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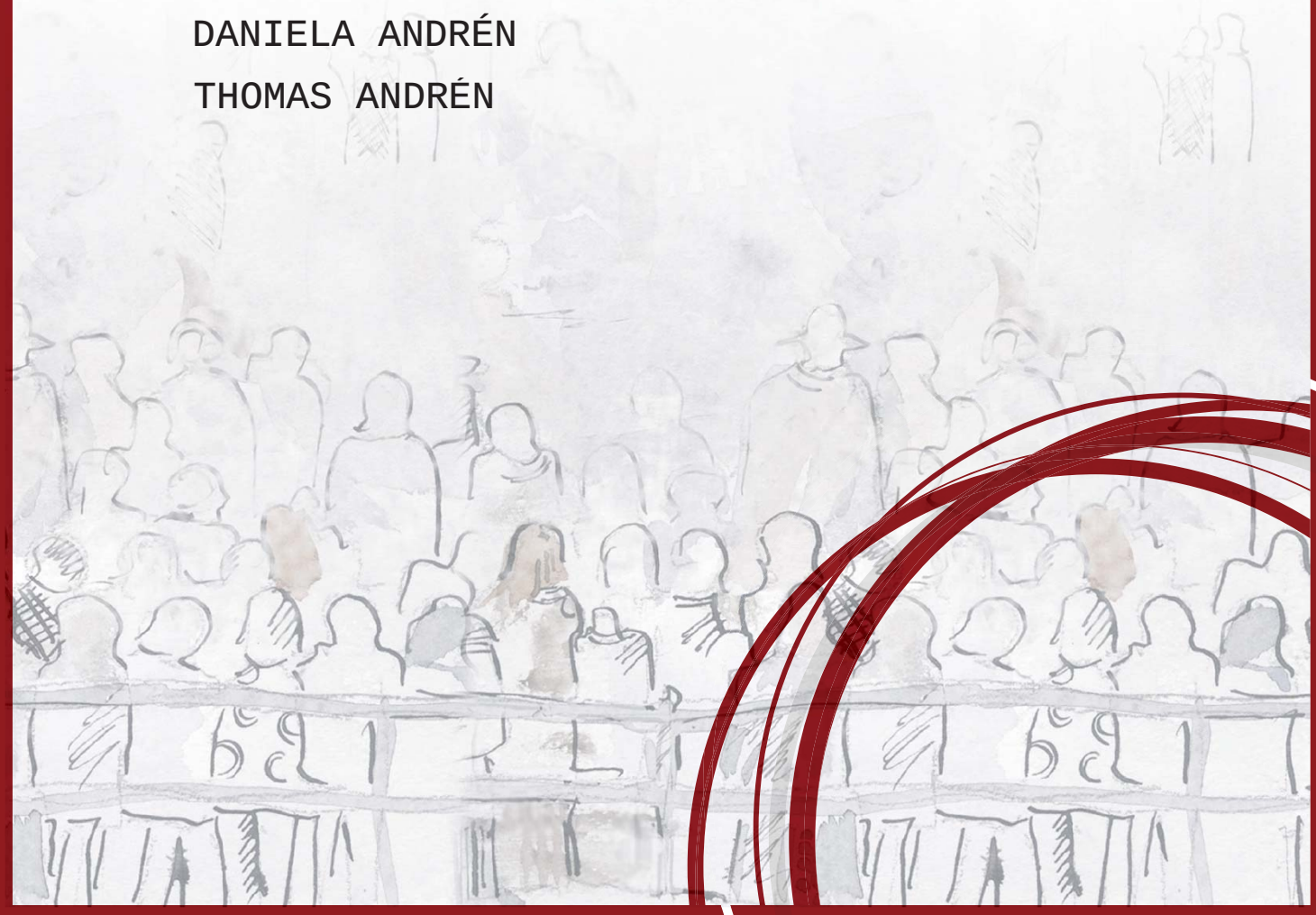

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ABSTRACT

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This study estimates the state dependence in social assistance in Sweden during 1990-1999 by different types of households, which were grouped by the country of birth of the sampled individual and his/her partner. The results show that the structural state dependence differed extensively across different household types. Although Swedish-born partners who separated are one of the groups with the lowest receipt of social assistance (i.e., 1.08-1.76%), these individuals exhibit the highest state dependence (24.4 percentage points). Foreign-born singles have almost the same value for the state dependence, but these individuals also have the highest receipt of social assistance (18.47%). Surprisingly, the group with the lowest receipt of social assistance (0.27-3.06%) and the lowest state dependence (4.7 percentage points) are the foreign-born women living together with a Swedish-born man. However, for the mixed samples, there are only few parameters for the country of origin that are statistically significant. For example, compared to the Nordic-born group, men born in Eastern Europe who lived with a Swedish-born woman during 1990-99 have a lower propensity (1 percentage points) to receive social assistance, whereas men born in the Middle East or the rest of the world who lived with a Swedish born woman in 1990 have a higher propensity (1.1-1.2 percentage points).

Keywords: social assistance, state dependence, country of birth, marital status, mixed couples, unobserved heterogeneity, initial condition, dynamic probit model, GHK simulator

JEL Classification: I30, I38, J18

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1 Introduction

The long-term use of social assistance is an increasing social problem in Sweden and other countries in Europe. An important factor behind the long-term use is the so-called state dependence, which means that the past experience of receiving social assistance determines an increased propensity of continuing social assistance use for a long time. For policy makers to design relevant welfare reforms, it is important to have a good understanding of the strength of the state dependence in the population and the extent that it varies with different factors and among different groups. This study focuses on the analysis of the persistence of social assistance in Sweden during the 1990s across different household types, which are defined by the countries of birth of the sampled person and her/his partner.

We constructed our analysis on two potential explanations emphasized in previous literature to explain why the conditional probability that an individual will experience the event in the future is a function of the individual's past experience. One explanation is that the experience with welfare use in itself alters the cost or the stigma related to welfare participation, which shifts the structure of the individual's preferences. An identical individual who did not experience the event in the past would behave differently compared to an individual who did experience the event. Relationships of this sort give rise to true or structural state dependence (Heckman 1981a).

An alternative explanation is that the observed persistence is a result of innate individual differences that originate from permanent unobserved heterogeneity across individuals. Individuals may differ in certain unmeasured variables that influence the individual's probability of experiencing the event but that are not influenced by the experience of the event. If this is the case, current participation has no structural effect on the future propensity to participate, and this phenomenon is referred to as spurious state dependence (Heckman 1981b).

The problem of distinguishing between structural and spurious dependence has a relatively long history. Heckman (1981a) reported that Bates and Neyman (1951) demonstrated that it is necessary to use panel data on individual histories to discriminate between the two explanations. The empirical applications vary from accidents (e.g., Heckman and Borjas 1980) to the mover-stayer model (e.g.,

Goodman 1961, Singer and Spilerman 1976) and the employment decision of married women (e.g., Heckman 1981a).

Although the academic literature on welfare participation is vast,[1] the body of literature focusing on state dependence and social assistance is still small.[2] For Sweden, Hansen and Lofstrom (2003, 2006, 2009) and Andrén and Andrén (2013) focus on the dynamics of social assistance (SA) participation of both natives and immigrants, and found that welfare participation is higher among immigrants compared with natives.[3] However, if the effect is distributed over time, it decreases and loses its statistical significance for both groups after three years (Andrén and Andrén, 2013).

