Social Policies Affecting Women: The Swedish Case

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Abstract

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1 Introduction

...Inspired by Sherwin Rosens chapter... this paper takes its start in four policies that in different ways can be thought of as female oriented. The policies considered are 1) paid parental leave, 2) child care subsidies, 3) "in-work" benefits, and 4) subsidies to household substitutes.

2 Social policies

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2.1 The paid parental leave system

Employed Swedish women have accessed the right to paid maternal leave since 1955. In 1974 Sweden became the first country that replaced the maternity-leave system with a parental-leave system, where the same rules applied to both fathers and mothers. Parental leave initially covered six months of payment, but was gradually extended over the years so to cover 15 months by the year of 1990. In 1993, the parents shared 360 days with a compensation corresponding to 90 percent of gross earning up to a ceiling,

and another 90 days at the guaranteed flat rate of 60 SEK per day. Figure X describes the evolution of the replacement rates and days of entitlement of the parental leave system since 1993.

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FIGURE X[1]

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In 1995, the Swedish government introduced a reform, the daddy-month, which implied that one month of the paid parental leave exclusively had to be used by each parent. As basically all mother used at least one month of parental leave before the reform, the restriction, in practice, only concerned fathers. In 2002, the daddy month was extended, and two months where reserved for each parent. At the same time, the total days of entitlement increased by 30 days. In practice this implied that an extra month available only for fathers was added to the paid parental leave system.

The paid parental leave system in Sweden provides generous economic support to parents staying at home with their young children. However, descriptive statistics shows that mothers take the major part of the parental leave. In fact, about half of all fathers used no days of their parental leave days prior to the introduction of the daddy-month.

With the introduction of the daddy-month 1995, which was extended to two months in 2002, the government wanted to provide strong economic incentives for fathers to take parental leave. From the Government Proposition 1993/94:47 (translated by Ekberg et al, 2004), the gender-oriented objective becomes clear: "...Another reason for increasing fathers' use of parental leave is that women's prospects of achieving equal opportunities to men in the labor market will be limited, as long as women are responsible for practical housework and children. A shared responsibility for the practical care of children would mean a more even distribution of interruptions in work between women and men, and women would thereby gain better opportunities

[1](1993-2005) 90,90,80,75,75,80,80,80, 80,80,80,?,80. In the figure 360 days until 2002 when it becomes 390. Write in the figure text that those extra 30 days are specific to the father in practice.(see footnote 2 in Ekberg et al) Eventuellt om rabbatmånad I denna text likväl. Se table 1 I Ekberg et al. 2005 gäller 390 dagar med SGI, 90 dagar med 60, och 60 dagar är exklusiverade för varje förälder. Detta gällde säkert 2004, 2003, och vi vet att det gällde 2002. The additional 90 days of the guaranteed flat rate of 60 SEK per day have been 60 SEK a day since 1987. From Sundström it say 1987util the date of publication which is 1991/92. Know also 60 sek a day 2005, and 60 sek a day at 1994 according to PPL prior to reform, Ekberg et al.

of development and making a career in their profession."

An evaluation of the Daddy-month reform also shows that the fathers' use of paid parental leave was affected. According to Ekberg et al (2004), fathers, on average, increased their parental leave by 15 days due to the reform. The fraction of fathers using zero days of paid parental leave fell from about half to less than 20 percent. At the same time there was a substantial increase in the number of fathers taking about one month of parental leave. The authors also note that the number of days used by mothers decreased by more than the fathers days increased.

Clearly one has to keep in mind that there are also other aims to consider when constructing the paid parental leave system. In particular, the system aims to encourage fertility. As the compensation during parental leave is linked to work and earnings history, parents are encouraged to postpone child-bearing. This holds, in particular, since earnings profiles tend to be steeper in the beginning of the career. In addition, the paid parental leave system has encouraged a closer spacing of children since 1980. If the second child is born before 30 months has passed since the first child was born, the compensation is at least as high as for the first child.

Also other policies influence women's position in the labor market. We will now turn to the system of child care subsidies, which also can be though of as a female-oriented policy.

2.2 Child care subsidies

The developments of child-care facilities since the 1970s are often put forth as one explanation for the strong increase in female labor force participation in Sweden that took place during the 70s and 80s. To increase labor market activity, in particular among women, has also been one of the major aims of the publicly subsidized child care. In addition to these aims, the government strives to fulfill a pedagogical task by enrolling children into pre-school.

As taking care of ones children has traditionally fallen within the female sphere of responsibilities makes it straightforward to view subsidized child-care as a female oriented policy. This view is further enhanced by the fact that there is an outspoken aim of the policy to strengthen the labor market position for women.

In 1983, 52 percent of preschool children were in publicly provided day care, either at day-care centers, in kindergartens, or in private day care homes, with "day-mothers" employed by the local government. Despite the

1980s baby boom, the share of preschool children in publicly day care had increased to 57 percent in 1992. Many of the remaining preschool children were with parents on paid parental leave. The publicly sponsored child-care has continued to increase the last ten years. Figure X shows how the share of children in ages 1 to 5 enrolled into preschool, as well as how the share of children in ages 6-9 enrolled in the after-school centers, has evolved since 1997.

