Institute for FUTURES STUDIES

Thomas Lindh and Ying Hong

Swedish fertility swings and public expenditure for children

Arbetsrapport/Institutet för Framtidsstudier 2011:2
ISSN: 1652-120X
ISBN: 978-91-85619-78-8

Thomas Lindh and Ying Hong

Swedish fertility swings and public expenditure for children

Arbetsrapport/Institutet för Framtidsstudier, 2011:2
Working Paper/Institute for Futures Studies, 2011:2

Stockholm 2011

Swedish fertility swings and public expenditure for children

by

Thomas Lindh and Ying Hong

Institute for Futures Study, Stockholm (both) and Linnaeus University (TL).

email thomas.lindh@framtidsstudier.se, ying.hong@framtidsstudier.se or

thomas.lindh@lnu.se

Abstract

This paper studies whether Swedish fertility swings and variation in public expenditure for children are related events. In the 1930s Swedish birth rates had fallen to levels close to the death rates and in public discourse this was perceived as a major social and national crisis, spurring a range of social policy reforms. While total fertility rates in Sweden have varied over large spans the completed cohort fertility rates are almost constant around 2 children per woman for women born in the 20th century. Using unique data for the years 1930-1997 on public expenditure per eligible child for schools, child allowances and child care we estimate age-specific fertility for broad age groups as a function of these variables. The results indicate that the age group 25-29 is most sensitive to variations in this public expenditure thus providing a tentative explanation of the swings in period fertility in terms of policy induced tempo variation. School expenditure is negatively correlated to fertility while child care and child allowance is positively correlated. This pattern is consistent with a quantity-quality trade-off by the parents. To check the predictive power of the model we use data from 1998-2007 and get an excellent prediction of the fertility turn-around after 1999 for all age groups except 35 and above where we tend to under-predict at the 10-year horizon. Further research along these lines is needed to uncover the causal mechanisms of these very stable correlations.

Sammanfattning

Artikeln studerar huruvida svenska svängningar i fruktsamheten och variation i offentliga utgifter riktade till barn är relaterade händelser. På 1930-talet hade svenska födelsetal sjunkit till nivåer nära dödstalen och i den offentliga debatten uppfattades detta som en större social och nationell kris som gav upphov till en rad reformer i socialpolitiken. Medan den summerade fruktsamheten på årsbas har varierat över breda intervall har den fullbordade kohortfruktsamheten varit nästan konstant runt två barn per kvinna under 1900-talet. Med unika data för åren 1930-1997 på offentliga utgifter per barn i de relevanta åldersgrupperna för skola, barnbidrag och barnomsorg skattar vi den åldersspecifika fruktsamheten som en funktion av dessa variabler. Resultaten pekar på att åldersgruppen 25-29 är mycket känsligare för variationer i dessa utgifter. Därmed blir sådana variationer också en möjlig orsak till de förändringar i periodfruktsamheten som sker till följd av tidigareläggning eller senareläggning av barnafödandet som följd av politikförändringar. Skolutgifter är negativt korrelerat med fruktsamheten medan barnbidrag och barnomsorg samvarierar positivt med fruktsamheten. Det är ett mönster som är konsistent med en kvalitets-kvantitetsmodell av fruktsamheten där föräldrar väger antalet barn mot kvaliteten (omsorgen) ägnad åt barnen. Modellen valideras genom projektioner utanför skattningstidpunkten och ger utmärkta prediktioner av den vändpunkt i fruktsamhetstrenden som äger rum efter 1999 för alla åldersgrupper med ett visst undantag för de över 35 där den faktiska utvecklingen under 2000-talet varit snabbare än prediktionen och därmed underskattar fruktsamhetsutvecklingen på 10-årshorisonten. Fortsatt forskning kring dessa relationer är nödvändigt för att klarlägga orsaksmekanismerna bakom dessa mycket stabila korrelationer.

8 March 2011

Comments by Vegard Skirbekk at the International Conference on Low Fertility and Reproductive Health, Tokyo, 2008, by participants at the ESPE 2009 Conference in Sevilla, and at the Macro Seminar, Uppsala University are gratefully acknowledged. We are also grateful for funding from the Swedish Research Council and Riksbankens Jubileumsfond.
JEL codes: J11. J13, J18

Keywords: fertility swings, tempo effects, public child expenditure

1 Introduction

While in most countries decreasing period fertility has been associated also with a decreasing desired number of children and decreasing completed fertility rates, Sweden so far seems to be an exception. Swedish completed cohort fertility rates are close to 2 for all cohorts born since the 1890s, although the period total fertility rate has fluctuated between 2.6 in 1945 and 1.5 in 1999. In this paper we study the hypothesis that these swings have their roots in variations in social policy that affect the timing of births rather than the quantum of fertility.

The hypothesis implies that fertility in different age groups must be interacting differently with changes in public policy. Our approach here is to study the variation in age-specific fertility and in public expenditure per eligible child over a long period of time. Although the different kinds of public expenditure on children (school, child allowances and childcare) cannot be expected to completely explain individual fertility behavior it should be noted that these expenditures also reflect family policies, public and social attitudes and norms regarding children. We establish that there are stable correlations between public child expenditure and age-specific fertility. These correlations conform to theoretical expectations with respect to sign although in this context a causal interpretation would most likely be mistaken. However, we validate the stability of the model by out-of-sample projection.

Thanks to a generational analysis performed at the Swedish Ministry of Finance (Pettersson et al. 2006) we have access to age-specific estimates of public transfers and public consumption back to 1930 that we use to study this issue. We are able to estimate not only stable correlations of public policies with the variations of the total fertility rate but also find different regression coefficients for women at different ages during the period 1930-1997. Our results show that, consistent with theory, public school expenditure, which lowers quality costs for parents, has a negative correlation with fertility while child care and child allowances, which offsets female opportunity costs and lower quantity costs of children, has a positive association to fertility. Moreover, it turns out that the estimated models have strong predictive power also for the 10-year out-of-sample period after 1997.

Below replacement fertility has become a global demographic reality in the 21st century. In all industrially developed countries period fertility[1] (TFR) is either below the

[1] I.e. the total fertility rate which is the sum of the age-specific fertility rates in a given year.

natural rate of reproduction of about 2.1 children per woman or balancing just at the border. In conjunction with decreasing mortality rates at high ages this leads to rapidly aging populations and increasing dependency rates. This in turn leads to well founded concerns regarding the future sustainability of social security and care systems for the elderly. It is important to note that sustainability of the elderly welfare systems may well require investment in support systems for the young to relax economic constraints on childbearing and education. Although we do not believe that there is a direct link between child expenditure changes to individual behavior our work may still be useful for designing policies to balance a given society's rate of reproduction and education at levels consistent with future demands on the support base for elderly welfare. This level may well be below reproduction rates given other concerns like environmental pressures and depletion of natural resources but it cannot be too low if future generations shall be able to satisfy demands for elderly care and health care.

The plan of the paper is as follows. In the next section a brief literature review is provided and a discussion of a few important theoretical contributions to the enormous literature on the determinants of fertility. After that follows a section with some background facts from Sweden in order to set the stage. Data and model considerations are presented in the fourth section. Section five reports the empirical results. Section six is devoted to a discussion of the results and conclusions.

2 Some relevant studies and theories

The reasons for decreasing fertility vary across countries and cover economic, social, cultural and attitudinal factors. One of the most mentioned potential causes is the increased labor force participation of women and the conflict between motherhood and career. Yet in a recent article Feyrer et al. (2008) noted that the previously negative country cross-section correlation between female market work and fertility in the last decades has switched to positive. They suggest that higher degrees of gender equality aided by public policy are explaining why countries with high female labor force participation also have higher fertility. While this may be true in some sense for explaining country differences, we would from a Swedish vantage point argue that gender equality could as well be a consequence of public policy rather than a cause. The European experience rather points to gender equality as an outcome of policies that facilitate the combination of work and children (Ferrarini, 2006). The cross-sectional and longitudinal analyses of Myrskylä et al (2009) suggest that, at advanced levels of development, there is a threshold value of the Human Development Index[2] where the combined social and economic influences on fertility actually reverse the trend of fertility decline. Institutional settings and social policies that facilitate social and economic development in terms of social security, individual welfare, and human capital accumulation, thus may play a role for the reversal of previous trends in the demographic transition.

Job insecurity and economic uncertainty are also often believed to be important reasons for low fertility, especially during economic crises. These problems may be mitigated by government intervention, for example by providing reasonable maternity benefits, free or inexpensive child care facilities, flexible employment, and so on (Caldwell et al, 2002). Although cross-country studies has led some scholars to believe that government expenditures aiming at raising fertility has achieved little or nothing, studies based on specific countries, such as the Nordic countries and some Eastern European countries, give a different picture (Avdeev and Monnier, 1995; Hoem and Hoem, 1996; Ferrarini, 2006). The social policy framework differs significantly across the industrialized countries. There are studies that emphasize the role of the long-standing differences in social and economic institutions in shaping the diverse social and demographic outcomes among the European countries (for example Billari and Philipov, 2004). Ferrarini (2006) attributed the much more damped downward fertility trend in Scandinavian countries to the interference with social policies promoting dual-earner families. A series of Swedish studies focusing mainly on individual childbearing decisions (Sundström, 1991; Bernhardt, 1991, 1993; Hoem, 1990, 2000) suggest that both the relatively high fertility in Sweden and its fluctuations during the latest decades should be attributed largely to family policies that focus on the compatibility of family activities and the labor-force participation of women and men. Most of these studies are based on data at the individual level and focus mainly on the effect of one type of social policy while assuming the effects of other policies as exogenous. This is an appropriate methodology at the individual level, but at the macro level such assumptions are hard to defend. Since our study concerns behavior at the national macro level rather than individual behavior we will focus on the measurable co-variation of social policies and period fertility over a long period of time. This does not imply that we discard the importance of social, cultural or attitudinal

[2] The HDI is the equally weighted sum of three indexes for life expectancy ((life expectancy at birth minus 25 divided by (85-25)), education (2/3*ALI+1/3*GEI, where ALI is an adult literacy index and GEI is a gross enrollment index)d and a GDP index (log(GDP per capita/100) divided by log(40000/100).

factors, but since our data measure the economic impact of policies, our interpretation will be guided by economically based theories.

