

# Unemployment persistence among second-generation immigrants

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## Abstract

Many immigrant groups disproportionately experience unemployment and this disadvantage often extends to their children—the second generation. This paper contributes to this stream of research by studying unemployment dynamics of the ancestral population and second-generation immigrants in Sweden. In particular, we ask: does unemployment persistence differ between ancestral Swedes and 10 second-generation immigrant groups? We answer this question using correlated dynamic random-effects logit models to study the effect of past on current unemployment—also known as genuine state dependence. We use Swedish register data to follow individuals over their early working careers. The results indicate that although past unemployment has a similar *relative effect* on current unemployment across the ancestry groups, past unemployment increases the probability of current unemployment (*absolute effect*) more among second-generation Middle-Eastern, Turkish, and Southern European immigrants. Because of higher baseline levels of unemployment, the labour market consequences of similar *relative effects* are more pronounced among the second generation as compared to ancestral Swedes. The paper concludes by elaborating on the reasons behind these contrasting results while highlighting the importance of examining heterogeneous effects on both the relative and absolute scales.

## Introduction

Many immigrant groups are socio-economically disadvantaged compared to the native population, but their children—the second generation—generally fare better than their parents, in line with classical assimilation theory. Despite general convergence, the second generation often remains disadvantaged in the labour market and, in particular, has higher unemployment rates than workers of native ancestry (Heath, Rethon and Kilpi, 2008; Drouhot and Nee, 2019). Unemployment has negative consequences on a broad range of outcomes (Gangl, 2006; Cockx and Picchio, 2013a; Brand, 2015; Janlert, Winefield and Hammarstrom, 2015; Tattarini and Grotti, 2022), and it can slow down the intergenerational integration of immigrant groups into host societies.

Beyond the aforementioned consequences, a large body of research has shown that unemployment experienced at one point in time increases the probability of experiencing it in the next time point as well (Heckman and Borjas, 1980; Machin and Manning,

1999; Arulampalam, 2001; Ayllón, Valbuena and Plum, 2022)—a process that is often referred to as unemployment persistence (Arulampalam, Booth, and Taylor, 2000; Ayllón, 2013). Unemployment persistence is a cumulative disadvantage process (DiPrete and Eirich, 2006) which leads to the burden of unemployment being disproportionately experienced by individuals who are already unemployed. It can, therefore, entrench the disadvantages produced by employer discrimination (Birkelund, Heggebø and Rogstad, 2017; Quillian *et al.*, 2019), lack of social and cultural capital (Crul and Vermeulen, 2003; Koopmans, 2016), and other factors that weaken the second generation's access to employment (Heath, Rethon and Kilpi, 2008; Drouhot and Nee, 2019).

The purpose of this study is to analyse unemployment persistence among the second generation in Sweden by focusing on the causal role that past unemployment has on current unemployment, a process that is referred to as genuine state dependence (GSD). Even though unemployment persistence can contribute to the

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second generation's disadvantage in the labour market, it has to our knowledge not been analysed in previous research. Therefore, we ask the following question: does (genuine) unemployment state dependence—the causal effect of past unemployment on current unemployment—vary between Swedes of native origin (i.e. ancestral Swedes) and 10 groups of Swedish-born children of immigrants (i.e. the second generation)? Sweden offers not only large and reliable data for analysing this research question but also a context with a large and diverse population of immigrants and their descendants.

We analyse data from Swedish total population registers using correlated dynamic random-effects (RE) logit models to control for unobserved heterogeneity. Results show that having been unemployed in the previous year leads to a 7-fold increase in the odds of being unemployed in the current year for all groups (*relative effects*). However, the results expressed in terms of percentage point differences (*absolute effects*) reveal high levels of inequality with second-generation immigrants experiencing greater GSD. As such, the second generation experiences a higher probability of being persistently unemployed relative to ancestral Swedes.

## The second generation in the labour market

Immigrants and their descendants together account for almost one-third of Sweden's population and are comprised of diverse origins. Prior to the 1970s, immigration was dominated by labour migration from Southern Europe, Poland, and Finland. Following a major shift in immigration policies in the early 1970s, immigration was dominated by asylum seekers and family reunification. Namely, large immigration flows came from Chile (1970s and 1980s), former Yugoslavia (1992–1995), Iran (1980s and 1990s), and most recently, Syria. Additionally, there have been steady flows of refugees and their families from Iraq, Lebanon, Ethiopia, and Eritrea. Today, the five largest immigrant groups originate from Syria, Finland, Iraq, Poland, and Iran (Aradhya and Mussino, 2020).

Second-generation immigrants are born and raised in the host country and generally do not face the same labour market challenges as their parents, such as a lack of language skills or transferability of educational qualifications (Crul and Vermeulen, 2003; Alba and Foner, 2015). As such, their labour market outcomes are an important barometer of long-term ethnic stratification in host societies. A review of recent research in Europe generally points to a pattern of socio-economic assimilation among immigrants over time and across generations (Drouhot and Nee, 2019). The most salient convergence between the children of immigrants

and those of natives is observed in educational performance and attainment. With respect to labour market outcomes, however, findings have been more mixed. Research has found that second-generation immigrants have better labour market outcomes compared to the immigrant generation, but they lag behind their peers with native-born parents in terms of employment and unemployment rates, and occupational attainment (OECD, 2017). Moreover, the intergenerational convergence in outcomes to the native average is not uniform, with certain groups experiencing little to no convergence (Heath, Rethon and Kilpi, 2008; Drouhot and Nee, 2019).

The situation in Sweden mirrors that of other high-income countries. Rooth and Ekberg (2003) reported that unemployment of the second generation was similar to the first generation. Those of non-Western origin had higher unemployment than those of Western origin, and individuals of Southern and Eastern European ancestries fared worse than those of Northern European heritage. Similar patterns of disadvantage by country of origin were also documented in other European countries (Connor and Koenig, 2015; Gracia, Vázquez-Quesada and Van de Werfhorst, 2016).

Poorer access to employment—rather than weaker advancement once employed—is a key factor explaining the second generation's disadvantage in the labour market (Algan *et al.*, 2010; Hermansen, 2013; Drouhot and Nee, 2019). Part of this disparity is related to lower levels of human capital. In Sweden, the employment disparities attenuate when human capital and demographic variables were controlled for, except for second-generation individuals with non-Western and Southern European ancestries (Rooth and Ekberg, 2003). The remaining gaps in employment access may reflect differences in unmeasured skills or characteristics such as language proficiency, acculturation, and weaker social networks (Crul and Vermeulen, 2003; Koopmans, 2016). Among women especially, differences in employment or labour market entry can also reflect gendered norms about household and economic activity (Fernandez and Fogli, 2009; Khoudja and Platt, 2018).

