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Structural State Dependence in Social Assistance through the Lens of Couples' Ethnic Composition. Evidence from Swedish Panel Data

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Abstract

This study investigates whether couple ethnic composition shapes household welfare dependence, a relevant dimension overlooked in previous studies. Using fifteen years of Swedish panel data and a dynamic discrete-choice model that addresses initial-conditions and unobserved heterogeneity, we analyze structural state dependence in social assistance across households of intra-ethnic and inter-ethnic couples. Consistent with previous studies, we find that that*welfare participation* is much higher for foreign-born individuals in both intra- and inter-ethnic couples than for couples of natives. However, the lowest *structural state dependence* in social assistance was found for households of inter-ethnic couples, while individuals from couples of natives show the strongest state dependence, nearly five times higher than for households of couples comprising foreign-born women with Swedish-born men and stable couples of foreign-born men and Swedish-born women. Our findings offer important policy implications for addressing social assistance needs across diverse household configurations in increasingly multicultural and fiscally constrained societies. Policy and political discourse focused primarily on reducing immigrants' welfare dependency may be misguided, as households of native-born individuals exhibit stronger structural state dependence despite lower overall participation rates. Policymakers should broaden their focus to include households of couples of natives in efforts to reduce welfare persistence.

Keywords: structural state dependence; social assistance; intra-ethnic; inter-ethnic

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1 Introduction

Welfare dependence is a critical policy challenge in contemporary welfare states that are experiencing demographic shifts and social protection systems under pressure. The long-term dependence on social assistance results in substantial budget costs and raises concerns about the effectiveness of social safety nets in promoting economic autonomy. This challenge has become particularly difficult in the context of mass migration, where questions regarding welfare participation patterns among immigrant populations have become increasingly politicized and central to public discourse across Europe and beyond (Borjas, 1999; Dustmann and Frattini, 2014). Political efforts to reduce welfare dependence frequently target immigrant populations based on their higher overall participation rates, potentially overlooking significant state dependence among native-born individuals. Immigration affects welfare participation of working-age individuals (Hansen and Löfstrom, 2003, 2009; Andrén and Andrén, 2013; Andrén et al., 2025), yet the literature provides relatively little evidence on how welfare dynamics and structural state dependence vary across household types defined by couples' ethnic composition.

Welfare participation, persistence, and dependence represent distinct yet interconnected concepts in social policy research. Welfare participation refers to the receipt of social assistance at a given point in time, representing a snapshot of an individual's reliance on welfare support. Welfare persistence describes the continued receipt of social assistance over time, indicating a pattern of repeated usage across multiple periods. State dependence, the main focus of our analysis, specifically refers to the causal effect, where past welfare participation directly influences future participation, controlling for observed and unobserved characteristics (Heckman, 1981a,b).

Whileearly studies primarily focused on welfare spell duration as the primary indicator of dependence, research has evolved to recognize that total time on welfare within a fixed interval may better capture dependence, regardless of whether this comprises few long spells or many short ones (Moffitt, 1992). This distinction matters because the underlying causes of welfare persistence may stem from two distinct theoretical mechanisms: "state dependence" and "heterogeneity" (Heckman, 1981a,b). State dependence suggests that prolonged welfare receipt causes skill deterioration and reduced future earnings capacity, while heterogeneity theory posits that individual characteristics predispose certain recipients to remain longer on welfare due to limited opportunities. This structural state dependence can emerge through various mechanisms, including welfare stigma, human capital depreciation, or changes in preferences, and represents a genuine behavioral effect distinct from spurious correlations due to unobserved heterogeneity. Distinguishing between structural (true) and

spurious state dependence is of considerable interest, since they have very different policy implications. A policy that temporarily changes the probability of welfare participation has different implications for future probabilities in a model with true state dependence than in a model where the welfare persistence is due to unobserved heterogeneity and/or serial correlation.

Our approach builds on the family economics literature (Becker, 1991; Pollak, 2003) by recognizing that while welfare eligibility is determined at the household level, individual decision-making is shaped by both partners' characteristics and their joint resources. Family members may have different preferences and resource allocation within households is influenced by bargaining power and outside options Pollak (2003). Within this framework, an individual's social assistance receipt may be influenced by intra-household bargaining power, specialization of labor, and resource pooling behaviors that vary across different partnership types (Lundberg and Pollak, 1996).

The intersection of partnership and migration background adds additional complexity to individual welfare dynamics. *Inter-ethnic* partnerships, i.e., couples consisting of one native and one immigrant, potentially reconfigure access to human capital (education, skills, culturally-specific productive values) and social capital (interpersonal networks, community resources) in ways that distinctively shape household economic outcomes (Borjas, 1992; Lin, 2001; Light, 1984; Portes and Manning, 1986). The socioeconomic position influences patterns of inter-ethnic marriage, which may subsequently impact individual economic trajectories, including welfare participation (Bro and Morav, 2024). The composition of a couple, mixed or same-origin, may influence economic outcomes through social networks and resources. Immigrants who partner with natives potentially gain access to broader social networks, language skills, and local labor market knowledge via their native-born spouse, and tend to achieve better economic outcomes (higher earnings, employment) than immigrants who marry within their own ethnic group (Dribe and Nystedt, 2014). This suggests a lower welfare participation and persistence for *intra-ethnic* couples. When both partners are foreign-born, they may rely more on ethnic enclaves or co-ethnic networks. While such networks can provide immediate job leads or community support, they might constrain long-term mobility if the couple remains in low-income ethnic niches and has many children, potentially increasing their welfare participation and persistence. Moreover, if both partners face discrimination or limited opportunities, the household's risk of continued welfare participation may be compounded. Additionally, new immigrants may face higher unemployment, skill mismatch, or language barriers, leading to greater reliance on social assistance. Over time, as immigrants gain host-country experience, their welfare participation is expected to assimilate towards native levels (Borjas, 1999). However, the pace of assimilation can be

slow and depends on immigrant type; for example, refugees often have more difficulty integrating than labor migrants, which can prolong their need for welfare. Differences in family structure such as larger families among some immigrant groups also contribute to higher welfare participation and persistence. Gender dynamics can also impact welfare participation and persistence; for example, a household with a foreign-born male breadwinner might experience different welfare usage patterns than one with a foreign-born female breadwinner, due to labor market disparities.

To investigate whether there are differences in structural state dependence in social assistance across households with inter- and intra-ethnic couples, we use the same data source and a similar approach as Andrén and Andrén (2013) to track social assistance histories for individuals in Sweden during 1985-1999 for individuals living with a partner in 1990.

Sweden in the 1990s provides a particularly valuable context for examining these dynamics, offering a unique testbed for studying state dependence under conditions that closely resemble those faced by much of the Western world today: declining demographics, economic stagnation, strained social welfare systems, and structural shifts in partnership composition and migration patterns. During this period, Sweden experienced a severe economic crisis with unemployment rising to unprecedented levels and persisting throughout the decade. Social assistance became increasingly critical, with the proportion of recipients increasing by over 40% between 1990 and 1997, while costs doubled in real terms. Simultaneously, qualification requirements became more stringent and benefits more restrictive as municipalities attempted to control expenditures in a strained fiscal environment (Bergmark and Palme, 2003). All these challenges offer a unique testbed for studying structural state dependence under conditions that closely resemble those faced by much of the Western world today: war migrants, declining demographics, economic stagnation, strained social welfare systems, and structural shifts in household composition.

The economic context of the 1990s significantly shaped welfare utilization patterns across different demographic groups. This is particularly instructive for the Swedish case because of its dual approach to economic policy: eligibility for social assistance is household-based, with eligibility criteria and benefit levels considering the combined resources of all household members, while taxation occurs at the individual level. These institutional settings create a complex interplay between individual and household economics. Households consist of individuals, and individuals can leave households due to migration, death, or partnership dissolution. This reality makes it important to keep the analytical setting constant when studying state dependence. In our study, "following the household" actually means following an individual who is part of a household with another individual. To properly understand structural state dependence, we maintain a constant structure by following individuals within

stable partnerships—those who remain with the same partner throughout the study period. This institutional feature amplifies the importance of partnership dynamics in individual welfare trajectories, as forming or dissolving unions can significantly alter an individual's economic stability and welfare needs (Hansen and Löfstrom, 2003, 2009; Andrén and Andrén, 2013).

Our analysis focuses on two potential explanations emphasized in previous literature regarding why the conditional probability of future welfare receipt depends on past experiences. In contrast to previous studies that estimated state dependence in social assistance using the sampled individuals as natives and immigrants (Andrén and Andrén, 2013; Andrén et al., 2025; Hansen and Löfstrom, 2003, 2009), in this study, to account for an important dimension of the heterogeneity of household ethnic composition, we extend the literature by considering the country of birth of both sampled individual and their partner using Swedish panel data spanning 15 years. Specifically, we analyze state dependence in social assistance across different household types, following individuals from both intra-ethnic couples (both partners native-born or both foreign-born) and inter-ethnic (mixed) couples (one native-born, one foreign-born). The first explanation suggests that prior welfare use itself alters the cost or stigma associated with take-up, thereby shifting individual preferences and behaviors, a mechanism that gives rise to structural state dependence (Heckman, 1981a). An alternative explanation attributes observed persistence to unobserved innate individual differences that remain unchanged by welfare experience, resulting in spurious rather than structural dependence (Heckman, 1981b). Disentangling these effects is crucial for effective policy design, as interventions would differ substantially depending on whether welfare dependence stems from structural or spurious mechanisms. We find that structural state dependence in social assistance receipt varies significantly based on their partnership stability and ethnic composition.