In Sweden, the household applies for social assistance, and therefore, all of the previous studies let the household be represented by the sampled individual. However, the sampled person is either foreign-born or Swedish-born. Therefore, under this design, the fact that a two-adult household can consist of one Swedish-born and one foreign-born is ignored, which might change the empirical results and implicitly the information delivered to the policy makers. Furthermore, this new design and its empirical results are expected to contribute to the literature on interethnic marriages and their economic effects, which is still in its infancy (Furtado and Trejo, 2012). Most empirical studies found beneficial effects for immigrants who marry natives rather than other immigrants; marrying a native, and by extension associate more with natives, is generally associated with more labor market success of immigrants (e.g., Kantarevic 2004, Meng and Gregory 2005, Furtado and Theodoropoulos 2010, Nekby 2010 and Nottmeyer 2010). Interethnic marriage rates have often been used as a proxy for the extent of assimilation by immigrant groups (Pagnini and Morgan 1990; Qian and Lichter 2007).

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[1] See Danziger et al. (1981), Lichter et al. (1997), Moffit (1992), and Barrett and McCarthy (2008) for literature surveys.

[2] See Chay et al. (1999), Cappellari and Jenkins (2009), and Wunder and Riphahn (2012) for studies on the US, Britain and Germany.

[3] All of these studies focused on state dependence, which is connected to the risk of reapplying for social assistance. In contrast, Mood (2013) focused on the duration of the dependence on social assistance, i.e., the connection between the time spent in the SA state and the probability of leaving the state. This study found that there is duration dependence among both Swedish-born individuals and immigrants and that these effects appear to be clearly smaller for the foreign-born individuals. Although immigrants are particularly vulnerable in terms of dependency on SA, the result might be driven by the fact that some foreign-born individuals spend less time in Sweden.

Furtado and Trejo (2012) stated that further research is needed to more definitively determine how and why intermarriage affects economic outcomes. In this study, we address this issue by estimating separate models for mixed couples in which a Swedish-born individual lives with a foreign-born individual. Altogether, we analyzed twelve types of household, which were defined based on the country of birth of the sampled person and his/her partner, and the length of the marital status.

We extend the existing literature by offering empirical evidence for the strength and determinants of the structural state dependence with respect to social assistance in different types of households and the effect of intermarriage between immigrants and natives on the receipt of social assistance.[4] Using the econometric framework developed by Andrén and Andrén (2013), which incorporates the effect of structural state dependence while controlling for the initial conditions problem and for individual unobserved heterogeneity, we found that that state dependence in Swedish social assistance is relatively strong and differs across different types of household. Although Swedish-born partners who separated are a group with one of the lowest receipt of social assistance during 1990-1999 (i.e., 1.08-1.76%), these individuals exhibit the highest state dependence (24.4 percentage points). Foreign-born singles have almost the same value for state dependence, but they are also the groups with the highest receipt of social assistance (i.e., 10.98-18.47%). Surprisingly, the group with the lowest receipt (0.27-3.06%) and the lowest state dependence (4.7 percentage points) are the foreign-born women living with a Swedish-born man. These results are expected to be a valuable support for policy makers in the design of effective welfare reforms.

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

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[4] Several papers show that welfare arrangements and reforms can destroy or support the family (REF). In contrast to this literature, Halla et al. (2013) evaluated the effect of the average implementation of the welfare state (measured as public social spending as a percentage of the GDP) on family outcomes (in terms of marriage, divorce, and fertility rates) at the aggregate level. Using data from OECD member countries during 1980-2007, this study found that an expansion in the welfare state increases the fertility and marriage and therefore concluded that the welfare state supports family formation. However, it is also reported that the welfare state decouples marriage and fertility and therefore alters the organization of the family.

2 Institutional settings and data

The right to social assistance in Sweden is regulated by the Social Services Act, which provides relatively general guidelines concerning eligibility standards and somewhat more detailed regulations with respect to compensation levels. The responsibility for financing and providing the benefit rests with the municipalities. Benefits are granted to households. The level is set to elevate the household above a minimum standard of living and covering expenses for food, housing, childcare, etc. No maximum period for eligibility is specified, but recipients must make full-time efforts to find a job (if they are unemployed) or to find other solutions to become independent of social assistance (Bäckman and Bergmark 2011).

The total SA benefit consists of two parts. The first part is a regulated component that covers expenditures for housing, childcare, and similar expenses. The second part covers the more basic daily consumption needs of the household, such as food and clothing, and it is referred to as the social assistance norm, which is regulated by the welfare recipient's home municipality. The National Board of Health and Welfare provide guidelines to the municipalities to harmonize the level across the country. The SA levels were determined by each of the 288 municipalities until 1998. Since January 1998, the regional variations in the benefit levels were replaced by a national uniform benefit level. In most municipalities, the SA generosity was reduced between 1993 and 1999, and the difference between the average SA benefit level in 1993 and the corresponding level in 1999 is approximately 20 percent (Flood et al. 2004).

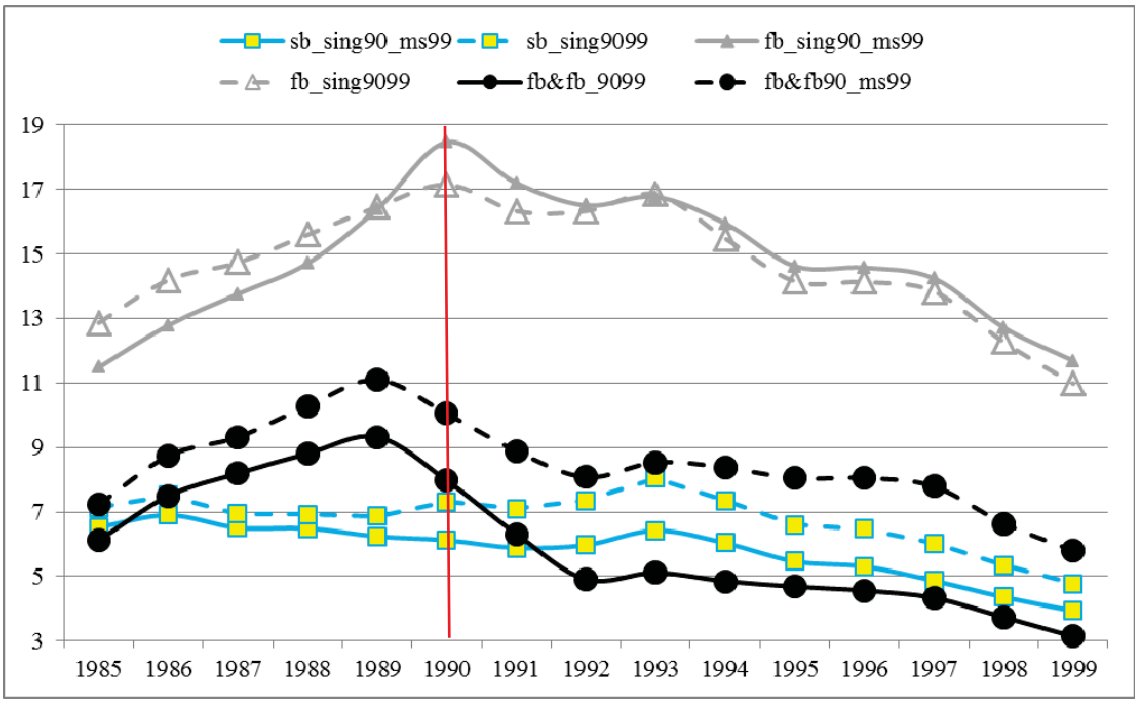
Applications are normally assessed at the social services office, and benefits are paid on a monthly basis. A social worker is in charge of the assessment process. Although the legislation defines some minimum standards, social workers enjoy a considerable degree of discretion in their decisions on both eligibility and the level of benefit awarded. The decision is based on an interview process and involves an assessment of the complete financial situation of the household. The applicant cannot voluntarily give up a job to live on social assistance. With some exceptions, the household assets must be exhausted before social assistance may be received.