Several field experiments have documented that employer discrimination contributes to disadvantages in access to employment (Quillian *et al.*, 2019). The pattern of discrimination often follows perceived cultural and social distances between natives and different ancestry groups (Hraba, Hagendoorn and Hagendoorn, 1989; Hagendoorn, 1995; Strabac and Listhaug, 2008), which may be derived not only from social or cultural differences but can also be inferred from visible traits, such as skin colour (Fetzer, 2013). Sweden shows a high rate of discrimination (Quillian

*et al.*, 2019), possibly reflecting the composition of its immigrant-background population. Field experiments from Sweden find that call-back rates show a negative correlation with an ethno-cultural distance where applicants with Arabic/North African/Middle-Eastern sounding names have the lowest call-back rates (Carlsson and Rooth, 2007; Bursell, 2014; Arai *et al.*, 2016). This immigrant disadvantage is mirrored among the second generation and across sectors (Carlsson, 2010). Importantly, some evidence suggests that discrimination is stronger against men from culturally and socially most distant ancestries (Bursell, 2014; Arai, Bursell and Nekby, 2016).

Taken together, the second generation is better integrated into the labour market than their immigrant parents (first generation); however, they tend to remain disadvantaged compared to those with native ancestry. These disadvantages vary between second-generation ancestry groups. A gap remains, however, as to whether second-generation immigrants are also more likely to remain stuck in unemployment (unemployment persistence).

### Unemployment persistence and the role of genuine state dependence

Unemployment begets unemployment: those unemployed at one point in time are more likely to be unemployed in the next point in time (Machin and Manning, 1999; Arulampalam, Booth, and Taylor, 2000; Arulampalam, 2001; Biewen and Steffes, 2010). A large body of research in labour economics and sociology has attempted to estimate whether unemployment has a causal effect on future unemployment or whether temporal persistence in unemployment reflects selection processes (Heckman and Borjas, 1980). According to the latter scenario, those who become unemployed are not randomly chosen from the labour force, and those who remain unemployed (i.e. do not find a job) become an even more selected group over time (Machin and Manning, 1999). These processes can reflect selection by observed factors—such as education, gender, and ethnicity—or unobserved ones, such as ability and motivation.

Conversely, studies on the effects of individual unemployment histories on future unemployment have reported strong causal scarring effects both in the short run (Arulampalam, Booth, and Taylor, 2000) as well as long term (Eliason and Storrie, 2006). In this case, unemployment persistence is the result of genuine state dependency, where being unemployed increases future unemployment risk.

State dependence leads to unemployment accumulation over individual life courses as it concentrates on already unemployed individuals. These processes

are further amplified if state dependence is stronger for individuals and groups with high unemployment risk. Existing research suggests that labour market disadvantages, including the risk of unemployment, tend to go hand in hand with the sociocultural distance between immigrant groups and ancestral Swedes. Therefore, the possible interplay between state dependence and ancestral groups will trigger processes of cumulative disadvantage concentrating unemployment in the most vulnerable (immigrant) groups. Overlooking heterogeneity across ancestral groups—disregarding the possible stratification of such unemployment dynamic—risks underestimating state dependence for certain groups (Plum and Ayllón, 2015).

Previous research shows that unemployment state dependence varies cross-nationally (Plum and Ayllón, 2015; Ayllón, Valbuena and Plum, 2022), is stronger among prime-age than younger workers (Arulampalam, Booth and Taylor, 2000), and among those who have experienced unemployment in the past (Cutuli and Grotti, 2020). Despite these extant findings, most research on unemployment state dependence does not consider heterogeneity, and no previous studies have analysed heterogeneity in unemployment state dependence between ethnic or migrant groups, even though these groups often disproportionately experience obstacles in the labour market.

### Heterogeneous genuine state dependence

Heterogeneity in GSD between ancestry groups may exist for two reasons: because groups are affected by different mechanisms linking past and current unemployment and/or because groups are affected by the same mechanisms but in different magnitudes. Below, we discuss the most important proposed mechanisms behind unemployment state dependence as well as why they can vary across ancestry groups.

Unemployed workers can be stuck in unemployment because they are at a disadvantage in receiving job offers and this may be due to both supply and demand side factors (Gangl, 2006; Ayllón, 2013; Kroft, Lange and Notowidigdo, 2013; Pedulla, 2016; Weisshaar, 2018). Human capital decay is one of the most common supply-side explanations offered and suggests that an individual's skills are not used and kept up to date during the unemployment spell (Becker, 1964; Pissarides, 1992; Machin and Manning, 1999). It is unclear, however, how human capital decay during unemployment differs between ancestry groups. An example could be related to the decay of general and job-specific language skills while unemployed. This mechanism may be relevant among first-generation immigrants, but less

so among second-generation immigrants since they are born, raised, and educated in the host society.

A second supply-side explanation suggests that unemployment can weaken the social contacts that aid in finding a job (cf. [Granovetter, 1977](#)). These processes can limit access to information on job openings, as well as reduce the number of call-backs and job offers. Besides potentially receiving fewer job offers, this can further discourage job search especially when unemployment rates are high ([Ayllón, 2013](#)). The effects of unemployment on social networks can differ by ancestry, especially when accompanied by a high degree of ethnic residential segregation and social homophily as is found in Sweden ([Bråmă, 2006](#); [Andersson, 2007](#)). This disadvantage can be particularly strong among groups with larger social distance from the native population since they may lack access to networks beneficial for gaining employment.

A third supply-side mechanism is related to possible employment disincentives triggered by the receipt of generous unemployment benefits. Previous research has shown that there may be disincentive effects, especially among individuals experiencing longer unemployment spells ([Jenkins and García-Serrano, 2004](#); [Benmarker, Carling and Holmlund, 2007](#)). We consider two possibilities in which disincentive effects may differ by ancestry. First, second-generation immigrant groups can be less integrated into social security systems than natives. Specifically, second-generation immigrants may be less aware of the resources available to them while unemployed which pushes them back into employment. Second, labour supply elasticities may vary across ancestry groups, leading to variation in unemployment benefit disincentive effects. There is little research on such variation by migrant background. [Mastrogiacomo and colleagues \(2013\)](#) found that fixed costs of working—such as commuting or childcare costs—had stronger negative employment effects among immigrants than natives. These stronger disincentive effects would strengthen state dependence among second-generation immigrants if, for example, they experience disproportionate commuting costs due to residential segregation patterns.

On the demand side, unemployment can signal low productivity and poor employability to employers who lack better information ([Stiglitz, 2002](#)). Evidence for discrimination against the unemployed has been found in field experiments that record call-back rates to unemployed compared to employed job applicants ([Cockx and Picchio, 2013a](#); [Eriksson and Rooth, 2014](#); [Pedulla, 2016](#); [Birkelund, Heggebø and Rogstad, 2017](#); [Weisshaar, 2018](#)). In Sweden, [Eriksson and Rooth \(2014\)](#) found lower call-back rates among job applicants who had been unemployed for 9 months or more, but not for the short-term unemployed nor the

previously unemployed. Similarly, [Cockx and Picchio \(2013a\)](#) concluded that in Belgium, negative signalling is an important explanation for unemployment persistence whereas human capital depreciation has a limited effect.