The remainder of the paper is organized as follows. Section 2 describes institutional settings and data, Section 3 presents the empirical specification and estimation method, Section 4 presents and discusses results, and Section 5 summarizes and concludes.

2 Institutional underpinnings of welfare dependence in Sweden

In Sweden, social security combines three main elements: the income-tested assistance designed to provide municipal inhabitants with a reasonable standard of living (Sveriges riksdag, 2001); social insurance to compensate for lost earnings when workers faced seemingly

random but shared risks such as work accidents, sickness, or unemployment; and universal benefits such as child allowances, covering all residents irrespective of income or labor market status.

Social insurance schemes protect employed individuals against social risk events such as unemployment, sickness or disability, in exchange for contributions. Social assistance, in contrast, is designed to secure a minimum standard of living without regard to past contributions.

The economic context of the 1990s significantly shaped the implementation and experience of these social security elements. During this period, Sweden experienced a severe economic crisis with unemployment rising to unprecedented levels and persisting throughout the decade. The employment problem was more pronounced than in other advanced industrial nations (except Finland), and the downturn had a powerful impact on public finances, resulting in increased expenditures and drastically eroded revenues (Bergmark and Palme, 2003).

2.1 The right to social assistance

The right to social assistance in Sweden is regulated by the Social Services Act, which provides general guidelines concerning eligibility standards and more detailed regulations regarding compensation levels. Benefits are granted to households.

Financing and provision of benefits rest with the municipal Office for social services (MOSS), which is tasked with ensuring that residents maintain a reasonable standard of living when temporarily unable to support themselves, provided that adults in the household actively seek to contribute to their own self-sufficiency. Applications are evaluated at the MOSS office at the municipal level, and benefits are distributed monthly. Prior to 1990, the average duration of social assistance per year was just over four months; by 2009, it had increased to 6.2 months (Bäckman and Åke Bergmark, 2011).

During the 1990s, social assistance became increasingly important as a financial support mechanism. Between 1990 and 1997, the proportion of the population receiving social assistance within a given year increased by over 40%, while costs doubled in real terms. This expansion was primarily driven by rising unemployment. Simultaneously, the decade was characterized by tougher qualification requirements and stricter conditions for recipients. Most municipalities implemented explicit efforts to control social assistance costs, resulting in less generous benefits and more demanding requirements. Though not systematically studied, observations suggest a clear trend toward greater restrictiveness during the crisis years, which likely had a restraining effect on the expansion of social assistance despite growing

economic hardship (Bergmark and Palme, 2003).

The financial support comprises two main components: the national standard allowance, an annually established sum by the Swedish national government covering standardized costs for essential household expenses such as food, clothing, and toiletries; and the MOSS's accepted costs for rent, heating, and other bills. Recipients can also apply for support for unexpected health-related expenses not covered by mandatory insurance (e.g., adult dental care and eyeglasses).

The benefit level is calibrated to raise households above a minimum standard of living by covering expenses for food, housing, and other essential needs. No maximum eligibility period is specified; however, recipients must actively seek full-time employment or pursue other pathways to independence from social assistance (Bergmark and Bäckman, 2011). This emphasis on labor market participation aligns with Sweden's active labor market policies and affects welfare persistence patterns, particularly among immigrant populations who face additional barriers to employment (Ekberg, 2011).

2.2 Household eligibility regardless of marriage or cohabitation

The Swedish welfare system is designed as an institutional welfare state recognizing the needs of family members. A key characteristic of this system is that entitlements are universal: in principle, the individual is the primary beneficiary. This means that eligibility for most social insurance benefits is determined on an individual basis, regardless of marital status. However, for means-tested benefits, including costs for social services such as childcare, social assistance, and housing allowance, eligibility is based on the household's joint income, regardless of marriage or cohabitation. This represents a basic rule of neutrality towards formal family forms built into the welfare support system (Björnberg, 2001).

Swedish policies tend to treat cohabitation as equal to marriage, and many of the regulations of marriage are applied to cohabiting relationships (Heimdal and Houseknecht, 2003). The legal recognition of cohabitation in Sweden was formalized through the Joint Homes Act of 1987, which regulates the relationships between partners who "live together in circumstances resembling marriage," with determination based on factors such as the duration of the relationship, sexual relationship, joint children, shared household, and economic cooperation (Björnberg, 2001). This approach stands in contrast to many other countries where cohabitation lacks formal legal recognition for welfare purposes. The Swedish model ensures that household composition rather than legal marital status determines access to certain forms of social assistance, creating a system where cohabiting families can access the same support structures as married families when in financial need.

Swedish law mandates parental support for biological or adopted children, regardless of marital or cohabiting status. If parents separate, custodial parents are entitled to support from the non-custodial parent, and the State may advance maintenance to the custodial parent through the Social Insurance Authority if this obligation is not met. By the late 1990s, joint custody after separation became the normal situation for both married and cohabiting parents (Björnberg, 2001)

2.3 Divorce, separation, joint custody and housing allowance

Divorce and separation are common in Sweden, and the country has developed robust social policies to support separated parents and children. Over the past two decades, Sweden has progressively adjusted its laws and benefits to accommodate the growing norm of shared physical custody, where children alternate residence between parents on a roughly equal basis, such as every-other-week.

Swedish family law strongly encourages joint custody and cooperation, reflecting a belief that continuing involvement of both parents is generally in the child's best interest. Shared custody has become a prevalent arrangement in Sweden. Legislative reforms in the late 1990s and mid-2000s bolstered the joint custody norm. Notably, 1998's custody reform empowered courts to order joint custody (even joint physical custody) after divorce against one parent's wishes if judged best for the child. This marked a shift toward viewing joint parental responsibility as the default. Alongside legal custody status, public policy encourages cooperative parenting arrangements. For example, all municipalities are required to offer free "cooperation discussions" to separating parents. These mediated sessions help parents agree on custody, residence schedules (often alternating weekly), and child support in a way that prioritizes the child's best interests. The emphasis is on mutual agreement and minimizing conflict, so that even after separation, parents can maintain a roughly equal sharing of child-care responsibilities. As a result of these legal and cultural shifts, a large share of Swedish children with separated parents spend substantial time in each parent's household.

This change in living patterns has prompted corresponding adjustments in how social assistance programs define household composition and allocate benefits. A child can only be officially registered at one parent's address at a time, even if living equally with both. In the past, including during the 1990s, this technicality affected benefit eligibility since many supports were paid to the "resident" parent. Recent reforms have attempted to mitigate the bias introduced by the child's registered address, ensuring that both parents can access support when custody is evenly shared. Therefore, housing allowance rules struggled with cases where a child lives part-time with each parent. Prior to the mid-2000s, the system

essentially assumed children lived with one primary custodian, only that parent could receive the child-related allowance supplements, while the other parent, if the child only visited occasionally, could at best claim a deduction for having an extra room. In fact, until 2005, a household where children were only visiting could receive housing allowance only based on housing cost, with no per-child subsidy.

3 Data

The data analyzed in this paper were extracted from the register-based Swedish Income Panel (SWIP), which is a stratified random sample of the population living in Sweden that has been drawn by Statistics Sweden annually since 1978. See Figure 1. SWIP includes a representative 1% sample of the Swedish-born population and a 10% sample of the foreign-born population. Demographic variables date back to 1980s and several variables from income registers (based on tax records) for all sampled individuals with repeated annual cross-sectional data extracts, and a few variables, including country of birth, for the sampled individual's partner.

Given the aim of our paper, we selected only individuals aged 20-50 year old in 1990, excluding students, early retirees and those who emigrated or died by 1999. Our data indicate whether their household of the sampled person received social assistance (SA) at least once during a calendar year and the total months received, although spells are not separately identified.

While social assistance eligibility in Sweden is determined at the household level, our analysis tracks individuals over time, recognizing that couples' ethnic composition and stability may significantly influence welfare trajectories. We therefore categorized individuals in 1990 by their couple's country-of-birth composition: intra-ethnic couples (both partners Swedish-born or both foreign-born) and inter-ethnic couples (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.

