



Master's Thesis of International Studies

Women's Socio economic Participation in Reshaping the Fertility pattern

-focusing on Sweden(2005-2020)-

스웨덴의 출산율과 여성의 사회경제적 참여 간의 상관관계 분석(2005-2020)

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Abstract

The present study provides an investigation of patterns in fertility among women in Sweden from 2005 to 2020. It aimed to figure out the relationship between women's economic participation and the fertility rate by analyzing the variables- average working hours, number of women working overtime, average age of marriage, average salary of women, etc. My research is focused on analyzing fertility patterns in Sweden with the reciprocal association of immigration, women's education and economic participation. I added immigration rate as one of my variables since it turned out that the foreign-born women's childbearing has a greater impact on childbearing in the country as a whole. By investigating changes in the association between women's socioeconomic status, labor market activity and fertility outcomes during the period where Sweden's fertility decreased drastically, this study reaches two main conclusions.

■ keyword :| Total Fertility Rate| Total Working Hours| Immigration| eduation 여성의 경제활동 참여 증가, 가족의 형태와 기능의 변화 및 노동시장에서의 고용불안정이 심화되면서 저출산 문제는 우리 사회가 직면한 가장 심각한 사회문제 중 하나가 되었다. 사회변화에 따라 일가정양립을 가능케하는 사회정책적 지원이 출산율을 유지하는 주요한 요인이라고 보고 이 연구를 진행하였다. 북유럽 국가들도 마찬가지로 출산을 장려하기 위한 다양한 정책을 펼쳤는데, 이중에서도 여성친화적인 복지로 유명한 스웨덴의 2005 년부터 2020 년까지의 출산율 증감 추이를 분석해보고자 한다. 이 과정에서 이민자가 증가했던 기간과 감소한 기간으로 구분하여 패널 분석을 진행했다. 현대사회에서 경제활동은 교육과 밀접한 관련을 가지고 있기에 교육과 관련된 변수를 출산율의 요인으로 보고자 스웨덴 상위 교육기관 여성 우수 졸업자의 수와, 여성의 석 박사 진학수, 그리고 석박사 학위 소지자의 평균 임금을 사회 활동 참여증대 요인으로 보고자 분석에 포함하였다. 또한 본 연구에서 진행하는 출산율 요인분석에서는 선진국에서 나타나는 꾸준한 이민 증가세를 고려한 요인분석을 진행하려고 한다. 이민률이 꾸준한 증가세를 보이고 있는 스웨덴 같은 선진국에서는 이민과 출산율이 밀접한 관계를 가지고 있기 때문이다. 나아가 2010 넌 이래로 스웨덴의 출산율 감소를 초래한 사회적 정책적인 변화 또한 살펴보고자 한다.

주요어 : 스웨덴; 이민자; 교육 참여; 고용; 출산율 **학 번 :** 2018-26674

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Chapter 1. Introduction

1.1. Study Background

The position of women within the family and the society has long been recognized as a crucial factor in determining fertility patterns. Along with prior studies, until the mid-1970s, the commonly held view was that fertility fell together with education. This view was consonant with the classic model of the demographic transition, which hypothesized a steady fertility decline concurrent with the process of socioeconomic development. A large body of research has proven the point and have substantiated that women's educational advancement is a powerful agent of social change and a promising catalyst for fertility decline. In general, the popular belief was an increase in female education at the individual level is associated with a decrease in their marital fertility but its magnitude varies from country to country. Since in demographic research, Sweden often stands out as a forerunner in the development of important aspects of an ideal welfare state with the best demographic data in the world. It is very common to associate the relatively high fertility in Sweden and its Nordic neighbors with its policies and the characteristics of the Nordic welfare regime. However Sweden's high fertility started to fall from 2010 which I found interesting.

Sweden had a relatively high fertility during 1980s to 1990s, the annual Total Fertility Rate(TFR) for Sweden was around just under 1.8, which is a bit lower than the corresponding level in France and well above the level in West Germany. The recuperation of fertility levels in the Nordic countries during the 1980s is often thought to be linked with the introduction and extension of various family-related policies. In the early 1990s, the Swedish baby boom with remarkably high fertility attracted global attention. Until the late 1900s public policies in Sweden continued to aim at promoting

gender equality and the reconciliation of family and work. The role of higher compatibility between female employment and parenthood, making family activities and the labor force participation of women and men compatible was the key to the setup of the Swedish welfare regime. The Swedish parental-leave system and public childcare was established in the 1970s and expanded in the 1980s, with the other Nordic countries following the same development though at a somewhat slower pace. A specific component of the present Swedish system, the so-called 'speed premium', was also introduced in the 1980s and contributed to the fertility increase during that decade. It provided incentives for women to have their children at relatively short birth intervals (Hoem 1990, 1993b; Andersson 1999; Andersson, Hoem and Duvander 2006). To sum up Sweden was pictured as a welfare state encouraging fertility increase until the late 1900s proven by many researches that delved into the institutional changes that helped women combine production and reproduction.

