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To cite this article: Daniela Andrén , Thomas Andrén & Martin Kahanec (10 Apr 2026): Structural state dependence in Swedish social assistance during the 1990s economic crisis, Applied Economics, DOI: [10.1080/00036846.2026.2648789](https://doi.org/10.1080/00036846.2026.2648789)

To link to this article: <https://doi.org/10.1080/00036846.2026.2648789>



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Published online: 10 Apr 2026.



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Structural state dependence in Swedish social assistance during the 1990s economic crisis

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ABSTRACT

We examine structural state dependence in social assistance in Sweden using register-based panel data from the 1990s, a period of severe economic stress, and document heterogeneity by partnership composition and migration background, with implications for contemporary integration policy and household economic mobility. Tracking a cohort of individuals who were single in 1990 and estimating dynamic discrete-choice models with unobserved heterogeneity and initial conditions, we find substantial persistence that varies systematically by gender, country of birth and partnership composition. A novel finding is that structural state dependence is highest among Swedish-born single individuals, particularly men. For both Swedish-born and foreign-born men, partnering with a Swedish-born woman is associated with lower structural state dependence, whereas partnering with a foreign-born woman is associated with higher structural state dependence only among foreign-born men. Because eligibility is assessed at the household level, these patterns should be interpreted as reduced-form persistence in household-level receipt that may combine behavioural state dependence with mechanical eligibility changes triggered by partnership formation and reassessment of joint resources.

KEYWORDS

Social assistance; country of birth; partnership; structural state dependence; dynamic discrete-choice model

JEL CLASSIFICATION

I30; I38; J18

I. Introduction

In Sweden, eligibility for social assistance is assessed at the household level. Partnership formation or dissolution can therefore change eligibility mechanically through reassessment of joint resources, implying that observed persistence in receipt may reflect both behavioural responses and household-eligibility mechanics. Previous Swedish studies (Andrén and Andrén 2013; Hansen and Lofstrom 2003, 2009) examined welfare persistence separately for Swedish-born and foreign-born samples during the 1990s, Sweden's most severe post-war economic crisis, which provides a natural test of welfare persistence dynamics under economic stress. These studies proxy the household by the representative individual, randomly selected by Statistics Sweden with respect to age, gender, and geographical location, but none explicitly modelled how the country-of-birth composition of partnerships interacts with state

dependence in a dynamic framework with household-level eligibility. This is the core innovation of the present study, which uses the same data source as Andrén and Andrén (2013) to extend their analysis by controlling for three types of partnership formation: native-native (both Swedish-born), immigrant-immigrant (both foreign-born), and mixed (one Swedish-born, one foreign-born). The institutional structure of household-level eligibility assessment that we analyse persists to the present day, making our methodological approach applicable to contemporary data.

We use 'structural state dependence' to denote the effect of past social assistance receipt on current receipt, conditional on observed characteristics and unobserved time-invariant heterogeneity; 'spurious state dependence' for persistence arising from heterogeneity and serially correlated shocks; and 'duration dependence' for dependence on the length of a spell. Because we observe annual receipt

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 Supplemental data for this article can be accessed online at <https://doi.org/10.1080/00036846.2026.2648789>

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indicators rather than monthly spells, our estimates pertain to annual persistence and should be interpreted accordingly.

Although the resilience of the Swedish welfare system during the 1990s crisis, marked by sharp increases in unemployment, large budget deficits, and a significant inflow of refugees from former Yugoslavia, has been well documented at the macro level (Gylfason et al. 2010), much less is known about whether partnership formation interacts with gender and migration background to shape structural state dependence in social assistance. We do not use the economic crisis as an explicit source of exogenous variation. Economic turbulence can influence the formation of cohabiting or marital relationships (hereafter, partnerships), and partnership status in turn shapes behavioural responses to economic shocks (Hess 2004). This article addresses two research questions: (1) To what extent is there structural state dependence in household-level social assistance receipt among individuals who were single at baseline during Sweden's 1990s crisis? and (2) How does structural state dependence vary with household composition defined by the individual's own country of birth and, when partnerships form, the partner's country of birth? To guide interpretation, [Section II](#) develops a conceptual framework and formulates four testable hypotheses that map directly to the estimated total effects of the structural state dependence parameter across partnership types. We find that structural state dependence in social assistance varies significantly with the interaction of gender, country of birth, and the partnership type (native-native, immigrant-immigrant, or mixed).

The remainder of the article is organized as follows: [Section II](#) reviews the related literature and develops a conceptual framework and hypotheses; [Section III](#) outlines the institutional context of social assistance in Sweden during the 1990s; [Section IV](#) presents the econometric framework and identification assumptions; [Section V](#) describes the data and variables; [Section VI](#) presents the results; and [Section VII](#) discusses the findings, limitations, and policy implications.

II. Related literature, conceptual framework and hypotheses

This section reviews the literature on state dependence in welfare receipt, partnership formation, migration background, and their intersection. We then develop a conceptual framework grounded in household economics, social capital theory, and immigrant integration research, from which we derive four hypotheses that guide our empirical analysis.

State dependence in welfare receipt

The distinction between structural and spurious state dependence in welfare participation is central to the analysis of benefit dynamics. Heckman (1981c,b) established the foundational framework, showing that observed persistence in programme participation may reflect a genuine causal effect of past receipt on current receipt (structural state dependence) and/or the sorting of individuals with persistent unobserved characteristics into welfare (spurious state dependence). If structural state dependence is present, a temporary spell of social assistance receipt increases the probability of future receipt even after controlling for individual heterogeneity. This distinction carries direct policy implications: structural state dependence suggests that preventing initial entry into welfare or providing targeted exit support may reduce long-run case-loads, whereas spurious state dependence implies that persistence reflects underlying disadvantage that welfare interventions alone cannot address.

Empirical evidence on state dependence in welfare receipt is substantial but geographically concentrated. Using U.S. data, Chay, Hoynes, and Hyslop (1999) found significant true state dependence in monthly welfare participation sequences. Cappellari and Jenkins (2014) documented substantial state dependence in social assistance receipt in Britain using the British Household Panel Survey. For Germany, Wunder and Riphahn (2014) estimated dynamic discrete-choice models and found that natives and immigrants differ in welfare entry and exit dynamics, with immigrants exhibiting higher persistence. Biewen (2009) extended this literature by allowing for feedback effects between household composition, employment status, and poverty in Germany, finding that

ignoring such feedback biases estimates of state dependence. For Sweden, Hansen and Lofstrom (2003, 2009) and Andrén and Andrén (2013) estimate persistence in social assistance participation and show that dynamics differ between Swedish-born and foreign-born individuals. However, these studies do not explicitly model how household composition – particularly the country-of-birth composition of partnerships – interacts with the persistence process when eligibility is assessed at the household level. This omission matters because household formation can change the assessment unit and thereby alter observed receipt even in the absence of behavioural change.