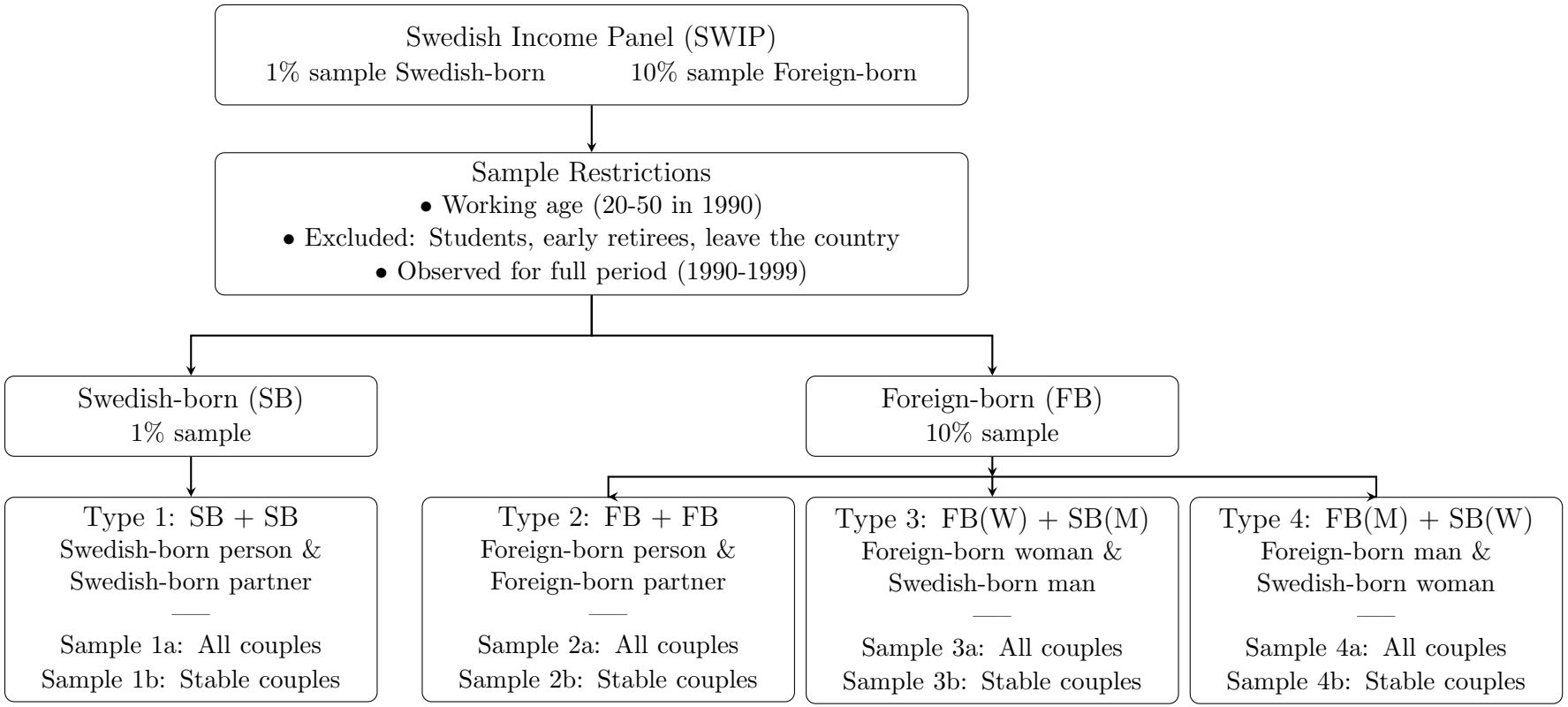
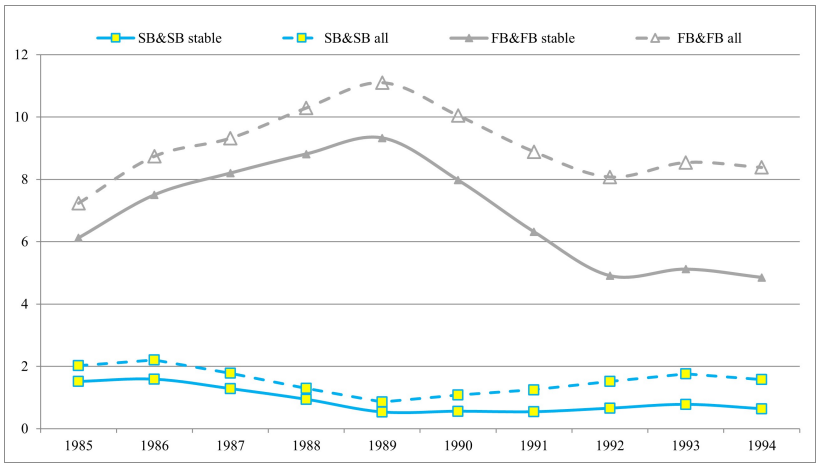


Figure 1: Data Structure and Sample Construction

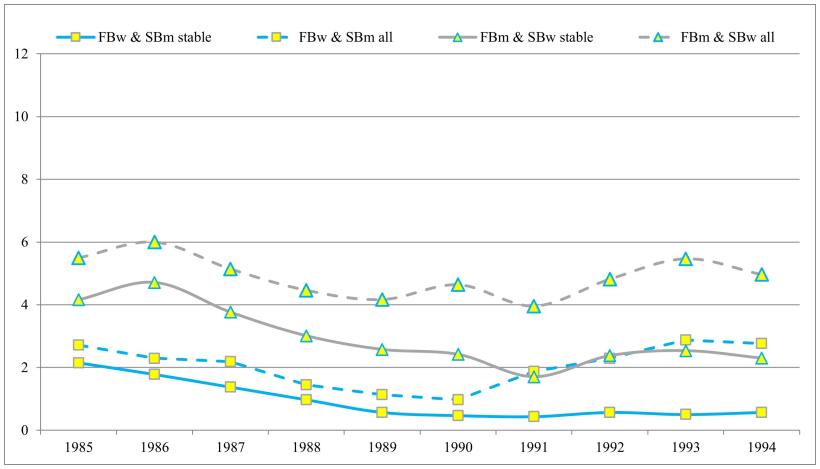
A critical methodological challenge in studying state dependence is distinguishing true structural effects from unobserved heterogeneity. We therefore define *stable* subsamples (individuals with the same partner from 1990 to 1999; Samples 1b-4b in Figure 1), and *full* samples (including partnership transitions; Samples 1a-4a in Figure 1). Our analysis of households of stable couples over the decade aims to the understanding of households behavior in social assistance receipt, particularly in relation to resource pooling and coordinated income strategies across inter-ethnic and intra-ethnic couples. In this way, we can relate to theories of assimilation and acculturation (Gordon, 1964; Berry, 2003) and assortative mating. We also incorporate pre-1990 welfare participation (1985–1989) to control for initial conditions.

Descriptive results from Figures 2a and 2b and Tables A1 and A2 in the Appendix reveal substantial differences in social assistance patterns across our eight groups of household during 1990-1999, showing lower social assistance receipt among stable couples compared to transitioning households, especially for foreign-born women partnered with Swedish-born men (Figure 2b). These patterns may reflect how separation eliminates the economic benefits of household resource pooling (Lundberg and Pollak, 1996) particularly affecting individuals who may have specialized in household production rather than market work during the marriage partnership, and the economic context of 1990s in Sweden, characterized by severe economic crisis, rising unemployment, and increasingly restrictive welfare policies, makes partnership stability especially significant as an economic resource.

All the variables used in the regression analyses are presented in Tables A1 in the Appendix. The mean values of the variables in 1990 are presented for for the full samples (all) and for the subsamples of individuals in stable couples (stable), by household ethnic composition. Table A2 presents the percentage of social assistance recipients 1985 – 1999, by household ethnic composition for both full and stable samples.



(a) Intra-ethnic couples



(b) Inter-ethnic couples

Note: SB = Swedish born; FB = Foreign-born; w =woman; m=man.

Figure 2: Welfare participation by household type

4 The Empirical Framework

When analyzing welfare participation over time, it is necessary to distinguish between different types of persistence after controlling for observable explanatory factors. Measuring welfare participation at one point in time requires cross-sectional data on benefit receipt. Measuring persistence, in contrast, requires longitudinal data tracking receipt over time. Determining state dependence is more complex: it demands not only information on duration but also on reasons for continued receipt. This section clarifies key concepts and their importance for correctly measuring welfare persistence and state dependence.

The literature identifies three key sources of persistence: serial correlation in the error term of unobservables, where random shocks in one period affect subsequent periods; unobserved individual heterogeneity, reflecting permanent differences between individuals that are not captured by observable characteristics; and structural (or true) state dependence, where the experience itself directly influences future behavior. While all sources matter, structural state dependence is particularly crucial for policy implications. This form of persistence captures the causal effect of previous welfare receipt on current participation decisions.

4.1 The model

To measure structural state dependence, we build a model of welfare take-up decision based on Andrén and Andrén (2013). The model follows individual i's decision to apply for social assistance in each time period t with the objective of maximizing lifetime utility. We reformulate the model to reflect the reality of institutional settings where eligibility depends on household h's joint income and assets. We address this challenge by focusing on households of stable couples over the full study period, holding couple ethnic composition constant to isolate structural state dependence across intra- and inter-ethnic couples.