There are three main economic theories about fertility change in industrialized countries. One is the theory of relative economic deprivation which was advanced by Easterlin (1969). The other is the theory proposed by e.g. Becker (1960, 1981) and others about rising opportunity costs of childbearing associated with increased female-male relative wages, and third, the theory about a trade off between children's quality and quantity (Becker and Lewis 1973). The latter two theories are often combined.

Easterlin's cohort crowding hypothesis has a strong social dimension in assuming that young people acquire their consumption aspirations by the standard their parents can afford as they grow up. When faced with the labor market as young adults they then base their fertility decisions on whether they believe they can afford the same consumption standard if they get a child. Large cohorts will tend to meet less favorable labor market conditions than smaller cohorts because young and old labor is imperfectly substitutable.

Empirically the Easterlin Hypothesis has a rather checkered past in the literature that to some extent may be due to lack of relevant data. It is hard to obtain accurate measures of the consumption aspirations that Easterlin posit. While US data show evidence of cohort crowding in terms of increasing spread between wages for older and younger workers as a baby boom enters the labor market, this does not show up in for example Swedish data where rather the opposite is found. The link to fertility seems even more fragile although see Macunovich (1996) for a more positive view. One reason could be that in many countries policy responses to cohort-crowding and low fertility may obscure the links that Easterlin refers to.

Obviously the Swedish experience would be hard to directly reconcile with the Easterlin hypothesis since the fertile cohorts are fairly large also when TFR is high. However, the completed fertility rate (CFR) is actually at its lowest level for the very large cohorts born before World War II and there is a weak tendency that the 1940s cohorts had fewer children than those born in the 1930s and 1950s. It is quite dubious whether this can be tied to variation in the relative wages of male youngsters relative to their parental generation. Rather the 1940s cohort has done better in most respects than their parental generation, although this is very much the result of a rapid expansion of education (Ohlsson 1986, Dahlberg and Nahum 2003). Increasing female education would indeed have a similar effect on fertility. In any case the data we have will not allow for observing this effect.

Becker (1960) and Willis (1973) are two of the most important contributions to the so called New Home Economics. This approach emphasizes the household production aspect of having and raising children. Since females are conventionally assumed to take a larger share of household work (and empirically also do so) fertility decreases with the relative female/male market wage, ceteris paribus, since this raises the opportunity cost of household work. Since female education is a key component in raising the female relative wage increases in female education should contribute more than male education to lower fertility. This then opens an alternative way for education expenditure to give a negative effect on fertility, different from the quantity-quality trade-off below. Public support by cash allowances offsets part of the quantity cost as well as the opportunity cost. Subsidized child care substantially decrease the opportunity cost of female labor force participation.

The quantity-quality tradeoff (Becker and Lewis 1973) in fertility builds on a non-linear budget restriction where the quantity cost associated with the number of children multiplied by the quality costs for better education and upbringing tends to yield a strong substitution effect at rising incomes. Given that the income elasticity is higher for quality than for quantity this substitution effect is strong enough to offset the positive income effect on number of children, i.e. quantity, entirely. Thus higher income levels will be associated with decreasing fertility as incomes rise and shadow prices of the quantity of children rise. From a policy perspective this motivates making a difference between subsidies that mainly affect the parents' cost for quality (e.g. education subsidies) and subsidies that mainly decrease the cost for quantity, like housing and daycare subsidies that like cash allowances decreases quantity costs. The latter will be expected to have positive effects on fertility by offsetting quantity cost. Reducing quality costs on the other hand induces an increase in the level of quality investment, "which in turn induces an increase in the shadow price of quantity (…) and thus a relatively large decrease in quantity."(Becker and Lewis 1973, p. S283).

Most of the existing studies about fertility variation in Sweden are based on individual data. To our knowledge, Löfström and Westerberg (2006) and Stanfors (2005) might be the only time series studies in recent years that try to find the factors at the macro-level behind the fertility swings in Sweden. Löfström and Westerberg focus on a relatively short period 1965-1998. They find that increasing numbers of female students and increasing divorce rates were negatively associated with the TFR of the subsequent years, while the changes in female labor force participation, child allowance, and the childcare benefits had a positive but more sluggish effect. Stanfors (2005) studies the period from 1915 up to 2000 and finds evidence consistent with Easterlin's relative income hypothesis. She also finds evidence for the New Home Economics prediction that increasing relative female wages will affect fertility negatively. Moreover, Swedish fertility tends to be countercyclical before 1975 and becomes procyclical after that, most likely due to the introduction of parental leave insurance having made it more attractive to have children in good labor markets.

Hoem and Hoem (1996) discuss the issue from a family policy perspective.[3] They do not formally test any hypothesis but informally discuss how one may interpret the ups and downs in Swedish fertility as responses to general economic conditions and family policy reforms. They draw the conclusion that there is a strong underlying social norm of 2 children per family and that people are adapting fertility behavior to surrounding conditions by changes in timing rather than any change in the quantum of fertility. Björklund (2006) studies cohort fertility for women born 1925-1958 in a cross-national approach with eight other countries and comes to essentially the same conclusions.

Heckman and Walker (1990) also study Swedish cohort fertility (with data from a fertility survey in 1981) and note that correlations to aggregate female wage data weaken for the younger cohorts. One explanation is that these cohorts have been more exposed to substantial increases in parental-leave benefits and child care subsidies. Tasiran (1995) adds micro data on wages to the same data and finds the correlation to female wages even more fragile.

3 Background: Fertility swings and social policy evolution

Figure 1 presents the period total fertility rate of Swedish women since 1930. Sweden was one of the forerunners in the world where the fertility fell below the replacement level throughout the 1930s and early 1940s. Then the period TFR jumped back briefly to a peak of 2.6 in 1945 and thereafter remained above replacement level for about two decades up to a peak in the mid-1960s; followed in the 1970s again by another period of below replacement level fertility until the mid-1980s. Then period TFR rose to 2.1 in 1990 and declined again through the late 1990s to an all time low of 1.5 in 1999 and is in 2007 up to 1.9 again. No other country seems to exhibit such regular and strong swings although similar—but much weaker—echo effects can be observed in some other countries as baby boomers come into their fertile period. The short and very regular span of booms and busts, each lasting about a decade, is, however, peculiar to Sweden.

[3] They also provide a very useful calendarium dating family policy reforms from the 1930s up to 1997.

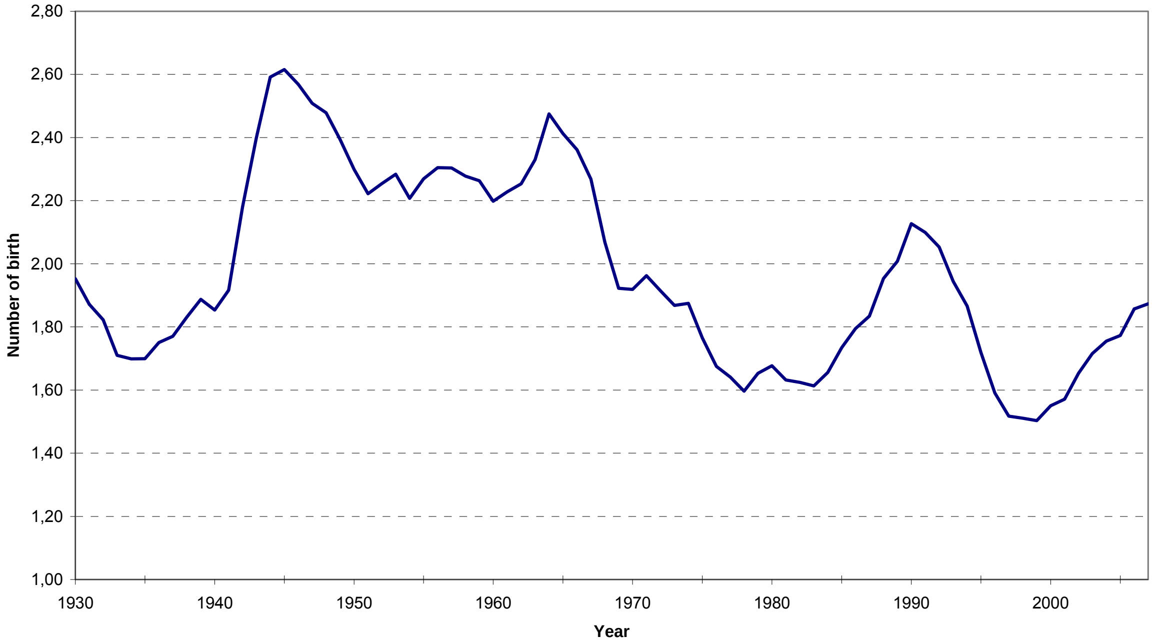

Figure 1 Total fertility rates for women in Sweden 1930-2007
Source: The Human Fertility Database, the Max Planck Institute for Demographic Research. **http://www.humanfertility.org/cgi-bin/main.php**.

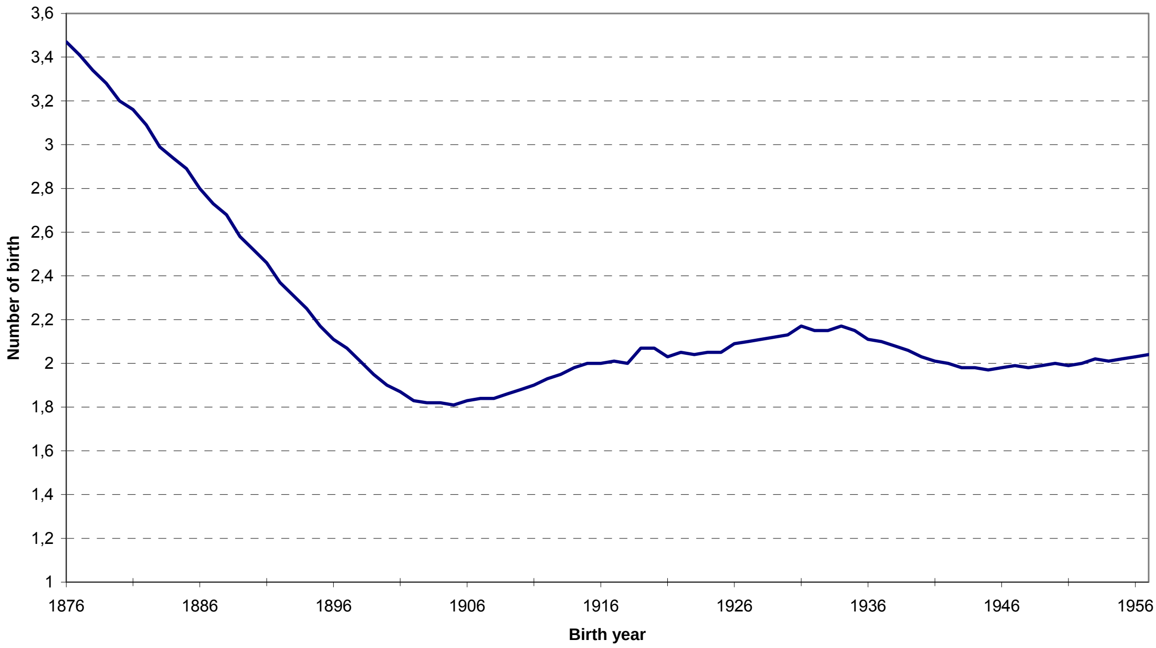

Figure 2 Cohort total fertility rate for Swedish women born 1876-1957.
Source: The same as Figure 1.