Dynamic discrete-choice models with unobserved heterogeneity provide a standard framework for identifying structural state dependence in binary outcomes, but credible estimation hinges on addressing the initial conditions problem (Heckman 1981a, 1981b, 1981c). Empirical work on social assistance and related welfare programmes documents substantial persistence and emphasizes the role of modelling choices (e.g. time aggregation) for distinguishing state dependence from duration-related patterns (Bhuller et al., 2017; Cappellari and Jenkins 2014; Chay, Hoynes, and Hyslop 1999; Wunder and Riphahn 2014). Cross-country evidence also highlights that persistence patterns depend on institutional context and programme design, implying that state dependence estimates are not automatically transferable across settings (Immervoll et al. 2015). A methodological concern raised by Bhuller et al. (2017) is that time aggregation – observing annual rather than monthly receipt – inflates estimates of state dependence by conflating within-year dynamics with cross-year persistence. While our data are annual, we follow the standard approach in the literature and interpret our estimates as measures of annual persistence conditional on observed and unobserved heterogeneity and consistent with household-based eligibility.

Partnership, country-of-birth and welfare participation

Partnership formation can affect welfare participation through different channels. In household economics, partnerships pool resources and may provide partial consumption insurance against income shocks, implying lower need for social

assistance when joint resources are assessed (Becker 1993; Hess 2004). Additionally, partnership formation can influence labour-market outcomes and access to information and networks (Becker (1993), affecting income trajectories and thus eligibility for means-tested assistance (Becker 1993; Borjas 1999; Constant and Zimmermann 2013; Furtado and Song 2015).

The effect of partnership formation on welfare participation may differ by the country-of-birth composition of the partnership. Mixed partnerships, in which one partner is native-born and the other is foreign-born, can facilitate host-country-specific human capital accumulation and access to social capital, which are linked to improved labour-market outcomes relative to immigrant-immigrant partnerships (Chiswick and Houseworth 2011; Dribe and Lundh 2008; Dribe and Nystedt 2014, 2015; Furtado and Song 2015; Constant and Zimmermann 2013; Meng and Gregory 2005). Chiswick and Houseworth (2011) provided evidence that intermarriage reflects and reinforces human capital accumulation, as partners in mixed unions tend to have higher education and language proficiency. Evidence from Australia and Sweden indicates that immigrants in mixed partnerships tend to have better labour-market outcomes than those in immigrant-immigrant partnerships, consistent with improved access to host-country-specific human capital and social networks (Dribe and Lundh 2008; Dribe and Nystedt 2014, 2015; Meng and Gregory 2005).

In contrast, immigrant-immigrant partnerships may concentrate disadvantage. When both partners are foreign-born, neither may have strong connections to the host-country labour market or familiarity with local institutions, limiting the household's capacity to exit welfare. Constant and Zimmermann (2013); Furtado and Song (2015) documented that intermarriage premiums are strongest when the native-born partner provides access to resources and networks unavailable to the immigrant partner. These patterns suggest that the country-of-birth composition of the partnership is an important dimension of heterogeneity in welfare dynamics.

Gender further complicates these patterns. Labour market attachment differs by gender, with women – particularly those with young children –

facing higher constraints on employment due to caregiving responsibilities (Becker 1993). In the Swedish context, although family policies are designed to promote gender equality, empirical evidence indicates that women with children, especially single mothers, have higher social assistance participation rates. At the same time, partnership formation tends to reduce welfare participation more for women than for men, as the partner's income often lifts the household above the eligibility threshold. Riphahn and Wunder (2016) found gender-differentiated patterns of welfare dependence among natives and immigrants in Germany, with women exhibiting different entry and exit dynamics than men.

A related stream of literature examines the relationship between welfare generosity and migration. Borjas (1999) argued that welfare benefits may attract immigrants (welfare magnets), though subsequent evidence suggests that the effects of welfare on migration are small compared to other drivers (Giulietti et al. 2013; Kahanec and Guzi 2022), and that welfare generosity may have some lock-in effect on immigrants' spatial mobility (Guzi, Kahanec, and Kureková 2018). While this literature is less central to our analysis of state dependence, it underscores that institutional features of the welfare system interact with migration in ways that shape welfare participation patterns.

Conceptual framework and hypotheses

Building on the literature reviewed above, we develop a conceptual framework that links partnership formation, country-of-birth composition, and gender to structural state dependence in social assistance. The framework rests on three mechanisms.

First, resource pooling: when two individuals form a household, their combined income, assets, and labour supply are assessed jointly for social assistance eligibility. If the partner contributes additional resources, the household is more likely to exceed the eligibility threshold, reducing the probability of continued receipt. This mechanism predicts that partnership formation, on average, is associated with lower social assistance participation compared to remaining single.

Second, host-country social capital: for foreign-born individuals, partnering with a Swedish-born person provides access to host-country-specific resources, including language skills, knowledge of labour market institutions, and social networks that facilitate employment. These resources reduce the household's reliance on social assistance beyond the mechanical effect of pooled income. Conversely, immigrant-immigrant partnerships may offer fewer such resources, potentially sustaining or reinforcing welfare dependence.

Third, gendered labour market constraints: differences in labour market attachment by gender – shaped by caregiving responsibilities, occupational sorting, and wage gaps – imply that partnership effects on welfare participation may differ between men and women. In particular, women with children face higher employment barriers, which may increase social assistance participation among single mothers but decrease it when a partner's income is present.

From these mechanisms, we derive four hypotheses that describe expected patterns in the estimated structural state dependence parameters across demographic subgroups and partnership types in our empirical framework of dynamic discrete-choice model estimated separately for Swedish-born and foreign-born samples.

Hypothesis 1 (Resource pooling): Partnership formation is associated with lower structural state dependence in social assistance compared to remaining single, through the pooling of resources at the household level. This hypothesis is testable by comparing the structural state dependence parameter for individuals who form partnerships with the parameter for always-single individuals, within both the Swedish-born and foreign-born samples.