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Figure X.

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These increased shares of enrollment in child-care services corresponds to that child-care services has always been one of the corner stones in the Swedish family policy program. The expansion of the child-care system in the 1990s aimed at making the child-care services more accessible to everyone, and in particular more accessible to some specific groups. A number of reforms, which will be discussed below, where conducted to enhance this expansion.

The average per child in pre school cost was in the year 1998 about 90 000 SEK and the year 2004 almost 96 000 SEK (in 2004 years prices). The total costs for pre-school in 2004 was about 34 billion SEK, which constitutes about 1.3 percent of GDP. In the beginning of the 1990s, there were about four children per server for preschool activities. The same number in 1997 was 5.7, and in 2003 the number was 5.4.

During the 1990s, budgetary constraints forced an increasing number of municipalities to look into their child-care fee system. The fees were gradually raised over the decade. By the year 2001 about 18 percent of the costs for child care was covered by child-care fees, whereas that share was about half the size in the beginning of the 1990s. It also became increasingly popular to have fees which linked to the hours of attendance. By having an attendance related fee, the municipality could reduce the demand for child care services and by that means reduce the cost of providing child-care. In most municipalities, the child-care fee was related both to the family income and hours of attendance. This induced disincentives for parents to move from part-time work to full-time work. The child-care fees also differed substantially across municipalities by the end of the 1990s. For a two child family with an average income, the fee in pre-schools could vary by up to SEK 50 000 per year in 1999 depending on in which municipality the family lived.

The gradually increasing fees for child-care and the differences in the fees across municipalities led the government to implement the maximum fee system in January 2002. The reform was constructed such that the fees for child care were fixed at a certain percent of parental income, however, this was not to exceed a specified amount. The maximum fee system have led to smaller differenced in fees across municipalities, and, for most families with children, a reduction in their child-care fee. Although, for a two child family with an average income, the fee in pre-schools could vary by up to SEK 50 000 per year in 1999 depending on in which municipality the family lived. By 2002 this difference never exceeded SEK 10 000. The maximum fee system aimed to improve the economic situation of families with children. Moreover, the reform aimed at improving the incentives, in particular for women, to increase their labor force participation.

In July 1, 2001, the children of parents who were unemployed received the right to pre-schooling of at least 15 hours week. On 1 January 2002 children of parents who were on parental leave due to the birth of a sibling received the same right. Universal pre-school for four and five year olds was introduced on 1 January 2003. This means that all children will be offered a place in pre-school as of the autumn term in which they reach the age of four. The universal pre-school should cover at least 525 hours a year. The municipalities are obliged to provide places, but parents themselves determine whether to make use of the place. The aim of the reform was to increase the accessibility to child care.

The National Agency of Education shows that the increased enrollment in pre-school could be explained by a higher participation rate of children with parents who are unemployed or on paid parental leave with a sibling. The maximum fee system can probably explain the increased enrollment into after-school centers, but to a lesser extent explain the increased enrollment into pre-school. The effects on labor supply and labor force participation of the maximum fee system has not yet been investigated.

2.3 In work benefits

To be written.....

2.4 Tax relieves for household substitutes

To be written.....

3 The model

This section explicitly models the decision making by women. The model is set in two periods. In the first period women are married, whereas in the second period there is an exogenous probability, $1-p$, that the marriage will be dissolved.

At the beginning of the first period the woman makes her career choice. By allocating her available time into market work, L_M, and family work, L_H, she can decide on how much of a market oriented career, and how much of a family oriented career, she wants to make. As the allocation of time has consequences also for the future, she accounts for the future possibility that the marriage will be dissolved when making her time allocation decision. The payoff from investing in market work is given by the net wage income, $wL_M - T(wL_M;.)$, where w is the market wage and $T(wL_M;.)$ is the tax payments. The tax schedule is assumed to be convex in wage income and is, for simplicity, assumed to take the following form: $T(wL_M;.) = B(wL_M)^2 - A$, where A and B are parameters.

Women derive utility from material good consumption, C, and from consumption of a family good, F. The family good can be produced/consumed at home, F_H, or be purchased in the market, F_M, where these are perceived to be perfect substitutes, i.e., $F = F_M + F_H$. The home produced family good is produced by use of own time, L_H, through the concave production function $F_H = L_H^{\alpha}$, $\alpha < 1$. The payoff from investing time in the family is then the utility the home produced family good yields.

Below we will consider a number of policy experiments concerning the paid parental leave system, child care subsidies, in work benefits, and tax relieves for household substitutes. In order to consider the particular features of each policy, this basic framework is modified to account for each policy's special features.