The completed fertility rates (Figure 2) for women born between the 1910s and early 1950s remain rather stable and vary slightly between 1.8 and 2.2. Note that the reproductive life span of these women covers mainly the period between the 1930s and the mid-1990s when the period TFRs vary significantly more and regularly. This indicates that the quasi-cyclicality is mainly due to tempo effects where the age pattern of giving birth changes over time. The changes in the timing of childbearing during this period are apparent in the yearly age-specific fertility[4] since 1930.

Figure 3 shows a clear trend of fertility decrease since the mid-1960s for women below age 25. In contrast, the fertility of women in their thirties increases significantly since the late 1970s, although with a temporary drop during the late 1990s. The fertility of women in ages 30-34 even reached a historically high level in the early 2000s when for the first time in the period the birth rate in this group surpassed that of the 25-29 age group. This pattern indicates a clear trend of fertility postponement among younger women and a relatively strong recuperation of fertility at older ages in Sweden during the previous decades.

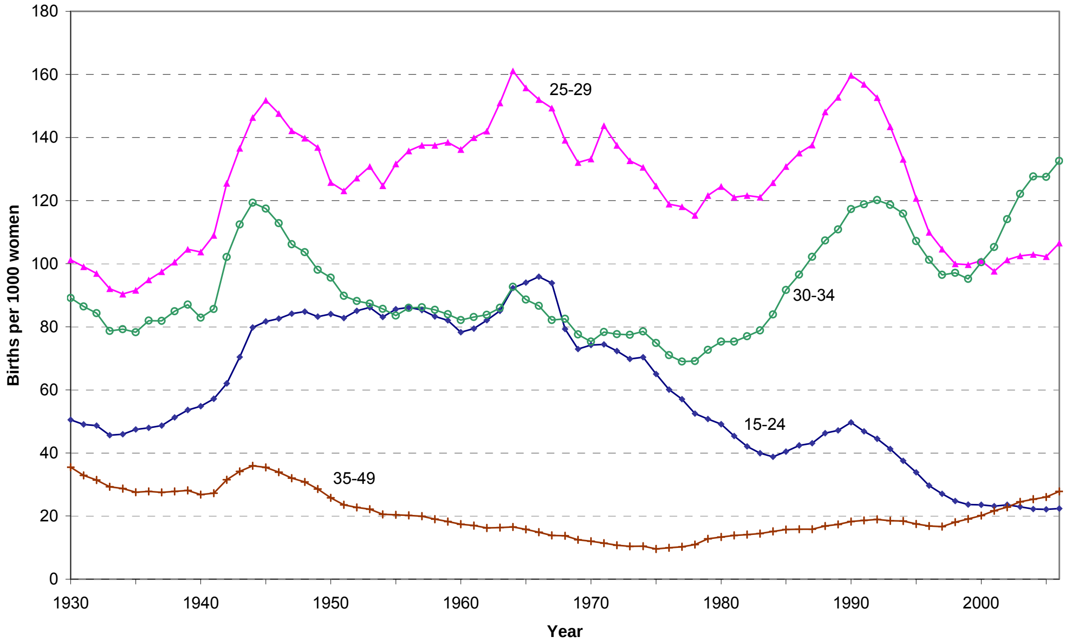

Figure 3 Age-specific fertility of Swedish women during 1930-2007.
Source: The same as Figure 1.

The age-specific fertilities over time also reveal that each of the fertility peaks since the 1930s resulted from fertility increases of women at different ages. The peak of the

[4] More precisely the average fertility for the annual cohorts within the designated age span.

mid-1940s was associated with a fertility increase of women at all ages. The following fertility decrease mainly involved women after age 25 while fertility of below 25 women was stable or increased. The fertility increase of the mid-1960s was mainly achieved by women below age 30, and the fertility decline afterward also occurred mainly among these women. The peak of the late 1980s and the early 1990s resulted mainly from fertility increases among women at ages 25-39, while the fertility of women at ages 20-24 had only a mild increase. In contrast to the previous peaks, the fertility increase since the early 2000s is almost exclusively concentrated to women at ages 30 and above.

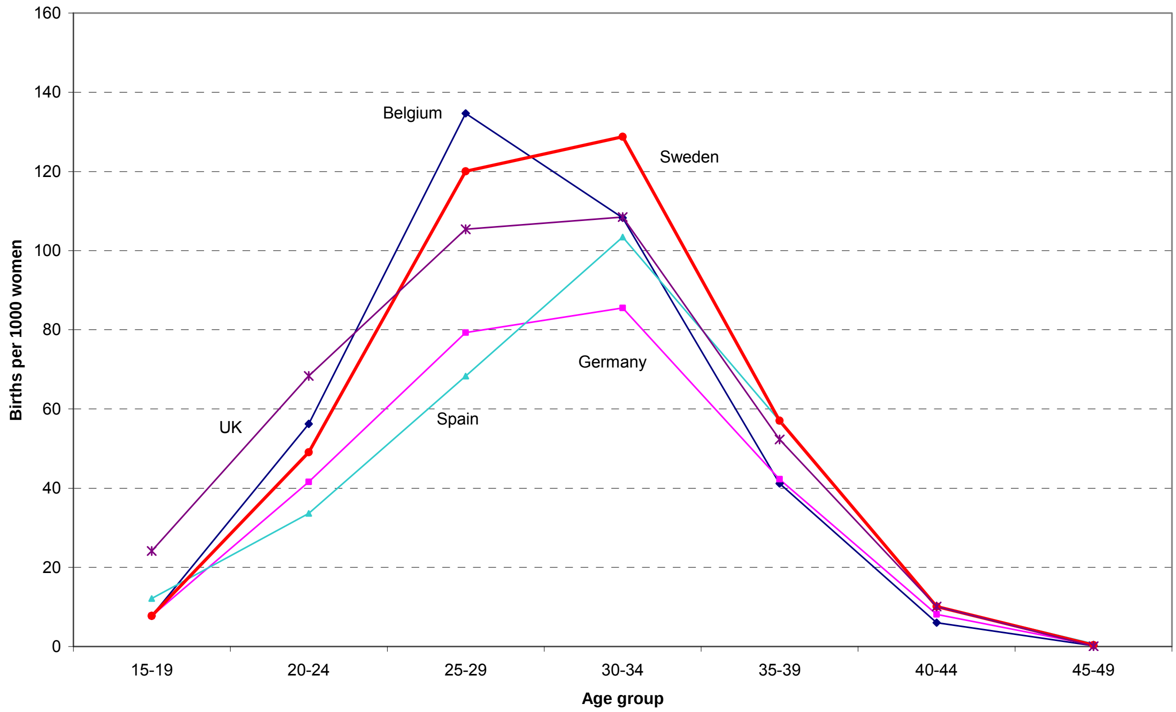

Figure 4 Age-specific fertility of women of some European countries during 2000-2005.
Source: UNPD, World Population Prospects, 2008 Revision.

There exists a strong tendency of fertility decrease among women at younger ages in both Sweden and other industrialized countries. The decreases in fertility at early ages, however, are offset to a large extent by increases at older ages in Sweden. Although there are fertility increases at older ages also in other European countries, the degree of increase is lower than that of Sweden. As shown by Figure 4, the fertility of Swedish women at ages below 30 was lower than in many other countries during 2005-2010 when the TFR of Sweden had recovered from a historical low level of 1.5 in 1999. The fertility of Swedish women at ages after 30 was, however, higher than the fertility of their counterparts in other European countries.

The evolution of social policies in Sweden from 1930 and forward is a rather gradual process where protection and support for mothers and children is introduced in a piecewise manner with rather frequent changes and extensions (see appendix for more details). Looking at Figure 5 we see, however, that there is a marked increase, almost a doubling of public consumption per child towards the end of the 1930s. Cash transfers start increasing in connection to the introduction of universal child allowances 1948. The public expenditure then increases up to the 1990s crisis.

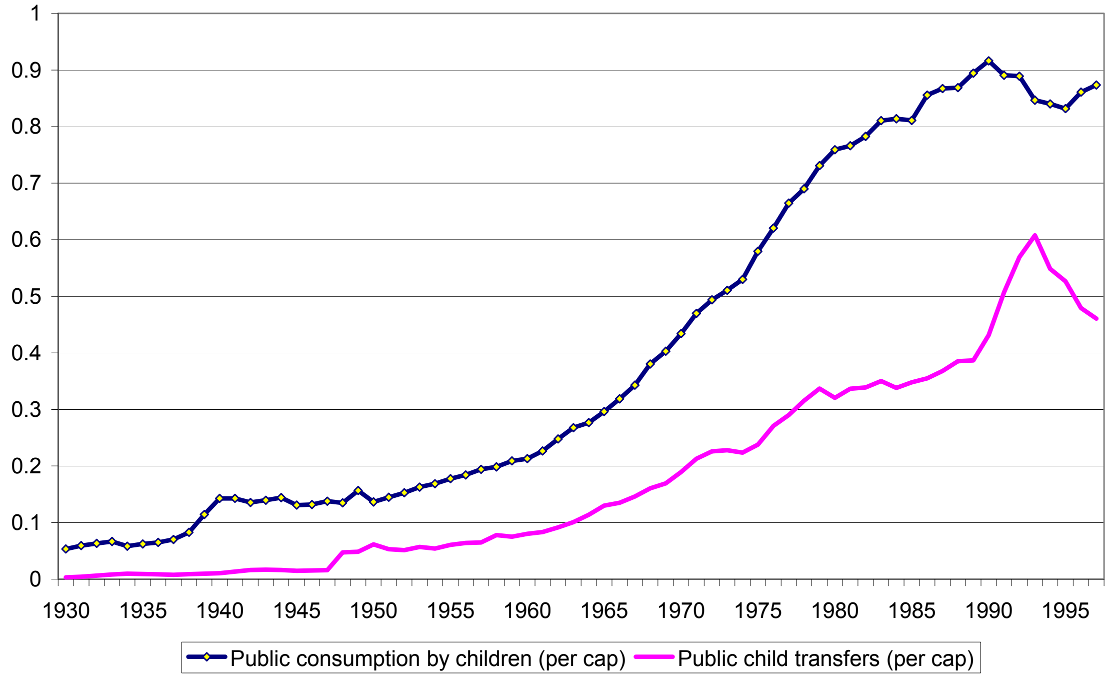

Figure 5 Public transfers and government consumption on average per child in millions of 1997 SEK 1930-1997. Computed from data provided by Pettersson et al. 2006.