Assume individual i in household h makes a discrete household-level decision in period t to apply for social assistance to maximize household utility. The decision is based on a latent continuous variable Y^*_{iht}, which represents the difference between household h utility with and without social assistance in period t. If the utility with social assistance is greater than the utility without social assistance, household h applies. We explicitly model the unobservable propensity to receive social assistance as a function of observable characteristics, unobservables, and previous welfare experience (Equation 1).

$$Y^*_{iht} = X_{iht}\beta_1 + \gamma Y_{ih,t-1} + v_{iht}, \tag{1}$$

$$Y_{iht} = \begin{cases} 1 & \text{if } Y^*_{iht} \geq 0, \\ 0 & \text{elsewhere,} \end{cases} \tag{2}$$

where X_{iht} is a vector of observed exogenous variables, γ captures true state dependence, and $Y_{ih,t-1}$ is a dummy variable that indicates whether individual i's household h received social assistance in year $t-1$. The error term v_{iht} is assumed to be independent of X_{it} and identically distributed over i according to a multivariate normal distribution with a mean of zero and a general intertemporal covariance matrix Ω that allows the error term to be freely correlated across all periods.

The availability of panel data allows us to decompose the error term into two parts: v_{iht} $= f(\alpha_i, u_{iht})$, where α_i captures permanent, unobserved individual heterogeneity and u_{iht} is a residual term representing effects of factors other than the individual specific characteristics not observed by the investigator. This specification lets otherwise identical individuals (i.e., homogenous in their observed characteristics) differ in response (i.e., heterogeneous in response variable) due to unobserved traits. The model used here extends beyond the standard treatment of heterogeneity imposed by the assumption of a variance-components specification

$$v_{iht} = \alpha_i + u_{iht} \tag{3}$$

and/or a first-order autoregressive scheme

$$v_{iht} = \rho v_{ih,t-1} + u_{iht}. \tag{4}$$

4.2 Welfare persistence

Our model specification allows for three different sources of persistence after controlling for observed explanatory factors. Persistence can be a result of serial correlation in the error term, u_{iht}, a result of unobserved heterogeneity, α_i, or a result of "true" or "structural state dependence" through the term γ . Although all three sources are interesting, our focus will be on the size and distribution of the components of the "true" state dependence γ, while controlling for the other two sources. If the components in the intertemporal covariance matrix are significantly different from zero, then unobserved individual specific heterogeneity and serial correlation will affect the estimates for the state dependence if not controlled for.

The estimate of γ captures the idea that the experience of receiving social assistance in the previous period has effect on the propensity to be in that state in the current period, above and beyond what can be explained by control variables X and unobserved time-invariant

individual effects. A first order Markov process captures the relation between pair-wise observations over time. Having $\gamma > 0$ would imply that the likelihood of being dependent on social assistance in the current period is larger for those with an experience in the previous year compared to otherwise identical individuals without such an experience. Within the observations of each individual, v_{iht} is assumed to be distributed multivariate normal with a mean zero and a general intertemporal covariance matrix Ω.

This approach aligns with Heckman (1981a) conceptualization of state dependence, whereby past experience has a genuine behavioral effect on future choices. In the context of household economics, as discussed by Becker (1991) and Pollak (2003), this structural state dependence may operate through changes in preferences, stigma costs, or information about welfare benefits that result from previous participation. For stable couples, we can more accurately measure these behavioral effects without the confounding influence of partnership transitions. By examining different ethnic compositions within stable partnerships, we can determine whether state dependence mechanisms operate differently depending on the specific combination of partners' origins, providing insights into how cultural factors and integration processes interact with welfare program dynamics.

The availability of panel data allows distinguishing average behavior from individual behavior. That is done here by giving the error term v_{iht} an unrestricted covariance structure (Heckman, 1981a), which implies estimating the components of an unrestricted $T \times T$ correlation matrix. The treatment of unobserved heterogeneity allows individuals who are homogenous in their observed characteristics to be heterogeneous in their response variables.

This approach to modeling unobserved heterogeneity is particularly powerful in our stable couples analysis, as it controls for time-invariant individual and partnership characteristics that might otherwise be conflated with structural state dependence. By limiting our analysis to stable partnerships, we create a more homogeneous comparison framework where differences in welfare persistence can be more confidently attributed to the ethnic composition of partnerships.

4.3 Structural state dependence in couples

Marriages form when individuals expect to realize gains from the relationship, including gains from specialization of labor and risk pooling (Weiss, 2001). By focusing on households of stable couples (Subsamples 1b-4b in Figure 1), these economic advantages remain constant over time, allowing us to isolate the causal effect of past social assistance on future receipt within stable, two-adult households. This approach follows Heckman's framework to distinguish true behavioral effects from spurious persistence (Heckman, 1981a). In household

economics (Becker, 1991; Pollak, 2003), structural state dependence may operate via shifts in preferences, stigma costs, or information acquired through past participation. Focusing on households of stable couples provides a cleaner estimation of how inter- and intra-ethnic partnerships influence welfare dynamics.

Our model's unrestricted intertemporal covariance structure and individual-specific effects allow for different patterns of unobserved heterogeneity across types of ethnic couples, critical when cultural integration, social networks, and discrimination may vary between inter- and intra-ethnic couples. We therefore estimate the magnitude and statistical significance of structural state dependence for stable couples, controlling for serial correlation and time-invariant heterogeneity and compare these estimates to those from the full samples (Samples 1a-4a in Figure 1) to assess how partnership transitions influence apparent persistence. When a couple dissolves, the economic gains from specialization and resource pooling are lost, potentially increasing welfare dependency in a way that mimics true state dependence but actually reflects unobserved individual or partnership characteristics.

By analyzing both the stable subsamples and the full samples across inter- and intra-ethnic couples, we can distinguish between structural state dependence, where prior assistance directly alters household utility trade-offs, and spurious persistence arising from unobserved heterogeneity or the resource shocks associated with partnership changes. Distinguishing structural from spurious persistence is crucial for policy: a temporary reduction in participation probability will have lasting effects only under true state dependence, whereas in a model driven solely by unobservables or serial correlation, such interventions may have no long-term impact. Specifically, by contrasting structural state dependence across ethnic compositions in households of stable couples, we gain insights into how cultural factors, labor-market integration, and social-network access shape welfare trajectories in increasingly diverse societies.

4.4 Estimation and identification

The estimation method is simulated maximum likelihood with the GHK simulator. [1]

Our dynamic model presents two key methodological challenges that must be addressed to obtain consistent estimates of structural state dependence in social assistance: the initial conditions problem and distinguishing between true and spurious state dependence.

The initial conditions problem is particularly relevant when studying welfare dynamics across households types defined by couple ethnic composition. Since we cannot observe welfare histories before 1990, unobserved pre-sample assistance may bias our estimates, espe-

[1] Technical details regarding the likelihood function specification, the GHK simulator implementation, and the precise mathematical formulation of marginal effects are provided in Appendix C.

cially for the households of foreign-born individuals who have potentially different pre-1990 experiences. To address this, we specify an approximation to the reduced form equation for the initial observation and estimating it simultaneously with the participation equation (Heckman, 1981b,c). This method allows the error term of the initial state to freely correlate with error terms in subsequent periods, thereby addressing potential endogeneity. This approach is crucial for our analysis of stable couples with different ethnic compositions, as it helps ensure that observed differences in state dependence between partnership types reflect genuine behavioral effects rather than unobserved pre-sample experiences.

The second challenge of distinguishing true from spurious state dependence is central to comparing welfare persistence requires accounting for unobserved heterogeneity and serial correlation. We address this by allowing for an unrestricted error covariance structure that captures potential correlations between error terms across all time periods (addressing unobserved heterogeneity) and by normalizing the variances ton one for all time periods (dacilitating identification of the model parameters).

This comprehensive methodological approach is particularly valuable for our analysis of different household types. Inter-ethnic and intra-ethnic partnerships may differ not only in observable characteristics but also in unobservable factors like cultural integration processes, discrimination experiences, and social network access. By properly accounting for both initial conditions, unobserved heterogeneity and serial correlation, we can more confidently attribute differences in estimated state dependence across partnership types to genuine behavioral effects rather than to statistical artifacts.

The marginal effects calculated in our analysis represent the mean effects over time and individuals, based on the full model. For simplicity, discrete variables have been treated as continuous, with derivatives calculated using finite difference formulas. These marginal effects allow us to quantify how the impact of past welfare receipt on current participation differs across different partnership ethnic compositions, providing valuable insights into how integration processes and household dynamics shape welfare persistence.

5 Results

Our empirical analysis reveals distinct patterns of welfare participation and persistence across different partnership configurations. Our results aligns with earlier literature (Gustafsson, 2011), showing that welfare participation differ across couples of natives, couples of immigrants and intra ethnic couples (Table A2) and the factors affecting both initial conditions (Tables B1 and B2) and welfare participation (Tables 3 and 4) differ across groups of households constructed based on the couples' ethnic composition.

5.1 Structural state dependence in social assistance

The central focus is understanding how structural state dependence varies across couple ethnic compositions, as reported in Tables 1 and 2. Table 1 provides statistical evidence of positive structural state dependence in seven of eight samples at $p < 0.01$, indicating that prior receipt causally increases the probability of future welfare participation, thereby complicating exit.