Moreover, in order to consider only fully financed reforms, we introduce a government budget constraint which is fulfilled at all times by allowing for adjustments in the parameters of the tax system. More specifically we allow the parameter B in the tax schedule to adjust so to fulfill the government budget at all times. In addition, we introduce a parameter δ, where $\delta \in [0,1]$, which captures the share of the expenditures on the particular policy in question which is financed by the female workers. When $\delta = 1$, the full burden of financing the particular policy falls on women, whereas when $\delta = 0$ the women don't have to take any part of the financing of the policy.

3.1 Paid parental leave

Paid parental leave in Sweden provides income to parents for a limited number of time periods when they choose to stay home with their young children. A parent is only entitled to this income during time periods when not working.[2] Paid parental leave thus works as a subsidy to a parent choosing family time rather than time at market work.

The parents share a limited numbers of periods with paid parental leave, which can be divided between them according to their likings. However, a number of reforms have been conducted in Sweden where some time periods of the paid parental leave exclusively have to be used by each parent.

We will now specify the basic framework presented above to enable an analyses of how an increased generosity of the paid parental leave system, and of how changed rules on how the periods of paid leave can be transferred between the spouses, affects the economic situation for women. In particular we want to investigate how these policies affect the female career choice, and how these policies affect the future poverty among women who ends up being divorced.

In the model, we now interpret the family good, F, as 'care for children'. As also the father can contribute to the child care by choosing paid parental leave, the family good is expressed as:

$$F = F_M + F_H + \bar{F}$$

where $\bar{F}$ is the father's own supply of time into child care.[3] The financial aspect of the paid parental leave is accounted for by adding a proportional subsidy for each time unit allocated to family activity in the first period.

The value of the first period can be written as $v(F) + wL_M - B(wL_M)^2 + A - kF_M + S(L_H; .)$, where $v(F)$ captures the utility from 'care of children' and $wL_M - B(wL_M)^2 + A - kF_M + S(L_H; .)$ captures the utility from material good consumption. Material good consumption is simply given by the income net of taxes and the payment from paid parental leave, $S(L_H; .)$, subtracting

[2] A parent is, however, free to divide a week/month/year into work days and days which are used for taking care of the children. The problem then reduces down to a one variable problem.

[3] It does not matter for the results that $\bar{F}$ is introduced as linear in fathers time although the woman's time enters through a concave function. Moreover, it does not affect the results if we assume that $F_M = L_M - \bar{F}$. That is, if we assume that the demand for child care has to be equal to the time when no-one is at home.

the expenses on the market purchased child care, kF_M, where k is the price on market purchased care for children. The payment from paid parental leave is given by $S(L_H;.) = sL_H$ if $L_H \leq \bar{L}_H$ and $S(L_H;.) = s\bar{L}_H$ if $L_H > \bar{L}_H$. Thus, if staying home with children more hours than $\bar{L}_H$, the ceiling of the paid parental leave is reached. The female spouse can then not reap more paid parental leave by increasing her family time.

In the second period, the children are older (possible grown-up), and the utility is simply given by the income net of taxes which is used for material good consumption, $wL_M - B(wL_M)^2 + A$. Imposing the time constraint, $\bar{T} = L_M + L_H$, and ignoring discounting, the expected present value can be written:

$$EV = v\left(F_M + \bar{F} + \left(\bar{T} - L_M\right)^{\alpha}\right) + 2wL_M - 2B(wL_M)^2 + 2A - kF_M + S\left(\bar{T} - L_M;.\right).$$

The female spouse chooses both the time allocation and how much of the family good she wants to purchase from the market in order to maximize the expected present value. For an interior solution, L_M, $L_H \in \left(0, \bar{T}\right)$ and

$F_M > 0$, the following first order conditions determine the optimal choices:

$$\frac{\partial EV}{\partial L_M} = -v'(F)\,\alpha\left(\bar{T} - L_M\right)^{\alpha-1} + 2w - 4Bw^2L_M - S'\left(\bar{T} - L_M;.\right) = 0, \quad (1)$$

$$\frac{\partial EV}{\partial F_M} = v'(F) - k = 0. \quad (2)$$

where $S'(.) = s$ if $L_M \geq \bar{L}_M$ and $S'(.) = 0$ if $L_M < \bar{L}_M$. Note that we only focus on the intensive margine by assuming an interior solution.

The objective function is continuos, but has a kink point at $L_M = \bar{L}_M$ in the presence of the paid parental leave system. When consider the effects of the policy experiment, we thus have to consider both cases where female spouses choose to exhaust their periods of paid parental leave, $L_M \leq \bar{L}_M$, and when they do not use all the periods of paid parental leave they are entitled to, $L_M > \bar{L}_M$.

We will conduct three policy experiments concerning the paid parental leave system. First we consider an increase in the payment while on paid parental leave. Then we consider two types of reforms related to changed rules on how the family's periods of paid parental leave can be transferred between the spouses.