In the 1940s not much happens during the war but the military draft of young males provides an increasing female labor demand.[5] After the end of the war it also did so except for women below 25. Sweden is therefore one of the few countries where TFR peaks in 1945 and then falls. The 1960s are golden years in Sweden with high growth rates and rapid urbanization and the big cohorts from the 1940s enter their reproductive period. In the 1970s economic problems and crises are common, but nevertheless public child related expenditure increases quickly.

At a first view it therefore seems reasonable to assume that the 1940s baby boom is associated with a general expansion of public consumption (other age groups have a

[5] Stanfors (2005) demonstrate a strong upward trend in female/male relative wages within manufacturing during the 1940s. This should have damped fertility and indeed she finds that with controls for cohort size and business cycle conditions, a negative relation to TFR is estimated.

similar pattern as the children in Figure 5). The fertility decline among women above age 25 after the world war may be associated with the rapid increase in the female/male wage rate. The baby boom in the 1960s may be associated with the introduction of maternity benefits in the late 1950s and early 1960s, as well as steadily increasing government expenditure in conjunction with very high growth rates in the economy and the introduction of extensive housing subsidies in the 1960s. The economic crises in the 1970s in conjunction with increased higher education and higher female labor force participation are associated with decreasing fertility rates especially for women below age 30, but increasing subsidies and full employment probably help to raise fertility again in the end of the 1980s. This development is interrupted by the crisis in the beginning of the 1990s and a rapid increase in the average age at first birth from 26 around 1990 to 29 in 2007. Fertility hits bottom at 1.5 in 1999. Intuitively at first look it thus seems that the hypothesis of a public policy interaction with TFR variation by tempo variation should be given some credibility in the Swedish context.

As theory warns different kinds of public consumption may have opposite effects on fertility. Increasing subsidies to education may decrease fertility by quantity-quality substitution, as well as intrusion of higher education into the prime reproductive period. Increased female education leads to higher opportunity and career costs from child birth. On top of that much of the labor demand from the expansion of the public sector was satisfied by increased female labor supply. The negative fertility effect from this was, however, partly offset by deliberate policies to increase female labor participation by generous parental leave provision, coupled with abandoning the previous co-taxation of married couples, expansion of the public child care, etc.

4 Data and model considerations

We first need to consider how macro data on period fertility and public child expenditures relate to the theory that is centered on individual micro behavior. A contemporary correlation between the dependent and the independent macro variables can arise for several different reasons none of which need imply a causal connection at the individual level. Both variables may be tied to some underlying third factor, or follow common trends. Restrictions in the environment (e.g. budget restrictions, see Becker 1962) may force a common macro behavior even if individuals are quite unaware of it. It may even be a pure coincidence. A parental decision to conceive a child has a waiting time of at least and often more than 9 months. Thus it may seem reasonable to expect a lag structure of the independent variables rather than contemporary values to influence decisions, but that is not necessarily the case. Some policy changes may be anticipated and indeed even caused by previous fertility development thus creating endogeneity problems at the macro level. Social network effects and attitudinal change can be expected to reinforce fertility tendencies in both directions thus tending to create serial correlation in the fertility variables.

For all the "independent" variables related to public child expenditure the size of child cohorts will affect the unit costs in one way or another; nominal cash allowances tend to lose value by inflation which in turn is affected by the age structure influence on supply and demand (Lindh and Malmberg, 1998); political decisions are influenced by observed period fertility. This implies a dynamically complex structure with macro feedbacks where also expectations of e.g. future crowding in school and child care may affect parental decisions. It would be rather naive to take macro correlations in a time series as evidence for a policy impact directly on the individual level. Such evidence can only come from well designed micro studies.

We also need to consider the kind of data that we have available. Although we have fairly long time series it is annual data so the degrees of freedom are limited. We simply cannot expect to disentangle the complex dynamics described above in a structural model approach so our study sets the more limited goal to study whether a reduced model is consistent with our hypothesis rather than formally testing it against all relevant alternatives. In order to validate the model we therefore do not primarily rely on conventional statistical hypothesis tests as we know beforehand that some of the assumptions these tests rely on are likely to be violated. Instead we test the predictive ability of the model out-of-sample. While this approach cannot prove a causal relation it does provide evidence of the stability of the estimated correlations. Given the data we have (see below) a simple regression model is

$$(1) \qquad y_t = \alpha_0 + \sum_k \beta_k a_{t-k} + \sum_m \gamma_m c_{t-m} + \sum_n \delta_n e_{t-n} + X_t \eta + \varepsilon_t$$

where y is the fertility variable, a is child allowances per eligible child, c is child care expenditure per eligible child, and e is compulsory school expenditure per eligible child. Control variables (if any are needed) are in the vector X.

Since there are minor differences in the different available series for fertility variables we decided to use fertility data from the Human Fertility Data Base (Max Planck Institute for Demographic Research) in order to have consistently computed fertility rates over the whole period 1930-2007.

Data on age-specific public transfers and consumption 1930-1997 has generously been provided by the Ministry of Finance. During the period 1968-1997 these data are based on the LINDA register data base.[6] Pettersson et al. (2006) have extended a sample of these data backwards to 1930 by using a pseudo-cohort approach and available information. Thus there is a marked difference in the quality of individual data before and after 1968 but the aggregated data that we use have been calibrated to reflect real information from National Accounts and other available sources; for example: income distribution, censuses and household surveys. The data on transfers and public consumption were originally attributed at the household level and then equally divided on individuals of different ages in the household leading to somewhat absurd consequences such as 80 year olds being attributed child allowances and so on. For our purposes, transfer and consumption components that could be directly tied to children have been reallocated to children within the eligible age intervals (see Figure 6). This was feasible for school expenditure from 1930, child allowances from 1948 (when they were introduced) and public child care from 1964 (when formal public child care was introduced).

For an out-of-sample test we have added to this corresponding data for 1998-2007 using official aggregate data divided by the number of eligible children in the population and ratio linked to the first mentioned series.[7]

Pre-testing of the data for child expenditure as well as the fertility variables showed that the hypothesis of a unit root in the series could not be rejected for practically all series. Thus a regression with level variables may yield spurious results. Hence a first action was to difference all variables and start studying the lag structure. Thus equation (1) refers to differenced variables y, a, c and e. Exploratory regressions using the TFR as dependent variable and different lag structures show the theoretically expected signs (see further below). There are a number of estimation problems though:

1. For obvious reasons structural breaks appear in the years when child allowance (1948) and public child care (1964) are introduced.
2. Serial correlation in the residuals tends to be high for several years back.
3. Evidence of bidirectional lag interactions may be causing endogeneity bias (correlation of right hand variables and residuals).

[6] LINDA is a longitudinal sample of individual data maintained at a level comprising three percent of the Swedish population. Register data on households, income etc. has been collected for a wide range of variables (Edin and Fredriksson 2000). In fact the data also includes 1998, though the sample we got access to ended in 1997.

[7] The data were collected with the help of Charlotte Thulstrup at the Institute for Futures Studies.

4. Kurtosis in the residuals (wide tails in the distribution) indicates that there might be outliers in the residuals.

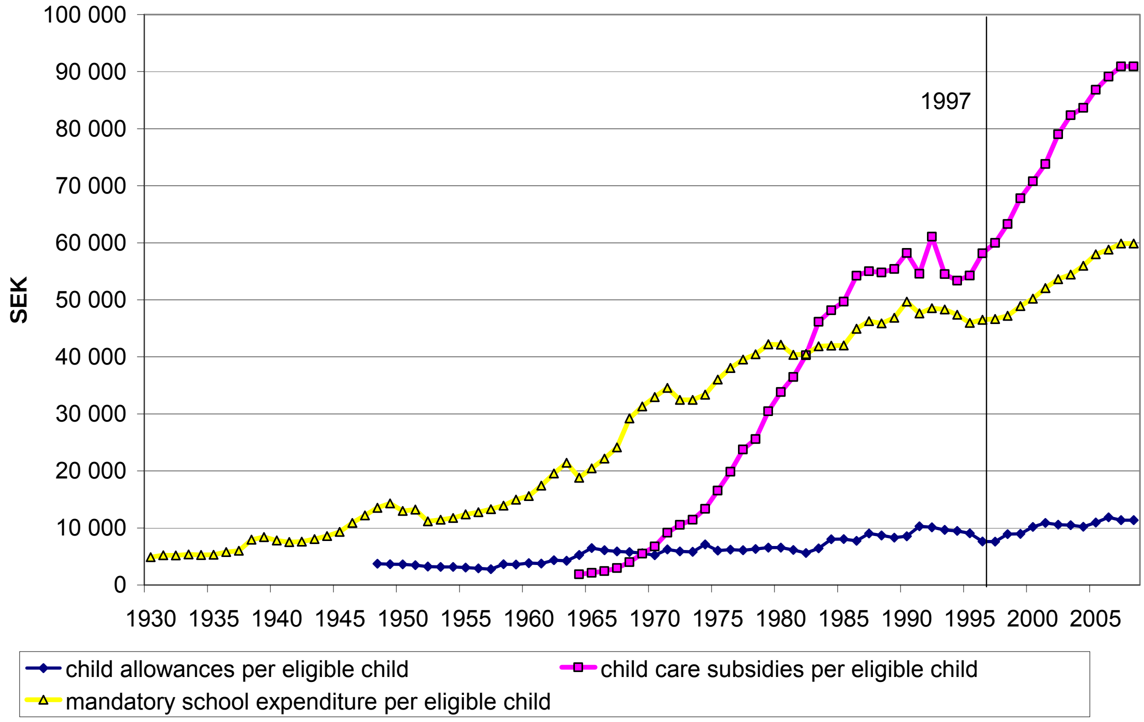

Figure 6 Expenditure on child support: mandatory education, child allowances and child care subsidies. All in 1997 SEK per eligible child. Computed from Pettersson et al. 2006. 1998-2007 are computed from aggregate numbers by the authors.