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 every year since 1978. SWIP contains

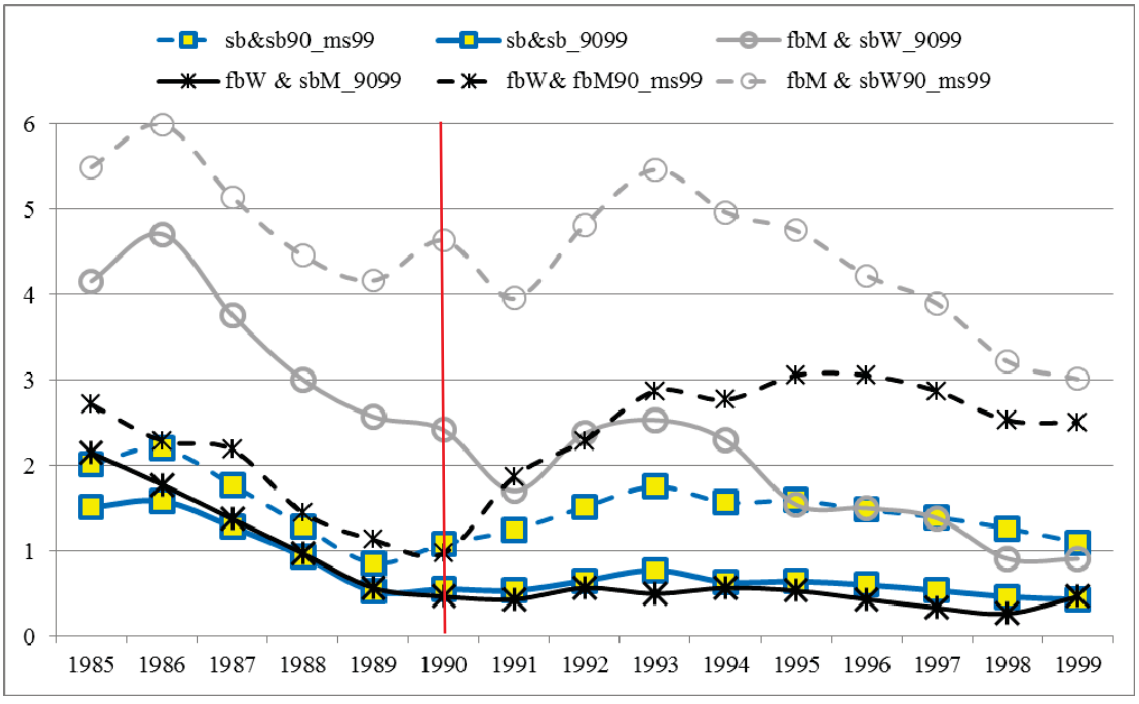
both a 1% sample of the Swedish-born population and a 10% sample of the foreign-born population.[5] Demographic variables going back to 1968 and several variables from income registers (based on tax data) for all sampled individuals and their partners are reported (with repeated yearly cross-sectional data extracts). Given this design and the aim of our paper to understand the persistence in social assistance (which is connected to the willingness to work), we selected only those individuals who were working-age during the entire analyzed period (i.e., those aged 20-50 in 1990) and excluded students and early retired people in 1990. We also later excluded drop-outs due to emigration, death, or other reason (i.e., individuals who are no longer in the tax register during 1991-1999).

Given that a household applies for social assistance, our data shows whether the household of the sampled person received social assistance at least once during a calendar year (we know how many months of assistance, but not if they were in one or more periods). Following the work of Hansen and Lofstrom (2003, 2006), we let the household be represented by the sampled individual. We used the characteristics of the sampled individual (e.g., gender, age, and education) as factors related to the person originally sampled in the SWIP. The sampled person is either foreign-born or Swedish-born, but it is possible that two-adult households consist of one Swedish-born and one foreign-born individual. Therefore, we constructed our samples by controlling whether the Swedish-/foreign-born individual lives either alone or with a Swedish/foreign born partner in 1990: (1) Swedish-born individuals living alone; (2) Couples of Swedish-born; (3) Couples of foreign born; (4) Couples of foreign-born woman living with a Swedish born man; (5) Couples of foreign-born man living with a Swedish born women; and (6) Foreign-born individuals living alone. To analyse the importance of marital status over time, we constructed six sub-samples of individuals from each of these samples who did not change their marital status during the period of 1990-1999. Figures 1a and 1b and Table A3 in the Appendix show that the social assistance varies across these samples during 1985-1999, which suggests that stable couples are less likely to be dependent on social assistance.

[5] More information can be found at the Swedish National Data Service's home page: http://snd.gu.se/en.



a) Swedish-born (sb) and foreign-born (fb) individuals who lived alone during 1990-1999 (sing9099) and who lived alone in 1990 and changed their marital status during 1991-1999 (sing90_ms99) and foreign-born couples (fb&fb).



b) Swedish-born couples and mixed couples.

Figure 1 Social assistance recipients during 1985-1999 by household type

All of the groups of couples who separated exhibited an increase in their receipt of social assistance; this finding was more apparent for Swedish-born individuals but was also found for both groups of foreign-born (women and men) who had been with a Swedish-born in 1990 (Figure 1a). The less exposed group was that of foreign-born women living for 10 years or more with a Swedish-born man (Figure 1b).

All of the variables used in the regression analyses are presented in Tables A1-A3 in the Appendix. Tables A1 and A2 present the variables' mean values by type of household in 1990 and 1990-1999, respectively.

3 The Empirical Specification

Based on the work conducted by Andrén and Andrén (2013), we assume an individual *i* makes a discrete decision about applying for social assistance in each time period *t* with the objective of maximizing his or her expected lifetime utility.[6] Although the decision is discrete, it is based on a latent continuous measure Y_{it}*, which represents the propensity of individual *i* to receive social assistance during period *t*. This measure is based on the difference between the individual utility with and without social assistance in period *t*. If the utility with social assistance is greater than the utility without social assistance, the individual *i* will choose the social assistance alternative. Therefore, the relevant measure when an individual is making a decision is the current utility difference in period *t*, which may be expressed in the following way:

$$Y_{it}^{*} = X_{it}\beta + \sum_{j=1}^{s} \gamma_j Y_{i;t-j} + v_{it} \text{ with } \quad Y_{it} = \begin{cases} 1 & Y_{it}^{*} \geq 0 \\ 0 & Y_{it}^{*} < 0 \end{cases}. \qquad (1)$$

where $i = 1,...,N; t = 1,...,T$. The error term v_{it} is assumed to be independent of X_{it} and is independently 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 between each and every time period. $Y_{i;t-j}$ is a dummy variable that shows whether the individual *i* received social assistance in year *t* - *j*, where *j* = 1,2..., *s* and s is the first year in the history of the individual or the maximum number of time periods that we control for. The estimate of γ_j is the measure for the state dependence and captures the idea that the effect of an experience in the previous period has a real and behavioral effect on the choice in the current period. A first order Markov

[6] The whole section is heavily based on the model description presented by Andrén and Andrén (2013).

process captures the correlation 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 earlier experience compared to others without such an experience.