3.1.1 Increased payment during paid parental leave

We let an increase in the generosity of the paid parental leave system be represented by an increase in s. An increase in s captures that the cash payment during the limited time periods of paid parental leave increases. The result of such policy can be summarized in the following proposition:

Proposition 1 *Increased payment during periods of paid parental leave reduce, or have no effect, on women investment in a more market oriented career and increases poverty among divorced women.*

Proof. ..... ■

If women choose to more than fully exhaust their periods of paid parental leave by allocating more time into the family than the system pays for, increased generosity of the paid parental leave system reduces the incentives to invest in a market oriented career. This follows as the increased generosity of the paid parental leave system calls for increased taxation in order to finance the reform.

If women do not fully exhaust their periods of paid parental leave, there is, in addition to the negative tax effect, a direct negative effect on market investments as the payments to additional family time has increased. Thus increased generosity of the paid parental leave system tends to reduce investment in market activities also in this case.

We may, however, also have the case where women bunch at the kink point. That is, women choose to exactly exhaust the periods of paid parental leave, $L_M = \bar{L}_M$, although they would have chosen additional family time if they were entitled to additional periods of paid leave.[4] As a direct effect, increased generosity of the paid parental leave system reinforces the fact that women bunch at the kink point, i.e., L_M is unaffected and given by $L_M = \bar{L}_M$. However, the higher expenses on paid parental leave calls for tax increases, which tends to reduce the incentives for market work. This may in fact induce women to choose a solution where $L_M < \bar{L}_M$.

The poverty among divorced women increase both because women choose to invest more in a family oriented career rather than in a market oriented career, and because the reform increases the tax payments. Thus the disposable income, $wL_M - T(wL_M; .)$, unambiguously falls with a more generous paid parental leave system.

[4]Clearly, they could also have chosen $L_M = \bar{L}_M$ because it is optimal also in absence of limits on the periods of paid parental leave.

3.1.2 The 'Daddy month'

Since 1995 some periods of paid parental leave have to be used exclusively by each parent. This implies that parents are no longer free to transfer all the time periods across each other in line with their likings. Two reforms have been conducted. First, the 1995 reform where the Swedish government introduced a rule which implied that one month of the family's total periods of paid parental leave exclusively had to be used by each parent. The number of total periods of paid parental leave the family was entitled to was maintained intact in this reform. As basically all mothers used at least one month of parental leave before the reform, the restriction, in practice, only concerned fathers. However, in case the mother used all the family's paid parental leave prior to the reform, an increase in the fathers leave time reduced the available time periods of paid leave for mothers by one month. The second reform was conducted in 2002, where now two months of the family's total periods of paid parental leave exclusively had to be used by each parent. This reform, however, extended the family's total periods of paid parental leave with one month. In practice this implied that an extra month available only for fathers was added to the family's periods of paid parental leave.

We represent these two types of reforms by letting $\bar{F}$ increase. By increasing $\bar{F}$, we increase the fathers family time. This will in a reform similar to the 2002 reform have no impact on the mother's available time for paid leave, $\bar{L}_M$. The results are summarized in the following proposition:

Proposition 2 *Increased paid family time of fathers, $\bar{F}$, will reduce, or have no effect, on women investment in a more market oriented career and increases poverty among divorced women.*

Proof. ..... ■

An increase in the fathers time at home, directly increases the female spouse's consumption of the family good. This induces the female spouse to buy less 'care time' on the market. In fact she will reduce her market buying of the family goods by more than the increased father's contribution. The reason is that the reform needs to be financed. An increase in the paid home time for fathers calls for increased tax rates in order to balance the government budget, which reduces the incentives to supply market work. Female market work is then reduced, which, in fact, implies that she instead

work more in the household as a response to that the father increases his contribution of the family good.

The poverty among divorced women increase both because women choose to invest more in a family oriented career rather than in a market oriented career, and because the reform increases the tax payments. Thus the disposable income, $wL_M - T(wL_M; .)$, falls with the prolonged paid parental leave.

We may, however, also have the case where women bunch at the kink point. That is, women choose to exactly exhaust the periods of paid parental leave, $L_M = \bar{L}_M$. Also in this case will the tax increases reduce the incentives for market work, which tends to induce women to choose a solution where where $L_M < \bar{L}_M$. However, the budget effect may not be strong enough to counteract that they are bunching at the kink point. In this case, they will continue to bunch at the kink point, and thus leave L_M unaffected and again given by $L_M = \bar{L}_M$.

Now considering a reform of the 1995 reform type, we have to account for that the reform also implies that $\bar{L}_M$ falls by an equivalent amount, leaving the family's total time of paid parental leave periods intact. The results are summarized in the following proposition:

Proposition 3 *Increased paid family time of fathers, $\bar{F}$, leaving the total time of paid parental leave intact, will: (1) leave women investment in market work, and poverty among divorced women, unaffected if women allocate more time into the family then the paid leave pays for, (2) reduce women investment in market work and increase poverty among divorced women if women do not exhaust their periods of paid parental leave, (3) increases women investment in market work and reduces poverty among divorced women if women bunch at the kink point.*

Proof. .....