Hypothesis 2 (Host-country social capital): For foreign-born individuals, mixed partnerships (with a Swedish-born partner) are associated with lower structural state dependence than immigrant-immigrant partnerships (with a foreign-born partner), because mixed partnerships provide greater access to host-country-specific resources. This hypothesis is testable by comparing the total structural state dependence estimates across partnership types within the foreign-born sample. We expect foreign-born men partnered with Swedish-born

women and foreign-born women partnered with Swedish-born men to exhibit lower state dependence than foreign-born – foreign-born partnerships. For Swedish-born individuals, this mechanism operates in reverse: partnering with a foreign-born individual may not add host-country-specific resources and could increase household-level persistence if the foreign-born partner has weaker labour market attachment.

Hypothesis 3 (Gender differences): Structural state dependence differs by gender due to differences in labour market attachment and child-related employment constraints. Women, particularly those with children, face higher barriers to employment that may increase welfare persistence when single. However, partnership formation may reduce state dependence more for women than for men if the partner's income is sufficient to lift the household above the eligibility threshold. This hypothesis is testable through the gender interaction terms in the state dependence specification (Equation 4), which allow the structural state dependence parameter to differ between men and women within each sample and partnership type.

Hypothesis 4 (Selection into partnerships): The magnitude of structural state dependence may differ between the full cohort of baseline singles and the always-single subsample due to selection into partnerships. If individuals with higher unobserved propensity for welfare exit are more likely to form partnerships, the full cohort estimates may understate persistence relative to the always-single benchmark. Conversely, if partnership formation is an endogenous response to welfare participation, the full cohort estimates may confound true state dependence with partnership-induced changes in eligibility. By estimating models separately for both samples, our design assesses the relationship between partnership formation and structural state dependence.

III. Welfare benefits in Sweden during the 1990s

Sweden's institutional design differs from the welfare systems analysed in related studies. In the

United States, the Aid to Families with Dependent Children (AFDC) programme targeted single-parent households with categorical eligibility rather than universal means-testing (Chay, Hoynes, and Hyslop 1999). In Britain, Income Support provided means-tested assistance but with different conditionality rules (Cappellari and Jenkins 2014). Germany's social assistance system shares the means-tested, household-level character of the Swedish system but operates within a federal structure with different administrative traditions (Biewen 2009; Wunder and Riphahn 2014). Sweden's combination of household-level eligibility, individual income taxation, and universal coverage regardless of nationality makes it a distinct institutional context for studying how partnership composition interacts with welfare persistence. A key institutional feature of the Swedish welfare system is that eligibility for social assistance is assessed at the *household* level, whereas Sweden has operated a fully *individual* income tax system since the 1971 reform. Consequently, partnership changes create no direct tax incentives; social assistance, which is non-taxable, does not affect the tax base or the benefit amount, leaving no fiscal incentive to cohabit. When individuals form a new partnership, their eligibility is reassessed based on the joint resources of the new household, potentially leading to an exit from or entry into social assistance that is mechanical rather than behavioural. This reassessment mechanism is central for interpreting persistence in household-level receipt.

Sweden's welfare system is grounded in the principle of equal access to social rights. The Social Services Act, first enacted in 1980 and revised in 1998, guaranteed all residents, including foreign-born individuals with residence permits, the right to apply for social assistance (Giertz 2004), though municipalities retained discretion over implementation (T. Andrén and Andrén 2013).

Social assistance eligibility is assessed at the *household* level rather than the individual level. The system is means-tested, requiring disclosure of household assets, income, and savings. Applicants must exhaust other income sources, including insurance schemes and deplete significant assets (e.g. housing and vehicles). The temporary nature of the benefit and strict eligibility

criteria may discourage some households from applying (Gustafsson 2002).

The benefit provides a reasonable, rather than minimal, standard of living, covering housing and childcare, and basic consumption. During the 1990s, most municipalities reduced social assistance generosity by approximately 20% (Flood, Hansen, and Wahlberg 2004). Work history requirements for social insurance eligibility contributed to over-representation of new immigrants among social assistance recipients. Until 1998, the National Board of Health and Welfare provided general guidelines for the social assistance norm, calculated from cost estimates for household expenditure from the Swedish Consumer Agency. The revised Social Services Act of 1998 introduced a system with more detailed analysis of actual expenditure items and established a national uniform benefit level. Because the 1998 reform took effect at the end of our observation window (affecting only 1998–1999 outcomes), we do not model it explicitly. Instead, the time dummies included in our specification absorb any common shift in benefit generosity or administrative practice that the reform may have introduced in the final two years of the panel.

Some entries into or exits from social assistance reflect changes in household composition rather than changes in individual economic need. Similarly, some differences in social assistance patterns between Swedish-born and foreign-born individuals were partly shaped by institutional rules for new arrivals; for example, refugees and recent immigrants were sometimes assigned to social assistance upon arrival as part of government integration policies, distinguishing them from long-term or voluntary migrants (Andrén and Andrén 2013). Therefore, distinguishing households by the intersection of gender and country of birth, and the partner's country of birth is essential for estimating structural state dependence in social assistance.

IV. Econometric framework

We adopt a dynamic random-effects probit framework following Heckman (1981a, 1981b, 1981c) for three reasons. First, the binary nature of social assistance receipt – observed as annual household-

level participation – makes probit a natural specification. Second, the random-effects structure allows us to model unobserved time-invariant heterogeneity, which is essential for separating structural from spurious state dependence. Third, Heckman's approach to initial conditions addresses the endogeneity of the first observation, which arises because the process generating social assistance receipt begins before our observation window. Alternative approaches, such as dynamic linear probability models, do not respect the binary nature of the outcome. Mixed proportional-hazard models require monthly spell data, which are unavailable in our register data. Quasi-experimental designs require plausibly exogenous variation in treatment assignment, which is difficult to construct for household-level social assistance in the absence of sharp policy discontinuities during our observation period.

The dependent variable Y_{it}^* is a latent propensity for individual i to receive social assistance in period t . The observed binary outcome, Y_{it} , equals 1 when $Y_{it}^* \geq 0$, and 0 otherwise, for all t . With this setup, the model is:

$$Y_{i1}^* = Z_{i1}\beta_1 + \varepsilon_{i1} \quad (\text{Initial condition equation}) \quad (1)$$

$$Y_{it}^* = X_{it}\beta_2 + \gamma Y_{it-1} + \varepsilon_{it} \quad (\text{Participation equation}) \quad (2)$$

where $i = 1, \dots, N$; $t = 2, \dots, T$; Z_{i1} is a vector of variables explaining the first observation for individual i in the observation window, and X_{it} is a vector of variables explaining the remaining observations. The lagged observed outcome variable, Y_{it-1} , on the right-hand side of the participation equation, captures dependence between past and present social assistance participation, and γ measures structural state dependence in social assistance.