Job applicants have a lower call-back rate if they are of foreign ancestry (and in particular, of visible minorities or of Middle-Eastern or North African background). [Birkelund, Heggebø and Rogstad \(2017\)](#) argued that ethnic unemployment scarring—where the negative signal of unemployment is particularly strong among minorities—is possible when two conditions co-exist: first, if employers discriminate against minorities—either by holding negative stereotypes against them or by using minority status as a proxy for unmeasured traits—and second, if unemployment is associated with human capital deterioration or other unfavourable characteristics. In such cases, employers can see unemployment and ethnic status as reinforcing one another. Their field experiment results of call-back rates of job applications with typically native Norwegian and Pakistani names did not support this hypothesis. Rather, the similar call-back effect of unemployment in the two groups suggested that employers treated ethnic and unemployment status independently.

So far, we have discussed unemployment persistence in terms of the barriers to get a job once unemployed—thus looking at persistence as a long unemployment spell. Alternatively, unemployment persistence can be the result of the recurrence of unemployment spells. This dynamic captures the idea that an individual can be observed as unemployed from one year to the next even if he/she has experienced some employment during that time. Importantly, in such a scenario, unemployment represents a substantial share of the person's labour market status every year. In this case, other mechanisms contributing to (re-)entering unemployment in the first place are relevant. In this respect, previous unemployment decreases a worker's tenure and can increase the risk of being laid off ([Böheim and Taylor, 2002](#)), particularly in labour markets, such as the Swedish one, that follows the 'last-in-first-out' principle in firing. Previously unemployed workers may also have a worse match with their current job—if, due to financial or other reasons, they accepted a job they otherwise would not have—than workers without previous unemployment, which can increase their subsequent probability of becoming unemployed again ([Heckman and Borjas, 1980](#)). It is unlikely that the first of these mechanisms varies by ancestry, once job tenure has been taken into account. However, if second-generation workers with a history of unemployment end up in poorer matching jobs than their peers of native ancestry because of discrimination, poorer human capital, or weaker social networks, a history of



unemployment may have a stronger effect on the risk of losing one's job among the former.

Although there are many ways in which second-generation immigrants are likely exposed to similar dynamics as the children of natives, unemployment state dependence is still likely to differ due to higher barriers to employment re-entry (e.g. employer discrimination or poorer networks) or higher risks of repeatedly losing the job due to, for example, poor matching. In addition, these dynamics are likely stronger for groups characterized by poorer labour market position, such as the second generation from Middle-Eastern or Turkish backgrounds. Therefore, we expect that the effect of past unemployment on current unemployment is larger for second-generation groups as compared to ancestral Swedes and this state dependence varies in magnitude across origin groups.

### Data, sample, and variables

We used Swedish total population registers to construct an individual-level longitudinal dataset covering socio-economic and demographic characteristics. In addition, we linked individuals to their parents to identify the parental country of birth, as well as the parents' socio-economic characteristics.

The study population included 217,872 men (2,166,420 person-year) and 205,391 women (1,877,102) born in Sweden between 1977 and 1981, and followed from the age of 25, or since they transited from education to the labour market, to the age of 39. As a result of this sample selection, we focus on the period from 2002 to 2016. We set the lower age limit to 25 to exclude years in which many individuals were still in full-time education. Furthermore, we limited the data to person-years in which the individual was in the labour market, defined as receiving any labour earnings or being registered as unemployed in the public employment office. We excluded person-years in education (measured by reciprocity of student allowances), long-term illness (reciprocity of long-term sickness benefits), and other forms of inactivity. The exclusion of inactive individuals was necessary given our interest in unemployment. However, individuals who are either employed or unemployed may transit into inactivity and thus exit our analytical population.<sup>1</sup>

### Unemployment measure

Our outcome of interest is unemployment, which we measure using the information on the number of days a person has been registered as unemployed during a calendar year.<sup>2</sup> Specifically, we define as unemployed during a given year those who were registered in the public employment office as unemployed for 90 days or more—irrespective of whether the days of

unemployment were continuative or not. Conversely, an individual is considered employed if he/she is not registered as unemployed and receives any labour earnings. As robustness checks, we performed our analyses using different cut-offs for defining individuals as unemployed, namely 60, 120, and 180 days of registered unemployment. While differences across cut-offs in the levels of unemployment exist, we observe very similar patterns in the differences between origin groups (see [Table A4](#) in the Supplementary Material).

Our measure of unemployment compares relatively well with official statistics from the Labour Force Survey (LFS). The overall unemployment rate that we registered over the period is 6.2 per cent for men and 5.7 per cent for women. The corresponding figures from official statistics based on the LFS are 6.1 and 6.7 per cent, respectively, for men and women. Comparing the two measures for different age groups, our measure leads to slightly higher estimates of unemployment in younger ages, when employment careers are more volatile (see [Figure A1](#) in Supplementary Material). Conversely, the LFS gives higher estimates of unemployment at older ages, probably capturing short spells attributable, for example, to job changes, which our definition excludes. Overall, beyond registering similar levels of unemployment, the two measures also follow the same trend and are consistent across all groups.

### Second-generation classification

Second-generation immigrants are defined according to their parents' country of birth; if the parents' foreign countries of birth differ, we define ancestry based on the father. In the case of the 2.5-generation immigrants (one parent was born in Sweden while the other one abroad), individuals are categorized according to the country of birth of the foreign-born parent. In our model, we include a variable to identify the 2.5 generation. We distinguish between 11 ancestries based on the parents' country of birth: Sweden, Finland, Other Nordic, Other Western (including both European and non-European Western countries, such as the United States and Australia), Eastern Europe, Yugoslavia and Bosnia, Southern Europe, Middle East, Iran, Turkey, and Other (Non-European).<sup>3</sup> While we mainly classify countries within broader geographical areas, we also separate particular origin groups that have had unique integration experiences in Sweden. For example, Finns have a long immigration history in Sweden and were well integrated into the labour market, at least initially, and a large share of them is part of a Swedish-speaking ethnolinguistic minority group in Finland ([Saarela and Scott, 2015](#)). Similarly, Iranians have integrated exceedingly well into the Swedish labour market, and their children (the second generation) have been shown to outperform their Swedish peers in education ([Jonsson](#)

and Rudolphi, 2011). In contrast, groups such as those with Turkish origin have traditionally struggled to gain a foothold in Swedish society (Bayram *et al.*, 2009).