In case women take more leave than the system pays for implies that there is no need to increase taxes in order to finance the reform. The reform is self financed as the lump-sum parental leave payments to women is reduced by the same amount as the cost of financing a longer paid parental leave for fathers. The career choice and economic situation for divorced women is therefore unaffected in this case. ■

On the other hand, in case women do not exhaust their periods of paid parental leave, the fact that the maximum periods of paid parental leave

available to them falls will have no effect on women investment in a market career. Thus, the result and analyses of the previous proposition holds in this case.

In case the father's paid family time increases in a situation where women bunch at the kink point will increase female investment in a market oriented career. Women who choose to exactly exhaust their periods of paid parental leave face a reduction in the marginal cost of working when their available periods of paid leave is reduced. This is a consequence of that an increased working time is no longer associated with a reduction in the benefits of paid parental leave. Thus, the incentives to invest in a more market oriented career has improved, which also improves the economic situation for divorced women.

3.2 Child Care Subsidies

This section uses the basic framework to consider how the Swedish child-care subsidies affect the female career choice and the future poverty for women who end up being divorced.

The more units the female spouse chose to work, the more units of child-care the family needs. Let cL_M represent the child-care payments for a family where the female spouse allocates L_M time units to market work. With no subsidies to child care we can interpret c as the going unit market price of child-care. Accounting for these child care costs, the present value is written:

$$EV = v\left(L_M + \left(\bar{T} - L_M\right)^{\alpha}\right) + 2\left[L_M - B\left(L_M\right)^2 + A\right] - cL_M,$$

where we have normalized the father's care time to zero and the wage rate to unity[5]. For an interior solution, the optimal time allocation between the market and the family is given by:

$$\frac{\partial EV}{\partial L_M} = v'\left(F\right)\left(1 - \alpha\left(\bar{T} - L_M\right)^{\alpha-1}\right) + 2 - c - 4BL_M = 0. \tag{3}$$

Consider now that we introduce a child-care subsidy which works so to lower the unit price of child care. Let the per child hourly unit cost be equal to $\tilde{c}$, and let z denote the subsidy rate, child care payments facing the buyer

[5]This is convenient as a time based fee works in an equivalent way as an income related fee. It is, however, of no importance for the results.

can then be written as $\tilde{c}(1-z)L_M$. An increase in the subsidy rate, z, then corresponds to a reduction in the unit price of child care, i.e., a reduction in $c = \tilde{c}(1-z)$ in (3), which tends to reduce the costs of working.

However, the subsidy needs also to be financed. Assume the following government budget constraint:

$$2\left[BL_M^2 - A\right] = \delta \tilde{c} z L_M, \tag{4}$$

where the tax parameter B adjusts so to fulfill the government budget at all times. The parameter $\delta \in [0,1]$ captures the share of the expenditures on child care subsidies which is financed by women. The effect of introducing a subsidy on child care is summarized in the following proposition:

Proposition 4 *Introducing a child care subsidy which reduces the unit price of child care will increase women time in the market and reduce poverty among divorced women, if women finance a minor share of the government expenditures on the child care subsidy. The opposite holds when women have to finance the main part of the subsidy.*

Proof. ..... ■

A child-care subsidy which reduces the unit price of child-care tends to improve the incentives to work, although there will be a counteracting effect as the subsidy needs to be financed. However, as long as women can transfer the main burden of financing the reform on to other citizens, women will increase their investment in market work following a child care subsidy.

Next we consider how fully financed increases in the subsidies to child care affect market work and poverty among divorced women.

3.2.1 Income related child-care fees

With an income related child-care fee, the female spouse's optimal time allocation is again given by (3), where $c = \tilde{c}(1-z)$. However, we can now interpret c as the degree of income indexation in the fee system. The government budget constraint is given by $2\left[BL_M^2 - A\right] = \delta \tilde{c} z L_M$. The impact of a higher subsidy rate is summarized in the following proposition:

Proposition 5 *With income related child-care fees, a higher subsidy rate increase women time in the market and reduce poverty among divorced women,*

if women finance a minor share of the government expenditures on the subsidy. The opposite holds when women have to finance the main part of the subsidy.

Proof. ..... ■

When the subsidy rate is increased, the child-care fee falls, which reduces the cost of a market career. Thus the female spouse faces improved incentives to work in the market. This effect is, however, counteracted by that the more generous child-care subsidy needs to be financed with higher taxes. The tax increases, in turn, reduces the incentives to invest in a market oriented career. If women can transfer the main burden of financing the subsidy on to other citizens, the direct effect of the subsidy will dominate the tax effect. Women will then choose a more market oriented career, which, in turn, will make them better off in case the marriage dissolves in the future. However, if women finance the main bulk of the government expenditures on child-care subsidies, the opposite result will materialize.