Our aim here is neither to maximize the fit of the regression, nor let formal hypothesis tests determine whether the public expenditure variables cause individuals to take a decision to have a child. We can and do test for statistical anomalies and sensitivity, however. In time series with limited degrees of freedom it is all too easy to over-fit models by estimation of too many parameters. On one hand, this means that we can not control for all possible direct and indirect plausible variables. On the other hand we do not want to estimate correlations that hinge on the influence of a few outlier values or are biased by correlation of the dependent variables and the residuals.

Although our ultimate goal is the estimation of coefficients for age-specific fertility as a function of public child expenditures we start off with total fertility rates in order to find a specification that avoids or at least diminish the estimation problems mentioned above. If we performed this specification search for each age-specific fertility variable we might end up with different specifications where it would be hard to discern whether differences in the coefficients for public child expenditures are significant and real or depends on differences in the specification.

5 Results

Exploratory regressions with TFR

Exploring the lag structure as noted above showed potential estimation problems. Below is briefly described the actions this led us to.

In the regressions with changes in TFR as dependent variable that are presented in Table 1 level shifts were added in 1948 and 1964 (both turned out negative) to deal with the structural break in trend introduced by new policies. Level shifts were introduced also in 1973 (positive) when the modern parental leave insurance and other reforms[8] took place, and also from 1992-1997 (negative) when the crisis changed the Swedish labor market structure. Note that level shifts in the differenced specification are to be interpreted as a shift in the linear trend slope.

Persistent autocorrelation in the residuals does not bias the coefficient estimates per se but it does lead to biased estimates of standard errors. Estimated standard errors are therefore in all tables corrected allowing for up to 5 lags by the Newey and West (1987) procedure for estimation of robust covariance matrices.

Bi-directional "causality" was detected as well. To deal with potential endogeneity and simultaneity instrumented models were estimated. Child care expenditure and school expenditure were reasonably well predicted ($\bar{R}^2$ around 0.25) using the first 5 lags of the independent variables, the level shifts and the first 5 lags of the dependent variable (except in the lag model in col. 4 where lags of the change in TFR were dropped). Child allowance, however, turned out to be non-predictable by the instruments in the first-stage regressions and was therefore left as exogenous. As shown by the significance level of the Jarque-Bera statistic normality of the residuals was not rejected in the instrumented models.

The level shifts are significant in the instrumented regressions. In the GMM estimation without lag where over-identifying restrictions are optimized (see Hansen 1982) also the policy variables become significant at the 1 percent level. The instrument restrictions are not rejected by Hansen's J-test.

[8] For example, divorce laws were liberalized and co-taxation of labor income was abandoned raising female opportunity costs for household production. This changed the general constraints on household bargaining and should also have an effect on fertility decisions.

To give an interpretation of the coefficients note that the variables are entered as fractions of a million SEK. Thus an increase by 10 000 SEK in for example child care expenditure per child per year in the first column is associated with an increase in TFR of around 0.04. The same amount in school expenditure decreases fertility by 0.08. Increasing child allowance with 10 000 SEK is associated with an increase of 0.18 in TFR. Child allowances are actually on this level since the 1980s.

Under the assumption that the coefficients could be considered marginal effects, the combined effect of public expenditure for children almost cancelled in 1997 (about 0.02) and in 2007 would be quite strong (about 1.0). The trend in TFR 1997 was hence (including the level shifts) clearly negative and in 2007 strongly positive. That it was negative in 1997 is information that was used to estimate the coefficients but the positive trend in 2007 is an out-of-sample prediction. In Figure 7 we see that the predictions out-of-sample of the period TFR according to the model in column 3 are quite accurate. The lag model in column 4 yield very similar projections although the coefficients of the policy variables are less statistically significant.

Table 1 Regressions with instrumental variables of the change in TFR 1930-1997. Absolute t-values below coefficients in parentheses

Dep var. ΔTFR	OLS	IV (2SLS)	GMM(no lag)	GMM (w lag)
Constant	0.036	0.079	0.070	0.066
	(1.00)	(2.91)	(5.21)	(2.98)
Lag of ΔTFR				0.0423
				(0.24)
Δschool expend/cap	-7.920	-20.048	-17.422	-8.503
	(0.81)	(1.78)	(3.31)	(1.19)
Δchild allowance/cap	10.858	11.811	11.732	9.247
	(1.03)	(1.16)	(2.79)	(1.29)
Δchild care	4.228	9.873	8.861	13.524
	(1.10)	(1.29)	(2.92)	(2.57)
level shift 1948	-0.046	-0.082	-0.070	-0.072
	(1.20)	(2.84)	(4.38)	(2.91)
level shift 1964	-0.038	-0.039	-0.043	-0.051
	(2.10)	(2.40)	(4.74)	(4.81)
level shift 1973	0.078	0.066	0.063	0.068
	(3.17)	(2.13)	(4.84)	(2.35)
level shift 1992	-0.128	-0.128	-0.120	-0.104
	(5.23)	(3.96)	(6.89)	(2.34)
adj R2	0.203	(0.282)	(0.291)	(0.281)
Hansen J p-value		0.946	0.946	0.865
Jarque-Bera p-value	0.013	0.440	0.272	0.198

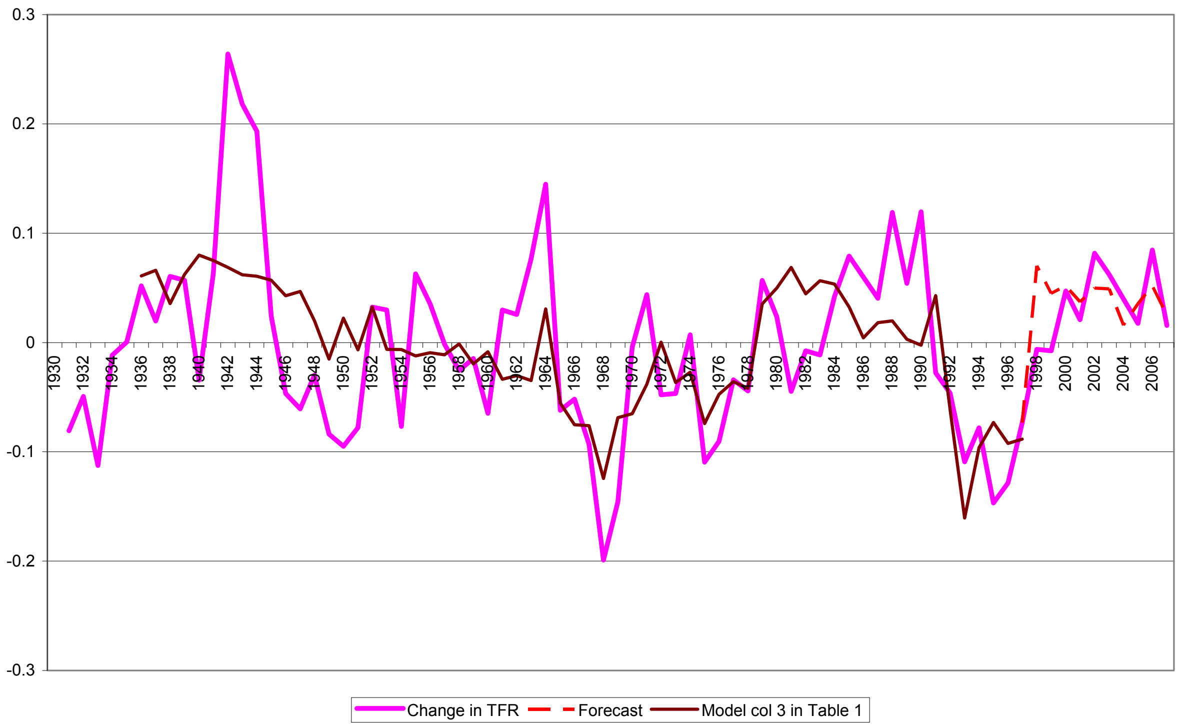

Figure 7 Model and projection from the regressions in column 3 of Table 1

The very reasonable out-of-sample projections over a period of 10 years provide evidence that our model does contain some useful information, although the model only explains some of the variation. In fact, given the observations of age-specific behavior in Figure 3 showing that variation in the TFR is related to different age-specific behavior at different points in time we should not expect the TFR model to fit very well since shifting tempo effects are causing substantial parts of the variation. The good projection is thus partly conditional on not too much change in age-specific behavior over this period.

Regressions of age-specific fertility on public child expenditures

In order to explain the fertility swings we need to investigate whether the shifts in age-specific fertility behavior are consistent with our model framework. The recent decline in fertility at young ages and the corresponding increase in older female fertility should be a consequence of policies having different impact on different age groups.

As remarked above we use the TFR specification with the optimized GMM specification for TFR for all age-specific regressions. This means that we run a risk of mis-specification for some age group that could be potentially serious. Our guard against this is again to use projections out-of-sample below as a test of the validity.

In Table 2 the lag model of column 4 in Table 1 is applied to grouped age-specific fertility rates in the age groups 15-24, 25-29, 30-34 and 35-49. The same instrument set as in Table 1 is used in order to minimize differences in specification. Thus the lag is used since the age-specific fertility rates are not part of the instrument set. The choice of groups is dictated by the consideration that most of the children are born by mothers between 25 and 34 and the other age groups are aggregated. The patterns we see are rather intuitive. Mothers above 30 are less affected by the quantity-quality effect through school expenditure. The estimates indicate that mothers at ages 25-29 seem to be most dependent on cash transfers and child care. The level shift of the parental leave reform is most significant for those over 30 and negative for the youngest. The level shifts are, however, much more modest than in the TFR model and will only affect age-specific fertility in the third decimal. Thus we can draw the tentative conclusion that most of the trend shifts in TFR are actually caused by relative changes in age-specific behavior. That level shifts are mostly significant only indicate that they serve the intended purpose of controlling for structural shifts. The Hansen J-statistics do not reject the over-identifying restrictions imposed by the GMM model so we have no indication of invalid instruments.