$\gamma > 0$ implies that the probability of social assistance participation in the current period t is higher for those with experience from receipt in period $t - 1$ than for otherwise identical individuals without such receipt. We label γ 'structural state dependence' following the terminology established by Heckman (1981c,b). γ captures the net effect of past household-level receipt on current receipt,

which may combine behavioural persistence with mechanical eligibility effects associated with changes in household composition. Given remaining exogeneity concerns for time-varying household composition, we interpret γ as reduced-form annual persistence in household-level receipt, and we avoid causal language when discussing partnership coefficients.

The vector of error terms $\varepsilon_i = (\varepsilon_{i1}, \dots, \varepsilon_{iT})$ is assumed multivariate normal: $\varepsilon_i \sim N(0, \Sigma)$, where Σ is a $T \times T$ positive definite intertemporal covariance matrix. To obtain consistent estimates of structural state dependence, it is necessary to control for unobserved heterogeneity, which allows us to separate the effect of innate individual differences in participation from true state dependence. Following Heckman (1981c), the model is estimated within the framework of a multivariate probit model with an unrestricted intertemporal covariance matrix, Σ , except for the time-specific variances that are normalized to 1 along the main diagonal. We evaluate the resulting multivariate normal probabilities using the Geweke – Hajivassiliou – Keane (GHK) simulator.¹ This approach allows a flexible error structure and provides robustness against misspecification of the error process. In our implementation, we use 20 Halton draws per individual for the GHK simulator, following standard practice in applied work with multivariate probit models of this dimension. The empirical work and the numerical optimization are performed using SAS/IML.

With incomplete histories, initial conditions may cause inconsistency. We specify initial conditions as in Equation (1). We adopt Heckman's (Heckman 1981a, 1981c) approach, which outperforms other methods in short panels (Akay 2011).

Because the model is defined within the multivariate probit framework, a likelihood function must be specified. The model described by Equations (1) and (2) runs over ten time periods (1990–1999) and therefore generates the following log-likelihood function:

$$L = \sum_{i=1}^N \log[\text{prob}(Y_{i1}, \dots, Y_{i10})], \quad (3)$$

where

$$\text{prob}(Y_{i1}, \dots, Y_{i10}) = \int_{a_{i1}}^{b_{i1}} \dots \int_{a_{i10}}^{b_{i10}} f(\varepsilon_{i1}, \dots, \varepsilon_{i10} | \Sigma) d\varepsilon_{i10} \dots d\varepsilon_{i1},$$

with $a_{i1} = -Z_{i1}\beta_1$ and $b_{it} = \infty$ if $Y_{i1} = 1$, whereas $a_{i1} = -\infty$ and $b_{i1} = -Z_{i1}\beta_1$ if $Y_{i1} = 0$. For $t = 2, 3, \dots, 10$, the truncation limits are defined analogously, according to Equation (2) and $f(\cdot | \Sigma)$ being the multivariate normal density function. Because we allow all covariances in the covariance matrix to be free, the main difficulty in maximizing the likelihood function is related to the 10-fold integral that must be solved for each individual in the sample. This is solved using the smooth recursive conditioning Geweke – Hajivassiliou – Keane (GHK) simulator, which simulates the integrals rather than numerically evaluating them.

The model defined by Equations (1) and (2) contains a single measure for the average structural state dependence, γ , related to the total sample of individuals used in the estimation. While this is an interesting parameter in general, our article focuses on how household composition and the interaction between gender and country of birth affect the magnitude of state dependence. We are particularly interested in how the magnitude of annual persistence changes when an individual moves from being single to a partnership, and how the association varies depending on whether the partner is Swedish-born or foreign-born. Additionally, we explore whether these effects are different for women and men, recognizing potential behavioural differences in partnership formation conditional on prior participation in social assistance. Therefore, in addition to analysing persistence for the full sample of individuals who were single in 1990, we also examine persistence for the subsample who remained single throughout the decade (always-singles). This design provides a benchmark that is not mechanically affected by

¹For a detailed description of the GHK-simulator, see Train (2003, pp. 126–137). The standard quadrature methods normally used to solve integrals numerically do not work well in practice when the integration problem exceeds five dimensions due to the curse of dimensionality problem; hence, this problem necessitates the use of simulation methods.

partnership transitions and helps assess how sensitive estimated persistence patterns are to partnership dynamics.

We introduce the following specification:

$$\gamma = \underbrace{(\gamma_0 + \gamma_1 W)}_{\text{Single}} + \underbrace{(\gamma_2 + \gamma_3 W)}_{\text{partnered with SB}} \text{ SB} + \underbrace{(\gamma_4 + \gamma_5 W)}_{\text{partnered with FB}} \text{ FB}, \quad (4)$$

with W denoting a binary variable equal to 1 for women, and 0 for men, and SB and FB denoting binary variables, equal to 1 if the individual partners with a Swedish-born person (SB) or a foreign-born person (FB), respectively. The reference category for both SB and FB is the state of being single, which implies that the composite parameter $(\gamma_0 + \gamma_1 W)$ is an estimate for always-singles, i.e. individuals who remain single throughout the period.

To facilitate the interpretation of Equation 4 and its connection to our empirical analysis, Table 1 presents a comprehensive mapping of how structural state dependence estimates vary across partnerships. Each coefficient in the equation was estimated separately for the specific sample, either Swedish-born or foreign-born, to reflect potential differences by the sampled individual's gender and country of birth and, for those who form a partnership, the partner's country of birth.

Because coefficients in nonlinear dynamic models are not directly interpretable as probability changes, we additionally report average marginal effects and representative predicted probabilities in the Supplementary Appendix (Tables A7 and A10), including bootstrap-based standard errors and confidence intervals.

V. Data

We use data from the register-based Swedish Income Panel (SWIP), a stratified random sample of Sweden's population, organized by Statistics Sweden. SWIP contains a 1% sample of the Swedish-born population and a 10% sample of the foreign-born population.² The oversampling of foreign-born individuals (10% versus 1% for Swedish-born) was designed by Statistics Sweden to ensure sufficient observations for analysis of immigrant outcomes.

