Social Assistance in Sweden[1]

1990 – 1995

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Abstract

Despite being a very hot subject in the public debate, the causes behind the increase in social assistance (SA) in the 1990s are relatively unknown. In this paper, I try to investigate if the increase is in part a result of an increase in the propensity to receive SA. Despite what is usually argued in the public debate, I find no evidence of a general increase in the mentioned propensity in Sweden during the period 1990 to 1995. But although there is no evidence of an increased propensity to receive SA, some behavioural changes seem to have occurred. First, I find evidence that the recipients may be subjected to tougher judgement criteria in 1995 than in the 1990, something that could mask a possible increase in the studied propensity in the empirical analysis. Second, the propensity to become a SA recipient has increased among people with university education. Thirdly the propensity to receive SA among young people seems to be lower in 1995 than in 1990 but this may be due to a tougher attitude shown by the authorities that is particularly affecting this group.

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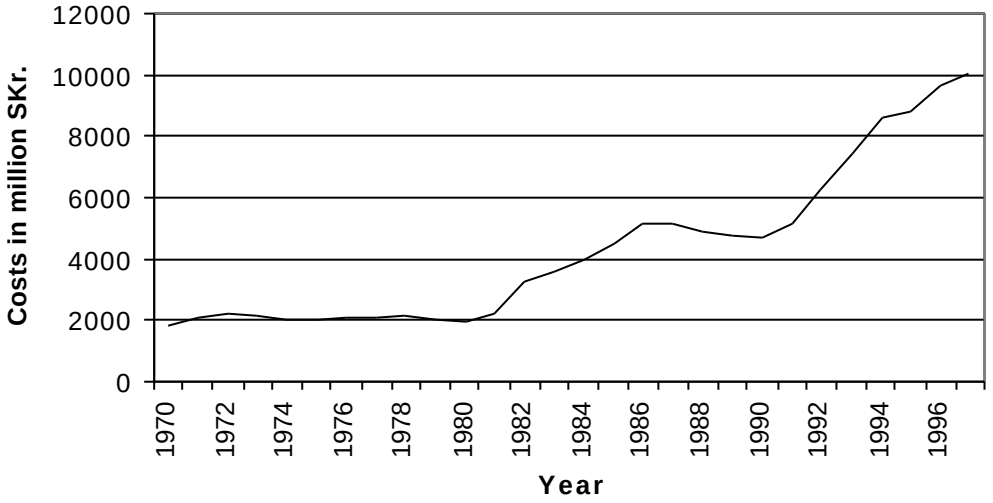
1 Introduction

The social assistance (SA, "welfare" in U.S. terminology) system in Sweden is generating an ongoing debate about its effects on people's behaviour. There is a widespread set of myths surrounding SA and its recipients. Assistance recipients are often portrayed as cheaters and persons lacking the will of being self-supporting. One of the most discussed issues is the question why the SA costs and number of assistance recipients have increased so dramatically in the past few years.

Figure 1: Social assistance costs in Sweden 1970 – 1997 (Fixed prices, base year 1990). Source:



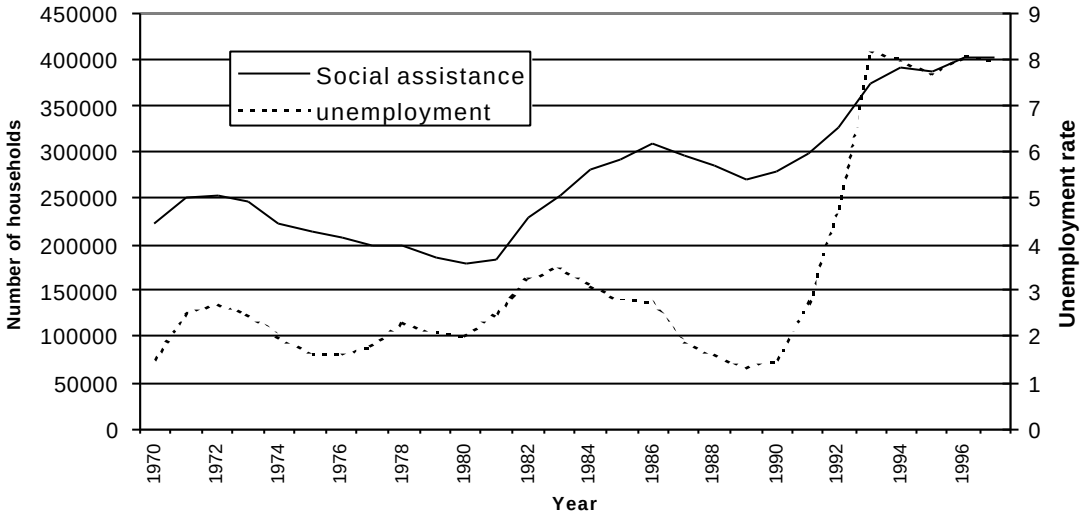
Socialstyrelsen (1999).

Figure 1 and Figure 2 illustrate the SA costs and the number of recipients for the period between 1970 and 1997 and show the dramatic increase in the 1990s. The costs increased from 4 722 million SKr (799 million US$) 1990 to about 10 037 million SKr (1 697 million US$) in 1997 which is more than a 100 % increase[3]. Likewise, the number of households that received SA once during a year went from 277 000 in 1990 to nearly 402 900 in 1997, or from 7.9 to 10.7 (10.3 % in 1995) percent of the households in Sweden (Socialstyrelsen 1999). It is also well known that the Swedish

[3] 1990 US$ to SKr exchange rates used.

labour market experienced a dramatic change in the 1990s (see Figure 2). While the unemployment rate was 1.6 in 1990, it jumped to 8.2 percent in 1993 and has remained high since (8.0 percent in 1997).

Figure 2: Number of households that received social assistance and the unemployment rate during



the period 1970 to 1997. Source: Socialstyrelsen (1999) and SCB (AKU).

There are two obvious reasons that could have caused the increase in SA costs and the number of recipient households. There may be changes in the number of households that is entitled to receiving SA or there may be an increase in the proportion of the entitled households that chooses to receive or apply for it. Given the dramatic increase in unemployment, the increase in the number of SA recipients is not very surprising since the number of eligible households has increased. Indeed, the inability of other replacement systems to cover earnings shocks like those arising from unemployment have been pointed out to be the main reasons for the increase in the number of SA recipients by some authors (see for example Salonen (1997)). But there is also another factor that could cause an increase in the number of eligible households, namely that people choose to make themselves eligible for SA (e.g. by not working).

Despite the lack of empirical evidence, especially in the public debate, it is often claimed that one of the reasons behind the increase in the number of SA recipients is a change in people's behaviour. It is suggested that, especially among young people, the shame associated with receiving SA has decreased dramatically in recent years. This argument usually comes from the assumption that an increase in the number of recipients weakens the social norm to live off one's own work and makes SA less shameful. Another possibility is that people who receive SA may over time come to value their leisure time more (see for example Lindbeck & Nyberg, 1999). If so, this would lead to an increase in the *propensity* (or tendency) to become a SA recipient. When we speak about an increase in the propensity to become a SA recipient, it should be observed that there are two dimensions involved. First, there could be a larger fraction of eligible households that chooses to apply for and receive SA. Second, a larger number of households could make themselves eligible for SA. It is the sum of these two factors that is meant when I refer to an increase in the mentioned propensity.

The purpose of this paper is to investigate whether the increase in the number of recipients in the 1990s is, in part, caused by an increased propensity to become a SA recipient or if it can be explained by other economic factors alone. The answer to this question has important policy implications for the design of the social insurance system. I restrict my attention to the 1990s, more specifically to the period 1990 to 1995. Moreover, I focus on the group consisting of single households with or without children. This is mainly due to the fact that 77 % of the Swedish households that receive SA are households with a single adult person (see Table A 1)[4].

