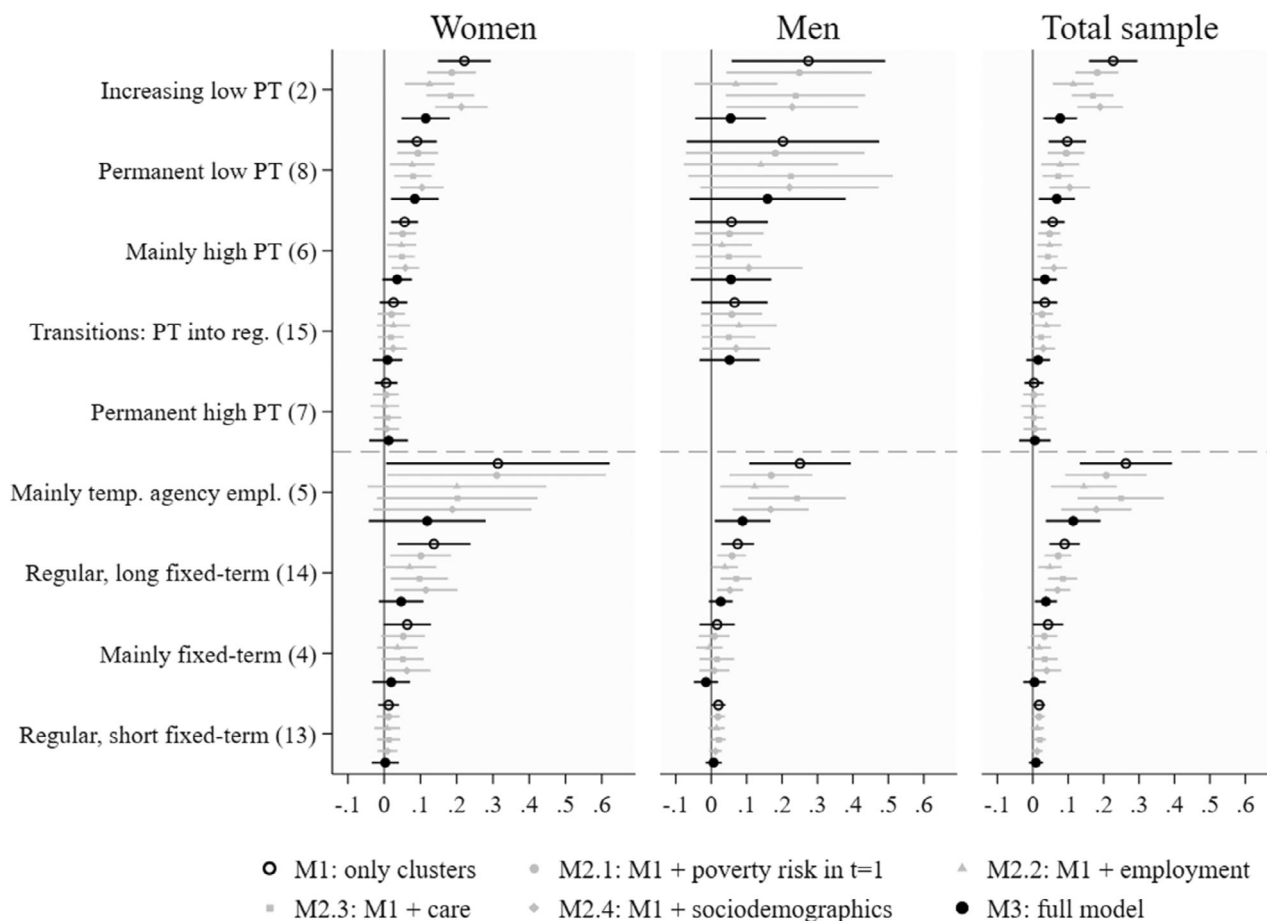
marginal effects (AMEs) are depicted, with the reference category being the permanently regularly employed (for a tabular overview, see Table A2). AMEs were preferred as they provide information about effect size and are comparable across models (Mood, 2010). Positive (negative) values can be interpreted as a higher (lower) poverty risk percentage than that of the permanent regularly employed (poverty risk gap). The six models are displayed for each of the nine clusters ranked in Table 2.

As expected, for the part-time clusters, the poverty risk gaps of women and the total sample were similar; for the temporary agency-employed and regularly employed with longer episodes of fixed-term employment clusters, men and the total sample had more similarities. No gender-specific differences were found for the regularly employed with short episodes of temporary employment. Considering the poverty risk in Year 1 (M2.1), the poverty risk gap substantially reduced in some clusters, most strongly among males mainly in temporary agency employment (8.2 percentage points and a reduction of 32.7%). However, significant gaps did not become insignificant in any cluster. Therefore, both genders witnessed significant poverty risk gaps in specific NSE clusters that could not be fully explained by the poverty risks before the observation period.