Tax register data link all household members, including spouses and children under age 18, to the sampled person, enabling construction of tax-register-based household units.

In our estimation, we do not apply sampling weights because our models condition on country of birth and estimate parameters separately for Swedish-born and foreign-born samples. Within each sample, observations are drawn randomly from the population stratum, and the oversampling

Table 1. Structural state dependence in SA and partnership status.

	Partner		Partnership	
	Gender	Country of Birth	Status	Total Effect
SB sample				
Man ($W = 0$)	–	–	Single SBM	γ_0^{SB}
Woman ($W = 1$)	–	–	Single SBW	$\gamma_0^{SB} + \gamma_1^{SB}$
Man ($W = 0$)	Woman ($W = 1$)	SB ($SB = 1$ & $FB = 0$)	SBM & SBW	$\gamma_0^{SB} + \gamma_2^{SB}$
Woman ($W = 1$)	Man ($W = 0$)	SB ($SB = 1$ & $FB = 0$)	SBW & SBM	$\gamma_0^{SB} + \gamma_1^{SB} + \gamma_2^{SB} + \gamma_3^{SB}$
Man ($W = 0$)	Woman ($W = 1$)	FB ($SB = 0$ & $FB = 1$)	SBM & FBW	$\gamma_0^{SB} + \gamma_4^{SB}$
Woman ($W = 1$)	Man ($W = 0$)	FB ($SB = 0$ & $FB = 1$)	SBW & FBM	$\gamma_0^{SB} + \gamma_1^{SB} + \gamma_4^{SB} + \gamma_5^{SB}$
FB Sample				
Man ($W = 0$)	–	–	Single FBM	γ_0^{FB}
Woman ($W = 1$)	–	–	Single FBW	$\gamma_0^{FB} + \gamma_1^{FB}$
Man ($W = 0$)	Woman ($W = 1$)	SB ($SB = 1$ & $FB = 0$)	FBM & SBW	$\gamma_0^{FB} + \gamma_2^{FB}$
Woman ($W = 1$)	Man ($W = 0$)	SB ($SB = 1$ & $FB = 0$)	FBW & SBM	$\gamma_0^{FB} + \gamma_1^{FB} + \gamma_2^{FB} + \gamma_3^{FB}$
Man ($W = 0$)	Woman ($W = 1$)	FB ($SB = 0$ & $FB = 1$)	FBM & FBW	$\gamma_0^{FB} + \gamma_4^{FB}$
Woman ($W = 1$)	Man ($W = 0$)	FB ($SB = 0$ & $FB = 1$)	FBW & FBM	$\gamma_0^{FB} + \gamma_1^{FB} + \gamma_4^{FB} + \gamma_5^{FB}$

Notes: SB = Swedish-born, FB = Foreign-born, M = man, W = woman. Partnership types are classified as: native-native (both Swedish-born), immigrant-immigrant (both foreign-born), or mixed (one Swedish-born and one foreign-born partner).

²For further information on SWIP, see <http://snd.gu.se/en/>.

does not affect the consistency of within-stratum estimates. The separate estimation for Swedish-born and foreign-born samples further ensures that differential sampling fractions do not bias the comparison of structural state dependence across groups.

As in Andrén and Andrén (2013), the individuals in our samples are aged 20–50 years and are observed in the register until the end of 1999; and they were not students, early retirees, emigrated or died by 1999. To align with our empirical strategy, we also excluded all individuals who were not *single* in 1990. Our analytical sample therefore represents the working-age singles who remained in Sweden throughout the decade, and results should be interpreted as pertaining to this population rather than to the full resident population of the 1990s. Because SWIP is register-based, there is no survey non-response or panel dropout due to refusal, and therefore attrition from the panel is limited to mortality and emigration.

Throughout the analysis, we estimated our model separately for two groups: (1) the full cohort of baseline singles (all individuals who were single in 1990, regardless of later partnership status), labelled ‘Singles 1990’, and (2) the subsample of those who remain single for the entire 1990–1999 period, labelled ‘always-singles’. Figure 1 summarizes the foreign-born cohort construction, highlighting the always-singles

benchmark and the full cohort partitions by country-of-birth composition of households of couples.

Individuals who formed a new household were classified by the country-of-birth composition of the partnership: native-native partnerships (both partners Swedish-born), immigrant-immigrant partnerships (both partners foreign-born), and mixed partnerships (one Swedish-born, one foreign-born), yielding four groups: (1) both Swedish-born; (2) both foreign-born; (3) foreign-born woman & Swedish-born man; (4) foreign-born man & Swedish-born woman.

This design mitigates (but does not eliminate) selection concerns; time-varying unobservables may still affect both partnership formation and social assistance receipt. By analysing these groups in parallel, rather than merely comparing outcomes between them, we provide a more robust understanding of both selection effects and structural state dependence in social assistance.

Partnership status in SWIP is identified from tax registers, which record formal marriages and registered partnerships. Unregistered cohabitation is not observed in the data. This measurement error is likely to attenuate our estimates of partnership effects, because some individuals classified as ‘single’ in the register are in fact cohabiting and sharing resources. However, this is less likely for a long-term status among social assistance recipients

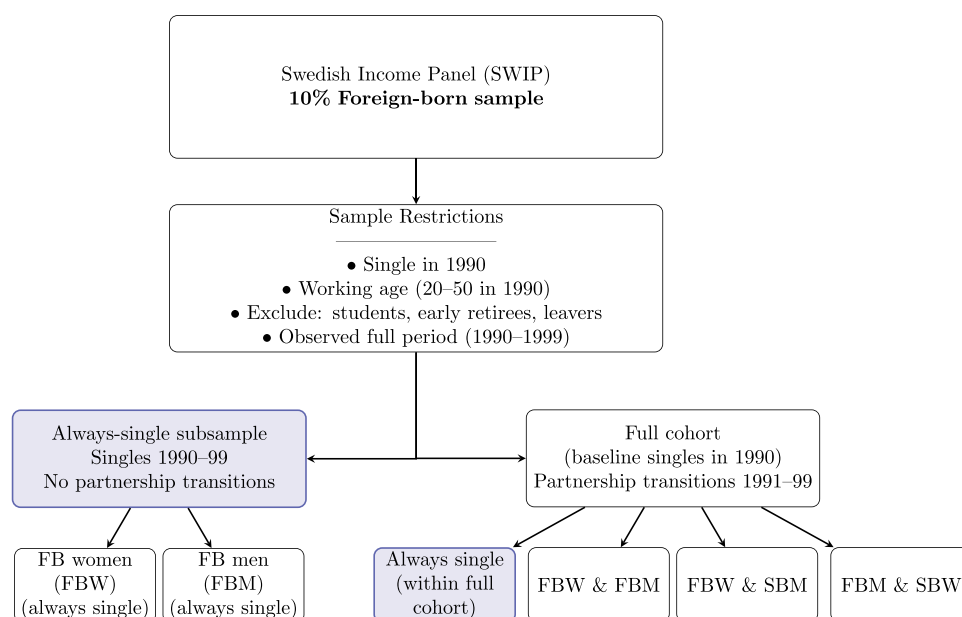


Figure 1. Data structure and sample construction; foreign-born cohort.

given the monthly assessment for eligibility and costs involved to have two different housing arrangements.