The availability of panel data allows distinguishing average behavior from individual behavior by specifying the error term v_{it} as a function of an unobserved individual specific component α_i and a residual idiosyncratic component u_{it}. Hence, the existence of an individual specific unobserved permanent component allows individuals who are homogenous in their observed characteristics to be heterogeneous in their response variables.

3.1 Social assistance persistence

Specification (1) allows for three different sources of persistence after controlling for observed explanatory factors: 1) serial correlation in the error term u_{it}; 2) unobserved heterogeneity α_i; and 3) true or structural state dependence through γ_j. Although all three sources are interesting, we focus on the size and the statistical significance of the structural state dependence while controlling for the other two sources. Distinguishing between structural and spurious state dependence is of considerable interest because these have very different policy implications. A policy that temporarily increases the probability of participation has different implications for future probabilities in a model with structural state dependence compared with a model in which the persistence is solely due to serial correlation and/or unobserved heterogeneity.

3.2 Estimation and identification

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 by equation (1) is based on ten time periods (1990-1999) and results in the following log-likelihood function:

$$L = \sum_{i=1}^{N} \log\left[prob\left(Y_{i1}, Y_{i2}, ..., Y_{i10}\right)\right], \qquad (2)$$

where

$$\text{Prob}\left(Y_{i1}, Y_{i2}, ..., Y_{i10}\right) = \int_{a_{i1}}^{b_{i1}} \cdots \int_{a_{i10}}^{b_{i10}} \left(v_{i1}, ..., v_{i10}\right) dv_{i10}, ..., dv_{i1}$$

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 (2), which will be 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

$$L_{SML} = \frac{1}{R}\sum_{i=1}^{R}\prod_{t=1}^{T} Q_t\left(\eta_1^r,...,\eta_{t-1}^r\right), \tag{3}$$

where $\prod_{t=1}^{T} Q_t$ represents the sequence of conditional probabilities and η_t^r is the random draws from the truncated normal density.[7] The simulated likelihood is a continuous and differentiable function of the parameters to be estimated. In addition, 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: the initial conditions problem and the necessity of separating the effect of an individual's unobserved characteristics from the possible effect of structural state dependence. The first problem 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 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. If the process is in equilibrium or if the previous experience is independent and exogenous of the behavior observed during the first time period, then there is no problem. However, this is unlikely to be the case. The problem of the initial conditions decreases with the length of the panel, but the panel length in this study is only ten time periods; thus, this is something that requires special attention. The standard estimator, which was introduced by Heckman (1981b, 1981c), involves the specification of an approximation to the reduced form equation for the initial observation and maximum likelihood estimation using the full set of sample observations and allowing cross-

[7] For an intuitive description of the procedure, see Train 2003.

correlation between the main and the initial period equations.[8] This is performed by approximating 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. In this study, the initial state equation was estimated simultaneously with the participation equation.

The second problem to consider is the problem of 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. The solution to this problem is related to the assumptions made on the residual term in equation (1).[9] To identify the parameters of the main model, it is necessary to impose some normalizations. To consistently estimate the coefficients of the model, it is sufficient to normalize the variance of the first time period only (the initial condition equation), which means that it is possible to 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 here are based on the full model and represent the mean marginal effects over time and individuals. These are defined through the following equation:

$$\frac{1}{NT}\sum_{i=1}^{N}\sum_{t=1}^{T}\frac{\partial}{\partial x_1}\Phi^{*}\left(y_{it}=1\,|\,x\right), \tag{4}$$

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. This continuous treatment is believed to be a good approximation

[8] See Orme (2001) and Wooldridge (2005) for alternative methods.
[9] In the literature there are many examples of more or less restrictive ways of dealing with the residual term in order to separate out the individual specific effects.

of the discrete counterpart. The derivatives are calculated using a finite difference formula.

4 Results

Because it is well-known that the welfare behavior differs greatly between natives and immigrants and that the factors affecting their participation behavior are different, we separated the analysis for twelve different types of households, which were grouped by the country of birth of sampled individual and his/her partner. The analysis focused on the estimated size of the structural state dependence within the framework of a first-order Markov process as an aggregated measure. Tables 1-3 present the estimates and marginal effects for the participation equation from the dynamic discrete choice model, by type of household, defined as a function of the country of birth of the sampled persons and their partners. The parameters of the initial conditions equation are of less interest because its main purpose was to control for the endogenous initial period; these are reported in Tables B1-B3 in the Appendix.

>>> Tables 1-3 here <<<

The overall results of almost all of the variables are in agreement with those found in the literature. However, the estimated parameters for the same explanatory variable are not always statistically significant, and their sign can vary across household types.

The single largest statistically significant effect among all types of households is the effect related to social assistance persistence and the effects of social assistance participation over time. In other words, when people are introduced to social assistance, a change in their propensity takes place, which makes it harder for them to leave the social assistance dependency. Our results show that the effect of structural state dependence varies strongly across the groups (from 4.6 to 24.4 percentage points). The lower values were obtained for mixed couples: 4.6 percentage points for stable couples composed of foreign-born men and Swedish-born women and 4.7 percentage points for couples composed of foreign-born women and Swedish-born men who changed marital status during 1991-99. The effect is almost double for stable foreign couples (10.3 percentage points) and for Swedish-born individuals living alone for a short (10.3) or longer time (12.3) and almost three times higher for foreign-born couples who changed

marital status during 1991-99 (14.3 percentage points). Surprisingly, our results show a stronger effect of the structural state dependence for Swedish-born couples that changed marital status during 1991-99 (i.e., 24.4 percentage points). These results are expected to have important policy implications because any short-term economic policy measure that increases the participation rate will have long-term consequences that might be difficult to solve.

In the literature, it is often argued that unemployment together with household separations explain the major part of the temporary need for social assistance. This is confirmed by the results, which show that, regardless of the country of birth, those who became single after living with a partner in 1990 or longer have a higher propensity of receiving social assistance. Surprisingly, the effect is stronger for Swedish-born individuals who lived with a Swedish-born partner (10 percentage points) compared with foreign-born individuals who lived with a foreign-born partner (4.2 percentage points) and foreign-born individuals who lived with a Swedish-born partner (2.5-3.2 percentage points).

One would also expect that cohabitation and marital status would reduce the likelihood of receiving social assistance. This was confirmed by the results, which indicated that individuals who lived with a partner after being single in 1990 or longer have a lower propensity for receiving social assistance. The effects are much smaller for Swedish-born (2.4 percentage points) than for foreign-born individuals (18.2 percentage points) who previously lived alone.

Our results for all samples confirm the expectation that unemployment is one reason why some people end up living on welfare. Being unemployed increases the likelihood of receiving social assistance by 3.2-3.4 percentage points for Swedish-born individuals living alone, by 8 percentage points for Swedish-born individuals who become single, by 5 percentage points for foreign-born individuals living alone, and by approximately 2 percentage points for foreign-born individuals as part of a stable couple and those who become single. This increase in the likelihood of receiving social assistance is most likely due to most people receive relatively low unemployment benefits and who are therefore entitled to social assistance. Interestingly, regardless the type of household, being unemployed in the previous year reduces the likelihood of getting social assistance; by 1.7 percentage points for both foreign-born individuals

living alone either a short time or a relatively longer time and by 0.5-0.8 percentage points for the other samples. This finding may be because unemployed people obtain help to search for and find a job.