## Female poverty risks

In three of the five part-time employment clusters, women had significantly higher poverty risks, ranging from 5.6% (mainly high-part-time) to 22.1% (increasing low-part-time). For women in the latter cluster, particularly considering employment-specific, but also care-specific, characteristics and the poverty risk in year 1 substantially reduced the poverty risk gap. However, a significant gap of 11.8% remained in the full model. The poverty risk gap of permanent low-part-time employed women (9.1%) could hardly be explained by any covariate, as it was only reduced by 0.6 percentage points in the full model and remained significant at 8.5%. For those mainly in high-part-time employment, the gap was reduced by 2 percentage points and became insignificant at 3.6%.

Regarding temporary employment, women had significant poverty risk gaps in the temporary agency-employed cluster and in the cluster with longer episodes of fixed-term employment. With a poverty risk gap of 31.4%, women mainly in temporary agency employment had the largest poverty risk of any subgroup of NSE histories. However, this finding should be interpreted with caution due to the small number (9) of cases in this subgroup. Women with longer fixed-term episodes had a poverty risk gap of 13.7%. For both clusters, the effect



**FIGURE 4** Average marginal effects of employment history clusters on income poverty for women, men, and the total sample. Values can be interpreted as poverty risk compared to permanent regularly employed (reference category). The first model includes the cluster variable; in the subsequent four models, poverty risk in year 1, employment-specific, care-related, and sociodemographic variables were added. The sixth model includes all variables.

became insignificant in the full model, which was most strongly attributable to the consideration of the employment-specific variables in the cluster with longer fixed-term episodes and to employment, care and socio-demographic characteristics in equal parts in the temporary agency-employed cluster.

The covariates associated with higher poverty risk for women (see Supporting Information: Table A2) were previous unemployment experience, being a lone parent or single (ref. group: couple, no children), having a lower level of education and living in eastern Germany. Household separations (the household type changes from couple to single or lone parent) during the observation period were associated with lower poverty risks.

### Male poverty risks

For men, poverty risk gaps were not significant in three out of four part-time clusters; only men in the increasing

low-part-time cluster had a significant poverty risk gap (27.5%). When employment-specific characteristics were considered, the effect was reduced by 20.5 percentage points and became insignificant. It remained unclear whether the effect became insignificant as men in part-time work were less affected than women or due to the small number of cases in these clusters, although high point estimates and large confidence intervals suggest the latter.

Men in three temporary employment clusters had a significant poverty risk gap. The gap was highest (25%) for the temporary agency-employed cluster and was reduced most when employment-specific characteristics were considered (by 12.8 percentage points). However, considering sociodemographic characteristics and the poverty risk in year 1 also reduced the gap by around 8 percentage points. A significant poverty risk gap (8.9%) remained in the full model. A similar pattern, but at a lower level, applied to men in regular employment with longer episodes of fixed-term employment. Mainly due to



the consideration of employment-specific characteristics, the significant effect was reduced from 7.5% to 2.8% and became insignificant in the full model. For regularly employed men with short episodes of temporary employment, the poverty risk gap (2.0%) was reduced to 0.7% and became insignificant in the full model. Interestingly, men in mainly fixed-term employment were the only subgroup for which there was a (non-significant) reversal of the effect direction, as they had lower poverty risks than the permanent regularly employed group in the full model.

For men, the covariates associated with higher poverty risks (see Supporting Information: Table A2) were previous unemployment experience, manual worker occupations, bad health status (ref. group: good), migration background and living alone or as a couple with two or more children (ref. group: couple, no children), while a high level of education was associated with lower poverty risks.

The following clusters witnessed no significant poverty risk gaps: women permanent high-part-time employed, those with transitions from part-time to regular employment, those mainly in fixed-term employment, women in regular employment with short episodes of fixed-term employment and men in two very small part-time clusters ( $n < 30$ ).

## Robustness checks

To examine the added value of the NSE history perspective, a robustness check was carried out in which the multivariate regression model was estimated using the employment status at the end of the observation instead of the cluster variable (see Supporting Information: Figure A3). The poverty risks of women in low- and high-part-time employment were similar to those in the permanent part-time employment clusters. The higher poverty risks in the non-permanent part-time clusters (2 and 6) were only captured through the history perspective. The clusters also offer a more differentiated perspective on fixed-term employment. While in two out of three fixed-term employment clusters, the poverty risk gap was marginal, people with fixed-term employment status had a significant poverty risk gap similar to those in the cluster with long episodes of fixed-term employment. A clear difference could be seen in the case of temporary agency employment, particularly for men. The poverty risk gap for those in the cluster was 11.9 percentage points higher and, unlike with employment status, could not be fully explained by employment-specific characteristics.

Additionally, as the clusters with short or long episodes of temporary employment (13, 14) also included

employment histories in which interruptions were not due to temporary forms of employment, the regression analyses were also estimated without these individuals. The results did not differ substantially in terms of effect sizes or significance.