In order to examine these issues, I develop a static model where the decision to apply for SA is modelled as the utility maximising behaviour. The fact that a substantial number of households, who are entitled to SA, choose not to receive it indicates that there are non-measurable costs associated with being a SA recipient. These "stigma" costs may be explained by a social norm that one should live off one's own work. See for example Moffit (1983) who finds econometric support for the existence of such stigma costs. The higher these costs are for a given household, the lower is its propensity to receive SA. I introduce stigma costs in my model in terms of disutility that is incurred

by receiving SA so that both economic incentives and social norms influence individual behaviour. I then try to empirically settle if there has been a change in the stigma costs incurred by the average household (or average individual since I focus on single households). If this is the case, it will be interpreted as a change in the propensity to receive SA. However, given the data, it is impossible to distinguish whether a change in the propensity to apply for- or a change in the application of SA rules (or both) causes the result. For example if there is an increase in the propensity to apply for SA at the same time as the authorities have become more restrictive in granting SA (which would result in more individuals being turned down), I could estimate the net effect as being "neutral". This would then (wrongly) be interpreted as no change in the studied propensity. This problem should be remembered when reading the results of this paper.

Although the literature on SA is vast, not many papers have dealt with the particular question asked in this paper. The paper by Blank & Ruggles (1993) investigates the relationship between eligibility and participation in the AFDC[5] and food stamp programs in the U.S. Their main result is that a majority of eligibility spells are short and do not result in program participation. Hoynes (1996) finds that welfare participation among two-parent families is highly responsive to changes in the benefit structure under the AFDC-UP[6] program. Hoynes (1995) finds no evidence that size of welfare contributes to increasing propensities to form female-headed households[7]. Blank (1997) finds evidence of increased take-up rates in U.S. in the 1990s. She concludes that both take-up rates and increases in the number of eligible households contributed to the increase in AFDC program participation.

My main result is that there are no indications of a general increase in the propensity to become a SA recipient. Nevertheless, some behavioural change seems to have occurred since there are indications that applicants are met by a tougher attitude in 1995. As stated above, this could mask a possible increase in the studied propensity. Second, the stigma costs seem to have decreased significantly

[4] Another reason for doing this is that it simplifies the empirical analysis. By limiting our analysis to single adult households we do not have to extend the model to the two-earner case and take account of spouses joint labour supply decisions.
[5] Aid to Families with Dependent Children.
[6] Aid to Families with Dependent Children – Unemployed Parent.
[7] The AFDC program provides benefits primarily to single parents with children and is generally not available to two-parent families. Thus, the question asked in the paper is if the availability of AFDC encourages the formation of female headed households.

among people with higher education (implying increased propensity to become a SA recipient). Also, contrary to what is usually argued, young people seem to have developed higher stigma costs although this may be the result of a tougher attitude being directed especially towards this group.

The rest of this paper is organised as follows. Section 2 presents the Swedish rules for SA and section 3 deals with data description. The theoretical and empirical strategy is outlined in sections 4 and 5, respectively. Section 6 presents the estimation results. Section 7 concludes the results.

2 Swedish rules for Social assistance

The SA system is intended as a safety net for people that cannot maintain themselves for various reasons. It is operated by the individual municipalities. SA is given on a household basis and is a means-tested system. According to Swedish law, the municipalities are responsible for securing ”a reasonable standard of living” for the individuals. The basic rule is that individuals who get into financial troubles and cannot maintain themselves in any other way are entitled to receive SA. The term ”a reasonable standard of living” is not defined and the municipalities have been given the freedom to decide how this should be interpreted in the individual municipality. The National Board of Health and Welfare establishes a guideline for the amount of SA that should be given but the final decision is made locally in the municipality of residence. The guideline amount for 1990 (1995) is about 39 000 (41 000) SKr[8] per year, but studies show that there are substantial variation across municipalities. This amount is supposed to cover expenses for food and other household expenses such as laundry, hygiene, telephone, insurance, clothes and newspapers. SA recipients are generally also entitled to get their housing expenses paid (not included in the amounts presented above)[9]. This amount varies greatly by geographic location and individual needs[10].

The amount that a given household is entitled to is reduced on a one to one basis for any increase in income (inclusive all other forms of transfers) that the household receives. Studies show that the municipalities generally follow the one to one reduction rule (SOU 1992:98) and this is what I will assume in my empirical study. Furthermore, a low-income but wealthy household is generally not entitled to SA[11]. These issues will be considered in connection with the theoretical and empirical model below.

[8] About 6600 (6930) US$ (1990 exchange rates).
[9] Housing expenses is supposed to cover a reasonable amount of living in the area of residence. Individual needs are also taken into consideration when this amount is calculated.
[10] This is neglected in my estimations. This also has the advantage that we do not need to worry about regional price variations.
[11] With the term wealthy household, I refer to a household that has savings or other assets. Also, a household could be forced to sell its other possessions (for example a car) before it gets entitled to social assistance.

3 Data

The data I use is contained in a register-based longitudinal data set called LINDA, which is described in Edin & Fredriksson (1997). It contains a random sample of about 290 000[12] individuals and is constructed so that the sample is representative for the Swedish population every year. This paper uses data from two years, 1990 and 1995, on single households between 18 and 65 years of age. Full time students are excluded because according to Swedish rules students are not entitled to SA except in extraordinary cases. The final sample consists of just under 70 000 individuals in 1990 and about 75 000 in 1995.

LINDA is based on the income tax register and contains yearly information on the source and amount of labour- and other incomes, transfer payments, household composition and individual characteristics for household members (such as educational level, nationality, sector of work etc.). One shortcoming is that I do not observe work hours and wage rates separately. The data contains information on the number of months and the yearly amount of SA received. Thus, there is no way of distinguishing between repeated spells and continuous receiving. I define a SA recipient as a person that has received SA *at least once* during the year.

Further, I observe the household's taxable amount of wealth, the amount of cash in bank deposits and the value of securities (shares excluded). As an approximation of household wealth I use the sum of the value of bank deposits and securities at the end of the previous year (i.e. 1989 and 1994)[13].

[12] 3 percent of the Swedish population.

[13] The variable households taxable wealth contains all household assets and is only observed if the total wealth is larger than 800 000 SKR. None of the households in our sample for which we observe this variable (576 households in 1990 and 992 households in 1995) has received social assistance so neglecting it would not change our results. Moreover it is not a good measure of wealth in our study since it is the liquidity of the asset that is most important for the eligibility for social assistance. For example if the taxable wealth was high because the household lived in an owner occupied house it could be entitled to receiving social assistance for some period without having to sell the house. The households bank deposits and value of securities are a much better measure of the type of wealth that would make a household being turned down when applying for social assistance. The problem with these variables is that we are only able to observe them at the end of the year (31/12). I feel that the amount at the beginning of the year is a better measure of the wealth that determines whether or not a household is entitled to receiving social assistance.

The empirical model that is developed in this paper requires data on the monthly guideline principles in the municipalities for 1990 and 1995. Statistics Sweden has done surveys to establish the monthly guideline principle in the municipalities. These are made on the first of February in 1991 and 1994 and also on the first of June 1996. A Swedish magazine named Kommunaktuellt has done a similar survey in 1995 (Lundborg 1995), which concludes that the guideline principles in 1995 are very similar to those in 1994. Also, because there is no information available from 1990, I choose to use the 1991 values as approximations. Since the 1991 values were collected at the beginning of the year I think that they should approximate the 1990 values quite well.

Table 1: Mean characteristics for social assistance recipients and non-recipients.