Little attention has been devoted to the interplay between immigration and fertility rate by economists. Also, this has not been carefully examined in Nordic countries compared to most other developed countries, since the Nordic countries have high levels of completed fertility.

I chose Sweden as my target country in order to illustrate the popular belief that Sweden's fertility rate is no longer all time high. According to current articles on Sweden, sixty-nine Swedish women gave birth at the age of 49 in 2017, highlighting how late motherhood is no longer a taboo nor a rarity for women in Sweden and this tendency is growing more and more. The average age of first-time mothers continues to steadily rise in Sweden gave birth to their first child at the age of 24 on average. In 2016, the average changed to 29, according to Statistics Sweden. This trends toward constantly delaying pregnancy is also reflected in the increased number of women in their forties willing to have a child at a later age. The following table illustrates this upward trend among older mothers:



Figure 1. the graph of average age of women getting married in Sweden

Since women in Sweden are delaying marriage in average, and with the phenomenon of sudden drop in fertility since 2016, this research is aimed to figure out the reason of this tendency in Sweden where it is known from the past with one of the highest fertility rates in the world. In this research, the dependent variables I chose are the number of graduates with higher degrees, the number of women with master's/doctorate degrees, average annual salary of women with master's and doctorate degrees. I supposed that these variables will have a negative effect towards fertility with the popular belief that young women may be discouraged from childbearing because they fear that once their educational enrollment is interrupted it may be impossible to continue their studies.

1.2. Purpose of Research

To contribute to the absence of research in the relation between immigration and its impact on Sweden's fertility decline, this research aims to investigate how immigration rate, female labor force participation and education level influence the fertility behavior of Swedish women during 2005 and 2020. Since the fertility rate in Sweden started to fall from 2010, I focused on the impact of the immigration, women's labor and education involvement during the period and also see the change of parental, labor, tax policy after 2010.



Figure 2. the graph of fertility rate in Sweden

Education and labor engagement usually is said as key indicators of a woman's potential reproductive behavior. That is, it can shape one's intrinsic and extrinsic value such as gender roles, value and knowledge that determines her professional environment during the formative years and subsequently during the further life course, which can have a big impact on the willingness to even have a child or further, their childbearing behavior. Therefore I chose women's education and economic activity as my factors affecting fertility since it can serve as an indicator of a person's preference and life-course orientation regarding her profession and family life.



Figure 3. the graph of qualifications awarded at higher education institutions (women)

In this research, I took the number of immigrants as one of the critical factors of fertility rate. As in the figure, there is a higher number of immigrants compared to the number of emigrators. With the increase of immigration, Sweden is dealing with demographic change with social reform. Also since immigrants have a higher fertility rate compared to the natives, I thought it was crucial to add immigrants as one of the variables in this study. In OECD countries, immigrant women had 1.98 children on average in 2012, compared with 1.64 among the native-born. Immigrant women's total fertility rate (TFR) was 0.5 births higher on average in the European Union than that of native-born women. Between 2008 and 2012, the highest average TFR among immigrant women was in France, a country where the native-born TFR is already high in itself, followed by Estonia and Belgium. The difference between the TFRs of immigrant and native-born women is particularly wide in some European countries where native-born fertility is low, such as Germany, Greece, Lithuania and Spain.

Also, according to a report from Statistics Sweden 'Immigrant fertility in Sweden – a cohort perspective', the share of foreign-born in the population has increased in Sweden, and more and more children have a foreign-born mother. In 2015, 28 percent of the children were born to mothers who were

not born in Sweden. This share has increased, from 13 percent in 1980. In 1970, 8 percent of new-borns had a mother who was born in another Nordic country. In 2015 that figure had dropped to 1 percent and instead mothers from non-European country with medium HDI was the most common group. The most recent projection from Statistics Sweden assumes that the proportion of children born to foreign-born women will increase in the next few years, to 28 percent. Then the percentage is assumed to decrease and reach a stable level of about 18 percent around 2050 (Statistics Sweden, 2015). This means that foreign-born women's childbearing has a greater impact on childbearing in the country as a whole. We start studying fertility the most common way, from a period perspective, using the Total Fertility Rate (TFR). When childbearing is studied with this measurement, as shown in figure 1, childbearing for both Swedish-born and foreign-born women has varied sharply over the years. There have also been big fluctuations between the different birth country groups, but foreign-born women have in total a higher fertility rate than Swedish-born women in all years. In 2015, female immigrants to Sweden had a TFR of 2.19, which was well above the TFR of 1.79 the same year for women born in Sweden(Johan Tollebrant. 2015). Therefore I set as a premise that immigrants tend to have a higher fertility than the natives.