3.2.2 Fixed child-care fees

With fully fixed child-care fees, the expected value takes the form: $EV = v\left(L_M + \left(\bar{T} - L_M\right)^{\alpha}\right) + 2\left[L_M - B\left(L_M\right)^2 + A\right] - C$, where C is the fixed fee for child-care use. The first order condition determining the female spouse's optimal time allocation now reduces down to:

$$\frac{\partial EV}{\partial L_M} = v'\left(F\right)\left(1 - \alpha\left(\bar{T} - L_M\right)^{\alpha-1}\right) + 2 - 4BL_M = 0.$$

The government budget constraint in this case is given by:

$$2\left[BL_M^2 - A\right] = \delta\left[\tilde{c}L_M - C\right],$$

where again the tax parameter B adjusts so to fulfill the government budget.

The effect of a higher subsidy in terms of a lower fee is summarized in the following proposition:

Proposition 6 *With fixed child-care fees, increased subsidies reduces women time in the market and increase poverty among divorced women.*

Proof. ..... ■

The increased subsidy has no direct positive incentive effect on women investing in a market oriented career. As the fee is not indexed to income, the increased subsidy will not reduce the price on a more market oriented career, and thus not provide incentives to invest in market time. Instead, investment in market time falls as the more generous subsidies to child care need to be financed with higher taxes. This negative effect on women labour supply holds as long as women take any part of the financing of the reform. Market investment falls and poverty among divorced women increases.

Note, however, that although a reduction in the fixed child-care fee have no direct impact on the intensive margin, the policy may increase female labour force participation. Such analyses of the extensive margin is left out here.

3.2.3 Income related fees with a ceiling

The Swedish child-care system today is characterized by a rather large subsidy and a child-care fee which is fixed if the family income is above a given threshold. Due to the reform 1999 this family threshold income is low enough making basically all families consisting of two working spouses pass the threshold and thus paying the fixed child-care fee. The only persons that basically still have a lower, and income related, child-care fee are single parents with low income. This policy is thus special as families with one parent face a different fee than families with two parents. In order to capture this specific policy feature, we make the female spouse more myopic when making her career choice in this subsection.

We model such system by letting the net pay-off in the first period be: $v\left(L_M+\left(\bar{T}-L_M\right)^{\alpha}\right)+L_M-B\left(L_M\right)^2+A-C$, and the expected net pay-off in the second period be: $\left(v\left(L_M+\left(\bar{T}-L_M\right)^{\alpha}\right)+L_M-B\left(L_M\right)^2+A\right)-pC-(1-p)\,cL_M$. We can in this case write the present value as:[6]

$$EV=2v\left(L_M+\left(\bar{T}-L_M\right)^{\alpha}\right)+2\left[L_M-B\left(L_M\right)^2+A\right]-(1+p)\,C-(1-p)\,\tilde{c}\,(1-z)\,L_M$$

where the female spouse's optimal time allocation is given by:

$$\frac{\partial EV}{\partial L_M}=-2v'(.)\left(1-\alpha\left(\bar{T}-L_M\right)^{\alpha-1}\right)+2-4BL_M-(1-p)\,\tilde{c}\,(1-z)=0.$$

[6]The mother is assumed to continue to pay the full daycare fee upon divorce.

The government budget constraint in this case is given by:

$$2BL_M^2 - 2A = \delta\left[\tilde{c}zL_M\left(1-p\right) + \left(1+p\right)\left(\tilde{c}L_M - C\right)\right]$$

where again the tax parameter B adjusts so to fulfill the government budget.

We can conclude the following regarding fixed versus income related fees:

Proposition 7 *Women invest more in a market oriented career in case the child-care fee is uniform and fixed instead of income related for low income families. The welfare gap between married and divorced women is, however, increased.*[7]

Proof. ..... ■

This result suggest that an income related child-care fee, although only for low income families, reduces the incentive for married women to choose a more market oriented career. This follows as a more market-oriented career is associated with higher child-care fees in the marital state of divorce. To have different fees for divorce and married women, however, provides an instrument which can reduce the welfare difference between married and divorced women.

Note again, however, that this concerns the intensive margin. A lower child-care fee for low income earners induced by a lower fee for child care may stimulate labour force participation.

The following proposition summarizes the results of increased subsidies to child-care given how the current system is structured:

Proposition 8 *Increased child-care subsidies in term of a reduced rate of the income related fee which face divorced women, increases the investment in a market career and reduces poverty among divorced women, if women finance a minor part of the subsidy. Increased child-care subsidies in term of a reduction in the fixed fee which face married women, reduces the investment in market oriented careers and increases poverty among married women.*

Proof. ..... ■

The intuition is straight forward and are described below proposition 5 and 6.

[7] A system with a lower child-care fee for divorced mothers, favours divorced women relative married women. Thus moving to a system with uniform child-care fees eliminates this difference.

3.3 In work benefits

In general, to be able to benefit from in-work benefits, a worker have to be employed in market work and have a family income below a certain threshold.[8] The most common construction of these in-work benefits is that there is a phase-in region and a phase-out region. In the phase-in region the worker get a subsidy or tax deduction which is proportional to the income until a certain income is reached. Then the worker reaches the maximum total benefit or tax deduction, whereafter the phase-out region starts. In the phase-out region, the subsidy or tax relieve is gradually reduced.