Another expectation is that larger households have a relatively more strained economic situation. The number of children below the age of 18 increases the likelihood of receiving social assistance by 1.7 percentage points for foreign-born singles during 1990-99 and by 1.1 percentage points for Swedish-born individuals who lived with a Swedish-born partner a relatively short time and for foreign-born singles during 1990 or longer. The effect of the number of children is less than 1 percentage point for the other samples.

A more interesting explanation of individual social assistance behavior is connected to the local (municipal) average social assistance participation rate. This variable stems from the effect of the influence of environmental or local networks on welfare participation. For all samples, we found a positive relationship between the share of social assistance recipients and the individual propensity to live on welfare: when the share of welfare recipients increases by 1 percentage point, the propensity increases by 9.9 percentage points for Swedish-born individuals who lived with a Swedish-born partner in 1990, by 4.4-5.3 percentage points for both groups of Swedish-born individuals who lived alone (for a short or a longer time), and by 7.3-8.2 percentage points for both groups of foreign-born individuals who lived alone. The effect was much smaller for both groups of foreign-born individuals who lived with a foreign-partner (1.1-1.5 percentage points) and all groups of mixed couples (1.6-2.9 percentage points). These results suggest a sorting/segregation across municipalities.

Another potential factor that is expected to influence the individual welfare behavior is the local (municipal) unemployment rate because in order to qualify for unemployment benefits in Sweden you must contribute to an A-Kassa fund for 12 months, a system which is voluntary and often linked to union membership. Our results are statistically significant for four samples, which represent households with a least a Swedish-born adult, and show a negative relationship between the share of unemployed individuals at the municipality level and the individual propensity to live on welfare: when the share of unemployed increases by 1 percentage point, the propensity decreases by 2.2 percentage points for the group of Swedish-born individuals who lived alone

during 1990-99 and by 1.8 percentage for foreign-born men who lived with a Swedish-born woman in 1990. The effect was a slightly weaker for Swedish-born individuals who lived alone in 1990 (1.2 percentage points) and foreign-born women who lived with a Swedish-born man in 1990 (1.4 percentage points).

When it is statistically significant, the effect from continuous age is negative, which implies that the likelihood of receiving social assistance decreases with age. This corresponds to persons that belong to households of Swedish-born and foreign-born individuals who live with a partner belonging to the same group for a relatively short time. For each additional age-year, the likelihood of receiving social assistance decreases by 0.2 percentage points.

It is also well established that the years of education (or higher education) is negatively associated with the propensity to live on welfare. Our statistically significant estimates indicate that an increase in the educational level reduces the risk of receiving social assistance for all samples. For Swedish-born individuals, regardless of the household type, the transition from primary schooling to a secondary schooling degree reduces the likelihood by 2-3 percentage points, and this figure more than doubles in the transition to a post-secondary degree or higher. The estimates are much smaller for all samples of foreign-born individuals and mixed couples, which suggests that it might be difficult for some foreign-born individuals with higher education to match their skills with the labor market's demand.

The samples of foreign born individuals and mixed couples contain additional observable factors that are directly related to the foreign-born group, namely country of origin, number of years in the country, and whether the individual originated from a refugee country.

The country of origin is expected to be important due to differences related to the culture, social norms, and language. Therefore, we control for several country-groups in the specification, and use the Nordic countries, which exhibited similar characteristics to the Swedish-born group, as the comparison group. With the exception of the parameter related to Eastern Europe, all other parameters are statistically significant for all samples of foreign-born individuals, but this is not the case for the mixed samples; none of the parameters are statistically significant for the sample of foreign-born women who lived with a Swedish-born man. Compared to the Nordic-born, we identified two

groups: one with a lower propensity for welfare (i.e., Western or Southern Europe) and one with a larger propensity (i.e., Middle East and the rest of the world). Compared to the those born in Nordic countries, both singles and couples of a Swedish-born and a partner born in Western Europe and Southern Europe have a lower propensity of receiving social assistance (1-1.9 percentage points). The highest effect was obtained for the Middle East, which showed that, compared to those born in Nordic countries; singles born in the Middle East have a higher propensity to receive social assistance (4.5 percentage points). Even Middle East-born living with a foreign-born individual had a higher propensity to receive social assistance: 2.5 percentage points for those who lived together in 1990 and 2.2 percentage points for those who were together during 1990-1999.

Additionally, compared to the Nordic-born group, men born in the Middle East or the rest of the world who lived with a Swedish born woman in 1990 have a higher propensity to receive social assistance (1.1-1.2 percentage points), whereas men born in Eastern Europe who lived with a Swedish-born woman during 1990-99 have a lower propensity (1 percentage points). From these results, it is very clear that there is a distinct difference in terms of welfare participation that depends on whether a person and his/her partner are born in Europe.

The second important immigrant-specific factor for social assistance participation is the number of years since immigration. The comparison group consists of those who had been in the country for less than five years at the beginning of the observation period. Regardless of the sample, our results suggest that persons that have lived in Sweden for a longer period of time are more unlikely to end up on social assistance. However, the magnitude varies across samples. The highest effect was found for foreign-born individuals who have been in Sweden for more than 22 years and were living with a foreign-born partner in 1990 (a 4.4 percentage point reduction in propensity), but an effect was also found for foreign-born singles (approximately 3.5 percentage points). The effect was much lower for foreign-born women living with a Swedish man in 1990 (i.e., 1.3 percentage points).

The estimated parameter for individuals who arrived in Sweden as refugees is statistically significant only for the samples of foreign born individuals living alone, and

the effect is relatively modest, corresponding to a propensity increase by 1 percentage point.

5 Summary

We estimated the size and the statistical significance of the structural state dependence in welfare participation in terms of social assistance in Sweden for different types of households, which were defined by taking into consideration the country of birth for sampled persons and their partner. The effects were estimated using a dynamic discrete choice model that controls the initial conditions and unobserved heterogeneity. The analysis focused on the estimated size of the structural state dependence within the framework of a first-order Markov process as an aggregated measure. We found that the effect is larger for singles compared with stable homogenous and mixed couples. The group with the lowest receipt and dependency are the foreign-born women living with a Swedish-born man. Our results show the importance of not only analyzing mixed couples but also differentiating couples from singles, which introduce additional perspectives for the policy makers.

Our results show that the structural state dependence in social assistance use exists, is important, and differs greatly across different types of households. Regardless of whether the individuals are Swedish-born, foreign-born, live alone, or live with a partner, the behavioral response to the experience of social assistance is statistically significant. Surprisingly, the group that was found to be least dependent on social assistance is that of foreign-born women who lived with a Swedish-born man in 1990. Even though the percentage of those who receive social assistance is low for the group of Swedish-born partners who separated (1-2%), we found that this group has the strongest state dependence (about 24.4 percentage points). This unexpected result suggests that policy makers need more information in order to design effective programs for all groups of individuals. However, the most alarming signal of our results is that we found the same high level of the state dependence for the two groups of foreign-born singles, which are the groups with the highest rate of social assistance receipt (17-18%). Even though this result suggests that special programs should be design to help foreign-born singles to work, the results for all other samples of foreign-born individuals, i.e., those that are part of a couple, suggest that some interventions and/or other factors successfully broke their dependency on social assistance.

Although we did not test it, we expect that interventions aimed at facilitating the transition to the labor market and social integration might have improved the economic outcomes of foreign-born individuals, e.g., the introduction programs offered to newly-arrived immigrants since the late 1960s, which focus on language training, education on Swedish society and the labor market, the building up of skills to search for a job and/or start-up their own business, and the active labor market programs that were used intensively during the 1990s.