The purpose of this paper is to figure out the correlation between Sweden's fertility and the increase of immigration from the period of 2005 to 2020. With the previous research proving that Immigration can act as a powerful catalyst for fertility increase in a Nordic country like Sweden. Migration and family building in many cases are interrelated processes and previous research on the political sociology of the welfare state has not considered seriously the role of immigration on support for social expenditure. The figure 4 below shows the number of immigrants during 2000 and 2017. The purple line indicates the number of immigrants whereas the red line shows the number of emigrants. While the red line does not seem to have a big difference in the amount, the purple line clearly shows a drastic increase in the amount. During the period of 2005 to 2020, the number of immigrants in the two Nordic countries Germany and Sweden showed a similar pattern. It showed a rising tendency until late 2015 and drastically dropped after. However the fertility pattern did not seem to go together. While Germany showed a rising graph after the immigration increase, Sweden showed a decline in fertility

after 2016(R Desiderio 2020). Therefore I wanted to figure out the reason why the pattern did not go together and figure out the reasons.



Figure 4. Immigration/Emigration during 2000-2017 from Statistics Sweden

The costs of children are widely believed to have increased as a result of economic changes following industrialization and urbanization, which made education and other investments in the 'quality' of children ever more important (Becker 1991). Therefore in my paper, I hypothesized women's socioeconomic activity and childbearing as dynamically interactive processes that mutually determine each other. Since the interplay between education and fertility has a significant influence on the roles women occupy, education and engagement in the labor market is expected to impart values, aspirations, and skills which encourage and facilitate non familial roles and it is likely that better educated women may assume less traditional role patterns than less-educated women which would make them hesitant to deliver a child or even get married.

In this paper, I compared the level of education attained at a woman's childbearing years (ages 20-44) with the type and level of education attained, and considered its association with the ultimate number of giving birth. This would provide a better explanation on the dynamics of childbearing and socio economic participation.

2. Literature Review

In the research paper 'Why does Sweden have such high fertility?' The author is giving a rationale in explaining Sweden's high fertility by doing comparative analysis between Sweden and Germany. Sweden has a determined egalitarian drive, and publicly financed campaigns are focused on gender equality. There is also a broad political consensus about the general goals in Sweden. By contrast, there are marked political differences among parties and interest groups regarding family policies reform in Germany. In Sweden, there have been continual efforts to build out the system since the 1960s, and during the difficult financial period in the 1990s, the struggle was to maintain existing standards. In Germany, the concern seems mostly to be directed toward retaining the status quo rather than to introduce any major political innovation(Jan M. Hoem. 2005).

Looking closer at Sweden's political effort on gender equality, each individual is taxed for his or her income and has his or her own social-security coverage. Whereas In Germany the family is taxed for the joint income of its members and the social-security unit is again the married couple. In Sweden, joint taxation of families was used until 1971. Married couples had more generous basic allowance than singles between 1920 and 1970 and lower tax rates than singles for a given taxable income between 1953 and 1970.26 This reveals that the more favourable treatment of married couples does not have any discernible effect on tax wedges before the Second World War. The marginal tax wedge will be somewhat lower for one-earner married couples than for singles after the Second World War until the abolishment in 1971. Besides that, the tax wedge for married one-earner couples and singles basically shows the same evolution. If both spouses were working, the favourable treatment is reduced and can even be reversed, i.e. the marginal tax wedge for a two-earner married couple could be higher than for singles. The long-term evolution of the tax wedge basically remains the same independent of family conditions.

Sweden has a forceful drive toward gender equality in every area of private and public life, including education and the labor market and German is far from that. In Sweden, considerations concerning gender-equality and social justice have guided reforms in family and other policies. The paper goes further into explaining that the arrival of a child does not have to imply the end of educational attainment. It is introducing that the Swedish system also has a clear child-oriented perspective. It is child-friendly by being woman-friendly. It emphasizes the equal right of working women to also have children instead of the right of mothers to have employment. The whole system encourages women to get a job and keep it rather than giving up a career to stay home and take care of their children. Moreover The Swedish system emphasizes daycare as a pedagogical opportunity and the whole system as a tool toward promoting equal opportunities for all children, not as a means of guarding children while their mothers are at work. Lastly Swedish policies encourage both-parent participation in child rearing.