A critical concern for our research design is that our model is, like the majority of previous studies that use dynamic binary response models with unobserved heterogeneity, estimated under the strict exogeneity assumption. However, this assumption may be questionable for regressors such as partnership status and the number of children (Biewen 2009). To address this concern, we also examined welfare persistence in the subsample who remained single throughout the decade (referred to as always-singles). The comparison of γ between always-singles and the full cohort speaks to H4 (selection into partnerships).

The dependent variable used in the analysis is binary and indicates whether the household receives social assistance in a given year. See Figures A1a-A1c and Tables A1 and A2 in the Supplementary Appendix, hereafter referred to as the Appendix. Because social assistance is received on a monthly basis but we observe annual records, a household was classified as a recipient in year t if it received social assistance for at least one month during that year. Therefore, the results should be interpreted as annual (cross-sectional) incidence; i.e. whether the household appears as a recipient in a given year. A stricter definition requiring receipt for, e.g. three or more months would reduce sample sizes and potentially exclude transitional receipt, but the qualitative patterns in structural state dependence are expected to be robust to this choice given the strong year-to-year persistence documented in Table A2. No observations in our analytical sample have missing values on the dependent variable or key covariates, as all variables are drawn from administrative registers with complete coverage for the sampled population.

VI. Results

To account for heterogeneous effects by immigrant status, we estimated Equation (4) separately for Swedish-born and foreign-born samples. We report estimates for the full cohort and the always-single subsample side-by-side. The full-cohort models incorporate time-varying indicators for partnership transitions and their country-of-birth

composition; the always-single models cannot have such transitions and therefore provide a benchmark unaffected by partnership dynamics.

Participation, initial conditions and covariance matrix

Table A3 in the Appendix presents coefficient estimates from social assistance participation equations (Equation 2) estimated separately for Swedish-born and foreign-born individuals, using the full sample (Single 1990) and the subsample of always-single (Single 1990–99). For all four groups, estimated parameters align with expectations: the age coefficient is consistently negative, though statistically significant only for ‘always-single’ foreign-born individuals, indicating that older individuals in this subgroup are less likely to receive social assistance. Higher education is associated with a lower probability of receipt, while being unemployed and having children at home are associated with a higher probability. Regarding residential context, a higher municipal share of social assistance recipients is associated with a higher probability, whereas residence in a city region and a higher municipal unemployment share are associated with a lower probability; in contrast, at the individual level, unemployment is associated with a higher probability.

For both foreign-born samples, refugees have a higher propensity, but increased time in country is associated with lower participation, possibly reflecting improved labour market integration or better social networks over time. Singles born in non-European countries show higher propensity than singles born in Nordic countries, and those from Western and Southern Europe show a slightly lower propensity. Notable differences between those who remained single throughout the period and the full sample are relatively modest, suggesting that partnership status may not substantially alter these demographic and socioeconomic patterns in social assistance participation.

Gender and partnership reveal complex interactions. In general, women exhibit lower welfare participation than men, a pattern particularly pronounced among the foreign-born. However, this gender effect reverses for women with children, who display significantly higher participation

rates. This effect is particularly pronounced among Swedish-born women who remained single throughout the period relative to their foreign-born counterparts.

Country-of-birth composition of partnerships reveals notable differences. Having a Swedish-born partner reduces social assistance participation for both groups, although the effect is stronger among foreign-born individuals. In contrast, having a foreign-born partner significantly increases social assistance participation for foreign-born individuals, while it has no statistically significant effect for Swedish-born individuals.

The interaction between gender and a partner's country of birth further underscores this complexity. For both Swedish-born and foreign-born women, having a partner, regardless of origin, generally reduces social assistance participation more than for men.

The estimated coefficients for the initial conditions equation (Equation 1) are reported in Table A4 in the Appendix. Although the initial conditions equations primarily serve to control for the endogenous initial period, most estimates are statistically significant across all four samples. Pre-sample social assistance receipt during 1985–1989 exhibits consistently significant associations with initial conditions. For Swedish-born individuals, the strongest effect is observed in 1989, while earlier years show moderate effects. For foreign-born singles, estimates for social assistance receipt three and four years prior are not statistically significant. However, the estimate for 1985 remains positive, large, and statistically significant, indicating a strong and persistent effect.

Covariance estimates between error terms of the initial conditions equation and the participation equation are all significantly different from zero, except for the Swedish-born always-single subsample (see Table A5 in the Appendix). These significant covariances indicate that unobserved factors affecting initial social assistance receipt are correlated with unobserved factors influencing subsequent participation. This correlation validates our approach of explicitly modelling initial conditions rather than treating them as exogenous, which would have led to biased estimates of structural state dependence. The non-significant covariance for the Swedish-born always-single subsample

suggests that, for this particular group, the unobserved heterogeneity determining initial receipt is largely independent of factors affecting future participation – possibly reflecting more transitory initial shocks or less persistent unobserved characteristics among Swedish-born singles who never form partnerships. This finding reinforces the importance of separately analysing different demographic groups, as the relationship between initial conditions and subsequent dynamics varies systematically across populations.

Structural state dependence

Table 2 presents the estimated γ parameters from Equation (4) and Table 1, separately for Swedish-born (SB) and foreign-born (FB) samples, and relates them to the four hypotheses developed in Section II. γ_0 is the only parameter estimated for both the full cohort and always-singles. Within each sample, γ_0 differs only slightly between the full cohort and always-singles. SB men exhibit marginally higher structural state dependence than FB men. However, the difference in magnitude indicates that SB men in the full sample have slightly higher structural state dependence than always-singles. In contrast, always-single foreign-born (FB) men exhibit slightly higher state dependence than the full cohort, suggesting that forming a partnership may increase their likelihood of exiting social assistance.