### Control variables

We control for a set of characteristics that are likely to be associated with unemployment dynamics in the different groups. Time-varying controls include age, ranging between 25 and 39 (we also include age squared); level of educational attainment, separating between primary, lower secondary, upper secondary (vocational or academic), post-secondary (vocational or university), and doctoral education; years since completing education (when the highest educational level is achieved), which indirectly captures work experience. We control for marital status (single, in couple, and separated or divorced) which has been shown to affect unemployment spell length (Teachman, Call and Carver, 1994) and for the number of children below 8 years of age (none, one, two, three, and four or more children), as young children may affect job search intensity, particularly for women. Finally, we include a measure of individual health problems proxied by whether he/she receives any sickness benefits.<sup>4</sup>

The time-constant controls include academic achievement (standardized grade point average (GPA) at age 16), as an additional variable to capture human capital. We also control for parental socio-economic status (SES), which can affect educational choices and proxy the size and quality of networks that can be used for finding a job (Pedulla and Pager, 2019). Parental SES is defined by parental occupation when the individual was 15 years old, and distinguishes between farmers, unskilled, low-skilled, medium-skilled, high-skilled and professionals, self-employed, not employed, and those with missing information. We followed the dominance criteria and took the highest occupation of the mother and father. Finally, we control for the region of residence at the NUTS 2 level and year dummies.

### Methods

We used a correlated dynamic RE logit model.<sup>5</sup> The dynamic specification models the amount of inertia in the previous status, state dependence, via the inclusion of a  $t - 1$  lag in the outcome variable, thus assuming a first-order Markov process.<sup>6</sup> State dependence processes, however, can be considered unbiased or *genuine* only in absence of unobserved heterogeneity correlated with the outcome (Heckman, 1981a). A further problem in identifying state dependence as genuine is the so-called initial condition problem—according to which the initial period  $y_{i0}$  that the researcher observed might not be the period in which the stochastic process leading to the observed outcome starts.

The literature has seen several different approaches to address these issues (Heckman, 1981b; Wooldridge, 2005; Biewen, 2009; Rabe-Hesketh and Skrondal, 2013). We employ the approach recently developed by Rabe-Hesketh and Skrondal (2013) as a parsimonious specification, which can also be implemented with unbalanced panels (see Skrondal and Rabe-Hesketh (2014) and Grotti and Cutuli (2018) for its implementation).

A general dynamic model is specified as follows:

$$y_{it}^* = \gamma Z_{it} + \rho y_{it-1} + c_i + u_{it} \quad (1)$$

where  $y_{it}^*$  in Equation (1) represents unemployment for unit  $i$  ( $i = 1, \dots, N$ ) at time  $t$ . It is a function of a set of time-varying explanatory variables  $Z_{it}$  which are considered exogenous, conditional on the unit-specific time-constant unobserved effect  $c_i$ .  $u_{it}$  represents an idiosyncratic error term.  $y_{it-1}$  captures the outcome in the previous year. We assess whether unemployment state dependence varies by ancestry by including an interaction between unemployment status in  $t - 1$  and ancestry ( $X_i$ ).

In practice, Equation (1) is augmented as in the following specification:

$$y_{it}^* = \gamma Z_{it} + \rho y_{it-1} + \delta X_i + \beta y_{it-1} * X_i + c_i + u_{it} \quad (2)$$

The unit-specific unobserved effect  $c_i$  is expressed as

$$c_i = \alpha_0 + \alpha_1 y_{i0} + \alpha_2 \bar{Z}_i + \alpha_3 Z_{i0} + \alpha_4 y_{i0} * X_i + a_i \quad (3)$$

where  $y_{i0}$  and  $Z_{i0}$  stand for the initial values of the outcome and of the time-varying explanatory variables, respectively.<sup>7</sup>  $\bar{Z}_i = \frac{1}{T} \sum_{i=0}^T Z_{it}$  represents the within-unit averages of the time-varying explanatory variables. The time-varying variables we rely on to capture unobserved heterogeneity include age, marital status, number of children, and health problems. Furthermore, following Wooldridge (2005: p. 48), ancestry is also interacted with the initial condition  $y_{i0}$ . This strategy is warranted given that ancestry is interacted with the past outcome. Finally,  $a_i$  is a unit-specific time-constant error term.

Under the assumption that unobserved heterogeneity is absorbed by  $c_i$ , the parameter  $\rho$  measures GSD—that is the causal effect exerted by unemployment in the previous year on unemployment in the current year. Based on the above equations, the model is then estimated as a standard RE logit model separately for men and women. Although RE probit models have been the convention in state dependence research, the logit specification is well suited for the task.

### Heterogeneity in unemployment state dependence: relative and absolute interaction effects

To date, research on unemployment state dependence has largely focused on population averages and

expressed state dependence in terms of average marginal effects. In practice, this is computed as the difference in the probability of unemployment at time  $t$  between individuals who were unemployed and employed in  $t - 1$  (i.e. persistence probability minus baseline/entry probability). When comparing state dependence between groups, one may want to take into account the differences in baseline unemployment rates between the groups: unemployment state dependence of, say, 5 per cent points is in relative terms larger if the baseline unemployment rate is 2 per cent rather than 10 per cent. Therefore, estimates of state dependence on the relative, multiplicative, scale provide complementary information on state dependence processes.

Typically, two independent variables will produce interaction effects on some scale whenever both of them affect the outcome (Rothman, Greenland and Lash, 2008). Since both second-generational status and previous unemployment affect the probability of unemployment, we would find interactions at least on the relative (multiplicative) scale or the absolute (additive) scale.<sup>8</sup> Interactions on the relative scale are given on in odds ratios (ORs), whereas interactions on the absolute scale are presented as differences in predicted probabilities.

Despite much technical discussion of whether interactions should be reported on the absolute [additive] scale (typically measured as percentage point differences) on the one hand, or the relative [multiplicative] scale (measured in ratios) on the other (e.g. Mize, 2019), there is little theory to guide this choice in labour market research or sociology in general. We draw on an established debate in epidemiology, which suggests that different types of interactions convey complementary information (e.g. VanderWeele and Knol, 2014; Mehta and Preston, 2016). Following this literature, interaction effects on the absolute scale tell about heterogeneity in the population consequences of unemployment persistence, namely about how much previous unemployment increases the unemployment rate in different groups. Because interactions on the relative scale do not depend on the difference in baseline unemployment rates, they can provide additional information on the structural features of the studied process.