Our results also imply that the observed persistence is a result of innate individual differences that originate from permanent unobserved heterogeneities across individuals. This indicates that some individuals have a larger propensity to live on welfare than others (e.g., foreign-born individuals living alone), whereas others have a lower propensity (e.g., stable couples of foreign-born women living with a Swedish-born man and Swedish-born individuals living with a Swedish-born partner). If this is the case, part of the current participation has no structural effect on the future propensity to participate. Therefore, we expect that the effects for other groups will be even stronger than those reported here if Sweden did not have both active labor market programs and anti-discrimination policies in the 1990s, which likely helped social assistance receivers obtain jobs and leave welfare.

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Appendix

Table 1 Participation equation estimates by type of household, Swedish born

	Living together with a Swedish-born partner				Living alone			
	1990 changed marital status 1991-99		1990-1999		1990 changed marital status 1991-99		1990-1999	
	PE	ME	PE	ME	PE	ME	PE	ME
Age/100	-4.414 ***	-0.710	-2.746		0.365	0.025	0.873	0.070
Age-squared/10000	2.373	0.382	1.254		-0.545	-0.037	-1.666	-0.134
Educational level								
Secondary	-0.191 ***	-0.031	-0.256 ***		-0.282 ***	-0.019	-0.276 ***	-0.022
Post-secondary, or more	-0.579 ***	-0.093	-0.544 ***		-0.739 ***	-0.051	-0.680 ***	-0.055
Woman					-0.097 ***	-0.007	-0.090 ***	-0.007
Women with children					0.188 ***	0.013	0.303 ***	0.024
Children at home	0.067 ***	0.011	0.137 ***		0.073 ***	0.005	0.053 **	0.004
City region	-0.088 **	-0.014	-0.079		-0.029	-0.002	-0.014	-0.001
Municipality characteristics (%)								
Social assistance recipient	0.617 ***	0.099	0.569 ***		0.639 ***	0.044	0.660 ***	0.053
Unemployed	-0.043	-0.007	0.199		-0.179 ***	-0.012	-0.268 ***	-0.022
Unemployed $_t$	0.500 ***	0.080	0.498 ***		0.471 ***	0.032	0.477 ***	0.038
Unemployed $_{t-1}$	-0.037	-0.006	-0.009		-0.068 ***	-0.005	-0.084 ***	-0.007
Changed marital status	0.622 ***	0.100			-0.355 ***	-0.024		
Structural state dependence	1.513 ***	0.244	1.506 ***		1.508 ***	0.103	1.525 ***	0.123
Time-dummies	Yes		Yes		Yes		Yes	
Log-likelihood	-0.425		-0.208		-1.202		-1.375	
Number observations	147570		122210		127360		82370	

Table 2 Participation equation estimates by type of household, Foreign-born

	Living together with a Foreign-born partner				Living alone			
	1990 changed marital status 1991-99		1990-1999		1990 changed marital status 1991-99		1990-1999	
	PE	ME	PE	ME	PE	ME	PE	ME
Age/100	-2.149 **	-0.177	-1.021	-0.048	0.879	0.136	-0.511	-0.074
Age-squared/10000	2.551 *	0.210	2.885	0.136	-1.128	-0.174	0.186	0.027
Educational level (CG: Low)								
Secondary	-0.147 ***	-0.012	-0.082 ***	-0.004	-0.155 ***	-0.024	-0.140 ***	-0.020
Post-secondary, or more	-0.301 ***	-0.025	-0.278 ***	-0.013	-0.389 ***	-0.060	-0.398 ***	-0.058
Woman					-0.172 ***	-0.027	-0.135 ***	-0.020
Women with children					0.094 ***	0.015	0.227 ***	0.033
Children at home	0.084 ***	0.007	0.130 ***	0.006	0.102 ***	0.016	0.070 ***	0.010
City region	0.042 *	0.003	0.021	0.001	-0.038 **	-0.006	-0.017	-0.003
Municipality characteristics (%)								
Social assistance recipient	0.181 ***	0.015	0.232 **	0.011	0.532 ***	0.082	0.501 ***	0.073
Unemployed	0.013	0.001	-0.071	-0.003	-0.044	-0.007	-0.081	-0.012
Unemployed $_t$	0.311 ***	0.026	0.355 ***	0.017	0.357 ***	0.055	0.367 ***	0.053
Unemployed $_{t-1}$	-0.078 ***	-0.006	-0.107 ***	-0.005	-0.111 ***	-0.017	-0.114 ***	-0.017
Country of origin (CG: Nordic)								
Western Europe	-0.213 ***	-0.018	-0.220 **	-0.010	-0.105 ***	-0.016	-0.086 **	-0.013
Eastern Europe	0.088 *	0.007	0.094	0.004	0.021	0.003	0.010	0.002
Southern Europe	-0.096 *	-0.008	0.076	0.004	-0.078 **	-0.012	-0.132 ***	-0.019
Middle East	0.309 ***	0.025	0.474 ***	0.022	0.294 ***	0.045	0.197 ***	0.029
Rest of the world	0.237 ***	0.020	0.311 ***	0.015	0.165 ***	0.025	0.085 **	0.012
Years in Sweden in 1985 (CG: 0-4 years)								
5 – 9	-0.145 ***	-0.012	-0.156 ***	-0.007	-0.067 ***	-0.010	-0.099 ***	-0.014
10 – 14	-0.338 ***	-0.028	-0.354 ***	-0.017	-0.089 ***	-0.014	-0.091 ***	-0.013
15 – 22	-0.438 ***	-0.036	-0.417 ***	-0.020	-0.123 ***	-0.019	-0.136 ***	-0.020
>22	-0.540 ***	-0.044	-0.586 ***	-0.028	-0.234 ***	-0.036	-0.238 ***	-0.035
Refugee	-0.009	-0.001	-0.065	-0.003	0.060 **	0.009	0.090 ***	0.013
Changed marital status	0.511 ***	0.042			-0.182 ***	-0.028		
Structural state dependence	1.741 ***	0.143	2.194 ***	0.103	1.571 ***	0.243	1.582 ***	0.230
Time-dummies	Yes		Yes		Yes		Yes	
Log-likelihood	-1.471							
Number observations	94840		71720		126430		79040	

Table 3 Participation equation estimates by type of household, mixed couples

	Foreign-born woman living together with a Swedish-born man				Foreign-born man living together with a Swedish-born woman			
	1990 changed marital status 1991-99		1990-1999		1990 changed marital status 1991-99		1990-1999	
	PE	ME	PE	ME	PE	ME	PE	ME
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
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 in 1985 (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
Changed marital status	0.930 ***	0.032			0.456 ***	0.025		
Structural state dependence	1.370 ***	0.047			1.504 ***	0.083	1.719 ***	0.046
Time-dummies	Yes				Yes		Yes	
Log-likelihood	-1.471							
Number observations	37920		29770		33840		25240	