Table 1: Structural state dependence by type of household. Parameter estimates

	All couples	Stable couple
Panel A: Intra-ethnic couples		
Swedish-born & Swedish-born	1.513***	1.506***
Foreign-born & Foreign-born	1.741***	2.194***
Panel B: Inter-ethnic couples		
Foreign-born woman & Swedish-born man	1.370***	–
Foreign-born man & Swedish-born woman	1.504***	1.719***

Notes: The optimization failed to converge for the subsample of households of couples comprising a foreign-born woman and a Swedish-born man in stable partnerships. *, **, *** Statistically significant at the 10%, 5%, and 1% level, respectively.

The marginal effects of the structural state dependence reported in Table 2 vary across ethic type of households, between 4.6 and 24.4 percentage points. Remarkably, the lowest structural state dependence values occur for households of inter-ethnic couples: 4.6 pp for foreign-born men in households of stable couples with Swedish-born women, and 4.7 pp for all foreign-born women who in 1990 lived with a Swedish-born man. This finding suggests that households of inter-ethnic couples may provide economic resilience that reduces welfare persistence.

The effect nearly doubles for all households of foreign-born men who in 1990 lived with a Swedish-born woman, rising to 8.3 pp. The effect is even higher for households of stable native couples, which exhibit a structural state dependence of 10.3 pp, but this is lower than the 14.3 pp observed for the full sample of households of native couples in 1990.

The strongest structural state dependence (24.4 pp) was found for all households of native couples in 1990 (i.e., both stable and couples who subsequently experienced separation), suggesting that dissolution among native couples may particularly intensify welfare persistence.

Additionally to these results, most off-diagonal elements in the intertemporal covariance matrix are significantly different from zero (Table B3 in Appendix), indicating that unobserved individual specific heterogeneity and serial correlation would bias the estimates for the structural state dependence if not controlled for. This suggests that observed persis-

Table 2: Structural state dependence by type of household. Marginal effects (ME)

	All couples	Stable couple
Panel A: Intra-ethnic couples		
Swedish-born & Swedish-born	0.244	–
Foreign-born & Foreign-born	0.143	0.103
Panel B: Inter-ethnic couples		
Foreign-born woman & Swedish-born man	0.047	–
Foreign-born man & Swedish-born woman	0.083	0.046

Notes: The optimization failed to converge for the subsamples of households of stable couples comprising a foreign-born woman and a Swedish-born man and stable couples of natives. *, **, *** Statistically significant at the 10%, 5%, and 1% level, respectively.

tence partly reflect permanent unobserved heterogeneity across individuals, while certain households of stable inter-ethnic couples demonstrate systematically lower propensity for continued welfare receipt. Sweden's active labor market programs and anti-discrimination policies during the 1990s likely mitigated welfare persistence across household of couples, though welfare effectiveness appears to have varied by couples' ethnic configuration.

5.2 Welfare participation equation

Tables 3 and 4 present both parameter estimates (PE) and marginal effects (ME) for households of couples by ethnic composition, uncovering distinct welfare participation patterns. Unemployment increases welfare receipt probability by 8 percentage points (pp) for households of native couples but only 2 pp for households of foreign-born couples, indicating lower economic vulnerability among the latter.

Household composition effects are modest but significant. Each additional child increases welfare receipt probability by approximately 1 pp across most couple types, with a slightly larger effect for the full sample of native couples.

Local policy contexts exert differential influence. AA one-percentage-point increase in the municipal social-assistance rate raises welfare uptake by 9.9 pp for households of native couples versus 1.1-1.5 pp for foreign-born couples, and 1.6-2.9 pp for intra-ethnic couples. In contrast, higher municipal unemployment correlates with reduced welfare receipt, most prominently in households of inter-ethnic couples.

Human capital indicators operate differently across households of inter-ethnic and intra-ethnic couples. Education significantly reduces welfare probability for all groups, with notably stronger effects in households of native couples, implying lower education and challenges in transferring foreign educational credentials to the Swedish labor market. However, age shows a modest negative relationship with welfare receipt (-0.2 pp) for full samples.

For foreign-born individuals, origin and integration factors are crucial determinants. Compared to Nordic-born immigrants, those from Western/Southern Europe have lower welfare propensity while those from the Middle East have higher rates. Notably, the country-of-origin effects disappear for foreign-born women in inter-ethnic couples with Swedish men, suggesting partnership-based economic integration advantages. Each additional year since migration reduces welfare probability, most markedly in households of foreign-born couples. These findings align with theoretical perspectives on assortative mating, household specialization, and economic integration, while highlighting how couple ethnic composition moderates both individual and local determinants of welfare receipt.

Table 3: Participation equation estimates by type of household, intra-ethnic couples

	Two Foreign-born				Two Swedish-born		
	All couples		Stable couple		All couples		Stable couple
	PE	ME	PE	ME	PE	ME	PE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Age/100	-2.149**	-0.177	-1.021	-0.048	-4.414***	-0.710	-2.746
Age-squared/10000	2.551*	0.210	2.885	0.136	2.373	0.382	1.254
Educational level (CG: Low)							
Secondary	-0.147***	-0.012	-0.082***	-0.004	-0.191***	-0.031	-0.256***
Post-secondary, or more	-0.301***	-0.025	-0.278***	-0.013	-0.579***	-0.093	-0.544***
Children at home	0.084***	0.007	0.130***	0.006	0.067***	0.011	0.137***
City region	0.042*	0.003	0.021	0.001	-0.088**	-0.014	-0.079
Municipality characteristics (%)							
Social assistance recipient	0.181***	0.015	0.232**	0.011	0.617***	0.099	0.569***
Unemployed	0.013	0.001	-0.071	-0.003	-0.043	-0.007	0.199
Unemployed $_t$	0.311***	0.026	0.355***	0.017	0.500***	0.080	0.498***
Unemployed $_{t-1}$	-0.078***	-0.006	-0.107***	-0.005	-0.037	-0.006	-0.009
Changed marital status	0.511***	0.042			0.622***	0.100	
Country of origin (CG: Nordic)							
Western Europe	-0.213***	-0.018	-0.220**	-0.010			
Eastern Europe	0.088*	0.007	0.094	0.004			
Southern Europe	-0.096*	-0.008	0.076	0.004			
Middle East	0.309***	0.025	0.474***	0.022			
Rest of the world	0.237***	0.020	0.311***	0.015			
Years in Sweden (CG: 0-4 years)							
5 – 9	-0.145***	-0.012	-0.156***	-0.007			
10 – 14	-0.338***	-0.028	-0.354***	-0.017			
15 – 22	-0.438***	-0.036	-0.417***	-0.020			
> 22	-0.540***	-0.044	-0.586***	-0.028			
Refugee	-0.009	-0.001	-0.065	-0.003			
Structural state dependence	1.741***	**0.143**	2.194***	**0.103**	1.513***	**0.244**	1.506***
Time-dummies	Yes		Yes		Yes		Yes
Mean Log-likelihood	-1.471		-0.0901		-0.425		-0.208
Number observations	94840		71730		147570		122210

Notes: PE = Parameter estimates; SE = Standard errors; ME = Marginal effects. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The code for computing ME for the sample of stable couples 1990-99 of Swedish-born individuals did not converge.

Table 4: Participation equation estimates by type of household, inter-ethnic couples

	Foreign-born woman & Swedish-born man				Foreign-born man & Swedish-born woman			
	All couples		Stable couple		All couples		Stable couple	
	PE	ME	PE	ME	PE	ME	PE	ME
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Age/100	1.674	0.058			2.793	0.155	-6.830	-0.183
Age-squared/10000	-6.693*	-0.231			-5.486*	-0.304	7.351	0.197
Educational level (CG: Low)								
Secondary	-0.173***	-0.006			-0.137***	-0.008	-0.187*	-0.005
Post-secondary, or more	-0.394***	-0.014			-0.478***	-0.027	-0.646***	-0.017
Children at home	-0.014	0.000			0.017	0.001	0.152***	0.004
City region	0.079	0.003			-0.113*	-0.006	-0.247**	-0.007
Municipality characteristics (%)								
Social assistance recipient	0.458**	0.016			0.514***	0.029	0.626**	0.017
Unemployed	-0.395**	-0.014			-0.334**	-0.018	-0.165	-0.004
Unemployed $_{t}$	0.343***	0.012			0.597***	0.033	0.634***	0.017
Unemployed $_{t-1}$	-0.086	-0.003			-0.145***	-0.008	-0.222**	-0.006
Changed marital status	0.930***	0.032			0.456***	0.025		
Country of origin (CG: Nordic)								
Western Europe	-0.157	-0.005			-0.092	-0.005	-0.104	-0.003
Eastern Europe	-0.174	-0.006			0.053	0.003	-0.361	-0.010
Southern Europe	-0.052	-0.002			-0.075	-0.004	-0.254*	-0.007
Middle East	-0.153	-0.005			0.208*	0.012	-0.024	-0.001
Rest of the world	0.039	0.001			0.199**	0.011	-0.006	0.000
Years in Sweden (CG: 0-4 years)								
5 – 9	-0.185*	-0.006			-0.106	-0.006	-0.199	-0.005
10 – 14	-0.397***	-0.014			-0.101	-0.006	-0.064	-0.002
15 – 22	-0.365***	-0.013			-0.155*	-0.009	-0.119	-0.003
$>$ 22	-0.388***	-0.013			-0.248***	-0.014	-0.165	-0.004
Refugee	0.104	0.004			-0.018	-0.001	0.224	0.006
Structural state dependence	1.370***	**0.047**			1.504***	**0.083**	1.719***	**0.046**
Time-dummies	Yes				Yes		Yes	
Mean Log-likelihood	-1.471				-1.047			
Number observations	37920		29770		33840		25240	

Notes: PE = Parameter estimates; SE = Standard errors; ME = Marginal effects. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The code for computing ME for the sample of stable couples 1990-99 of a foreign-born woman living together with a Swedish-born man did not converge.