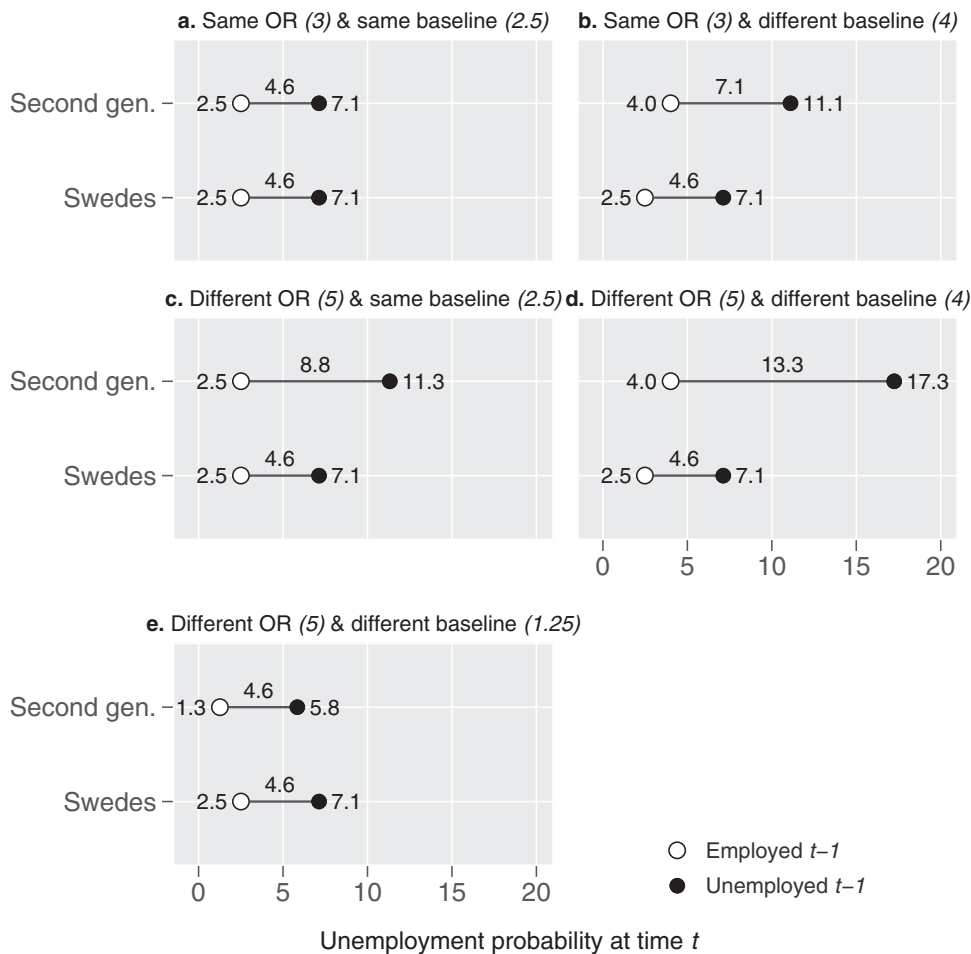
Figure 1 aids in considering different types of interaction effects. In scenario (a), unemployment at  $t - 1$  increases the probability of unemployment at  $t$  with no interaction on either relative or absolute scale (similar relative and absolute unemployment state dependence between ancestral Swedes and second-generation immigrants). In scenario (b), the second generation experiences a higher baseline risk, but similar state dependence on the relative scale when compared to ancestral Swedes—being unemployed at  $t - 1$  leads to

a 3-fold multiplication in the risk of unemployment at  $t$  for both groups. There is no interaction effect on the relative (here, OR) scale, but differences in baseline unemployment translate into an interaction effect on the absolute scale (in percentage points) and to larger unemployment consequences among the second generation.

In scenarios (c) and (d), the relative effects differ. Theorizing when such cases would be expected is generally more difficult, but Mehta and Preston (2016) suggested that multiplicative interaction can be expected when the moderating factor applies to different stages of a Markov-like process. For example, if human capital decay associated with unemployment is more rapid among the second generation than the natives, or employers perceive the loss of human capital to be stronger among the second generation (cf. Birkelund, Heggebo and Rogstad, 2017, for a similar theoretical argument), then the multiplicative effect of unemployment at  $t - 1$  can be larger for the second generation. In this situation, similar baseline unemployment risks across groups (scenario c) translates into a larger absolute effect for second-generation immigrants, which is further amplified when their baseline risk is higher (scenario d).<sup>9</sup> Finally, scenario (e) shows that second-generation immigrants have a higher multiplicative effect but a lower baseline unemployment probability leading to a similar additive effect. A difference in baseline unemployment rates is a sufficient condition for an interaction effect on the additive scale, whereas differences in the mechanisms that produce unemployment state dependency are a necessary condition for multiplicative interaction effects. Examining both provides a more complete picture of unemployment state dependency across groups.

## Results

Table 1 reports descriptive statistics for the study population. Second-generation immigrants represent 14 per cent of the population, while ancestral Swedes make up the remaining 86 per cent. The size of second-generation immigrant groups ranges from 0.1 to 5.2 per cent for Iranian and Finnish origin individuals, respectively. Overall, individuals are followed up between 9.9 (second-generation Iranians) and 11.5 (ancestral Swedes) years. These differences reflect variations in age at labour market entry, for which Iranian origins individuals are those who enter the labour market at the oldest age—23.2 years old. Age at labour market entry reflects educational achievements—origin groups characterized by higher age at labour market entry also display higher shares of tertiary education (see Table A2 in Supplementary Material). Results for women show a similar pattern, although they are followed for



**Figure 1** Hypothetical scenarios for the second generation as compared to ancestral Swedes (OR = 3 and baseline probability = 2.5%). Values reported are probabilities to be unemployed at time  $t$  by unemployment status at  $t - 1$ . Notes: OR: odds for the Unemployed at  $t - 1$  as compared to the Employed at  $t - 1$ . Baseline probability: probability to be unemployed at time  $t$  for the Employed at  $t - 1$

a slightly shorter period, since they enter the labour market at later ages.

The last three columns of [Table 1](#) report a series of statistics concerning unemployment. The overall unemployment rate over the period 2002–2016 was 6.2 per cent for men and 5.7 per cent for women. There are differences across origin groups. Among men, the unemployment rate for ancestral Swedes is among the lowest at 5.7 per cent. For the other groups, unemployment ranges between 6.6 per cent for Other Western origin men and 11.4 per cent for men with Turkish origins. The unemployment rate for women displays larger variation, ranging between 6.1 and 12.6 per cent for Other Western and Turkish origin women, respectively. In general, second-generation Other Western and Iranian men and women report among the lowest rates of unemployment, whereas second-generation Turkish, Middle-Eastern, and Yugoslavian and Bosnians report the highest unemployment rates.

The remaining two columns present the descriptive statistics on unemployment dynamics. The entry rate reflects the share of individuals that transit from employment to unemployment from one year to the next, and the persistence rate reflects the share of individuals who remain unemployed among those who were unemployed in the previous year. Similar to unemployment rates, the groups that stand out as the most disadvantaged as measured by these statistics are men and women with Turkish, Yugoslavian and Bosnian, and Middle East origins. Men and women of Iranian ancestry are more advantaged, with unemployment rates close to, and unemployment persistence below that of workers with Swedish ancestry.