	Non recipients			**Recipients**		
	1990	**1995**	**Change**	**1990**	**1995**	**Change**
Wealth	38 209 (268 542)	32 253 (99 490)	-15.5 %	3 1801 (14 242)	1 466 (8 643)	-54 %
Earnings (Labour income)	124 984 (71 634)	107 261 (81 947)	-14 %	65 324 (51 151)	30 457 (40 542)	-53 %
Disposable income [1]	94 080 (44 823)	90 302 (80 143)	-4 %	82 475 (38 574)	71 120 (37 595)	-14 %
Disposable Income [2]	94 080 (44 823)	90 302 (80 143)	-4 %	66 189 (40 995)	50 779 (40 470)	-23 %
Social assistance	---	---		16 286 (21 327)	20 340 (21 041)	25 %
Age	32.03	33.30	3.9 %	31.59	31.06	-1.7 %
% Women	45.0	45.5	1.1 %	48.6	49.7	2.2 %
# children	0.12	0.16	33.3 %	0.41	0.37	-9.8 %
% Foreigners	5.14	4.64	-9.7 %	18.59	18.36	-1.23 %
# months with SA	---	---	---	4.27	5.20	22 %
% in every educ. cat.						
1-Missing or unspecified	5.5	1.2	-78 %	21.6	5.1	-76 %
2- <9 years	7.6	5.5	-28 %	7.4	6.5	-12 %
3- >9 year compulsory school	15.8	15.1	-4 %	26.7	25.5	-4.5 %
4-High school, £. 2 years	37.7	32.7	-13.3 %	35.1	33.9	-3 %
5-High school>2years	16.7	20.8	26 %	5.1	18.3	258 %
6-College, <3 years	9.6	16.1	68 %	2.5	7.5	200 %
7-College, ³ 3 years	6.8	8.2	21 %	1.6	3.0	87.5 %
8- PhD.	0.4	0.4	0 %	0.02	0.12	500 %
# of observations	63 310	66 219	4.6 %	5 073	7 744	53 %

Standard deviations are in parentheses. [1] Includes SA. [2] Excludes SA

Table 1 presents means of the data together with the percentage change between 1990 and 1995. All comparisons made between the two years use fixed prices where the 1995 amounts have been transformed into their 1990 equivalents by using the consumer price index. As we can see SA

recipients are more likely to be younger, men, foreign citizens and have more children than non-recipients. In 1995, 32 % of foreign singles received SA while the corresponding figure was 9 % for Swedes (not shown in the table). The percentage of female recipients has increased slightly. Also, not displayed in the table is that Swedish males and females have about the same increase (about 51 %) while for foreigners, the increase in the number of female recipients is much larger than for the males (65 % and 39 % respectively). The percentage of SA recipients belonging to the younger (under 25 years of age) and older (over 50 years of age) age categories has increased in 1995 (not in the table). Also, the percentage of recipients with higher education (≥ 3 years of high school or college degree) is larger in 1995. Since there are more individuals with higher education in 1995, the percentage of recipients in the different categories is presented in Table A 3.

The mean income and wealth have decreased for recipients as well as non-recipients although the decrease is larger for recipients. It is interesting to note that while the mean *labour* income has decreased by 53 % for SA recipients, their total disposable income (inclusive SA) has only decreased by 16 %. The mean wealth has decreased by 54 % for assistance recipients and by only 15.5 % for non-recipients. It is also more unusual to observe relatively wealthier households that receive SA in 1995 compared to 1990. In the group consisting of wealthier individuals (over say 50 000 SKr. in wealth), there is a lower number of recipients in 1995[14] (although there are 53 % more recipients in 1995 than in 1990). I will not speculate further on the causes of the lower take-up rates among the wealthier individuals in 1995, although one reason could be that the municipalities have become more reluctant to accord SA in later years. This is a point that I will return to later.

Table A 2 shows the percentage[15] of SA recipients according to different disposable income (including SA) categories. A large fraction of individuals in our data set have a yearly disposable income below the SA norm in the community in which they are situated but do still not receive SA. The reason may be that these individuals either have wealth that makes them ineligible or that they choose not to receive SA although they are entitled to it due to the disutility (stigma) arising from being a SA recipient. There is also a data related problem that could explain part of this pattern.

[14] About 19% (1990) and 14% (1995) of the households in the sample falls into this group. The fraction of social assistance recipients that falls into this category is about 1,3 % (1990) and 0,5 % (1995) respectively.
[15] I.e. the number of social assistance recipients in each income category divided by the total number of households falling into the same category.

While our data set and thus the household definition is based on the tax register, this does not always agree with the actual household composition. More specifically, some of the households that are defined as single in the tax register may consist of two persons living together[16]. Thus, they will be a part of our sample although they will not be regarded as single households by the administrator and thus be subjected to different rules. For example, a person with low income that is defined as single in the tax register may be denied SA if he/she is living together with someone who has a high income[17]. Thus, he/she will be observed as a low-income person not receiving SA. Also, if two persons in a low-income household are granted SA, only one of them will be registered as a recipient. Thus for such households, there is a 50 % chance that a recipient will be *observed* as a non-recipient in the data. Another noticeable feature in Table A 2 is that we observe SA recipients with disposable income levels way over the community norm, something that should be theoretically impossible since the Swedish SA system imposes a 100 % tax rate on assistance recipients. Our data being annual and some individuals receiving SA only partially during the year could be one explanation to this.

4 Theory and empirical specification[18]

The aim of this section is to develop a model that can be used to estimate if the propensity to be a SA recipient has changed during the 1990s. The model assumes that the probability that a given individual receives SA is a product of the probability that he/she applies for SA and the probability that he/she is granted SA given application.

4.1 The individuals application decision

An individual in this model is assumed to maximise its utility over two parameters: work hours and application for SA, i.e.:

[16] The definition is that non-married persons living together without any common children are classified as single household.
[17] As stated above, SA is given on a household basis.
[18] I want to thank Nils Gottfries for help with developing this model.

(1) $$\max_{\psi,h} U\left(\underset{+}{Y},\underset{-}{h}\right) - C(z)\psi$$
$$s.t. h \le \bar{h}$$

where $Y = wh + y_n + \psi b$ and $b = \max(0, g_k - wh - y_n)$

Y is the individual's total disposable income and is the sum of earnings (wh), non-labour income (y_n) and SA (b) if received. Any increase in income reduces the amount of SA available on a one to one basis and the maximum amount of SA that can be received is the monthly guarantee in the k:th municipality, g_k. $\psi \in \{0,1\}$ is an indicator variable that is one if the individual applies for SA and zero otherwise. h is hours of work that may be constrained to some level $\bar{h}$. Thus, the individual chooses h and ψ to maximise it's utility and from his/her point of view, the application decision is based on the assumption that SA will be granted. The individual also gets some disutility from receiving SA (stigma costs), which is expressed by the cost function C(z). Following Moffit (1983), disutility from SA is assumed to be separable from the utility function. z is a number of individual characteristics that influence the SA stigma. The individual's labour supply decisions becomes:

(2) $$\max_{h} U(wh + y_n, h) \quad \text{if } \psi = 0 \text{ and,}$$
$$s.t. h \le \bar{h}$$

(3) $$\max_{h} U(g_k, h) - C(z)$$
$$\Rightarrow h = 0 \quad \text{if } \psi = 1.$$

This model thus predicts that SA recipients do not work[19]. This is a direct result of the fact that the Swedish SA rules impose a 100 % tax rate on the income of SA recipients (and assuming that leisure is a normal good). From equation (2) and (3), we see that a given individual will choose to apply for SA iff:

(4) $$\max_{h} U(wh + y_n, h) - [\max_{h} U(g_k, 0) - C(z)] < 0$$
$$s.t. h \le \bar{h}$$

[19] Since our data is annual, we may (and in fact do) observe people that both receive SA and work even if this is the right model.

In this model, the individual has two choices; receiving g_k in SA and incurring C(z) in stigma costs (in which case it will not work) or to work and receive $wh+y_n$ in income and some disutility from work. The individual will choose the state that yields the highest utility. From equation (4), we see that the relevant income measures are the *potential income* (i.e. the total income that could be received if working) and the guaranteed level in the municipality of residence. Adding a stochastic term, equation (4) can be written as:

(5) $\text{Prob}(\psi=1) = \text{Prob}\,[\{U(wh^*+y_n, h^*, \bar{h}) - [U(g_k,0) - C(z) + e]\} < 0]$ or,

(6) $\text{Prob}(\psi=1) = P[wh^*+y_n, h^*, \bar{h}, g_k, C(z)]$

where h* is the optimal hours given that the individual works.