In modeling the in-work benefits, we take account of the fact that the female spouse are not entitled to the benefit in case she is married. The family income is then simply too high. However, in case she is divorced in the second period she may be entitled to the in-work benefit. Low time investments in the market is associated with the phase-in region. Increasing the investment in market activities in this region induce a larger in-work benefit. High investments in the market is associated with the phase-out region. Increasing the investment in market activities in this region reduce the in-work benefit. Very high market investments does not make the female spouse entitled to in-work benefits even if she is divorced.

As this policy mainly concerns the wage income, and is not directly associated with a family good, we will disregard from that the family good can be purchased from the market in this section. Thus L_H could in this section be interpreted as leisure. This simplifies the analyses as it reduces the maximization problem down to a one variable problem.[9] However, the results does not change if we also include a market purchased family good.

Let $\tilde{L}_M$ represent the income associated with the maximum available in-work benefit. The in-work benefit received in period two in case of divorce is $S(wL_M) = \phi w L_M$ in case $L_M \leq \tilde{L}_M$, and $S(wL_M) = w\tilde{L}_M(\phi + \varphi) - \delta w L_M$ in case $\tilde{L}_M < L_M < \frac{\tilde{L}_M(\phi+\varphi)}{\varphi}$, and $S(wL_M) = 0$ in case $\frac{\tilde{L}_M(\phi+\delta)}{\delta} \leq L_M$. The expected present value is given by:

$$EV = 2\left[v\left(\bar{T} - L_M\right) + wL_M - B\left(wL_M\right)^2 + A\right] + (1-p)\,S\left(wL_M\right).$$

For an interior solution, the optimal time allocation between the market and the family is given by:

[8] ...US and UK systems.

[9] This also implies that we can let $\bar{T} - L_M$ enter linearly into the value of home time.

$$\frac{\partial EV}{\partial L_M} = -v'(.)\,2 + 2w - 4Bw^2 L_M + (1-p)\,S'(wL_M) = 0,$$

where $S'(.) = \phi$ in case $L_M \leq \tilde{L}_M$, and $S'(.) = -\delta$ in case $\tilde{L}_M < L_M < \frac{\tilde{L}_M(\phi+\varphi)}{\varphi}$, and $S'(.) = 0$ in case $\frac{\tilde{L}_M(\phi+\delta)}{\delta} \leq L_M$.

However, the in-work benefit needs to be financed with taxes. The government budget constraint in this case is given by:

$$2BL_M^2 - 2A = \delta\,(1-p)\,S\,(wL_M)\,.$$

We summarize the results of increased generosity of the in-work benefits in the following proposition:

Proposition 9 *If women finance a major share of the government expenditures on the in-work benefit, a steeper phase-in profile increases women time in the market, reduce poverty among divorced mothers and reduces the welfare gap between married and divorced women for women in the phase in region. If women finance a major share of the in work benefit, the effect is ambiguous.*

Proof. ..... ■

When women can transfer the burden of financing the in-work benefit on to other citizens, the direct effect of the benefit will dominate the tax effect, and women will invest more time into the market. The poverty among divorced women falls both because women choose more of a market career and because the in-work benefit increases.

The more generous in-work benefit, which is only accessible to divorced women, will reduce the dispersion in wellbeing between married and divorced women. This follows because the in-work benefit increases both directly, and indirectly as labour income increase with a more market oriented career.

When women finance the main part of the in-work benefit, women will invest less in a market career. The effect on poverty and dispersion is in this case ambiguous. The fact that less time is invested in a market career tends to increase poverty and inequality between married and divorced women. However, the direct effect of a more generous in-work benefit only accessible for divorced women reduces poverty and the dispersion in welfare.

The effects of a steeper phase-out range has an ambiguous effect on market investments, poverty, and welfare dispersion for women in the phase out region.

3.4 Household substitutes

There has been an ongoing policy discussion for more than a decade now of whether or not Sweden should introduce tax relieves on goods and services that are considered to be close substitutes to home produced goods and services. Several European countries have seen policy initiatives where tax reliefs are introduces on various 'household goods' such as gardening, catering, and cleaning. The argument in favour of such reforms is that the efficiency in the tax system would improve, and that employment would increase. We will now consider how the female spouse's career choice is affected if we introduce tax relieves on goods that are close substitutes to home produced goods.

In the model, we now interpret family time, L_H, as time allocated into home production. This home time is now used to produce household goods at a decreasing rate of return. Equivalent household goods can, however, be purchased in the market.

The household good is assumed to be marriage specific.[10] This could, for example, be if the family good is various types of household services such as a 'mowed lawn', 'rinsed pool' and a 'clean house'. These goods yields no utility to the woman in case of divorce as the woman then don't have a garden, pool, or a house. In case she is divorced, she can only afford to live in an apartment.....