Single women exhibit different patterns. SB single women have slightly lower state dependence than SB single men, whereas FB single women exhibit slightly higher state dependence than FB single men, but lower levels than SB single men.

When individuals form partnerships, the effect of past social assistance is modified by both gender and the partner's country of birth. In partnerships where both partners are Swedish-born, the persistence effect is lower compared to singles, consistent with resource pooling and improved labour-market attachment in native-native households. In contrast, when SB individuals partner with a FB individual, structural state dependence is higher, whereas among foreign-born individuals partnering with a SB person reduces state

Table 2. Structural state dependence by partnership status.

Partnership status	Total Effect		
	Estimates (Table A3)	Single 1990	Single 1990–99
Panel A: SB sample			
Single SB Man (M)	γ_0^{SB***}	1.580***	1.525***
Single SB Woman (W)	$\gamma_0^{SB***} + \gamma_1^{SB***}$	1.392	
SBM & SBW	$\gamma_0^{SB***} + \gamma_2^{SB}$	1.456	
SBW & SBM	$\gamma_0^{SB***} + \gamma_1^{SB***} + \gamma_2^{SB} + \gamma_3^{SB}$	1.228	
SBM & FBW	$\gamma_0^{SB***} + \gamma_4^{SB}$	1.734	
SBW & FBM	$\gamma_0^{SB***} + \gamma_1^{SB} + \gamma_4^{SB} + \gamma_5^{SB}$	1.611	
Panel B: FB sample			
Single FB Man	γ_0^{FB***}	1.458***	1.491***
Single FB Woman	$\gamma_0^{FB***} + \gamma_1^{FB}$	1.498	
FBM & SBW	$\gamma_0^{FB***} + \gamma_2^{FB***}$	1.272	
FBW & SBM	$\gamma_0^{FB***} + \gamma_1^{FB} + \gamma_2^{FB} + \gamma_3^{FB***}$	1.265	
FBM & FBW	$\gamma_0^{FB***} + \gamma_4^{FB***}$	1.733	
FBW & FBM	$\gamma_0^{FB***} + \gamma_1^{FB} + \gamma_4^{FB***} + \gamma_5^{FB}$	1.873	

Notes: M = man; W = woman; FB = foreign-born; SB = Swedish-born; SBM & SBW = native-native partnership; FBM & FBW = immigrant-immigrant partnerships; one SB and one FB partner = mixed partnerships. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, and refer to the directly estimated -parameters reported in Table A3. Total effect' entries are linear combinations of the -parameters in Equation (4), mapped in Table 1, and are reported as point estimates. Bootstrap-based standard errors and 95% confidence intervals for average effects by groups are reported in Supplementary Table A7.

dependence regardless of gender. When both partners are foreign-born, the persistence effect is much higher compared to other groups. This indicates that for FB individuals, partnering with a FB partner is linked to a greater likelihood that past social assistance receipt will lead to future participation, compared to partnering with a SB individual.

The patterns in Table 2 provide partial and, in some cases, full support for the four hypotheses developed in Section II. Regarding H1 (resource pooling), the evidence is mixed. For the Swedish-born sample, native-native partnerships exhibit lower structural state dependence than single SB men, consistent with resource pooling reducing persistence. For the foreign-born sample, mixed partnerships also show lower state dependence than single FB men. However, immigrant-immigrant partnerships do not follow this pattern: FBM&FBW and FBW&FBM exhibit higher structural state dependence than singles. This suggests that partnership formation reduces persistence primarily when the partnership composition provides additional economic resources or host-country social capital.

Regarding H2 (host-country social capital), the results are consistent with the hypothesis for the foreign-born sample. Mixed partnerships show substantially lower structural state dependence than immigrant-immigrant partnerships. This

pattern is consistent with Swedish-born partners providing access to host-country-specific resources – language skills, social networks, and knowledge of labour market institutions – that reduce welfare persistence. For Swedish-born individuals, the reverse pattern holds: partnering with a foreign-born person is associated with higher structural state dependence than native-native partnerships, consistent with the hypothesis that such partnerships do not add host-country-specific resources and may increase household-level persistence.

Regarding H3 (gender differences), single SB women have lower structural state dependence than single SB men, while single FB women have slightly higher state dependence than single FB men. Within partnerships, women generally exhibit lower state dependence than men in the same partnership type, consistent with the hypothesis that partnership formation reduces state dependence more for women. The gender interaction is most pronounced in native-native partnerships among Swedish-born individuals and in mixed partnerships among foreign-born individuals.

Regarding H4 (selection into partnerships), the close similarity between γ_0 for always-singles and the full cohort within both the SB sample and the FB sample suggests that selection into partnerships only slightly alters the estimate of structural state dependence for singles. The small differences are

consistent with modest selection effects: for the foreign-born sample, always-singles show slightly higher state dependence than the full cohort, consistent with the possibility that individuals with better unobserved exit prospects are somewhat more likely to form partnerships.

Robustness checks

As an auxiliary robustness and interpretation device, we re-estimated Equation (4) using maximum likelihood probit, and standard numerical optimization (BFGS algorithm) to maximize the log-likelihood function. This re-estimation avoids the high-dimensional integration required by the GHK estimator and therefore allows straightforward computation of average marginal effects and predicted probabilities with bootstrap confidence intervals. Full coefficient estimates for the foreign-born sample are reported in Supplementary Table A6. The estimates have in general the same sign and statistical significance as the GHK-estimates reported in Table A3, but they are slightly different in magnitude, suggesting that the control for unobserved heterogeneity is important. Table A7 reports the marginal effect of SA-receipt by groups, suggesting the same direction and magnitude of results reported in Table 2: the lowest marginal effect is for the group of foreign-born who partner with a SB-person and the highest effect is for FB-men who partner with FB-woman. Almost the same level of the effect was for the group of FB of both Nordic origin and European of non-Nordic origin.

Robustness checks addressing potential reverse causality in partnership status and measurement error from unregistered cohabitation (lagged partnership; excluding ages 18–25) are reported in Supplementary Table A8. All specifications yield qualitatively identical conclusions regarding state dependence magnitude and partnership protective effects. Table A9 presents Wald tests for equality of coefficients across specifications. No pairwise comparison yields a significant difference (all $p > 0.10$), confirming robustness.