6 Discussion and Conclusions

While substantial research has examined welfare participation, analyses of state dependence often categorize households simply as native or immigrant, overlooking how couples' ethnic composition shapes welfare persistence. Using fifteen years of Swedish panel data, we estimate structural state dependence in social assistance across households of couples defined by both partners' countries of birth. The focus on households reflects Sweden's household-level eligibility rules and provides novel insights into intra- and inter-ethnic household trajectories, enriching the emerging literature on couples' ethnic composition.

The effects of structural state dependence in social assistance were estimated using a dynamic discrete-choice model that controls for unobserved heterogeneity and the initial-conditions problem within the framework of a first-order Markov process.

The most striking finding is the substantial variation in structural state dependence from 4.6 percentage points (pp) for households of stable inter-ethnic couples of foreign-born men with Swedish-born women to 24.4 pp in full sample of households of native couples. This wide variation challenges conventional understandings of welfare persistence and reveals couples' ethnic composition as a crucial moderating factor in welfare dynamics.

Particularly unexpected was the strong state dependence among all households of native couples (24.4 pp), despite their low overall welfare participation rates (1-2%). This finding suggests that partnership dissolution may be especially economically consequential for this group, possibly reflecting greater household specialization patterns that create vulnerability when partnerships end. In contrast, foreign-born individuals in households of stable inter-ethnic couples demonstrated remarkably low welfare persistence, suggesting unique economic resilience in these household configurations.

Gender differences within households of intra-ethnic couples present another intriguing pattern. The full sample of the households that consist of a foreign-born man and a Swedish-born woman has a structural state dependence nearly double (8.3 versus 4.7 pp) than the sample of the households that consist of a foreign-born woman and a Swedish-born man. This gender asymmetry suggests differential integration processes and post-separation economic trajectories that merit further investigation.

Our findings carry significant implications for understanding household economics and welfare dynamics. The patterns we observe align with theories of household specialization, assortative mating, and partnership-specific investments, while highlighting how these mechanisms operate differently across couples' ethnic composition. The lower structural state dependence in households of stable inter-ethnic couples suggests these configurations may provide effective economic insurance through complementary skills, diverse networks,

and enhanced integration opportunities.

Our analysis of structural state dependence in social assistance across households of couples with different ethnic background reveals several novel insights that significantly extend existing welfare dynamics research. Moving beyond the traditional native-immigrant dichotomy, our focus on households using couple's ethnic composition approach uncovers complex patterns of welfare persistence previously masked in broader categorizations. Our findings also reveal a critical disconnect between political attention and empirical reality regarding welfare dependency. While policy discourse predominantly focuses on reducing immigrants' welfare dependency given their higher participation rates, our findings suggest that structural state dependence is actually strongest among native-born individuals. This indicates that policymakers may be neglecting an important dimension of welfare persistence by directing resources primarily toward immigrant integration while overlooking native Swedes' stronger tendency to remain in the welfare system once they enter it. Effective policy approaches should address the distinct needs of both natives and immigrants rather than focusing predominantly on immigrant populations.

For policy design, our results suggest that targeting welfare interventions based solely on immigrant status is insufficient. The high state dependence can be driven by dissolved native partnerships, suggesting that this group may require specific support during partnership transitions. Meanwhile, the economic resilience observed in households of stable inter-ethnic couples points to potential integration advantages that could inform broader social policy approaches.

This study's limitations include its focus on the 1990s economic crisis context, reliance on strong assumptions in the dynamic discrete-choice framework, and convergence issues. For one sample, the optimization routine failed to converge for any parameters, and for another sample, convergence was only achieved for parameter estimates but not for marginal effects. This indicates that the maximum likelihood function did not reach a well-defined optimum, and therefore no results were reported for these cases.

Future research should explore the mechanisms driving these differential patterns, particularly the factors contributing to economic resilience in households of stable inter-ethnic couples and the gender asymmetries in welfare persistence following partnership dissolution. A deeper understanding of these dynamics would further enhance both theoretical models of household economic behavior and practical approaches to social assistance policy in increasingly diverse societies.

Finally, our research demonstrates the value of examining welfare dynamics through the lens of household economics. By considering both partners' characteristics and the economic advantages of different family structures, we gain insights into the mechanisms driving wel-

fare persistence that would be missed in individual-level analyses. Future research should continue to explore how household bargaining, resource pooling, and specialization influence welfare participation patterns, particularly in the context of changing family structures and increasing ethnic diversity. and nonetheless, remember that even there are only few couples of natives who receive social assistance to assure a reasonable standard of life, they also need more structural help to eliminator their structural dependence in social assistance!

Conflict of Interest

The authors declare that they have no conflict of interest.

Data availability

Data used in this paper is extracted from the The Swedish income panel archived by Swedish National Data Service (SND). Data are accessible on request. Access to data is limited due to restrictions because the data contain personal data or other sensitive information. If you want to gain access to data with restrictions, you place a request for the data to SND. Read more here: `https://www.snd.se/en/about-us`.

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Appendix A: Descriptive Statistics

Table A1: Mean observable characteristics in 1990, by type of couple

	Intra-ethnic couples				Inter-ethnic (mixed) couples			
	SB & SB		FB & BB		FB-woman & SB-man		FB-man & SB-woman	
	all	stable	all	stable	all	stable	all	stable
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Social assistance recipient (%)	1.08	0.56	10.05	7.98	0.98	0.47	4.64	2.42
Unemployed (%)	3.52	3.09	7.79	7.31	6.78	6.35	5.29	4.08
Age (in years)	38.80	39.14	37.01	37.52	37.73	38.25	38.75	39.52
Children at home	1.44	1.43	1.54	1.56	1.37	1.38	1.38	1.39
Educational level (%)								
Primary	28.44	28.32	65.66	64.28	43.09	41.49	43.20	40.49
Secondary	44.74	44.08	24.93	25.98	35.65	36.41	36.23	37.12
Post-secondary, or more	26.82	27.60	9.42	9.75	21.26	22.1	20.57	22.39
City region (%)	20.31	20.15	36.35	35.35	25.98	25.33	29.31	29.24
Municipality characteristics								
Social assistance recipient (%)	3.84	3.83	4.53	4.5	4.04	4.02	4.16	4.13
Unemployed (%)	1.30	1.30	1.23	1.24	1.31	1.31	1.24	1.25
Years in the country in 1990 (%)								
0 – 4			27.2	24.09	10.92	9.37	10.67	7.41
5 – 9			16	15.2	11.05	10.98	8.54	8.28
10 – 14			18.25	18.61	14.11	14.04	12.44	12.08
15 – 22			23.79	25.98	24.97	25.13	23.64	24.05
> 22			14.76	16.12	38.95	40.48	44.71	48.18
Country of origin (%)								
Nordic countries			33	34.58	56.99	57.58	44.77	45.76
Western Europe			3.99	3.97	13.92	14.51	22.07	23.1
Eastern Europe			12.63	12.08	13.13	12.7	6.71	7.25
Southern Europe			12.9	13.71	4.67	4.57	12.86	12.8
Middle East			22.1	21.65	0.82	0.77	5.94	5.03
Rest of the world			15.38	14.01	10.47	9.88	7.65	6.06
Refugee			52.65	51.19	17.48	16.96	21.40	20.4
Sample size	14757	12221	9484	7172	3792	2977	3384	2524