4.2 Granting probability

Given that a person has chosen to apply for SA, there is also a possibility that he/she will be turned down. I assume that the probability to be granted SA, given application is a function of a number of factors:

(7) $\Pi = \Pi\,[W, k, wh+y_n, g_k]$

where W is the individual's wealth and k is a factor determining the attitude against SA applicants that may depend on a variety of factors (such as characteristics of the applicant). The monthly guarantee (g_k) is included as a proxy for the generosity towards granting SA in the municipality. The assumption is that municipalities giving more generous SA are generally less restrictive towards applicants. Wealth is included in the granting equation rather than in the individual's application decision. The main reason for this is that it will hopefully be a good proxy for the attitude shown by the authorities in granting SA. I.e. I assume that wealth will be a proxy for the authorities' judgement of the individual's self-supporting capacity other than earnings. Including wealth in the granting

equation (rather than the decision equation) will only effect the way we interpret its estimated coefficient. A problem with wealth is the possible simultaneity between wealth and the SA decision, i.e. the individual's wealth may be influenced by his/her decision to apply for SA. I try to mitigate this problem by using initial wealth (recorded at the end of the preceding year) and dummy variables for wealth categories (instead of actual values) in our model. By using dummy variables, the endogeneity of wealth may be reduced since small changes in wealth do not affect our estimates (i.e. if the individual remains in the same wealth category).

From equation (6) and (7), the probability of being a SA recipient is given by:

$$(8) \qquad \text{Prob(receive SA)} = P[\underset{(-)}{wh^*} + \underset{(-)}{y_n}, \underset{(+)}{h^*}, \underset{(+)}{g_k}, \underset{(-)}{C(z)}, \bar{h}] \cdot \Pi [\underset{(-)}{wh} + \underset{(-)}{y_n}, \underset{(-)}{W}, \underset{(+)}{g_k}, \underset{(\pm)}{k}]$$

Equation (8) is the final equation to be estimated. The theoretically expected signs are given under each variable. Income is expected to reduce both the probability to apply for SA and the probability to be granted given application. The monthly guarantee in the community is expected to increase the application probability since once granted, more money will be received. It is also expected to increase the granting probability since it is included as a proxy for the generosity towards granting SA in the municipality. The net effect of this variable is thus assumed to increase the probability to receive SA. Wealth reduces the granting probability while increased stigma reduces the application probability.

When estimating the reduced form of equation (8), the interpretation of coefficient estimates partly depends on which equation (application and/or granting) they belong to. For many of the variables there are no strong theoretical grounds from where they should be excluded and some variables clearly belong to both equations. Thus in some cases, the interpretations made becomes more or less subjective.

4.3 Specifying the cost function and the hypothesis to be tested

The cost function C(z) represents the disutility associated with receiving SA. z is a vector of individual characteristics such as education, age and gender that may be expected to influence the stigma costs for SA. The main hypothesis to be tested empirically in this paper is whether the cost function differs between 1990 and 1995. To estimate if there is a general change in the probability to receive SA, data from 1990 and 1995 will be pooled. Then, equation (8) will be estimated with a dummy variable for 1995 included as an additional variable. If this dummy is significant, this will be interpreted as that the propensity to become a SA recipient has changed between the two years. Stated differently, this would indicate that *controlling for potential income, wealth and personal characteristics there is an unexplained difference between the probability to be a SA recipient between the two years*. However as stated above, given our data, it is not possible to distinguish whether a change in the propensity or a change in the application of SA rules (or both) causes the result. Thus, as can also be seen from equation (8) the coefficient estimate for the dummy variable gives the "net" effect between propensity to apply for- and being granted SA given application.

The other coefficient estimates will be time averages of how particular characteristics influence the probability to be a SA recipient and can thus give answers to a number of different questions. An example may clarify this. It is possible that people with higher education are more reluctant to receive SA than people with lower education. If so, we would expect the coefficient estimates to decrease with increases in education.

By estimating separate equations for 1990 and 1995, a number of additional interesting questions can be addressed. The coefficient estimates from separate estimations will allow us to analyse if the stigma costs has changed for people in a particular group between the two years. For example, a point usually made in public debate is that, especially young people, have become less reluctant to receive SA. If so, we would expect the coefficient estimate for this group to be significantly lower in 1995 compared to 1990. As before, only the "net" effect can be observed. For example, if the propensity to apply for SA increases for a particular group at the same time as this group is subjected to tougher judgement criteria, I may estimate the "net" effect to be zero[20].

[20] In equation (7), we assumed that the granting probability is affected by the attitude against applicants (the variable k), which may differ between different groups. If we believe that a certain individual characteristic influences the granting probability, it will enter the granting equation (through k) and will thus be in both the decision and the granting equation. Thus when estimating equation (8) we will only observe the net effect.

A problem with estimating equation (8) empirically is that I do not observe wages and work hours separately. Thus, I have to assume that earnings is a proxy for the utility of earnings net of the disutility for work[21]. Thus, I estimate equation (8) as reflected through earnings (and thus disposable income). Since I do not observe *potential* income directly (the income I observe is the income given the choice that has been made) I will have to estimate it empirically. Stated differently, since income is endogenous to the SA decision I cannot use the observed income in my estimations. This will be described in more detail below.

5 Estimation results

This section provides the estimation results. I choose to estimate my model with three different samples. First, I use the whole sample, which gives an answer to the question of whether or not there is a general change in the take-up rate in society. Second, I estimate separate models for Swedish and foreign citizens respectively to explore if there are any differences between these two groups. Note that due to the relatively small sample size for foreign citizens, many coefficients have low significance levels.

The estimation results are presented as odds ratios (relative risks) due to their easier interpretation. An estimated coefficient of 1.1 in front of a given variable should be understood as representing a 10% increase in the relative risk of being a SA recipient. Consequently, an estimated coefficient of 0.9 means a 10 % decrease while a coefficient of 1 indicates a ”neutral effect”. It should be observed that I do not take *unobservable* individual heterogeneity into account (i.e. no unobserved individual effects are included), i.e. I implicitly assume that everyone with the same covariate pattern has the same probability of being a SA recipient. It should also be clear that all results are ”pure” effects since I control for wealth and income. Thus if I for example estimate a lower odds ratio associated with a certain group of people this is *not* due to higher average income and wealth in this group. When I compare the estimates between the two years it is done with respect to the base

[21] I.e. we implicitly assume that utility has the form $(w-\lambda)h$ in earnings.

category in each year. For example when I compare the estimated odds ratios for different age categories between the two years, it is with respect to the base category for respective year that the comparison is made. Thus what I am able to tell is if the relative odds of receiving SA compared to the base category *in each year* differs between 1990 and 1995.

It seems reasonable to assume that the influence of income on the probability of being a SA recipient will differ between different income intervals since a given income increase probably would have a larger influence the lower the individual's income is. Thus, I use a spline function instead of a simple linear relation in this paper, which allows for a more flexible relationship. The income variable has been divided into four segments: 0-25 000, 25 000-50 000, 50 000-100 000 and >100 000[22]. The interpretation of the estimated coefficients is that they measure the slope in each income interval.

There are three wealth-category dummy variables included in the estimations. The base category is taken to be individuals with an observed wealth lower than 10 000 SKr. The three dummy variables wealth1-wealth3 indicate individuals with wealth in the category 10 000 - 25 000, 25 000 - 100 000 and > 100 000 SKr. respectively. It should be observed that the income and wealth variables do not have the same interpretation. While the income variables measure how *additional income in each income interval* changes the probability of being an assistance recipient, the wealth variables are dummies thus measuring how *belonging to a certain wealth category* changes the same probability compared to the base category.

Next, I give a brief explanation about the endogeneity problem and the income variables used in the study.

5.1 Potential income - Income equations

The endogeneity problem mentioned earlier is a result of the individuals choosing their hours of work and thus earnings simultaneously with their decision of whether or not to receive SA. In other words, people may take the possibility of receiving SA into consideration when they choose their hours of

[22] The spline is defined in such a way that the linear segments are joined at the knots.

work. The earnings observed (and thus the observed disposable income) in the data is thus the individual's earnings *given its choice*. What I would like to observe is the disposable income *he/she would have had* if the other alternative had not been available[23].