To aid interpretation in probability space, Supplementary Table A10 reports predicted probabilities for representative profiles. For example, among foreign-born men with the representative profile, predicted receipt probability increases from

0.079 without prior receipt to 0.647 with prior receipt, while partnering with a Swedish-born partner reduces predicted receipt to 0.035 for FB without prior receipt and to 0.395 for those with prior receipt.

VII. Discussion and conclusion

Previous Swedish studies examined welfare persistence separately for Swedish-born and foreign-born samples, but did not explicitly model how the country-of-birth composition of partnerships interacts with state dependence. Andrén and Andrén (2013) analysed separately Swedish-born and foreign-born individuals aged 18–50 in 1990, in a balanced panel, and found that structural state dependence was about three times larger for foreign-born than for Swedish-born individuals after the first year of receipt, but the effect declined over time and was not statistically significant beyond three years for either group. We use the same data source as Andrén and Andrén (2013), but follow only the cohort of individuals who were *single* in 1990 and analyse state dependence in social assistance separately for the always-single (i.e. those who remain single during the entire decade) and the full cohort, controlling for three types of partnership formation: native-native (both Swedish-born), immigrant-immigrant (both foreign-born), and mixed (one Swedish-born, one foreign-born), capturing both entry into receipt and persistence conditional on entry, rather than restricting attention to baseline recipients. In this way, we complement the results reported by Andrén and Andrén (2013) with two main results. First, Swedish-born men exhibit the highest structural state dependence among singles. Structural state dependence is significantly lower for SB women, and both FB women and men exhibit slightly lower dependence than SB men. For FB men, structural state dependence is higher among those who remain single throughout the decade and among those partnering with an FB individual, but it is lower when an FB man partners with an SB woman. Second, partnering with an SB individual is associated with a lower probability of receiving social assistance, while partnering with a foreign-born (FB) individual increases it, particularly for FB men. However, for women, partnership reduces

the propensity regardless of their partner's country of birth. These patterns are consistent with resource pooling and access to host-country human and social capital in mixed partnerships, and with weaker access in immigrant-immigrant partnerships. These findings align with international evidence on the role of social and human capital spillovers within mixed partnerships (e.g. Andrén et al. 2025; Dribe and Nystedt 2014; Riphahn and Wunder 2016) and reinforce the importance of the country-of-birth composition of the household for persistent participation. Our findings qualify standard welfare-dependence narratives by showing that persistence is not primarily concentrated among immigrants, but is strongly shaped by household composition and host-country social capital mechanisms. This implies that theoretical models of welfare persistence should incorporate household formation and joint resource assessment as endogenous components of persistence dynamics. In addition, host-country social capital is not only an individual attribute but can be transmitted within households, influencing welfare dynamics.

Limitations and future research

First, our analysis uses data from 1985 to 1999. While the household-level eligibility structure persists and the patterns we document likely have enduring relevance, specific magnitudes should not be directly extrapolated to contemporary Sweden. Second, we observe annual household-based outcomes without monthly spell information, preventing us from fully addressing the critique by Bhuller, Brinch, and Königs (2017) regarding duration dependence versus state dependence. Third, partnership status identified from tax registers may undercount unregistered cohabitation, potentially attenuating partnership effects. Fourth, despite controls for pre-sample histories and unobserved heterogeneity, time-varying unobservables (e.g. health shocks, informal transfers) may violate strict exogeneity. Fifth, we analyse a single cohort (singles in 1990), limiting external validity to other cohorts or periods.

Updated replication using current data with monthly spell information would enable mixed proportional-hazards models to better distinguish

duration from structural state dependence. Quasi-experimental designs exploiting municipal rule changes or administrative thresholds could strengthen causal identification. Event-study and inverse-probability-weighted marginal structural models could address time-varying confounding between participation and partnership formation. Richer partnership measures (cohabitation registries, separations) and family formation data would clarify mechanisms. Finally, heterogeneity analysis by arrival cohort, refugee status, and cross-national comparisons could illuminate how institutions mediate persistence.

Policy relevance

Despite using historical data, household-level eligibility persists, so distinguishing mechanical eligibility changes from behavioural persistence remains relevant for contemporary administrative data. Our findings therefore offer insights for contemporary policy. First, ongoing concerns about immigrant integration and benefit dependency in Sweden and across Europe make our documentation of heterogeneity by partnership type (native-native, immigrant-immigrant, and mixed) directly policy-relevant. Second, debates about household-level versus individual-level benefit assessment in social safety nets benefit from empirical evidence on how household formation affects benefit dynamics – evidence our historical analysis provides. National welfare authorities could draw on our evidence when evaluating whether household-level eligibility assessment interacts with integration goals in ways that inadvertently sustain welfare dependence among specific household types. Labour-market agencies may benefit from recognizing that the effectiveness of activation programmes likely differs across household constellations, with immigrant-immigrant households potentially requiring more intensive support to break welfare persistence.

Most importantly, policy discussions should distinguish clearly between entry into social assistance and persistence conditional on entry. While integration policies remain relevant for foreign-born groups with higher incidence, our evidence indicates that Swedish-born men who remain single exhibit comparatively high annual persistence

once they enter receipt. A policy focus that treats persistence as predominantly an ‘immigrant issue’ risks overlooking a small but high-persistence subgroup among Swedish-born singles.

Acknowledgements

Daniela Andrén acknowledges financial support from the Faculty of Business, Science and Engineering at Örebro University and Martin Kahanec acknowledges financial support from the BRRIDGE, EGRUiEN, TransEuroWorkS, and INTEGRATE-DIALOGUE projects, funded by the European Union’s Horizon Europe research and innovation program under grant agreement Nos. 101079219, 101178146, 101061198, and 101177913, respectively, as well as APVV grant GENGOLD No. APVV-24-0350.

Author contributions

CRedit: **Daniela Andrén:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Methodology, Project administration, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing; **Thomas Andrén:** Data curation, Methodology, Software, Writing – review & editing; **Martin Kahanec:** Conceptualization, Funding acquisition, Methodology, Writing – review & editing.

Disclosure statement

The authors declare that they have no conflict of interest.

Data availability

Data used in this article are extracted from the Swedish income panel archived by Swedish National Data Service (SND). Participants cannot be identified through the manuscript. Data are accessible on request. If you want to gain access to data with restrictions, you must submit a request for the data to SND. Read more here: <https://www.snd.se/en/about-us>.

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