Table A2: Social assistance recipients (%), 1985 – 1999, by type of household

	Intra-ethnic couples				Inter-ethnic (mixed) couples			
	SB & SB		FB & FB		FB-woman & SB-man		FB-man & SB-woman	
	all	stable	all	stable	all	stable	all	stable
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1985	2.02	1.51	7.23	6.12	2.72	2.15	5.50	4.16
1986	2.20	1.59	8.74	7.50	2.29	1.78	6.00	4.71
1987	1.78	1.28	9.32	8.20	2.19	1.38	5.14	3.76
1988	1.29	0.94	10.29	8.81	1.45	0.97	4.46	3.01
1989	0.86	0.53	11.10	9.33	1.13	0.57	4.17	2.58
1990	1.08	0.56	10.05	7.98	0.98	0.47	4.64	2.42
1991	1.25	0.54	8.89	6.32	1.87	0.44	3.96	1.70
1992	1.52	0.65	8.08	4.91	2.29	0.57	4.82	2.38
1993	1.76	0.78	8.54	5.12	2.87	0.50	5.47	2.54
1994	1.57	0.64	8.38	4.85	2.77	0.57	4.96	2.30
1995	1.59	0.65	8.05	4.68	3.06	0.54	4.76	1.55
1996	1.48	0.61	8.06	4.56	3.06	0.44	4.23	1.51
1997	1.40	0.54	7.79	4.34	2.87	0.34	3.90	1.39
1998	1.27	0.47	6.64	3.74	2.53	0.27	3.22	0.91
1999	1.10	0.43	5.80	3.14	2.51	0.47	3.01	0.91

Appendix B: Coefficient Estimates of Initial Conditions and Participation Equations

Table B1: Estimates for initial-conditions equation, intra-ethnic couples

	Foreign-born couples				Swedish-born couples			
	all		stable		all		stable	
	PE	SE	PE	SE	PE	SE	PE	SE
Constant	-1.638	(0.539)***	-1.896	(0.742)**	0.366	(0.891)	-2.145	(1.620)
Age/100	-0.071	(3.035)	-0.546	(4.144)	-13.146	(5.215)**	-1.904	(9.508)
Age-squared/10000	-1.101	(4.328)	0.435	(5.926)	13.776	(7.480)*	-0.577	(13.476)
Educational level (CG: Low)								
Secondary	-0.073	(0.071)	0.074	(0.095)	-0.351	(0.091)***	-0.271	(0.138) **
Post-secondary, or more	-0.460	(0.138)***	-0.679	(0.245)***	-0.599	(0.161)***	-0.407	(0.201) **
Woman								
Women with children								
Children at home	0.083	(0.019)***	0.106	(0.026)***	0.044	(0.038)	0.050	(0.053)
City region	-0.091	(0.059)	-0.078	(0.081)	-0.160	(0.121)	-0.222	(0.180)
Municipality characteristics (%)								
Social assistance recipient	0.120	(0.231)	-0.291	(0.326)	0.679	(0.480)	1.041	(0.784)
Unemployed	1.589	(0.426)***	1.844	(0.544)***	-1.055	(0.666)	-0.657	(1.073)
Unemployed $_t$	0.113	(0.077)	0.195	(0.107)*	0.172	(0.145)	0.040	(0.262)
Unemployed $_{t-1}$	0.035	(0.056)	-0.182	(0.089)**	-0.103	(0.140)	-0.291	(0.268)
Country of origin (CG: Nordic)								
Western Europe	0.045	(0.178)	0.207	(0.258)				
Eastern Europe	0.100	(0.133)	0.577	(0.180)***				
Southern Europe	-0.193	(0.140)	0.138	(0.190)				
Middle East	0.100	(0.127)	0.571	(0.171)***				
Rest of the world	0.111	(0.099)	0.437	(0.139)***				
Years in Sweden (CG: 0-4 years)								
5 – 9	-0.749	(0.083)***	-0.833	(0.113)***				
10 – 14	-0.812	(0.086)***	-0.776	(0.113)***				
15 – 22	-0.868	(0.102)***	-0.955	(0.153)***				
>22	0.886	(0.134)***	-1.062	(0.201)***				
Refugee	0.122	(0.097)	-0.039	(0.128)				
Social assistance recipient								
1985	0.652	(0.087)***	0.734	(0.126)***	0.520	(0.139)***	0.426	(0.261) *
1986	-0.007	(0.087)	-0.142	(0.124)	0.405	(0.138)***	0.397	(0.233)
1987	0.108	(0.081)	-0.018	(0.109)	0.118	(0.137)	-0.016	(0.239)
1988	0.000	(0.073)	0.011	(0.096)	0.501	(0.148)***	0.303	(0.277)
1989	1.551	(0.061)***	1.712	(0.082)***	1.544	(0.137)***	1.508	(0.219) ***

Table B2: Estimates for initial-conditions equation, inter-ethnic couples

	FB woman & SB man				FB man & SB woman			
	all		stable		all		stable	
	PE	SE			PE	SE	PE	SE
Constant	-0.099	(3.240)			-0.994	(1.219)	-0.471	(2.523)
Age/100	-7.958	(19.792)			-2.114	(6.826)	-8.768	(14.463)
Age-squared/10000	1.493	(31.769)			-0.744	(9.519)	9.889	(19.782)
Educational level (CG: Low)								
Secondary	-0.392	(0.383)			-0.211	(0.134)	-0.298	(0.232)
Post-secondary, or more	-0.950	(1.175)			-0.314	(0.215)	-0.568	(0.438)
Children at home	-0.060	(0.176)			-0.005	(0.050)	0.079	(0.092)
City region	0.340	(0.406)			-0.455	(0.153)***	-0.420	(0.340)
Municipality characteristics (%)								
Social assistance recipient	0.353	(1.665)			0.969	(0.506)*	1.328	(1.017)
Unemployed	0.661	(1.934)			0.075	(0.870)	-0.174	(1.908)
Unemployed $_t$	0.211	(0.433)			0.057	(0.169)	-0.222	(0.370)
Unemployed $_{t-1}$	-0.137	(0.509)			-0.075	(0.160)	0.004	(0.345)
Country of origin (CG: Nordic)								
Western Europe	-0.508	(1.356)			-0.029	(0.176)	-0.067	(0.346)
Eastern Europe	0.665	(1.001)			-0.166	(0.441)	-0.150	(0.589)
Southern Europe	-0.274	(0.546)			0.138	(0.234)	-0.137	(0.380)
Middle East	0.435	(1.219)			0.321	(0.317)	0.271	(0.585)
Rest of the world	0.037	(0.497)			0.199	(0.215)	0.323	(0.412)
Years in Sweden in 1985 (CG: 0-4 years)								
5 – 9	-0.155	(0.562)			-0.563	(0.221)**	-0.383	(0.375)
10 – 14	-0.568	(0.761)			-0.403	(0.192)**	-0.394	(0.416)
15 – 22	0.069	(0.469)			-0.552	(0.203)***	-0.360	(0.367)
$>$ 22	-0.332	(0.498)			-0.527	(0.189)***	-0.505	(0.339)
Refugee	-0.493	(0.900)			-0.054	(0.249)	0.121	(0.434)
Social assistance recipient								
1985	0.002	(0.598)			0.636	(0.186)***	0.602	(0.324) *
1986	0.096	(0.621)			0.335	(0.154)**	0.202	(0.282)
1987	1.019	(0.433)	**		0.160	(0.158)	0.208	(0.268)
1988	-0.218	(0.540)			0.399	(0.156)**	0.430	(0.271)
1989	1.457	(0.452)	***		1.143	(0.150)***	1.140	(0.272) ***