We can write the present value as:

$$EV = \left[v\left(F_M + \left(T - L_M\right)^{\alpha}\right) - kF_M\right](1+p) + 2wL_M - 2\left(B\left(wL_M\right)^2 - A\right)$$

where k is the price on market purchased household goods. The female spouse now chooses both the time allocation and how much of the household good she wants to purchase from the market. For an interior solution, L_M, $L_H \in \left(0, \bar{T}\right)$ and $F_M > 0$, the following first order conditions determine the optimal choices:

$$\frac{\partial EV}{\partial L_M} = -(1+p)\,v'(.)\,\alpha\left(T - L_M\right)^{\alpha-1} + 2w - 4Bw^2L_M = 0, \quad (5)$$

$$\frac{\partial EV}{\partial F_M} = (1+p)\left[v'(.) - k\right] = 0. \quad (6)$$

[10] This is, somewhat of a strange assumption...However, only a temporary assumption and plays no role for any of the results except for the welfare dispersion result.

As is clear from the first order condition in (5), the time allocation is determined so that the expected marginal payoff of producing own household goods equals the marginal payoff from market work. Equation (6) alone pins down the optimal consumption of the household good, $F = f(L_H) + F_M$.[11] Thus, the household goods that are not produced at home are bought in the market at the price k so to fulfill (6).

Consider now that we introduce a price subsidy, τ, for market purchased household goods. The price facing the buyer can then be written as $k = \tilde{k}(1-\tau)$. Introducing a price subsidy, $\tau > 0$, then corresponds to a reduction in the price of the market purchased household goods, i.e., a reduction in k in (6). However, before considering the policy experiment of a subsidy on market purchased household substitutes we have to specify the government budget restriction so to account for the financing of the reform. The government budget constrain will in the presence of a price subsidy to market produced household substitutes take the following form:

$$2B(wL_M)^2 - 2A = \delta\tau\tilde{k}F_M(1+p)$$

where $\tau\tilde{k}$ is the government subsidy on each market purchased household substitute. The results of the reform is summarized in the following proposition:

Proposition 10 *If the market for household substitutes is small, introducing a price subsidy on the purchased household goods will induce women to invest more in a market career, consume more household goods, reduce poverty among divorced women, and reduce the welfare gap between married and divorced women.*

Proof. ..... ■

A subsidy reduces the price on the market produced household goods. This induces an increase in the amount of household good purchased in the market, making the total consumption of household goods, $F = f(L_H) + F_M$, increase. As it is the market purchased goods that has become relatively cheaper, the amount of household goods bought from the market increases

[11] thus with a concave home production function and convex tax function is is possible to have an interior maximum (i keep the convex tax system although it may not be necessary, the concave home production function is however necessary in this particular set-up). Thus possible to have L_M, $L_H \in (0,T)$ and $F_M > 0$ *with* the appropriate shape of the utility function.

also at the expense of home produced household goods. Thus women will invest more in a market oriented career as they find it optimal to substitute household goods produced by own time for market produced household goods. The higher market investment also improve their economic situation in case of divorce, thus reducing poverty among divorced women.

Interesting to note is that the welfare dispersion between married and divorced women actually falls although married women increase their total consumption of the household goods, F. The reason is the following. Although married women get higher welfare due to the increased consumption of household goods, they also have to pay for it. The higher welfare following an additional unit of purchased household good is exactly counteracted by the price paid for the unit. However, when market purchased household goods replaces own production of household goods, married women face an additional cost in terms of lost home production. This particular loss is compensated by a gain in terms of higher market income. But noticeable this gain favours also divorced women. Thus welfare dispersion between married and divorced women falls.

However, the fact that this subsidy may induce a budget deficit calls for tax increases to balance the government budget. This, in turn, discourages women to invest in a market oriented career. These counteracting effects are, however, small when the market for household goods is small. The government's cost of financing a subsidy on household substitutes is then low. This implies that tax increases due to a subsidy on household substitutes will be modest, and so will the effect on women investment in market work. Clearly, if the market for household substitutes is large, introducing a price subsidy to household substitutes is going to call for tax increases. The impact on women investment in market work, poverty among divorced women, and welfare dispersion is then ambiguous. The only unambiguous conclusion we can make in this case is that consumption of household goods are going to increase when the price on the market produced household good is reduced.

4 Conclusions

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5 References

Rosen, S.,

Sweden and US comparison Women and part-time work

	Incidence of part-time: women	Incidence of part-time: men	Female share of fu
Sweden	22.6	7.6	43.8
US	19.4	7.3	43.1

Source: Women at Work: An Economic Perspective (2005).

Female employment rate by presence of children

	No children		One child		Two or more chil
	employment rate	gender gap	employment rate	gendergap	employment rate
Sweden	81.9	-0.4	80.6	9.8	81.8
US	78.6	7.2	75.6	17.4	64.7

Source: Women at Work: An Economic Perspective (2005).

Part-time work by gender and presence of children

	Women: no children	Women: one child	Women: two or more children	Men: no children	Men: with children
Sweden	14.6	16.7	22.2	5.2	3.4
US	10.1	15.8	23.6	3.5	1.8

Source: Women at Work: An Economic Perspective (2005).