#### Unemployment state dependence: relative effects

[Table 2](#) presents estimates of unemployment state dependence from correlated dynamic RE logit models, in



**Table 1** Descriptive statistics

Men	N individuals	Group size (%)	Mean N years	Mean age at LM entry	Unemployment rate	Entry rate	Persistence rate
Native	185,996	85.9	11.5	21.9	5.7	2.5	46.2
Finland	11,282	5.2	11.4	21.1	8.7	3.6	51.5
Other Nordic	3,746	1.7	11.2	21.3	8.6	3.7	51.1
Other Western	3,756	1.6	10.8	22.4	6.6	2.9	47.5
Eastern Europe	2,810	1.2	10.7	22.7	8.2	3.4	49.9
Yugoslavia and Bosnia	2,598	1.2	11.5	21.0	10.3	4.3	53.1
Southern Europe	1,952	0.9	11.0	21.8	9.0	3.9	48.6
Middle East	579	0.3	10.9	21.6	10.5	4.4	53.0
Iran	239	0.1	9.9	23.2	7.6	3.7	42.4
Turkey	1,646	0.7	11.4	20.5	11.4	5.1	52.8
Other	3,268	1.3	10.3	22.3	9.9	4.0	53.4
Women							
Native	175,183	85.9	11.0	22.9	5.3	2.5	42.2
Finland	10,873	5.2	10.8	22.2	7.6	3.4	47.6
Other Nordic	3,588	1.7	10.8	22.2	7.7	3.4	48.7
Other Western	3,547	1.6	10.3	23.4	6.1	2.8	43.1
Eastern Europe	2,637	1.2	10.3	23.4	7.7	3.4	47.9
Yugoslavia and Bosnia	2,374	1.2	10.9	22.0	9.2	3.7	51.4
Southern Europe	1,838	0.8	10.3	22.8	7.8	3.7	44.2
Middle East	513	0.2	10.6	22.1	11.6	4.9	52.9
Iran	198	0.1	9.8	23.7	6.5	3.4	41.8
Turkey	1,638	0.8	11.1	21.2	12.6	5.3	54.3
Other	3,002	1.3	9.8	23.5	8.4	3.8	46.9

ORs, by origin group. The estimates are predicted from a model interacting ancestry and lagged unemployment (as fully presented in [Table A3](#) in Supplementary Material). The first column of the table for men and women incorporates the GSD estimates of the effects of lagged unemployment on current unemployment, predicted from the interaction models, for each group. The interaction effect estimates themselves are reported in the second column, while the third column reports their confidence intervals. These can be used to test unemployment state dependence differences between each second-generation group and ancestral Swedes.

Starting with ancestral Swedes, men and women report ORs of 7.7 and 7.1, respectively. That means that the odds of being unemployed are approximately 7–8 times higher for those who were unemployed in the previous year compared to those who were employed in the previous year. This suggests strong genuine unemployment state dependence, of similar strength, for both ancestral Swedish men and women. This result clearly confirms the idea of an effect of past unemployment on current unemployment that accumulates the experience of unemployment upon the same individuals over time.

**Table 2.** Genuine state dependence in unemployment by parental origin. OR and CI from CRE dynamic logit model

	Men			Women		
	GSD	Interaction effect		GSD	Interaction effect	
	OR	OR	CI	OR	OR	CI
Sweden	7.68	Ref.	Ref.	7.06	Ref.	Ref.
Finland	7.58	0.99	[0.92–1.06]	7.09	1.01	[0.93–1.09]
Other Nordic	7.87	1.02	[0.91–1.15]	7.60	1.08	[0.95–1.23]
Other Western	7.66	1.00	[0.87–1.14]	6.56	0.93	[0.80–1.08]
Eastern Europe	6.66	0.87	[0.75–1.00]	7.09	1.00	[0.86–1.17]
Yugoslavia and Bosnia	7.58	0.99	[0.87–1.12]	7.96	1.13	[0.97–1.31]
Southern Europe	7.03	0.91	[0.78–1.07]	6.05	0.86	[0.72–1.03]
Middle East	7.09	0.92	[0.70–1.22]	7.08	1.00	[0.76–1.33]
Iran	4.50	0.59	[0.35–1.00]	4.46	0.63	[0.34–1.17]
Turkey	6.83	0.89	[0.77–1.03]	8.10	1.15	[0.99–1.33]
Other	7.57	0.99	[0.87–1.12]	6.26	0.89	[0.77–1.02]
Total population	7.63	–	–	7.06	–	–

Note: The column ‘GSD’ reports odds ratio (OR) for unemployment state dependence for each group. Columns ‘Interaction’, report the OR and the confidence interval of the interaction between past unemployment and each ancestry group—where Swedish ancestry represent the reference group.

Unemployment state dependence in the second generation is very similar to that of ancestral Swedes. Among men, apart from Other Nordic, all of the point estimates are smaller in the second generation than among the ancestral Swedes, and among women, they are larger in the Other Nordic, Former Yugoslavian and Bosnian, and Turkish ancestry groups. None of the differences in the strength of unemployment state dependence are statistically significant at the conventional levels—the confidence interval of the interaction always includes 1. Unemployment state dependence is clearly the weakest among women and men of Iranian ancestry, but the differences to those of native origin are not statistically significant at the conventional levels. However, our data cover the entire cohorts we analyse and therefore the group differences in the estimates we report cannot be due to sampling error, although they can convey other information about the uncertainty of the processes that produced the data. Therefore, we can conclude that in our birth cohorts, unemployment state dependence is among the strongest among ancestral Swedish men (7.7) and women (7.1), and the weakest among second-generation men (4.3) and women (4.2) of Iranian background. This conclusion goes against our expectations that predicted stronger state dependence among the second generation, at least when the effect of past unemployment is measured on the relative (multiplicative) scale. Substantively, however, in the case of second-generation Iranians, the finding is in line with results pointing to their higher

educational performance and ambitions (Jonsson and Rudolphi, 2011).

### Unemployment state dependence: absolute effects

The analyses presented in Figures 2 and 3 test whether an interaction between past unemployment and the origin group can be detected on the absolute scale. As discussed above, relative and absolute interaction effects provide complementary information on state dependence. Similar magnitudes of relative state dependence increase the unemployment rate among the previously unemployed more strongly in groups with high baseline unemployment rates, such as the second generation.

Figures 2 and 3 show, for men and women, respectively, the predicted probabilities of being unemployed at time  $t$  for individuals who were employed (white dots) or unemployed (black dots) in the previous year. They can also be interpreted as unemployment entry and persistence rates, respectively. Predicted probabilities have been estimated by fixing the values of the other covariates at their sample means. The difference between the two probabilities (i.e. between the white and black dots) can be interpreted in terms of marginal effects.