Table B3: Estimated intertemporal covariance matrix, by household type

	Stable FB&FB couples			Stable SB&SB couples			All FBm&SBw couples			All FBw&SBm couples		
Cov1	-0.151	0.049	***	0.131	0.106		-0.112	0.081		0.049	0.146	
Cov2	-0.220	0.048	***	0.239	0.090	***	-0.007	0.078		0.238	0.091	***
Cov3	-0.175	0.052	***	0.166	0.085	**	0.055	0.071		0.231	0.088	***
Cov4	-0.007	0.052		0.355	0.084	***	0.179	0.075	**	0.207	0.095	**
Cov5	-0.098	0.055	*	0.109	0.183		0.096	0.081		0.135	0.100	
Cov6	0.040	0.057		0.445	0.085	***	0.061	0.087		-0.008	0.098	
Cov7	0.047	0.060		0.258	0.099	***	0.093	0.084		0.224	0.101	**
Cov8	-0.065	0.066		0.278	0.092	***	0.217	0.083	***	0.069	0.114	
Cov9	-0.221	0.064	***	0.113	0.121		0.127	0.091		0.096	0.109	
Cov10	0.161	0.048	***	0.352	0.073	***	0.165	0.064	**	0.049	0.155	
Cov11	0.160	0.044	***	0.394	0.065	***	0.231	0.062	***	0.265	0.101	***
Cov12	0.133	0.052	**	0.159	0.095	*	0.209	0.067	***	0.217	0.120	*
Cov13	0.155	0.046	***	0.557	0.101	***	0.262	0.065	***	0.138	0.082	*
Cov14	0.213	0.050	***	0.366	0.104	***	0.203	0.073	***	0.278	0.101	***
Cov15	0.067	0.062		0.280	0.101	***	0.327	0.074	***	0.298	0.086	***
Cov16	0.272	0.056	***	0.500	0.082	***	0.179	0.082	**	0.435	0.090	***
Cov17	-0.019	0.059		0.262	0.099	***	0.236	0.084	***	0.439	0.091	***
Cov18	0.185	0.048	***	0.333	0.087	***	0.101	0.070		0.178	0.156	
Cov19	0.168	0.044	***	0.408	0.074	***	0.300	0.063	***	0.314	0.095	***
Cov20	0.164	0.046	***	0.373	0.086	***	0.245	0.067	***	0.265	0.086	**
Cov21	0.171	0.050	***	0.445	0.081	***	0.220	0.069	***	0.267	0.083	***
Cov22	0.230	0.056	***	0.532	0.081	***	0.317	0.069	***	0.315	0.092	***
Cov23	0.323	0.052	***	0.373	0.091	***	0.234	0.082	***	0.181	0.104	*
Cov24	-0.014	0.068		0.369	0.102	***	0.273	0.087	***	0.276	0.098	***
Cov25	0.203	0.052	***	0.285	0.099	***	0.179	0.076	**	0.114	0.162	
Cov26	0.201	0.046	***	0.406	0.112	***	0.324	0.073	***	0.155	0.085	*
Cov27	0.249	0.048	***	0.452	0.087	***	0.133	0.072	*	0.183	0.091	**
Cov28	0.129	0.053	**	0.413	0.079	***	0.264	0.077	***	0.219	0.100	**
Cov29	0.189	0.063	***	0.499	0.076	***	0.376	0.071	***	0.303	0.105	***
Cov30	-0.079	0.054		0.377	0.101	***	0.224	0.089	**	0.232	0.104	**
Cov31	0.145	0.052	***	0.218	0.128	*	0.189	0.072	***	0.164	0.161	
Cov32	0.192	0.057	***	0.374	0.090	***	0.187	0.088	**	0.457	0.085	***
Cov33	0.141	0.057	**	0.144	0.114		0.205	0.072	***	0.181	0.111	
Cov34	0.251	0.058	***	0.501	0.092	***	0.205	0.083	**	0.285	0.098	***
Cov35	0.096	0.056	*	0.283	0.094	***	0.148	0.094		0.229	0.099	**
Cov36	0.291	0.049	***	0.287	0.135	**	0.060	0.087		0.062	0.132	
Cov37	0.109	0.058	*	0.496	0.106	***	0.209	0.086	**	0.272	0.122	**
Cov38	0.184	0.057	***	0.183	0.115		0.040	0.080		0.144	0.134	
Cov39	-0.027	0.057		0.314	0.119	***	0.216	0.077	***	0.120	0.108	
Cov40	0.210	0.054	***	0.262	0.123	**	0.229	0.079	***	0.192	0.123	
Cov41	0.079	0.061		0.428	0.097	***	0.081	0.102		0.420	0.099	***
Cov42	0.035	0.066		0.217	0.116	*	0.321	0.074	***	0.161	0.084	*
Cov43	0.246	0.060	***	0.285	0.114	**	0.107	0.094		0.299	0.116	***
Cov44	0.120	0.056	**	0.254	0.097	***	0.216	0.100	**	0.147	0.097	
Cov45	0.019	0.057		0.469	0.110	***	0.206	0.081	**	0.196	0.100	*

Notes: FB = forign-born; SB = Swedish-born; m = man; w = woman.
The position of the covariance is displayed in the table below.

Var1	Cov1	Cov10	Cov18	Cov25	Cov31	Cov36	Cov40	Cov43	Cov45
	Var2	Cov2	Cov11	Cov19	Cov26	Cov32	Cov37	Cov41	Cov44
		Var3	Cov3	Cov12	Cov20	Cov27	Cov33	Cov38	Cov42
			Var4	Cov4	Cov13	Cov21	Cov28	Cov34	Cov39
				Var5	Cov5	Cov14	Cov22	Cov29	Cov35
					Var6	Cov6	Cov15	Cov23	Cov30
						Var7	Cov7	Cov16	Cov24
							Var8	Cov8	Cov17
								Var9	Cov9
									Var10

Appendix C: Estimation and identification

Following Andrén and Andrén (2013),the estimation method applied in this study is based on the maximum likelihood technique, which requires the formulation of a likelihood function. The model described is based on ten time periods (1990-1999) and results in the following log-likelihood function:

$$\log L = \log \int \cdots \int f(v_{i1}, \ldots, v_{iT}) dv_{i1} \ldots dv_{iT}, \tag{5}$$

where the integration is over $\{v_{i1}, \ldots, v_{iT} : a_{it} < v_{it} < b_{it}, t = 1, \ldots, T\}$.

Note that $a_{it} = -X_{it}\beta$ and $b_{it} = \infty$ if $Y_{it} = 1$, whereas $a_{it} = -\infty$ and $b_{it} = -X_{it}\beta$ if $Y_{it} = 0$. In addition, $f(.)$ is the multivariate normal density function.

A standard difficulty is the evaluation of the ten-fold integral in equation, which is solved using a smooth recursive conditioning simulator, i.e., the Geweke-Hajivassiliou-Keane (GHK) simulator, which simulates (instead of numerically evaluates) the multivariate probabilities. The likelihood function described above may therefore be rewritten as

$$\log L = \log \int \cdots \int P_1 P_2 \ldots P_{T-1} P_T dv_{i1} \ldots dv_{iT} \tag{6}$$

where P_t represents a sequence of conditional probabilities and η_t a random draw from the truncated normal density. The simulated likelihood is a continuous and differentiable function of the parameters to be estimated. The simulated likelihood function is an unbiased estimator of the likelihood function (Börsch-Supan and Hajivassiliou, 1993).

Because this is a dynamic model, two additional complications need to be solved to receive consistent estimates of the parameters of interest. First, the initial conditions problem, which is related to the fact that we are unable to observe the data generating process from its beginning for all individuals. In other words, some individuals have previous welfare participation before 1990 that is not accounted for in the initial year of the observed series, and this generates a conditional relationship that causes inconsistent estimates of the parameters of interest. To address this issue, we follow Heckman (1981b,c), and approximate the initial state in the sample using a univariate probit model, which estimates its parameters separately and allows its error term to freely correlate with the error terms of the remaining time periods to thereby circumvent the endogeneity problem. The initial state equation was estimated simultaneously with the participation equation. This approach to addressing the initial conditions problem is particularly relevant when studying welfare dynamics in households, as it allows us to account for the possibility that unobserved factors affecting welfare participation at the beginning of our observation period may be correlated with subsequent

participation decisions. Such factors might include household-specific characteristics like migration history, labor market attachment, or relationship quality that could influence both initial welfare receipt and future dependency patterns.

Second, distinguishing between true/structural and spurious state dependence, which is the same as separating the effects of unobserved individual characteristics from the potential effect of true state dependence. To consistently estimate the coefficients of the model, we normalize the variance of the first time period only (the initial condition equation), which allow heteroscedasticity over time. However, when using the GHK simulator, such normalization causes an asymmetry in the simulated error structure, which biases the standard errors (for the coefficients of the participation equation) received from the estimated information matrix using standard numerical methods, such as the finite difference approach. Therefore, the variances for all time periods have been normalized to one, which imposes homoscedasticity over time.

The marginal effects calculated in this study are based on the full model and represent the mean marginal effects over time and individuals:

$$ME = \frac{1}{NT} \sum_{i=1}^{N} \sum_{t=1}^{T} \frac{\partial}{\partial x_1} \phi^*(y_{it} = 1|x) \tag{7}$$

where $\phi^*(y_{it} = 1|x)$ is the marginal probability function for period t (all other time periods have been integrated out). For simplicity, the discrete variables have all been treated as continuous. The derivatives are calculated using a finite difference formula.

Immigration, Partnership Dynamics and Welfare Persistence

ABSTRACT

When economic crises destabilize labor markets, they offer unique opportunities to explore welfare dynamics and the interplay between partnership formation and social assistance. Using data from Sweden's 1990s economic crisis, characterized by high unemployment, expanding budget deficit, and a large inflow of war refugees from the former Yugoslavia, we examine state dependence in social assistance, which refers to the increased likelihood that households will receive benefits in the future if they have previously received them. Because Swedish social assistance eligibility depends on household-level resources and that partnership formation may correlate with unobserved factors, we focus on individuals who were single in 1990, prior to the recession, tracking their social assistance receipt and household composition over the sub-sequent decade. This approach allows us to compare individuals who remain single throughout the decade with those who form partnerships, assessing how gender, country of birth, and part-nership choices affect state dependence in social assistance. Using a dynamic discrete choice model that addresses both unobserved heterogeneity and initial conditions, we found differ-ences in structural state dependence both between and within the samples of Swedish-born (SB) and foreign-born (FB) individuals. Among singles, SB women exhibit lower structural state dependence than SB men, whereas FB women display slightly higher structural state dependence than FB men but lower than SB men. For FB individuals, the structural state dependence decreases when they partner with a SB individual but increases when they partner with another FB individual, suggesting that partnering with an SB individual may reduce the structural impact of prior welfare dependency, while partnering with an FB individual may reinforce it.

JEL Classification: I30, I38, J18.

Keywords: welfare persistence, social assistance, structural state dependence, unobserved heterogeneity, dynamic discrete choice model, GHK simulator.


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