Table A1 Mean observable characteristics in 1990, by type of household

	Swedish-born (SB) living				Foreign-born (FB) living							
	with Swedish-born		alone		with Foreign-born		with Swedish-born				alone	
							FB-woman & SB-man		FB-man & SB-woman			
	1990	1990-99	1990	1990-99	1990	1990-99	1990	1990-99	1990	1990-99	1990	1990-99
Social assistance recipient (%)	1.08	0.56	6.12	7.31	10.05	7.98	0.98	0.47	4.64	2.42	18.47	17.16
Unemployed (%)	3.52	3.09	8.36	8.33	7.79	7.31	6.78	6.35	5.29	4.08	9.25	9.41
Age (in years)	38.80	39.14	31.14	32.39	37.01	37.52	37.73	38.25	38.75	39.52	33.29	34.56
Children at home	1.44	1.43	0.20	0.19	1.54	1.56	1.37	1.38	1.38	1.39	0.38	0.30
Educational level (%)												
Primary	28.44	28.32	26.97	29.99	65.66	64.28	43.09	41.49	43.20	40.49	57.91	54.42
Secondary	44.74	44.08	54.46	53.60	24.93	25.98	35.65	36.41	36.23	37.12	31.59	34.46
Post-secondary, or more	26.82	27.60	18.57	16.41	9.42	9.75	21.26	22.1	20.57	22.39	10.50	11.12
City region (%)	20.31	20.15	30.21	29.83	36.35	35.35	25.98	25.33	29.31	29.24	38.20	39.22
Municipality characteristics												
Social assistance recipient (%)	3.84	3.83	4.11	4.12	4.53	4.5	4.04	4.02	4.16	4.13	4.51	4.53
Unemployed (%)	1.30	1.30	1.33	1.34	1.23	1.24	1.31	1.31	1.24	1.25	1.25	1.24
Years in the country in 1990 (%)												
0 – 4					27.2	24.09	10.92	9.37	10.67	7.41	30.94	22.89
5 – 9					16	15.2	11.05	10.98	8.54	8.28	12.57	12.46
10 – 14					18.25	18.61	14.11	14.04	12.44	12.08	14.02	15.25
15 – 22					23.79	25.98	24.97	25.13	23.64	24.05	22.87	26.66
>22					14.76	16.12	38.95	40.48	44.71	48.18	19.60	22.75
Country of origin (%)												
Nordic countries					33	34.58	56.99	57.58	44.77	45.76	43.25	49.63
Western Europe					3.99	3.97	13.92	14.51	22.07	23.1	9.29	9.88
Eastern Europe					12.63	12.08	13.13	12.7	6.71	7.25	9.00	8.89
Southern Europe					12.9	13.71	4.67	4.57	12.86	12.8	8.33	8.41
Middle East					22.1	21.65	0.82	0.77	5.94	5.03	13.64	8.27
Rest of the world					15.38	14.01	10.47	9.88	7.65	6.06	16.50	14.90
Refugee					52.65	51.19	17.48	16.96	21.40	20.4	35.62	30.01
Sample size	14757	12221	12736	8237	9484	7172	3792	2977	3384	2524	12643	7904

Table A2 Mean observable characteristics in 1990-1990, by type of household

	Swedish-born (SB) living				Foreign-born (FB) living							
	with Swedish-born		alone		with Foreign-born		with Swedish-born				alone	
							FB-woman & SB-man		FB-man & SB-woman			
	1990	1990-99	1990	1990-99	1990	1990-99	1990	1990-99	1990	1990-99	1990	1990-99
Social assistance recipient (%)	1.4	0.59	5.44	6.64	8.03	4.96	2.48	0.46	4.30	1.76	15.28	14.75
Unemployed (%)	9.67	8.72	18.4	19.43	20.87	19.04	15.67	14.07	13.51	10.96	23.64	22.73
Age (in years)	43.3	43.64	35.64	36.89	41.51	42.02	42.23	42.75	43.25	44.02	37.79	39.06
Children at home	1.27	1.28	0.47	0.23	1.4	1.47	1.25	1.26	1.23	1.36	0.56	0.28
Educational level (%)												
Primary	23.79	23.80	21.71	24.61	42.47	42.24	26.35	24.91	28.73	26.57	37.67	37.52
Secondary	47.51	46.74	56.48	56.31	39.62	39.66	45.36	45.72	44.65	44.89	44.6	45.94
Post-secondary, or more	28.71	29.47	21.81	19.08	17.9	18.1	28.29	29.37	26.62	28.55	17.73	16.54
City region (%)	19.46	19.17	29.65	30.68	37.27	35.92	25.3	24.31	28.87	28.03	40.31	41.23
Municipality characteristics												
Social assistance recipient (%)	4.68	4.67	5.06	5.11	5.72	5.67	4.96	4.91	5.14	5.09	5.69	5.73
Unemployed (%)	5.69	5.69	5.8	5.85	5.8	5.79	5.7	5.69	5.7	5.69	5.81	5.81
Years in the country in 1990 (%)												
0 – 4					8.76	7.56	3.64	3.01	3.78	2.39	12.17	8.64
5 – 9					18.34	16.56	8.64	7.77	7.83	6.18	19.40	15.33
10 – 14					18.79	18.01	11.86	11.57	9.86	9.08	14.96	14.56
15 – 22					25.2	26.20	22.14	22.48	20.03	20.04	20.84	23.17
>22					28.9	31.67	53.71	55.18	58.51	62.31	32.63	38.3
Country of origin (%)												
Nordic countries					32.99	34.57	56.98	57.57	44.75	45.76	43.23	50.4
Western Europe					3.98	3.97	13.93	14.53	22.05	23.09	9.29	9.09
Eastern Europe					12.63	12.07	13.15	12.72	6.69	7.25	9	8.89
Southern Europe					12.89	13.70	4.67	4.57	12.85	12.8	8.33	8.41
Middle East					22.11	21.68	0.82	0.77	5.92	5.03	13.62	8.27
Rest of the world					15.39	14.01	10.45	9.84	7.73	6.08	16.53	14.95
Refugee					50.01	48.51	16.95	16.42	20.64	19.53	33.71	29.01
Sample size	147570	122210	127360	82370	94840	71720	37920	29770	33840	25240	126430	79040

Table A3 Social assistance recipients (%), 1985 – 1999, by type of household, by type of household

	Swedish-born (SB) living				Foreign-born (FB) living							
	with Swedish-born		alone		with Foreign-born		with Swedish-born				alone	
							FB-women & SB-men		FB-men & SB-women			
	1990	1990-99	1990	1990-99	1990	1990-99	1990	1990-99	1990	1990-99	1990	1990-99
1985	2.02	1.51	6.52	7.14	7.23	6.12	2.72	2.15	5.50	4.16	11.49	12.87
1986	2.20	1.59	6.90	7.51	8.74	7.50	2.29	1.78	6.00	4.71	12.79	14.20
1987	1.78	1.28	6.51	6.94	9.32	8.20	2.19	1.38	5.14	3.76	13.76	14.74
1988	1.29	0.94	6.49	6.92	10.29	8.81	1.45	0.97	4.46	3.01	14.71	15.60
1989	0.86	0.53	6.24	6.86	11.10	9.33	1.13	0.57	4.17	2.58	16.39	16.46
1990	1.08	0.56	6.12	7.31	10.05	7.98	0.98	0.47	4.64	2.42	18.47	17.16
1991	1.25	0.54	5.89	7.10	8.89	6.32	1.87	0.44	3.96	1.70	17.20	16.33
1992	1.52	0.65	5.98	7.36	8.08	4.91	2.29	0.57	4.82	2.38	16.51	16.33
1993	1.76	0.78	6.42	8.05	8.54	5.12	2.87	0.50	5.47	2.54	16.78	16.85
1994	1.57	0.64	6.04	7.34	8.38	4.85	2.77	0.57	4.96	2.30	15.95	15.49
1995	1.59	0.65	5.46	6.59	8.05	4.68	3.06	0.54	4.76	1.55	14.63	14.16
1996	1.48	0.61	5.31	6.47	8.06	4.56	3.06	0.44	4.23	1.51	14.58	14.13
1997	1.40	0.54	4.87	6.02	7.79	4.34	2.87	0.34	3.90	1.39	14.25	13.84
1998	1.27	0.47	4.36	5.35	6.64	3.74	2.53	0.27	3.22	0.91	12.72	12.27
1999	1.10	0.43	3.93	4.77	5.80	3.14	2.51	0.47	3.01	0.91	11.69	10.98