The standard solution to endogeneity is by an instrumental variable method, i.e. instruments for the individual's "potential income" in the two states (recipient and non-recipient) is needed. Due to Swedish rules, the income as a recipient can be approximated by the guideline principle in the municipality of residence. Instruments for the non-recipient state is created by using predictions from income equations. I.e. I estimate disposable income regressions using data from non-recipients and then use the predicted values from these regressions as instruments of potential income for the non-recipient state. As explanatory variables, I use individual characteristics such as education and experience as well as other variables such as the local unemployment rate and the sector in which the individual works. The excluded instruments in the decision function are the sector variables and the local unemployment rate[24], which allows me to identify my model.

I have chosen to estimate separate equations for Swedish and foreign citizens for each year, which are presented in Table A 4. All equations are estimated conditional on not receiving SA. Since there are no good excluding restrictions, the sample selection introduced by only selecting the non-recipient part of the population is ignored[25].

The estimated coefficient on experience is positive while the experience squared is negative. This means that income increases with experience at a decreasing rate in the relevant interval. The coefficient on gender shows that women have lower average income than men do. Although there are some exceptions, the average income generally increases with education.

[23] The Hausman exogeneity test confirms that the income we observe cannot be assumed exogenous (Significant at the 1 % level).
[24] The idea is that unemployment will not influence the social assistance decision other than through income. Indeed, when the local unemployment rate is included in the social assistance equation it is in most cases insignificant (Significant at the 10 % but not 5 % level in a few cases).
[25] I have estimated Heckman type selection models without exclusion restrictions (i.e. identification by functional form alone) and using the proportion of SA recipients in the municipality of residence as an exclusion restriction. Both procedures yielded almost identical results to those obtained by ignoring the selection bias.

5.2 Estimation results, pooling 1990 and 1995

Table 2 present estimation results where the observations for 1990 and 1995 are pooled. The table contains three columns, which corresponds to samples using all individuals, Swedish citizens and foreign citizens respectively.

The estimation results indicate no general change in the propensity to receive SA. The relative odds of being a SA recipient do not differ between the two years, which can be seen from the fact that the estimated coefficient of the dummy variable d95 is not significantly different from one. The same conclusion also holds for Swedish citizens. Looking at the third column in the table, the results indicate a *decrease* in the studied propensity among foreign citizens since the 1995 dummy is significantly smaller than one.

As could be expected the coefficients in front of the income variables are less than one in magnitude indicating that higher income lowers the probability of being a SA recipient. We see that the estimated coefficients differ between income categories, which indicates that using a linear spline makes sense. The guideline principle in the municipality of residence have a significant and positive influence on the probability of being an assistance recipient. Thus, people living in more "generous" municipalities have a higher probability of being SA recipients.

Table 2: Estimates using specification 2 for the cost function.

	All Individuals		Swedish citizens		Foreign citizens	
	Coeff.	*Std.err.*	*Coeff.*	*Std. err.*	*Coeff.*	*Std.err.*
Income (0-25')	0.94**	(0.0048)	0.99	(0.0075)	0.945**	(0.0085)
Income (25'-50')	0.96**	(0.0017)	0.960**	(0.0020)	0.964**	(0.0045)
Income(50'-100')	0.977**	(0.00081)	0.975**	(0.0009)	0.990*	(0.0026)
Income (>100')	0.991**	(0.0010)	0.992**	(0.0011)	0.990**	(0.0030)
Wealth (10'-25')	0.14**	(0.0072)	0.14**	(0.0076)	0.20**	(0.037)
Wealth (25'-100')	0.068**	(0.0045)	0.068**	(0.0049)	0.075**	(0.020)
Wealth (>100')	0.025**	(0.0043)	0.027**	(0.0048)	---	---
Municipality guideline	1.020**	(0.0044)	1.021**	(0.0049)	1.020*	(0.012)
Age categories (Base: 35-39)						
Age 18-25	0.30**	(0.015)	0.30**	(0.015)	0.50**	(0.081)
Age 26-29	0.48**	(0.023)	0.47**	(0.024)	0.61**	(0.081)
Age 30-34	0.72**	(0.031)	0.73**	(0.034)	0.70**	(0.080)
Age 40-49	1.03	(0.042)	1.03	(0.042)	1.14	(0.12)
Age 50-59	0.59**	(0.034)	0.59**	(0.036)	0.94	(0.15)
Age 60-65	0.31**	(0.036)	0.23**	(0.034)	1.55*	(0.345)
Gender (1=Woman)	0.80**	(0.017)	0.82**	(0.020)	0.68**	(0.042)
Educational categories (Base: >9 years compulsory school).						
missing or unspecified	2.33**	(0.071)	1.84**	(0.103)	1.18	(0.073)
<9 years	1.42**	(0.060)	1.22**	(0.065)	1.57**	(0.19)
High school, £. 2 years	1.26**	(0.031)	1.21**	(0.033)	1.06	(0.10)
High school, >2 years	0.76**	(0.024)	0.71**	(0.024)	0.86	(0.097)
College, <3 years	0.62**	(0.027)	0.55**	(0.027)	0.73*	(0.090)
College, >3 years	0.68**	(0.039)	0.55**	(0.039)	0.75*	(0.095)
PhD.	0.41**	(0.126)	0.31**	(0.139)	0.35*	(0.15)
# Children under 16	1.70**	(0.105)	1.66**	(0.11)	1.62**	(0.26)
Woman with children	1.22**	(0.076)	1.19**	(0.080)	1.36*	(0.23)
Im. 1					1.03	(0.27)
Im. 2					2.24**	(0.18)
Im. 3					1.36*	(0.11)
Dummy 1995	0.95	(0.028)	0.96	(0.04)	0.79**	(0.074)
Log likelihood	-33 591		-29 971		-3 742	
Sensitivity, Pr(+ | True)[1]	68.0 %		65.2 %		74.1 %	
Specificity, Pr (- | False)[1]	78.8 %		78.6 %		63.8 %	
Area under the ROC curve [2]	0.82		0.82		0.77	
Correctly classified[1]	77.7 %		77.6 %		66.6 %	
Pseudo R^2	0.22		0.19		0.22	
# observations	141 740		133 936		7 804	

Odds ratios. The odds ratio of a coefficient is calculated as exp(b) where b is the corresponding maximum likelihood logit estimate. The standard error of the odds ratio is exp(b)*s where s is the standard error of the logit parameter estimate. All equations include a (non-reported) constant. A linear spline is used for income. Im. 1-Im. 3 are dummy variables indicating immigration. Im. 1 indicates immigration during the current year. Im. 2 indicates immigration during the five year period before the current year and Im. 3 indicates immigration during the five year period before that. * Significant at the 10 % level. ** Significant at the 1 % level. Standard errors are corrected for the two-stage procedure.

[1]) A cut-off value of 0.12 (0.26) is used for the first two (last) models.

[2]) The area under the ROC curve is a measure of the models predictive power and is the area under the curve that graphs sensitivity versus one minus specificity as the cutoff varies. A model with no predictive power would have area 0.5 while a perfect model would have area 1.0.

The wealth category dummies are all significantly below one, indicating that belonging to a higher wealth category dramatically reduces the probability of being a SA recipient (base category is 0-10 000 SKr.). Also, the estimated wealth coefficients seem to be slightly larger in magnitude for foreign citizens. The estimate for the third wealth category for foreign citizens is missing due to the lack of assistance recipients falling into this category.

There are some other interesting results that can be seen in Table 2. We see that women are less likely to be recipients (especially foreign citizens), although the interaction term woman with children has a positive effect. The younger and older persons have odds-ratios significantly below one (compared to the base category which includes those between 35 and 39 years of age) for all- and Swedish households. Foreign citizens present a little different pattern with slightly larger estimates in front of the younger age categories than Swedes. Further, those between 60 and 65 years of age also seem to have lower stigma. Those with higher education seem to be more reluctant to receiving SA. There are also three new variables included in the estimation for foreign citizens. These are dummy variables for three different immigration year categories and are included as control variables for the newly immigrated. The first category (Im1) stands for the current year and the other two divides the ten year period before the current year into two five year periods. All three dummies come out larger than one, indicating a higher probability among newly immigrated.