Women and men have, overall, similar unemployment entry rates in all groups. Ancestral Swedes have the lowest annual unemployment entry rate both



**Figure 2** Predicted probabilities of being unemployed for those who were employed and those who were unemployed the year before ( $t - 1$ ), men. Notes: based on models in Table A3 in Supplementary Material. Solid lines that connect the dots represent genuine state dependence.

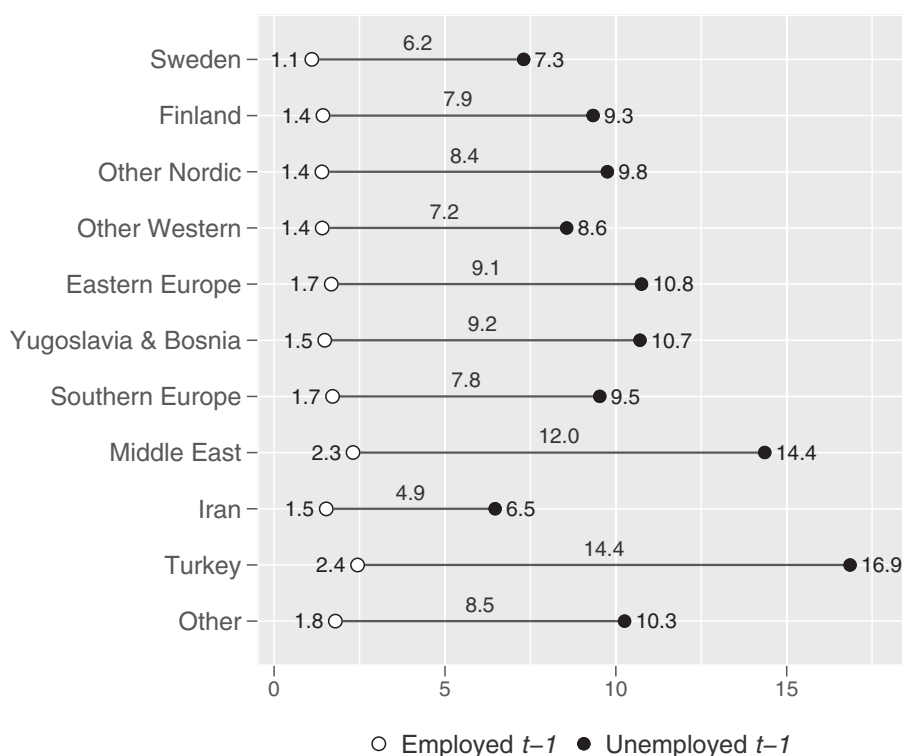
among men (1.0 per cent) and women (1.1 per cent). The second-generation entry rates show large variation between the different groups. Of second-generation groups, those of Western (including Finnish and other Nordic) ancestry have the lowest annual unemployment entry risks, even if they are 0.4 (men) and 0.3 (women) percentage points higher than the unemployment risks of those of Swedish ancestry. Annual risks of entering unemployment grow with increasing social distance, being higher among Eastern and Southern European ancestries, and are the highest among second-generation men and women of Middle-Eastern and Turkish ancestries. The unemployment entry rate compared to native ancestry Swedes is more than twice as high among both men (2.2%) and women (2.4%) of Turkish ancestry. Men of Iranian ancestry stick out and have unemployment entry rates closer to those of Southern and Eastern Europeans rather than Middle-Eastern and Turkish ancestries.

Turning to the main aim of the study, the figures support our prediction that the absolute effects of past unemployment on current unemployment are larger among most of the second-generation groups than among ancestral Swedes. Moreover, such effects are

the largest for those groups which are the most socially distant from ancestral Swedes—this pattern is visible, especially for men.

Among ancestral Swedes, having been unemployed last year increases the current year’s unemployment rate by 6.1 (men) and 6.2 (women) percentage points, respectively. Among the second generation, the negative consequences of past unemployment are more severe, notwithstanding a similar relative unemployment state dependence to the ancestral Swedes. In fact, the absolute effect sizes for second-generation groups, range up to 11.1 and 14.4 percentage points for Turkish ancestry men and women, respectively. The only exception to this pattern is the Iranian ancestry group, reporting an absolute effect of 5.1 percentage points for men and 4.9 percentage points for women.

The results described above reflect the scenario described in Figure 1 panel b. Specifically, unemployment state dependence among men of ‘Other Western’ ancestry (OR = 7.66) is nearly equivalent to that among Swedish ancestry men (OR = 7.68) (Table 2); however, nearly equal state dependence on the relative scale translates to a clearly larger increase in the probability of unemployment in the former group (Figure 2). The ‘Other Western’ group displays an absolute



**Figure 3** Predicted probabilities of being unemployed for those who were employed and those who were unemployed the year before ( $t - 1$ ), women. Notes: based on models in Table A3 in Supplementary Material. Solid lines that connect the dots represent genuine state dependence.

effect of 8.3 percentage points as compared to 6.1 among ancestral Swedes. This is the result of the second-generation group's higher baseline unemployment probability—the annual unemployment entry rate—which unemployment state dependence multiplies to a larger absolute effect. Combined, this translates into much higher unemployment persistence rates for the second-generation group (9.7 per cent) compared to ancestral Swedes (7.1 per cent) (black dots).

## Discussion and conclusions

Even though the children of immigrants—the second generation—show higher socio-economic attainment than their parents, many origin groups are disadvantaged in the labour market. In particular, children of immigrants—especially those with non-Western origin—have higher unemployment rates than their native ancestry peers in many countries, which is often explained by the lack of human and social capital and discrimination by employers (Drouhot and Nee, 2019; Quillian *et al.*, 2019).

In this study, we analysed unemployment state dependence among second-generation Swedish women and men, as well as Swedes of native ancestry.

Unemployment state dependence refers to the effect of previous unemployment on current unemployment (e.g. Heckman and Borjas, 1980; Arulampalam, 2001; Ayllón, 2013). Unemployment state dependence contributes to unemployment persistence, the tendency of unemployment being disproportionately experienced over time by individuals who have been unemployed before. At the group level, it accumulates unemployment into groups that are at greater risk of unemployment to begin with, contributing to the second generation's higher unemployment rates by entrenching initial labour market disadvantages over time. Although unemployment state dependence is an important process that contributes to the disadvantage children of immigrants face in the labour market, it has not been previously analysed in this population. More generally, heterogeneity in GSD has not been a focus of past research.

We used Swedish total population register data on cohorts born 1977–1981 and estimated correlated dynamic RE logit models (Rabe-Hesketh and Skrondal, 2013) of unemployment state dependence in 10 second-generation groups and among those of native Swedish ancestry. We found contrasting results when evaluating state dependence on the relative and



absolute scales. On the one hand, we found strong but not heterogeneous unemployment state dependence on the relative scale: being unemployed in 1 year multiplies the odds of unemployment in the next year 7–8-fold across second-generation immigrant groups and ancestral Swedes. One exception was the second-generation Iranians who displayed lower state dependence and is largely in line with their high degree of labour market integration in Sweden (Rooth and Ekberg, 2003). On the other hand, we observed heterogeneous unemployment state dependence on the absolute scale: being unemployed in 1 year increases the probability of unemployment in the next year to a greater extent across second-generation immigrant groups (up to 14 percentage points) compared to ancestral Swedes (6 percentage points).