Table B1 Estimates for initial-conditions equation by type of household, Swedish born

	Living together with a Swedish-born partner						Living alone					
	1990 changed marital status 1991-99			1990-1999			1990 changed marital status 1991-99			1990-1999		
	PE	SE		PE	SE		PE	SE		PE	SE	
Constant	0.366	(0.891)		-2.145	(1.620)		-0.956	(0.382)	**	-1.535	(0.456)	***
Age/10	-13.146	(5.215)	**	-1.904	(9.508)		-6.699	(2.373)	***	-1.795	(2.826)	
Age-squared/100	13.776	(7.480)	*	-0.577	(13.476)		9.105	(3.566)	**	1.281	(4.207)	
Educational level												
Secondary	-0.351	(0.091)	***	-0.271	(0.138)	**	-0.262	(0.048)	***	-0.246	(0.057)	***
Post-secondary, or more	-0.599	(0.161)	***	-0.407	(0.201)	**	-0.661	(0.099)	***	-0.686	(0.117)	***
Woman							-0.143	(0.061)	**	-0.176	(0.072)	**
Women with children							0.276	(0.100)	***	0.328	(0.123)	***
Children at home	0.044	(0.038)		0.050	(0.053)		0.165	(0.050)	***	0.212	(0.060)	***
City region	-0.160	(0.121)		-0.222	(0.180)		0.073	(0.067)		0.117	(0.079)	
Municipality characteristics (%)												
Social assistance recipient	0.679	(0.480)		1.041	(0.784)		0.498	(0.239)	**	0.369	(0.280)	
Unemployed	-1.055	(0.666)		-0.657	(1.073)		-0.094	(0.386)		-0.330	(0.443)	
Unemployed $_t$	0.172	(0.145)		0.040	(0.262)		0.459	(0.059)	***	0.474	(0.072)	***
Unemployed $_{t-1}$	-0.103	(0.140)		-0.291	(0.268)		-0.028	(0.062)		0.013	(0.069)	
Social assistance recipient												
1985	0.520	(0.139)	***	0.426	(0.261)	*	0.311	(0.068)	***	0.316	(0.080)	***
1986	0.405	(0.138)	***	0.397	(0.233)		0.258	(0.070)	***	0.205	(0.083)	**
1987	0.118	(0.137)		-0.016	(0.239)		0.255	(0.067)	***	0.316	(0.080)	***
1988	0.501	(0.148)	***	0.303	(0.277)		0.392	(0.062)	***	0.463	(0.074)	***
1989	1.544	(0.137)	***	1.508	(0.219)	***	1.127	(0.059)	***	1.074	(0.072)	***

Table B2 Estimates for initial-conditions equation by type of household, Foreign-born

	Living together with a Foreign-born partner						Living alone					
	1990 changed marital status 1991-99			1990-1999			1990 changed marital status 1991-99			1990-1999		
	PE	SE		PE	SE		PE	SE		PE	SE	
	-1.638	(0.539)	***	-1.896	(0.742)	**	-0.852	(0.286)	***	-0.630	(0.371)	*
Age/100	-0.071	(3.035)		-0.546	(4.144)		-1.574	(1.713)		-2.297	(2.230)	
Age-squared/10000	-1.101	(4.328)		0.435	(5.926)		1.032	(2.561)		0.883	(3.315)	
Educational level (CG: Low)												
Secondary	-0.073	(0.071)		0.074	(0.095)		-0.238	(0.044)	***	-0.194	(0.053)	***
Post-secondary, or more	-0.460	(0.138)	***	-0.679	(0.245)	***	-0.453	(0.091)	***	-0.450	(0.115)	***
Woman							-0.208	(0.044)	***	-0.054	(0.056)	
Women with children							0.059	(0.064)		0.170	(0.095)	*
Children at home	0.083	(0.019)	***	0.106	(0.026)	***	0.213	(0.022)	***	0.202	(0.040)	***
City region	-0.091	(0.059)		-0.078	(0.081)		-0.169	(0.040)	***	-0.154	(0.052)	***
Municipality characteristics (%)												
Social assistance recipient	0.120	(0.231)		-0.291	(0.326)		0.262	(0.143)	*	0.262	(0.183)	
Unemployed	1.589	(0.426)	***	1.844	(0.544)	***	0.876	(0.249)	***	0.637	(0.319)	**
Unemployed $_{t}$	0.113	(0.077)		0.195	(0.107)	*	0.275	(0.044)	***	0.339	(0.056)	***
Unemployed $_{t-1}$	0.035	(0.056)		-0.182	(0.089)	**	-0.047	(0.037)		-0.036	(0.050)	
Country of origin (CG: Nordic)												
Western Europe	0.045	(0.178)		0.207	(0.258)		-0.210	(0.074)	***	-0.179	(0.089)	**
Eastern Europe	0.100	(0.133)		0.577	(0.180)	***	0.080	(0.085)		0.012	(0.112)	
Southern Europe	-0.193	(0.140)		0.138	(0.190)		-0.111	(0.083)		-0.186	(0.105)	*
Middle East	0.100	(0.127)		0.571	(0.171)	***	0.362	(0.076)	***	0.380	(0.103)	***
Rest of the world	0.111	(0.099)		0.437	(0.139)	***	0.294	(0.055)	***	0.317	(0.072)	***
Years in Sweden in 1985 (CG: 0-4 years)												
5 – 9	-0.749	(0.083)	***	-0.833	(0.113)	***	-0.622	(0.056)	***	-0.735	(0.074)	***
10 – 14	-0.812	(0.086)	***	-0.776	(0.113)	***	-0.526	(0.058)	***	-0.576	(0.072)	***
15 – 22	-0.868	(0.102)	***	-0.955	(0.153)	***	-0.541	(0.058)	***	-0.565	(0.070)	***
>22	-0.886	(0.134)	***	-1.062	(0.201)	***	-0.511	(0.067)	***	-0.487	(0.082)	***
Refugee	0.122	(0.097)		-0.039	(0.128)		0.134	(0.059)	**	0.154	(0.080)	*
Social assistance recipient												
1985	0.652	(0.087)	***	0.734	(0.126)	***	0.339	(0.052)	***	0.334	(0.063)	***
1986	-0.007	(0.087)		-0.142	(0.124)		0.043	(0.053)		0.061	(0.065)	
1987	0.108	(0.081)		-0.018	(0.109)		0.021	(0.049)		0.080	(0.064)	
1988	0.000	(0.073)		0.011	(0.096)		0.137	(0.044)	***	0.195	(0.058)	***
1989	1.551	(0.061)	***	1.712	(0.082)	***	1.083	(0.038)	***	1.045	(0.050)	***

Table B3 Estimates for initial-conditions equation by type of household, mixed couples

	Foreign-born woman living together with a Swedish-born man				Foreign-born man living together with a Swedish-born woman			
	1990 changed marital status 1991-99		1990-1999		1990 changed marital status 1991-99		1990-1999	
	PE	SE	PE	SE	PE	SE	PE	SE
	-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) ***


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