5.3 Comparing 1990 and 1995

Table 3 (Swedes and foreigners) and Table A 5 in the appendix (All individuals) presents separate estimations for the two years. The table includes a third column, which gives the p-value for the null hypothesis of no differences between the coefficients for the two years. The p-values are calculated as a Wald-test of the 1990 values being equal to those of 1995[26]. Consequently, a low (say less than 0.05) p-value indicates that there is a statistically significant change in the corresponding coefficient between the two years. We see that the estimated income and wealth coefficients are significantly lower in 1995 (with one exception). Thus for every unit of increase in income or wealth, the

[26] The reason why I use the 1990 as reference is that I want to avoid getting false significance since the standard errors are smaller in 1995.

probability of being a SA recipient is reduced more in 1995 than in 1990. Especially for the wealth variable, one can suspect one of the underlying reasons could be that the authorities have become more restrictive in granting SA. If the assumption that wealth is a proxy for the attitude shown by the authorities is realistic, this may be an indication that a tougher attitude is shown in 1995 compared to 1990. Also in 1995, the probability of being a SA recipient is influenced more by the "generosity" of the municipality of residence (The coefficient in front of the municipality guideline increases). This in turn could be interpreted as some kind of behavioural change, which I will return to in the conclusions below.

Age category coefficients seems to indicate that the reluctance towards receiving SA increases for younger individuals and remains about the same for older persons compared to the base category for all- and Swedish households. Thus, contrary to what is usually said in the public debate, young people seem to have developed higher distaste against SA. This result may seem a bit odd but could have its explanation in that the authorities have in particular become more restrictive in granting SA to young people. Indeed, when I restrict the sample to persons that is 25 years or younger, the reduction in the income and wealth coefficients is even more apparent. For foreign citizens, none of the dummy variables are significant although the pattern seems to be similar. The estimate in front of gender increases slightly indicating lower stigma among women in 1995 (not significant for foreigners) although the estimated coefficient is below one in both years.

Table 3: Separate estimates for 1990 and 1995, specification 2 for the cost function.

	Swedes			**Foreigners**		
	1990	***1995***	***p-val.***	***1990***	***1995***	***p-val.***
Income (0-25')	1.41** (0.19)	0.98** (0.0076)	0.007	1.11 (0.076)	0.94** (0.010)	0.01
Income (25'-50')	0.961** (0.005)	0.958** (0.0024)	0.6	0.967** (0.008)	0.945** (0.0063)	0.007
Income(50'-100')	0.98** (0.0013)	0.96** (0.0011)	0.000	0.99* (0.0041)	0.982** (0.0043)	0.019
Income (>100')	1.00 (0.0019)	0.99** (0.0012)	0.000	0.992 (0.0069)	0.987* (0.0062)	0.000
Wealth (10'-25')	0.16** (0.012)	0.12** (0.010)	0.000	0.27** (0.055)	0.12** (0.046)	0.000
Wealth (25'-100')	0.082** (0.0077)	0.059** (0.0060)	0.001	0.09** (0.033)	0.051** (0.026)	0.08
Wealth (>100')	0.040** (0.0083)	0.016** (0.0053)	0.000	---	---	---
Municipality guideline	1.015* (0.0066)	1.029** (0.0073)	0.05	1.01 (0.016)	1.045* (0.018)	0.000

	Swedes			Foreigners		
	1990	*1995*	*p-val.*	*1990*	*1995*	*p-val.*
Age categories (Base: 35-39)						
Age 18-25	0.36** (0.030)	0.28** (0.018)	0.000	0.57** (0.12)	0.46** (0.11)	0.18
Age 26-29	0.70** (0.055)	0.37** (0.024)	0.000	0.63** (0.12)	0.56** (0.10)	0.44
Age 30-34	0.96 (0.070)	0.61** (0.037)	0.000	0.75* (0.14)	0.63** (0.092)	0.29
Age 40-49	1.06 (0.076)	1.00 (0.060)	0.47	0.98 (0.16)	1.32* (0.20)	0.07
Age 50-59	0.50** (0.053)	0.65** (0.051)	0.01	0.98 (0.21)	0.86 (0.17)	0.55
Age 60-65	0.27** (0.066)	0.21** (0.041)	0.23	1.36 (0.46)	1.65 (0.57)	0.60
Gender (1=Woman)	0.80** (0.032)	0.86** (0.027)	0.04	0.66** (0.063)	0.71** (0.060)	0.55
Educational categories (Base: >9 years compulsory school)						
missing or unspecified	1.41** (0.096)	1.78** (0.17)	0.001	1.52** (0.23)	0.69* (0.11)	0.000
<9 years	0.91 (0.073)	1.55** (0.120)	0.000	1.72** (0.33)	1.49** (0.22)	0.49
High school, £. 2 years	0.81** (0.033)	1.61** (0.060)	0.000	1.15 (0.20)	1.01 (0.13)	0.45
High school, >2 years	0.29** (0.021)	0.98 (0.041)	0.000	0.74 (0.19)	0.84 (0.11)	0.64
College, <3 years	0.29** (0.027)	0.75** (0.046)	0.000	0.45* (0.17)	0.73* (0.12)	0.21
College, >3 years	0.29** (0.035)	0.77** (0.068)	0.000	0.37* (0.18)	0.76* (0.106)	0.15
PhD.	0.09** (0.075)	0.57 (0.315)	0.000	---	0.41* (0.22)	---
# Children under 16	1.62** (0.181)	1.62** (0.14)	0.95	1.02 (0.31)	1.73** (0.35)	0.04
Woman with children	1.29** (0.138)	1.16* (0.098)	0.000	1.95* (0.52)	1.10 (0.24)	0.03
Im. 1				1.20 (0.47)	0.38 (0.29)	0.000
Im. 2				1.98** (0.23)	2.25** (0.26)	0.28
Im. 3				1.38* (0.17)	1.28* (0.14)	0.60
Log likelihood	-12 385	-16 952		-1 772	-1 938	
Sensitivity, Pr(+ | True)[1]	64.0 %	69.4 %		66.5 %	80.8 %	
Specificity, Pr (- | False)[1]	81.8 %	76.7 %		66.5 %	61.4 %	
Area under the ROC curve [2]	0.82	0.82		0.74	0.79	
Correctly classified[1]	80.7 %	76.1 %		66.5 %	67.5 %	
Pseudo R^2	0.19	0.20		0.17	0.21	
# observations	64 307	69 629		3 802	3 993	

Odds ratios. The odds ratio of a coefficient is calculated as exp(b) where b is the corresponding maximum likelihood logit estimate. The standard error of the odds ratio is exp(b)*s where s is the standard error of the logit parameter estimate. Standard errors are in parentheses. All equations include a (non-reported) constant. A linear spline is used for income. Income is predicted from income equations. Im. 1-Im. 3 are dummy variables indicating immigration. Im. 1 indicates immigration during the current year. Im. 2 indicates immigration during the five-year period before the current year and Im. 3 indicates immigration during the five year period before that. * Significant at the 10 % level. ** Significant at the 1 % level. The column named p-val. gives the p-value for the null

hypothesis of no difference between the estimated coefficient for 1990 and 1995. Standard errors are corrected for the two-stage procedure.
[1]) A cut-off value of 0.12 (0.26) is used for the first two (last) models.
[2]) The area under the ROC curve is a measure of the models predictive power and is the area under the curve that graphs sensitivity versus one minus specificity as the cutoff varies. A model with no predictive power would have area 0.5 while a perfect model would have area 1.0.

The coefficients in front of the educational categories generally increase in 1995 for all- and Swedish households. Looking at the coefficient estimates in Table 3, we see that the increases are especially evident for the higher educational categories. This indicates a decrease in the reluctance among people with higher education. Although the stigma costs still increases with education (the coefficient estimates generally decreases with educational level) in 1995, the differences between people belonging to high- and low educational categories is not as apparent as in 1990. For foreign citizens, none of the coefficient changes significantly (except in the first category).