Table 2 GMM regressions of grouped average age-specific fertility rates. Absolute t-values below coefficient estimates in parentheses.

Dep var. ΔASFR	15-24 years	25-29 years	30-34 years	35+ years
Lag of ΔASFR	0.395	0.467	0.535	0.525
	(5.72)	(13.57)	(14.28)	(12.75)
Constant*1000	1.759	0.239	0.186	-0.010
	(5.04)	(0.52)	(1.07)	(0.09)
Δschool expend/cap	-0.354	-0.658	-0.167	-0.125
	(2.44)	(5.81)	(2.66)	(3.14)
Δchild allowance/cap	0.204	0.669	0.132	0.105
	(1.06)	(6.21)	(1.76)	(3.35)
Δchild care/cap	0.284	0.581	0.176	0.158
	(2.90)	(6.20)	(4.23)	(5.31)
level shift 1948*1000	-1.349	-0.577	-0.667	0.254
	(3.57)	(1.04)	(3.19)	(3.35)
level shift 1964*1000	-0.405	-1.104	0.170	0.235
	(1.09)	(3.09)	(1.42)	(2.10)
level shift 1973*1000	-1.313	1.489	0.626	0.407
	(2.77)	(3.55)	(5.24)	(4.49)
level shift 1992*1000	-1.062	-1.800	0.358	0.240
	(2.87)	(5.26)	(1.83)	(1.90)
dummy 1968	-0.008			
	(3.84)			
dummy 1942		0.012	0.003	0.003
		(9.94)	(7.48)	(10.24)

J-stat p-value	0.988	0.981	0.971	0.976
J-B p-value	0.427	0.251	0.636	0.476

Without the dummies for 1968 (in the estimation for the 15-24 age group) and for 1942 (all others) the assumption of normally distributed residuals is rejected. It is mainly the hypothesis of zero kurtosis that is rejected indicating overly influential outliers in the results that we have dummied out in Table 2. The interpretation of the dummies is that in these years we have an isolated deviation from the linear trend. Recalling that we in fact are predicting school expenditure and child care expenditure by lags of the variable set there is no specific reason why the outlier would be caused by events in the particular dummy year. Most likely the negative outlier for below 25 fertility has to do with the introduction of efficient and generally available contraceptives (the contraceptive pill and the loop) in the years just before 1968. Why 1942 stands out as a positive outlier for ages 25 and above is harder to imagine. Most of the kids born in 1942 must have been conceived in 1941. Sweden was neutral in World War II and the preceding years are highly economically expansive, which may be the explanation for rising fertility in spite of the world war. In any case the actual impact of the dummies is small.

The grouped age-specific fertility rates that we have used for the regressions in Table 2 are referring to the average one-year ASFR within the age interval. Due to shifts in both fertility patterns and variations in the cohort-sizes of the fertile population this average will apply to different one-year age classes in the interval over time. This introduces a certain fuzziness in the interpretation of the coefficients since it picks up, not only the tempo effects, but also variation within the age groups due to cohort-size effects. Using the total fertility rate over the same broad age groups instead, we can avoid that fuzziness at the price of a subtly different interpretation where the effects refer not to the reaction of the average age class but rather to the reaction to policies by the whole age group, without reference to any representative age class.

The patterns we see in Table 3 are in many respects similar to Table 2. Mothers above 30 are less affected by the quantity-quality effect through school expenditure. The estimates now indicate that mothers 30-34 as a group seem most dependent on cash transfers but it is still 25-29 that depend most on child care. The level shift of the parental leave reform is most significant for those over 30 and negative for the youngest. The Jarque-Bera tests for normality of the residuals have marginally higher p-values.

Table 3 GMM regressions of age-group total fertility rates. Absolute t-values below coefficient estimates in parentheses.

Dep var. ΔATFR	15-24 years	25-29 years	30-34 years	35+ years
Lag of ΔATFR	0.396	0.365	0.532	0.525
	(5.73)	(9.60)	(11.92)	(12.79)
Constant	0.018	0.013	0.001	0.000
	(5.04)	(5.65)	(0.57)	(0.09)
Δschool expend/cap	-3.546	-5.025	-2.162	-1.869
	(2.44)	(4.62)	(2.99)	(3.14)
Δchild allowance/cap	2.076	1.718	3.216	1.550
	(1.07)	(1.44)	(4.17)	(3.28)
Δchild care/cap	2.862	4.738	3.063	2.365
	(2.89)	(5.03)	(4.80)	(5.30)
level shift 1948	-0.013	-0.007	-0.002	-0.004
	(3.57)	(2.67)	(0.52)	(1.64)
level shift 1964	-0.004	-0.014	-0.008	-0.004
	(1.09)	(5.15)	(4.79)	(2.09)
level shift 1973	-0.013	0.004	0.008	0.006
	(2.77)	(1.26)	(3.56)	(4.50)
level shift 1992	-0.011	-0.025	-0.011	-0.004
	(2.84)	(6.71)	(4.30)	(1.93)
dummy 1968	-0.077			
	(3.84)			
dummy 1942		0.046	0.064	0.048
		(5.73)	(11.19)	(10.28)
J-stat p-value	0.988	0.982	0.980	0.976
J-B p-value	0.427	0.932	0.671	0.476

The fit of both variants (ASFR and ATFR) of these regressions is much better than for the TFR regressions. Although the conventional R-square measures are not really relevant as statistics for instrumental variables regressions, it can be noted that as compared to the TFR case adjusted R-square doubles for the age-specific regressions.

It is interesting to note that the lag variable becomes insignificant for the two older age groups, and it is only weakly correlated for the younger age groups indicating less problems with serial correlation than in the TFR case. The better fit within-sample of a specification of the model established by exploring TFR correlations may tentatively be interpreted as evidence that it is indeed the shifting tempo effects that cause the poor fit of the TFR model.

However, within-sample fit cannot be decisive for such conclusions. In spite of our efforts to get statistically significant correlations with as little bias as possible, it is obvious that we have omitted many potentially important variables. In order to verify that our regressions contain information useful for prediction we use the same out-of-sample method as for TFR above using the actual age class fertilities over the period. This is not a real forecast test, since a real forecast would need to predict the child expenditure variables, but it does test whether the correlation patterns estimated before 1998 remain stable.

In Figure 8 the fit of the model with grouped age-specific fertilities over the period 1930 to 1997 and the out-of-sample projections 1998-2007 are depicted. For a ten-year out-of-sample projection the performance is impressive. Only for the oldest group do we have a substantial under-prediction of the changes in age-specific fertility. Considering that we also predict from a date just before a turning-point in the trend this is unexpectedly good projection performance.

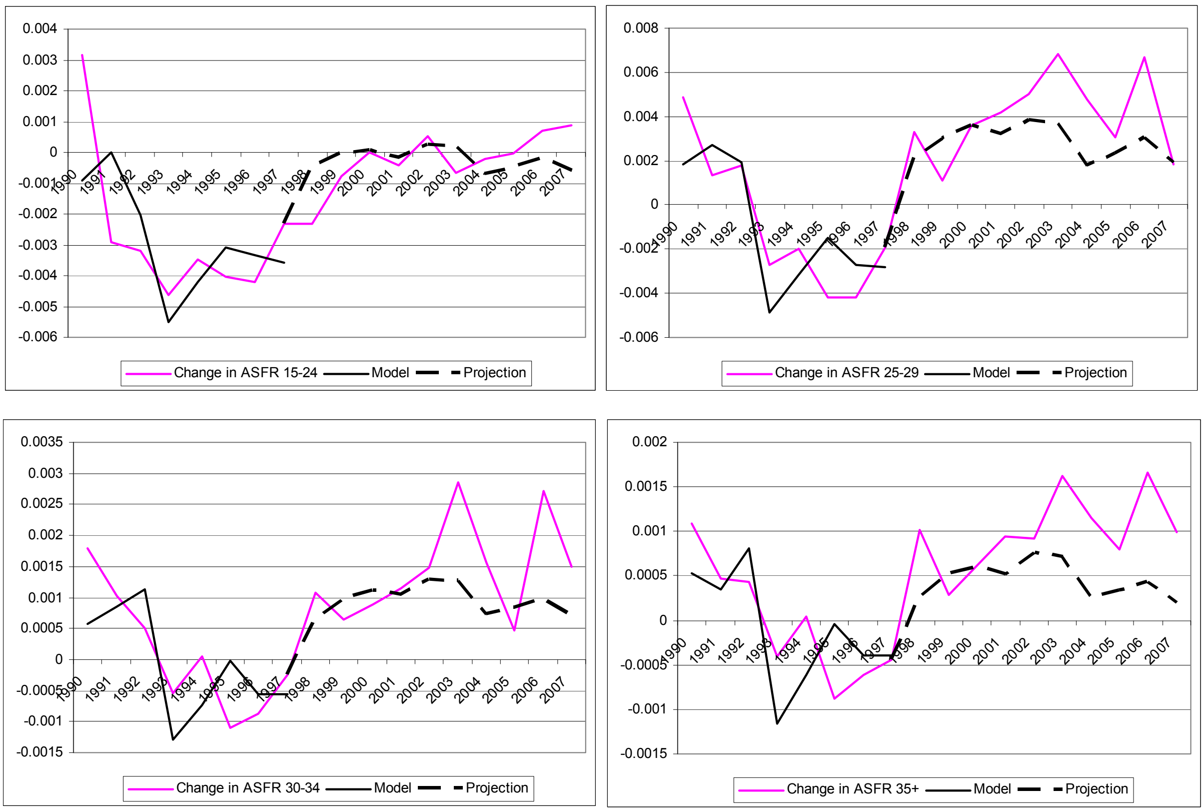

Figure 8 The out-of-sample projections of ASFR 1998-2007 for the four age groups.

In Figure 9 we show the results of the same exercise using age group total fertility rates. We achieve even somewhat better results in predicting turning points.

Obviously our child-related expenditures work as excellent leading indicators for Swedish fertility changes.