Furthermore, the employment histories of additional earners were examined descriptively to check whether the poverty risks differed (see Supporting Information: Table A3 and Figure A5). High poverty risks were mainly found in clusters with longer phases of unemployment, inactivity and at least marginal employment. NSE clusters with medium poverty risks were those with transitions from marginal into low-part-time employment (6.6%), mainly low-part-time employment (6.1%) and mainly fixed-term employment and inactivity (8.9%). The differences in the poverty risks of those who worked predominantly in low-part-time, high-part-time or regular employment were much less pronounced, varying between 0% and 4.2%. Temporary agency employment was not prevalent among additional earners. Further sequence analysis was conducted using the sample of main earners to check descriptively whether the poverty risks of the NSE histories differed from those of substantial earners (see Supporting Information: Table A3 and Figure A4). Part-time clusters were less common among main earners, low-part-time clusters in particular had a lower share. With the exception of higher poverty risks for those permanent in low-part-time or mainly high-part-time, the poverty risks were similar to substantial earners.

## DISCUSSION

This study aimed to identify, classify and quantify NSE histories and their associated poverty risks among substantial earners over 10 years of their main career phases. Almost three quarters of all, and more than half of female, employment histories were identified as substantial earners. Substantial earners witnessed shorter durations of inactivity, unemployment and marginal employment than additional earners.

The results revealed four key findings: first, NSE is important among substantial earners, as more than one third experienced NSE in their main career phase. Prevalence and stability differ widely, as demonstrated in five, mainly female, part-time and four temporary employment clusters. Second, the employment history perspective revealed that in-work poverty affects substantial earners and is not only a matter of persons witnessing employment interruptions, such as unemployment or inactivity, but also of whether NSE promotes a lock-in effect resulting in permanent marginalised employment. Higher poverty risks than the permanent regularly

employed are seen by (mostly male) mainly temporary agency-employed, (mostly female) increasing and permanent low-part-time employed, those with longer episodes of fixed-term employment, (female) mainly high-part-time employed and (male) regularly employed with short episodes of temporary employment. Third, the gender-specific nature of certain employment histories leads to gender-specific poverty risks, particularly regarding female part-time employment histories. Furthermore, there was a tendency for the underrepresented gender in gender-specific NSE clusters to witness higher poverty risks, this being the case for men in increasing low-part-time clusters and for women mainly in temporary agency employment and with longer episodes of fixed-term employment. However, these results must be treated with caution due to the very small sample sizes for the underrepresented groups.

Fourth, according to the size of the poverty gap, the following four employment clusters clearly contain an NSE lock-in effect. Increasing and permanent (female) low-part-time employment is accompanied by high poverty risks, which is only partly explicable by the cumulation of employment- and care-specific disadvantages, while low-part-time employment entails no substantial poverty risks among additional earners. These insecure labour market trajectories are also due to a lack of labour market alternatives. As the poverty risks of those in permanent high-part-time employment are marginal, the causes of mothers, in particular, taking up long-lasting low-part-time employment should be addressed. First, by expanding early childcare education and second, by encouraging parents to equalise their parental leave, for example, by reducing tax advantages that married couples receive due to an unequal distribution of labour in Germany. Additionally, labour market alternatives are lacking for those mainly in temporary agency employment. If such employment is long-lasting, it is accompanied by high poverty risks. This group, in which predominantly male manual workers, low-skilled workers and people with a migration background are strongly overrepresented, can be seen as the biggest losers of a segmented labour market in an employment-centred society. Despite participating in the labour market at close to a full-time level, they cannot gain a foothold in the primary labour market. In these cases, temporary agency work does not serve as a career stepping stone but, at best, as a bridge to further insecure employment. These employment structures can only be broken through targeted job-specific training programmes. Finally, those with long episodes in fixed-term employment witness high poverty risks, although a high share of transitions to regular employment occurs. The pattern of disadvantages is similar to that seen among the mainly

temporary agency-employed but applies to a lesser extent. As concerns the low poverty risks of those regularly employed with short breaks of temporary employment, in particular, the aim should be to shorten fixed-term employment episodes.

The study has some limitations. As mentioned, the threshold for substantial earners was set at more than 33% of the household income, as the more common approach of focusing on main earners excludes from the analysis the person responsible for caregiving in households with children, who typically earn less. However, robustness checks for the sample of main earners showed similar poverty risks for NSE histories, with the exception of higher poverty risks for those permanent in low-part-time or mainly high-part-time. Additionally, the very low number of cases in some gender-specific clusters made it particularly difficult to draw conclusions on the effects of men with part-time employment histories, as it is unclear whether the effects are not significant due to the small number of cases or a large dispersion within the cluster.

Nevertheless, the study results demonstrate that a differentiated view of poverty risks within employment trajectories among substantial earners offers great added value by displaying NSE lock-in effects. Regular employment histories—transitions into, briefly interrupted or permanent regular employment—witnessed very low poverty risks. In addition to confirming the high poverty risks of specific NSE histories, this study demonstrates the labour market dualisation from an employment course perspective. Therefore, labour market and family policy measures should focus on improving the labour market situation of those mainly in temporary agency employment, witnessing long episodes of fixed-term employment as well as in increasing and in permanent low-part-time employment. In total, these NSE histories make up 12.7% of substantial earners and their high risk of poverty is difficult to legitimise in a society in which work should be rewarding.

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## CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from German Institute for Economic Research (DIW Berlin). Restrictions apply to the availability of these data, which were used under license for this study. The Stata code to replicate the study results is publicly available: <https://doi.org/10.17605/OSF.IO/JSDFQ>.

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