A joint likelihood ratio test of the variables in the cost function (i.e. $\varphi_{90} = \varphi_{95}$) is significant at the 1 % level. Thus, the stigma pattern seems to be significantly different between the two years.

5.4 Decomposing the change in social assistance

An interesting extension of the above analysis is to decompose variations in SA between the two years into changes in the recipient's average characteristics (e.g. average income and wealth together with other individual characteristics) and changes in how different characteristics influence the probability to be a SA recipient. The last part reveals itself in differences in the estimated coefficients between the two years. In order to analyse this I use a Blinder-Oaxaca type of analysis. For the logit model we have:

$$\frac{p_{95}}{p_{90}} = \frac{\dfrac{e^{\beta_{95}X_{95}}}{1+e^{\beta_{95}X_{95}}}}{\dfrac{e^{\beta_{90}X_{90}}}{1+e^{\beta_{90}X_{90}}}}$$

where p_{90} and p_{95} stand for the (average) probability to be a SA recipient in 1990 and 1995 respectively. Taking logarithms we obtain:

(9) $$\ln(p_{95})-\ln(p_{90}) = \beta_{95}X_{95} - \beta_{90}X_{90} + \ln(1+e^{\beta_{90}X_{90}}) - \ln(1+e^{\beta_{95}X_{95}})$$

The two logarithm terms on the right hand side of equation (9) are small[27] compared to the first two terms so by neglecting them and adding and subtracting $\beta_{90}X_{95}$ we get:

(10) $$\ln(p_{95})-\ln(p_{90}) \cong \beta_{90}\Delta X + X_{95}\Delta\beta$$ [28]

i.e. the difference in (the logarithm of) the probabilities between the two years is decomposed into a change in the recipients average characteristics (the first term) and change in the influence of different characteristics (the second term). Table A 6 in the appendix presents the results for two different indexes. As we can see, 77 % (141 %) of the increase in SA can be explained by changes in the main characteristics of the recipients. Income and wealth makes up the main part of this change. Stated differently, a large part of the increase in SA seems to be due to decreases in average income and wealth. The remaining 23 % (-41 %) of the change can be interpreted as coming from behavioural changes. Here, the changes are mainly due to changes in the coefficients on municipality guideline and higher educational categories.

5.5 Extending the period backwards

Given the results obtained for the 1990s, it would be of interest to extend the period back to the 1980s and compare the 1980s with the 1990s. Unfortunately, poor data availability makes this difficult. Nevertheless, in this section I make an attempt to extend the period back to 1985, using the

[27] The two logarithmic terms can be Taylor extended as $\ln(1+e^{x}) = e^{x} - \frac{e^{2x}}{2} + \frac{e^{3x}}{3} - \cdots + (-1)^{n-1}\frac{e^{nx}}{n} + R_{n+1}$. For our data, the calculated values of $\beta_{90}X_{90}$=-3.42 and $\beta_{95}X_{95}$=-3.10. If we insert these values for x into the Taylor expression above, we see that the exponential terms are small compared to the two first terms in equation (9) that we calculated above.

[28] Alternatively, we can subtract and add $\beta_{95}X_{90}$ to get the expression $\beta_{95}\Delta X+X_{90}\Delta\beta$. The choice between which of these expressions to use (i.e. which weights to employ) is a classical index problem and we present the results for both.

limited information available. The data from 1985 no longer contains any information on assets, educational level or the sector in which labour income is earned.

The result from this exercise is presented in Table A 7 in the appendix. As can be seen, the results do not give any support for an increase in the propensity to receive SA between 1985 and 1990. The results should be interpreted with great caution since I lack information on important factors such as assets.

6 Conclusions

The results presented in this paper indicate no general change in the propensity to receive SA between 1990 and 1995. Looking at different subgroups this is also true for Swedish citizens. Regarding foreign citizens I find evidence of a decrease in the studied propensity. I earlier stated that one limitation with my study is that I am not able to distinguish weather the estimated net effect is the result of a change in the propensity, a change in the application of rules or both. Although there are no indications of an increase in the propensity to receive SA, some behavioural changes seem to have occurred.

First, when I compare the two years, the estimated income and wealth coefficients are significantly lower in 1995 than in 1990. This suggests that income and wealth have a larger impact on the probability of receiving SA in 1995. Also, the amount of assistance one is entitled to has a larger effect in 1995. The decrease in the income and wealth coefficients (which *could* be the result of a tougher attitude towards recipients) together with the increase in the municipality guideline coefficient could be the result of an increased propensity, although the estimated net effect is zero. I.e. one is more willing to receive SA but at the same time met by a tougher attitude in 1995 resulting in a neutral total effect. Second, the stigma associated with SA has changed for some groups between the two years. Most noticeable is that the reluctance to receive SA seems to have been reduced significantly among people with higher education. Third, young people seem to have developed higher distaste against SA although this may be the result of a tougher attitude shown by the authorities in particular being directed towards this group.

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Appendix A

Table A 1: Social assistance recipients distributed according to different household types, the situation in 1995.

Married/Living together		**Single Man**		**Single Woman**	
With children	***Without children***	***With children***	***Without children***	***With children***	***Without children***
15 %	8 %	1 %	37 %	16 %	23 %

Table A 2: Percentage of single households that received social assistance according to different disposable income (inclusive of social assistance) categories (in thousands SKr.).

	0-10	***10-20***	***20-30***	***30-40***	***40-50***	***50-60***	***60-70***
1990	5.1	7.2	6.6	10.3	10.7	14.0	14.6
1995	4.9	9.5	14.6	17.8	22.8	28.4	22.7
	70-80	***80-100***	***100-120***	***120-150***	***150-200***	***>200***	***All***
1990	11.2	7.0	5.0	4.9	5.3	3.9	7.3
1995	14.5	7.3	5.3	5.1	5.8	2.6	10.3

Table A 3: Percentage of single households in each educational category that received SA in 1990 and 1995.

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1990	24	7	12	7	2.4	2	1.8	0.4
1995	33	12	16	11	9	5.2	4.1	3.9

Table A 4: Income equation estimates. Dependent variable log(Income)

Variable	Swedes 1990	Swedes 1995	Foreigners 1990	Foreigners 1995
Experience	0.062** (0.00073)	0.089** (0.00098)	0.051** (0.0047)	0.088** (0.0079)
Experience^2	-0.001** (0.000017)	-0.0016** (0.00002)	-0.0007** (0.00009)	-0.0015** (0.00017)
Gender (1=woman)	-0.048** (0.0089)	-0.091** (0.011)	-0.046 (0.069)	-0.156 (0.105)
Educational categories				
Missing or unspecified	0.16** (0.014)	0.63** (0.045)	0.02 (0.051)	0.48** (0.10)
<9 years	0.06** (0.013)	0.17** (0.044)	0.01 (0.050)	0.41** (0.09)
High school, £. 2 years	0.32** (0.013)	0.51** (0.044)	0.21** (0.042)	0.55** (0.10)
High school, >2 years	0.24** (0.013)	0.48** (0.044)	0.22** (0.052)	0.46** (0.096)
College, <3 years	0.45** (0.014)	0.65** (0.045)	0.33** (0.063)	0.62** (0.11)
College, >3 years	0.54** (0.014)	0.80** (0.045)	0.42** (0.066)	0.67** (0.11)
PhD.	0.56** (0.035)	0.87** (0.061)	-0.17 (0.20)	0.47* (0.223)
Sector 1	0.77** (0.011)	0.82** (0.011)	0.90** (0.056)	1.11** (0.086)
Sector 2	0.68** (0.010)	0.73** (0.009)	0.88** (0.049)	1.16** (0.062)
Sector 3	0.78** (0.01)	0.87** (0.008)	0.97** (0.044)	1.23** (0.049)
Sector 4	0.12** (0.016)	0.19** (0.023)	0.21 (0.14)	0.31 (0.20)
Im. 1			-0.32** (0.091)	0.014 (0.20)
Im. 2			-0.16** (0.035)	-0.23** (0.058)
Im. 3			-0.06* (0.036)	-0.06 (0.048)
Municipality unemployment rate	-1.83** (0.30)	-1.20** (0.25)	-4.13* (1.78)	-1.12 (1.01)
Children 1	0.15** (0.023)	0.18** (0.028)	0.22* (0.132)	0.30 (0.24)
Children 2	0.27** (0.045)	0.24** (0.049)	-0.27 (0.33)	0.59 (0.437)
Children 3	0.29 (0.28)	0.49 (0.61)	0.18 (0.65)	0.65 (0.68)
Number of observations	64 448	69 869	3 935	4 096
R^2 adjusted	0.34	0.45	0.26	0.36

All equations include a (non-reported) constant. Sector 1-Sector 4 are dummy variables indicating the sector in which the majority of labour income is earned. The dummy variables stand for central public sector, local public sector, non-public sector and working in banks and other financial corporations respectively. Im 1-Im 3 are dummy variables indicating immigration. Im 1 indicates immigration during the current year. Im 2 indicates immigration during the five-year period before the current year and Im 3 indicates immigration during the five year period before that. Children 1-children 3 are dummy variables indicating the presence of 1, 1-3 and more than 3 children under the age of 16 respectively. * Significant at the 10 % level. ** Significant at the 1 % level. Standard errors are in parentheses.