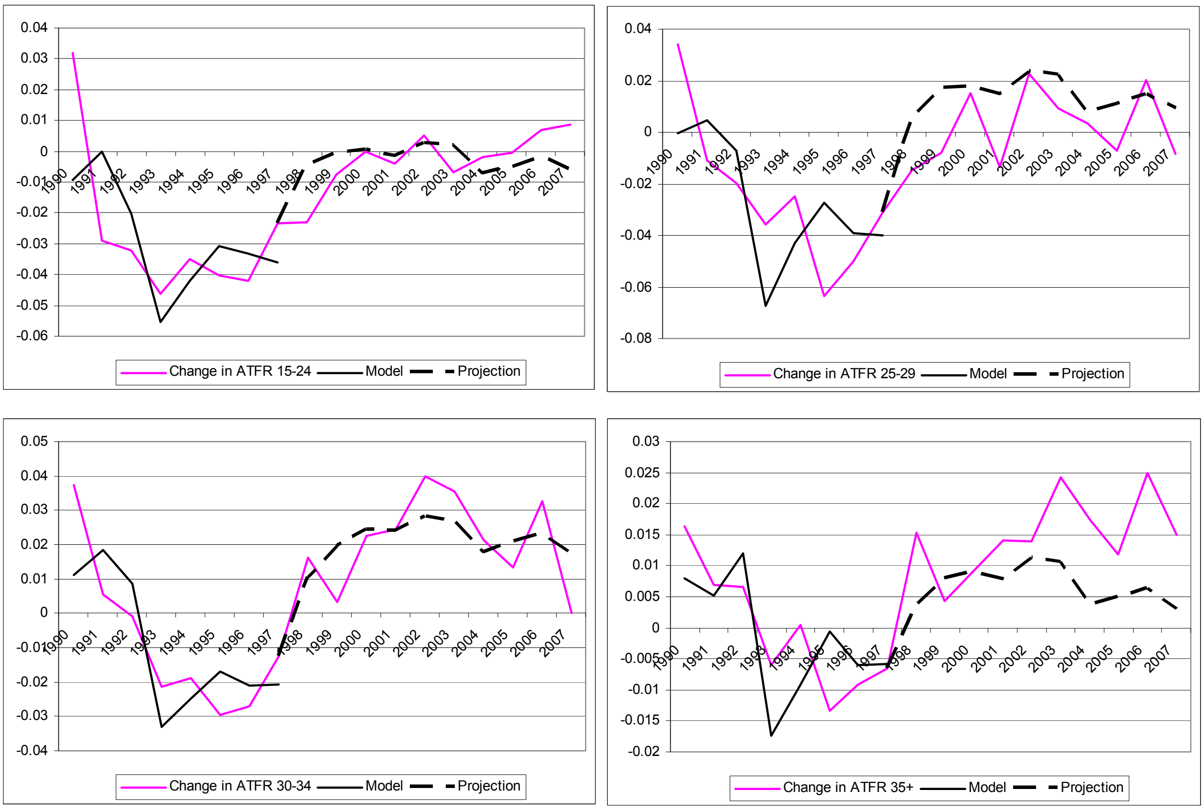

Figure 9 The out-of-sample projections of ATFR 1998-2007 for the four age groups.

Considering that it has been regarded as quite hard to predict short-term movements in the fertility rates these results are surprising. For long-term forward projections expenditure rates themselves have to be predicted, considerably increasing the uncertainty. The results may be more helpful for modeling and predicting short- or medium- term effects of different policy scenarios if it turns out that our results can be generalized to other contexts.

6 Discussion and conclusions

The regressions presented here only bear evidence of the partial correlations between the variables and is no causal evidence per se. In fact, there is a high likelihood that the causal links run in both directions and encompass rather complex macro feedback mechanisms. Using instrument variable techniques we are able to fit public expenditure per eligible child for school expenditure, child allowances and child care to model changes in age-specific fertility rates with little sign of bias in the statistics. Low fertility in Sweden has frequently motivated increases in family support which in general have been followed by increases in fertility. Instrumentation of the regressions using lagged variables clearly indicates that some causal links from expenditure to fertility exists, although not necessarily by a direct impact on individual behavior. The policies have somewhat different impact for different age groups in a way that is consistent with the delayed fertility patterns that we can observe in the Swedish fertility swings.

The age-specific regressions bear evidence that the partial correlations of age-specific fertility to the economic environment and the transfer system although homogeneous in terms of sign are heterogeneous in terms of strength. This pattern can explain why Swedish TFR varies much more strongly than completed cohort fertility. Adaptation in the intergenerational transfer system to decreasing birth rates tends to affect age-specific fertility in different ways.

The model exhibits a surprisingly good projection performance ten years ahead and out-of-sample. The results promise to be useful in modeling different policy scenarios and could conceivably be used in order to avoid further roller-coasting in the Swedish total fertility rates by balancing child-related expenditures in an appropriate way.

It is important to note that we predict changes in the fertility rates and the linear trends in the level of fertility are taken as given. Thus the conclusion is that in order to keep fertility at a given level child-related expenditure has to be balanced against increasing relative child costs (not least the opportunity costs of women).

It is, of course, untenable to maintain that fertility rates would be affected only by the three expenditure variables we have included in the regressions. For example, changes in parental leave benefits are left out, as are many other potentially important factors, e.g. increasing use of in-vitro fertilization, changing social attitudes towards children and gender equality, and so on and so forth. The evidence here should rather be thought of as a reduced form that reflects important parts of all the different factors, and not a structural model that gives an exhaustive explanation of behavioral mechanisms. The projection performance should be thought of as a promising leading indicator approach that may or may not be peculiar to the social and political institutions of Sweden. Further research is needed for assessing the generality of our conclusions.

References

Avdeev, Alexandre and Alain Monnier. 1995. A survey of modern Russian fertility. *Population*, an English Selection 7: 39-66.

Becker, Gary S. (1960) An economic analysis of fertility. In *Demographic and Economic Change in Developed Countries.* (NBER Conference Series No 11.) Princeton, NJ: Princeton University Press.

Becker, Gary S. (1962) Irrational Behavior and Economic Theory. *Journal of Political Economy*, 70(1), 1-13.

Becker, Gary S.1981, *A Treatise on the Family*. Cambridge, MA: Harvard University Press.

Becker, Gary S. and Lewis, H. Gregg (1973) On the Interaction between the Quantity and Quality of Children. *Journal of Political Economy*, Mar.-Apr. 1973, 81:2 (Part II): S279-S288.

Bernhardt, E., 1991. "Working parents in Sweden: an example for Europe?". In: *Human Resources in Europe at the dawn of the 21st Century*: 231-254. Eurostat Conference, November 27-29, 1991, Luxembourg.

Bernhardt, E., 1993. "Fertility and employment". *European Sociological Review* 9: 25-42.

Björklund, Anders (2006) Does Family Policy Affect Fertility? Lessons from Sweden. *Journal of Population Economics* 19(1), 3-24.

Billari, F. C. and D. Philipov. 2004. "Education and the transition to motherhood: A comparative analysis of Western Europe." *European Demographic Research Papers Series 3*. Vienna Institute of Demography, Vienna.

Caldwell, John C, Pat Caldwell, and Peter McDonald (2002) Policy responses to low fertility and its consequences: A global survey. *Journal of Population Research* 19(1), 1-24.

Dahlberg, Susanne and Nahum, Ruth-Aïda (2003) Cohort Effects on Earnings Profiles: Evidence from Sweden. Working Paper 2003:3, Institute for Futures Studies, Stockholm.

Easterlin, Richard A. "Towards a Socio-Economic Theory of Fertility: A Survey of Recent Research on Economic Factors in American Fertility," in S.J. Behrman et al, eds., Fertility and Family Planning: A World View, Ann Arbor: University of Michigan Press, 1969, 127-156.

Edin ,Per-Anders and Fredriksson, Peter (2000), LINDA - Longitudinal INdividual DAta for Sweden Department of Economics Uppsala University, Working Paper 2000:19.

Ferrarini, Tommy (2006) Families, States and Labour Markets: Institutions, Causes and Consequences of Family Policy in Post-War Welfare States. Cheltenham: Edward Elgar Publishing.

Feyrer, James; Sacerdote, Bruce and Stern, Ariel Dora (2008) Will the Stork Return to Europe and Japan? Understanding Fertility within Developed Nations. *Journal of Economic Perspectives* 22(3) Summer, 3-22.

Hansen, L.P. (1982) Large sample properties of generalized method of moments estimators. *Econometrica* 50, 1029-1054.

Heckman, James J. and James R. Walker (1990) The relationship between wages and income and the timing and spacing of births: Evidence from Swedish longitudinal data. *Econometrica* 58(6), 1411-1441.

Hoem, Britta and Hoem, Jan (1996) Sweden's family policies and roller-coaster fertility. *Journal of Population Problems* 52(3-4), 1-22.

Hoem, B., 2000. "Entry into motherhood in Sweden: the influence of economic factors on the rise and fall in fertility, 1986-1997". *Demographic Research* 2(4).

Hoem, Jan, 1990. Social policy and recent fertility change in Sweden. *Population and Development Review* 16, 735-748.

Lindh, T and B Malmberg, (1998) Age structure and inflation – A Wicksellian interpretation of the OECD data, *Journal of Economic Behavior and Organization*, July, 36(1), 19-37.

Löfström, Åsa and Westerberg, Thomas (2006) Variations in Fertility - a Consequence of Other Factors Besides Love? Umeå Economic Studies 681, Umeå University, Department of Economics.

Macunovich, Diane J. (1996) A Review of Recent Developments in the Economics of Fertility. In Menchik, P. L. (ed.) *Household and Family Economics.* Boston, MA: Kluwer Academic Publishers.

Myrdal, Alva and Myrdal, Gunnar (1934) Kris i befolkningsfrågan (Crisis in the population issue). Bonniers förlag, Stockholm.

Myrskylä, Mikko, Hans-Peter Kohler and Francesco C. Billari (2009) Advances in development reverse fertility declines. *Nature* 460, 741-743.

Newey, Whitney K. and Kenneth D. West (1987) A Simple, Positive Semi-Definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix. *Econometrica* 55(3), 703-708.

Ohlsson, Rolf (1986) *Högre utbildning och demografisk förändring* (Higher education and demographic change). Ekonomisk-historiska föreningen, Lund.