Following VanderWeele and Knol (2014), effects on the relative (multiplicative) scale allow us to consider the structural features of unemployment state dependence. Since we find no heterogeneity in state dependence on the relative scale, it suggests that factors linking past and current unemployment, for example, human capital deterioration, negative signalling, or employment disincentives, operate similarly for all groups. This is not to say that second-generation immigrants are not disadvantaged with respect to unemployment, but that the modifying effect of past unemployment on current unemployment is the same for all groups. In other words, there are no indications that second-generation groups are disproportionately affected and/or discriminated due to past unemployment (cf. Birkelund, Heggebo and Rogstad, 2017, for a similar conclusion).

The second generation's disadvantages are clearly reflected by the effect of unemployment state dependence on the absolute scale. As VanderWeele and Knol (2014) suggest, effects on the absolute (additive) scale are more informative about social consequences. In our case, being unemployed for 1 year carries a larger penalty of future unemployment for the children of immigrants. This is the case because second-generation immigrants experience a higher baseline (entry) probability of unemployment compared to ancestral Swedes, such that a similar relative increase translates into larger absolute unemployment state dependence and subsequently persistence. In other words, decreasing unemployment state dependence in the entire population through policy intervention would benefit the second generation more so than ancestral Swedes (VanderWeele and Knol, 2014). It is not within the scope of the study, however, to specify how these policies are designed but rather provide an interpretation about the societal consequences of our findings.

Our findings have several implications for understanding the integration of the second generation into host country labour markets. First, our results point to unemployment state dependence as a mechanism

that reproduces second-generation disadvantage in the labour market. Specifically, this can happen even when state dependence on the relative scale is similar (or even weaker) among the second generation as among workers of native ancestry.

Second, unemployment state dependence in the second generation's labour market integration can be expected to be more important in 'stickier' labour markets where state dependence is stronger (Plum and Ayllón, 2015; Ayllón, Valbuena and Plum, 2022). Research comparing state dependence across European countries has shown that Sweden is a comparatively dynamic labour market (Ayllón, Valbuena and Plum, 2022). Therefore, contexts characterized by less dynamic labour markets, for example, the Southern European labour markets, might experience larger inequalities between second-generation immigrants and natives due to higher state dependence.

Third, and perhaps the most important implication of our study is that the largest inequality is seen in unemployment entry, that is, the risk of losing a job. Research on ethnic and racial unemployment inequality has to the best of our knowledge only focused on barriers to unemployment exit, that is, getting a job (Quillian *et al.*, 2019). Our findings suggest that the first dynamic is clearly the most important in accounting for the immigrant disadvantage. Inequality in unemployment entry could be the result of, for example, second-generation immigrants having different types of employment contracts, for example, fixed-term contract, being employed in industries with large turnover, or in the risk of being fired. To date, this is an overlooked dimension of unemployment that requires further attention in future research.

Our study was the first to analyse heterogeneities in unemployment state dependence by migrant background, and among the few that have analysed state dependence heterogeneity in general (cf. Arulampalam, Booth, and Taylor, 2000; Plum and Ayllón, 2015; Cutuli and Grotti, 2020). Finally, we have analysed and discussed heterogeneity in state dependence on the multiplicative and additive scales, which we consider as one contribution of our study. The contradictory findings that have emerged highlight the scale dependency of statistical interactions, in which there is typically an interaction effect between two variables on at least one scale whenever these variables affect the outcome (Rothman, Greenland and Lash, 2008). Debates on which ones should be favoured have mostly been technical (Ai and Norton, 2003; Buis, 2010; Mize, 2019) with less theoretical considerations underlying them (Mehta and Preston, 2016: p. 95). We believe more consideration of the estimation scale is warranted when analysing cumulative disadvantage processes such as unemployment state dependence (DiPrete and Ichim, 2006), as well as more generally.

- 1 In our population, around 8 per cent of men and 10 per cent of women transit from unemployment to inactivity every year with some differences across groups—Swedes displaying the lowest transition rates into inactivity. Among the second-generation men and women, the highest transition rates were for Eastern European men (11.1 per cent) and Finnish women (12.3 per cent). Moreover, second-generation immigrants are more likely to transit from employment to inactivity as compared to the ancestral Swedes. This is likely to underestimate the differences in genuine state dependence across ancestry groups.
- 2 Our interest here is on unemployment dynamics and therefore we contrast employment to unemployment. Considering solely active individuals provide only a partial picture of the labour market integration of second-generation immigrants. Had we studied dynamics in labour market participation, thus contrasting activity to inactivity, we may have observed much more variation both across origin groups and also between men and women. Inactivity rates, however, are pretty low in Sweden—especially in comparative perspective—and we are thus confident that focusing on the unemployment dynamics of the active population still shed light on a crucial aspect of labour market integration.
- 3 See [Table A5](#) in Supplementary Material for detailed description of the country classification.
- 4 Sickness benefits are received for spells that are longer than those covered by the employer period (generally 2 weeks), but is reserved for illnesses that are temporary. This differs from long-term sickness benefits which are provided to individuals whose sickness renders them unable to participate full time in the labour market (e.g. early retirement).
- 5 Past research traditionally used probit models; however, we deviate from this approach by using logit models.
- 6 Genuine state dependence is generally considered a first-order Markov process in past research. However, if longer term dependence exist, we are likely to overestimate the persistence parameter  $\rho$ .
- 7 Note that the subscript  $i0$  refers to the first observation of the unit  $i$ ;  $it$  refers to the current time period at which the unit is evaluated; while  $it - 1$  refers to the time period before the unit is evaluated.
- 8 Throughout the paper, we use the terms relative and multiplicative, as well as absolute and additive interchangeably. We refer to multiplicative and additive effects in the Method section as they are more precise terms.
- 9 [Mehta and Preston \(2016: p. 95\)](#) presented an example from social epidemiology: if smoking triples the risk of developing influenza and blacks are twice as likely as whites to die from infectious disease because they receive poorer health care, one can expect that black smokers have a six times higher risk of dying from influenza than white non-smokers. In this case, the effect of smoking on dying from influenza would also be twice as large among blacks than among whites due the blacks' poorer healthcare access.

## Supplementary Data

Supplementary data are available at *ESR* online.

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## Author Contributions

All authors contributed equally to the manuscript.

## Data Availability

Data may be obtained from a third party and are not publicly available. Aggregated data can be made available by the authors, conditional on ethical vetting. The authors access the individual-level data through Statistics Sweden's micro-online access system MONA.

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