Table A 5: Separate estimates for 1990 and 1995, specification 2 for the cost function, all individuals in the sample.

	1990	*1995*	*p-val.*
Income (0-25')	1.06 (0.057)	0.93** (0.0051)	0.013
Income (25'-50')	0.963** (0.004)	0.955** (0.0021)	0.032
Income(50'-100')	0.98** (0.0013)	0.96** (0.0011)	0.000
Income (>100')	1.00 (0.0018)	0.99** (0.0012)	0.000
Wealth (10'-25')	0.17** (0.011)	0.12** (0.009)	0.000
Wealth (25'-100')	0.08** (0.0073)	0.055** (0.0056)	0.000
Wealth (>100')	0.036** (0.0075)	0.015** (0.0047)	0.000
Municipality guideline	1.014* (0.0061)	1.030** (0.0067)	0.012
Age categories (Base: 35-39)			
Age 18-25	0.37** (0.029)	0.27** (0.018)	0.000
Age 26-29	0.69** (0.050)	0.38** (0.024)	0.000
Age 30-34	0.92 (0.062)	0.61** (0.035)	0.000
Age 40-49	1.04 (0.068)	1.03 (0.054)	0.98
Age 50-59	0.53** (0.053)	0.64** (0.045)	0.057
Age 60-65	0.39** (0.074)	0.28** (0.045)	0.052
Gender (1=Woman)	0.77** (0.029)	0.84** (0.023)	0.05
Educational categories (Base: >9 years compulsory school)			
missing or unspecified	1.96** (0.085)	1.59** (0.145)	0.000
<9 years	1.01 (0.064)	1.82** (0.120)	0.000
High school, £. 2 years	0.84** (0.032)	1.68** (0.057)	0.000
High school, >2 years	0.32** (0.021)	1.04 (0.040)	0.000
College, <3 years	0.30** (0.027)	0.87** (0.046)	0.000
College, >3 years	0.30** (0.035)	0.97* (0.07)	0.000
PhD.	0.07** (0.064)	0.72* (0.24)	0.029
# Children under 16	1.50** (0.161)	1.67** (0.133)	0.267
Woman with children	1.39** (0.138)	1.12* (0.089)	0.039
Log likelihood	-14 279	-19 033	
Sensitivity, Pr(+ | True)[1]	62.1 %	74.5 %	
Specificity, Pr (- | False)[1]	88.7 %	74.1 %	
Area under the ROC curve [2]	0.83	0.82	

	1990	*1995*	*p-val.*
Correctly classified[1]	81.3 %	74.2 %	
Pseudo R^2	0.21	0.23	
# observations	68 240	73 717	

Odds ratios. The odds ratio of a coefficient is calculated as exp(b) where b is the corresponding maximum likelihood logit estimate. The standard error of the odds ratio is exp(b)*s where s is the standard error of the logit parameter estimate. Standard errors are in parentheses. All equations include a (non-reported) constant. A linear spline is used for income. Income is predicted from income equations. * Significant at the 10 % level. ** Significant at the 1 % level. The column named p-val. gives the p-value for the null hypothesis of no difference between the estimated coefficient for 1990 and 1995. Standard errors are corrected for the two-stage procedure.
[1]) A cut-off value of 0.12 (0.26) is used for the first two (last) models.
[2]) The area under the ROC curve is a measure of the models predictive power and is the area under the curve that graphs sensitivity versus one minus specificity as the cutoff varies. A model with no predictive power would have area 0.5 while a perfect model would have area 1.0.

Table A 6: Decomposing the total variation in the average probability of being a SA recipient between 1990 and 1995.

	$b_{90}DX + X_{95}Db$		$b_{95}DX + X_{90}Db$	
	$b_{90}DX$	$X_{95}Db$	$b_{95}DX$	$X_{90}Db$
Variation	0.252	0.076	0.462	-0.135
% of total Variation	77 %	23 %	141 %	-41 %

The decomposition into two parts is presented for two different weights.

Table A 7: Estimation results for the period 1985-1990.

	Coefficient	**Standard error**
Income (0-40')	0.99*	(0.006)
Income (40'-80')	1.01	(0.01)
Income(>80')	1.01	(0.01)
Municipality guideline	1.01*	(0.003)
Age categories (Base: 35-39)		
Age 18-25	1.37**	(0.14)
Age 26-29	1.19**	(0.08)
Age 30-34	1.24**	(0.07)
Age 40-49	0.76**	(0.04)
Age 50-59	0.61**	(0.04)
Age 60-65	0.49**	(0.07)
Citizenship (1=Swedish)	0.18**	(0.008)
Gender (1=Woman)	0.80**	(0.02)
Dummy 1990	0.68**	(0.03)
Pseudo R^2	0.04	
Log likelihood	-27 778	
Area under the ROC curve	0.63	
# observations	117 311	

Odds ratios. The odds ratio of a coefficient is calculated as exp(b) where b is the corresponding maximum likelihood logit estimate. The standard error of the odds ratio is exp(b)*s where s is the standard error of the logit parameter estimate. Standard errors are in parentheses. All equations include a (non-reported) constant. A linear spline is used for income. Income is predicted from income equations. * Significant at the 10 % level. ** Significant at the 1 % level. Standard errors are corrected for the two-stage procedure.

Variable definitions

Experience: Calculated as age-6-years of education. Years of education is approximated for educational categories (See above). In the data set there is also a variable for year of completion of studies. This is missing for the big majority in our data set but for those observed, experience is calculated as year-year of completion of studies.

Educational category: In our data set, I am able to observe educational categories, which are defined as follows:

1) No education or unspecified level
2) <9 year compulsory school
3) >9 year compulsory school
4) High school, max. 2 year
5) High school, >2 year
6) College, <3 year
7) College, 3 year or longer
8) PhD.

Income: The income measure used is post-tax disposable income (DISPINK), which is the sum of all kinds of earned and non-earned income including transfer payments.

Earnings (labour income): Earnings from employment and self-employment plus temporary transfer payments that are received as a result of temporary absence from work (e.g. sickness payment).

Im. 1 - Im. 3: These are dummy variables created from the continuous variable year of immigration. Im. 1 is 1 for those immigrated during the current year and 0 for others. Im. 2 indicates immigration during the five-year period before the current year and Im. 3 indicates immigration during the five year period before that.

Municipality guideline: Yearly guideline principle in the municipality of residence is calculated as 12* the monthly guideline principle. Sources: The 1990 values are taken from SOU 1992:98 and the 1994 values from ”Statistiska meddelanden, S 45 SM 9401”, Statistics Sweden.

Municipality unemployment rate: Average unemployment rate during the year in the municipality of residence. Source: AMS.

Sector 1-Sector 4: Dummy variables indicating the sector in which the majority of labour income is earned. The dummy variables stand for central public sector, local public sector, non-public sector and working in banks and other financial corporations.

Social assistance recipient: A person (household) that has received SA at least once during the year.