Pettersson, Thomas; Pettersson, Tomas and Westerberg, Anna (2006) *Generationsanalyser – omfördelning mellan generationer i en växande välfärdsstat* (Generational analysis – redistribution between generations in a growing welfare state.) ESS Report 2006:6, Swedish Ministry of Finance.

Sundström, M., 1991. "Sweden: supporting work, family, and gender equality". In: Kamerman, S., and A. Kahn, eds, *Child Care, Parental Leave, and the Under 3s: Policy Innovation in Europe*: 171-200. Westport, Connecticut: Auburn House.

Tasiran, Ali (1995) Fertility Dynamics: Spacing and Timing of Births in Sweden and the United States. In *Contributions to Economic Analysis Series*, North-Holland Publishing Company. Number 229, 329 pages

Stanfors, Maria (2005) Explaining Fertility Variation in Twentieth Century Sweden. Manuscript , Lund University.

Willis, Robert J. (1973) A New Approach to the Economic Theory of Fertility. *Journal of Political Economy* 81, S14-S64.

Appendix: The evolution of social policy in Sweden

In this appendix we give a brief review of major changes in family related policies and events in Sweden. We owe Hoem and Hoem (1996) for compiling most of the facts below.

In the 1930s social policies evolve fast in Sweden, although only minor parts would count directly as family policy. In 1931 some groups get the right to maternity leave and in some cases even modest cash benefits. 1938 some benefit is given to all mothers and single mothers receive extra support. In 1939 job security is guaranteed by forbidding dismissal due to pregnancy or marriage. It is hard to believe that these minor although important reforms caused the later baby boom. However, the whole system of social security improves during the 1930s by improved employment protection, social insurance for sickness etc. and an economic boom starts in the mid 1930s.

In the 1940s the military draft of young males provides an increasing female labor demand. In 1948 a universal child allowance is introduced when TFR is but remains above 2 for the whole 1950s. After World War II both transfers and public consumption enters an increasing trend. In 1955 a universal maternity leave for three months with a low benefit is introduced. In 1963 this is extended to 6 months with a low earnings related benefit. In 1964 the contraceptive pill is introduced and in 1967 the loop. The 1960s are golden years in Sweden with high growth rates and rapid urbanization.

In the 1970s economic problems and crises are common, paid paternity leave becomes an option in 1974 and the benefit level increases to 90 percent of earnings and the divorce law is liberalized. Separate taxation of spouses already in 1971 changes the restrictions on household bargaining. 1975 parental leave is extended to 7 months paid at 90 percent. 1976 free abortion is introduced. 1977 longer leave for sick children. 1978 parental leave is further extended to 8 months with 90 percent pay and one month at a low flat rate. 1979 parents get the right to part time work (75 percent) as long as children are in pre-school age. Child transfers stop increasing in the beginning of the 1980s although in 1980 parental leave is further extended to 9 months with replacement and 3 months at a flat rate. At the same time a speed premium for having the next child within 24 months is introduced together with two months of paid leave to attend to sick children and some other minor changes.

In 1982 an extra child allowance is introduced for three or more children and in 1986 the speed premium period is extended to 30 months. Towards the end of the 1980s child transfers are expanding again but this trend is broken in the early 1990s with the Swedish economic crisis and also public consumption per child goes down. 1989 parental leave is further extended to 12 months paid at 90 percent and 3 months at a low flat rate. Paid leave for sick children is extended to 3 months in 1989 and 4 months in 1990. 1995 parents are granted the right to part time work when they have children that are 8 years old or below.

In 1995 benefits for parental leave are limited to 80 percent of regular earnings and one month is reserved for the father and one for the mother, while the other 10 months can be shared. In 1996 the income replacement rate is further limited to 75 percent. 1998 the benefit level was restored to 80 percent. In 2002 two months were reserved for each parent and paid leave extended to 13 months.

Former Working Papers:

- **Arbetsrapport/Institutet för Framtidsstudier; 2000:1- 2008:15,** se www.framtidsstudier.se.

- **Arbetsrapport/Institutet för Framtidsstudier; 2009:1**
Enström Öst, Cecilia, *The Effect of Parental Wealth on Tenure Choice. A study of family background and young adults housing situation*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:2**
Gartell, Marie, *Unemployment and subsequent earnings for Swedish college graduates. A study of scarring effects*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:3**
Bergman, Ann & Jan Ch Karlsson, *Från shopping till sanningsserum. En typologi över förutsägelser*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:4**
Amcoff, Jan; Möller, Peter & Westholm, Erik, *När lanthandeln stänger. En studie av lanthandelns betydelse för flyttning in och ut och för människorna i byn*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:5**
Lundqvist, Torbjörn, *The Emergence of Foresight Activities in Swedish Government Authorities*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:6**
Thalberg, Sara, *Childbearing of students. The case of Sweden*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:7**
Baroni, Elisa; Žamac, Jovan & Öberg, Gustav, *IFSIM Handbook*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:8**
Lundqvist, Torbjörn, *Socialt kapital och karteller*
- **Arbetsrapport/Institutet för Framtidsstudier: 2009:9**
Hernández Ibarzábal, José Alberto, *Energy policy and regulatory challenges in natural gas infrastructure and supply in the energy transition in Sweden*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:10**
Lundqvist, Torbjörn, *Strategisk omvärldsanalys vid myndigheter*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:11**
Minas, Renate, *Activation in integrated services?. Bridging social and employment services in European countries*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:12**
Bohman, Samuel, *Omvärldsanalys i statliga myndigheter. Framväxt, organisation och arbetsmetoder*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:13**
Blomqvist, Paula & Larsson, Jakob, *Towards common European health policies. What are the implications for the Nordic countries?*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:14**
Elowsson, Maria, *Service utan lokal närvaro?. Förändringar av statlig direktservice i Dalarnas län under 2000-talet*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:15**
Ström, Sara, *Housing and first births in Sweden, 1972-2005*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:16**
Gartell, Marie. *Stability of college rankings. A study of relative earnings estimates applying different methods and models on Swedish data*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:17**
Alm, Susanne. *Social mobilitet och yrkestillfredsställelse – spelar mamma och pappa någon roll?*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:18**
Hallberg, Daniel. *Balansen mellan de unga och de gamla. Intergenerationella resursomfördelningar och en åldrande befolkning*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:19**
Johannesson, Livia*. Könsperspektiv inom framtidsstudier. En studie av tidskriften Futures: the journal of policy, planning and futures studies 1968-2008*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:20**
Nilsson, Anders & Estrada, Felipe. *Kriminalitet och livschanser. Uppväxtvillkor, brottslighet och levnadsförhållanden som vuxen*

- **Arbetsrapport/Institutet för Framtidsstudier; 2009:21**
  Östh, John; van Ham, Maarten & Niedomysl, Thomas. *The geographies of recruiting a partner from abroad. An exploration of Swedish data*
- **Arbetsrapport/Institutet för Framtidsstudier; 2010:1**
  Meagher, Gabrielle & Szebehely, Marta. *Private financing of elder care in Sweden. Arbuments for and against*
- **Arbetsrapport/Institutet för Framtidsstudier; 2010:2**
  Niedomysl, Thomas & Amcoff, Jan. *Is there a hidden potential for rural population growth in Sweden?*
- **Arbetsrapport/Institutet för Framtidsstudier; 2010:3**
  Gartell, Marie. *The College-to Work Transition during the 1990s. Evidence from Sweden*
- **Arbetsrapport/Institutet för Framtidsstudier; 2010:4**
  Esser, Ingrid & Ferrarini, Tommy. *Family Policy, Perceived Stress and Work-Family Conflict. A Comparative Analysis of Women in 20 Welfare States*
- **Arbetsrapport/Institutet för Framtidsstudier; 2010:5**
  Baroni, Elisa. *Effects of Sharing Parental Leave on Pensioners' Poverty and Gender Inequality in Old Age. A Simulation in IFSIM*
- **Arbetsrapport/Institutet för Framtidsstudier; 2010:6**
  Korpi, Martin & Abbasoğlu Ösgören, Ayse. *Does Immigration Hurt Low Income Workers?. Immigration and Real Wage Income below the 50th Percentile*, *Sweden 1993-2003*
- **Arbetsrapport/Institutet för Framtidsstudier; 2010:7**
  Montanari, Ingalill & Nelson, Kenneth. *Health Care Developments in EU Member States. Regressing Trends and Institutional Similarity?*
- **Arbetsrapport/Institutet för Framtidsstudier; 2010:8**
  Kumlin, Johanna. *Har kvinnor och män blivit mer jämnt fördelade över yrken, organisationer och arbetsplatser i Sverige under perioden 1990-2003?*
- **Arbetsrapport/Institutet för Framtidsstudier; 2010:9**
  Minas, Renate. *(Re)centralizing tendencies within Health Care Services. Implementation of a new idea?*
- **Arbetsrapport/Institutet för Framtidsstudier; 2010:10**
  Mkandawire, Thandika*. On Tax Efforts and Colonial Heritage in Africa*
- **Arbetsrapport/Institutet för Framtidsstudier; 2010:11**
  Kuivalainen Susan and Nelson, Kenneth. *The Nordic welfare model in a European perspective*
- **Arbetsrapport/Institutet för Framtidsstudier; 2010:12**
  Strömblad, Per and Bengtsson, Bo. *Political Participation of Ethnic Associations. Exploring the Importance of Organisational Level Differences in Resources, Motivation and Recruitment Networks*
- **Arbetsrapport/Institutet för Framtidsstudier; 2010:13**
  Alm, Susanne; Bäckman, Olof; Gavanas, Anna och Kumlin, Johanna. *Utsatthetens olika ansikten. Begreppsöversikt och analys*
- **Arbetsrapport/Institutet för Framtidsstudier; 2010:14**
  Lundqvist, Torbjörn. *Visioner om IKT i arbetslivet. Från distansarbete till arbete när som helst och var som helst?*
- **Arbetsrapport/Institutet för Framtidsstudier; 2010:15**
  Johansson, Peter. *Sociala rättigheter och migration. Det svenska pensionssystemet i internationella situationer 1946-1993*
- **Arbetsrapport/Institutet för Framtidsstudier; 2011:1**
  Pelling, Lisa; Hedberg, Charlotta; Malmberg, Bo. *Remittances from Sweden. An exploration of Swedish survey data*

ISSN: 1652-120X
ISBN: 978-91-85619-78-8