From this research paper, I could imply that the taxation in Sweden is education factor nor labor market participation cannot fully serve as a great implicator of a declining fertility in Sweden where public engagement in family policies seems much child-friendly and woman-friendly than in other Nordic countries. In Sweden (where public engagement in family policies seems much the stronger) there is a determined egalitarian drive, and publicly financed campaigns are conducted to influence public opinion further toward gender equality. Adding to this research, I researched current Sweden policy documents to review the change in policy and more to find out the decisive reason why Sweden's fertility fell starting from 2010.

The impact of socio-economic status on net fertility during the historical fertility decline: A comparative analysis of Canada, Iceland, Sweden, Norway, and the USA.(M Dribe, 2014) This study investigated socio-economic differences in fertility during the initial stages of the fertility transition, using large-scale micro data for five different populations in the North Atlantic region. Overall, the patterns across countries are fairly similar, with the exception of Iceland, where, probably since it is

such a small island with less social stratification. Except for Iceland, low net fertility is a distinctive feature of the elite group in all populations.

Overall, the elite/upper middle class of professionals, managers, clerical and sales personnel (comprising between 10 and 20 percent of the populations studied) showed considerably lower net fertility (child-woman ratios) than other groups, while in most populations farmers had the highest net fertility,

Except in Iceland, workers usually have about 10-20 per cent higher child-woman ratios than the elite/upper middle class, while farmers in the USA and Canada have around 20-30 per cent more children than the high-status group. These differences are substantial given the powerful control for spatial heterogeneity as well as individual characteristics such as age, age difference between spouses, household status, and migration history. It shows that SES was an important determinant of net fertility in the early phases of the fertility transition, and that this effect was not a simple by-product of spatial heterogeneity. Adding on to this study, I supposed that the fertility behavior has a lot to do with the SES in the North Atlantic region and wanted to look at more of a recent time period where the fertility fell substantially in Sweden.

According to this Population and Development Review, Social Policy and Recent Fertility Change in Sweden the increase in Sweden's period total fertility rate (TFR) in the mid-1980s has a lot to do with Sweden's social policy change. The TFR reached the replacement level despite Swedish women's record-high labor force participation and their unusually late entry into motherhood. The demographic mechanism behind this development is an increase in the tempo of childbearing. Recordhigh and continuously growing labor force participation of Swedish women, combined with comparatively high and generally increasing fertility, should be a reward for such efforts. The paper concludes that fertility is responding to the expansion in public daycare, child benefits, parental leave provisions, parents' rights to part-time work, and similar measures. Attitudinal changes have accompanied such measures. A combination of public campaigns for responsible parenthood and a new taste for "self-realization" and "the good life" among young people (Rolen and Springfeldt, 1987) must have been among the forces driving the postponement of entry into parenthood.

A positive correlation between various measures of gender equality and fertility on the individual level has been found in some studies. Mencarini and Tanturri (2004) find evidence that a gender-symmetric role-set among parents with high socio-economic status in Italy increases their likelihood of having another child. Torr and Short (2004) show that individual equity behaviour, in terms of division of household work, seems to correlate with the transition to a second child among US couples. Buber (2002) shows that fathers' participation in childcare correlates with mothers' childbearing intentions in Austria. Mills et al. (2008) show a negative correlation between an asymmetrical division of household labour in Italy and the Netherlands and fertility intentions, especially among working women and mothers.

Another study on Nordic region's fertility, Beyond the Economic Gaze: Childbearing During and After Recessions in the Nordic Countries, is comparing country-specific annual childbearing risks relative to a baseline at the onset of two economic critical junctures (i.e., the 1990–1992 and the 2008– 2010 recessions) in each Nordic country. During the 2010s, fertility rates fell across the Nordic region. The onset of these declines seems linked to the Great Recession of 2008–2009, but their continuation cannot easily be linked to subsequent economic change.

Moreover, even though in most Nordic countries, the more recent crisis in 2008 was milder and lasted less long than that in the 1990s, the latter seems to have had more persistent and uniform scarring effects on childbearing intensities across countries, parities, ages, and educational groups. Further, our findings show that the decline in frst birth rates accelerated in the second half of the 2010s in three out of four countries for which we have data for these years, and that first and second birth rates to low educated women dropped at an increasing rate in these more recent years.

Considering how countries and welfare states manage an economic crisis and how this may be related to subsequent fertility behavior, the paper further says that the crisis management is important. This crisis management—that is, the policies that are introduced to tackle economic turmoil—may be directed at the economic performance of the country—for example, by stabilizing the banking sector or supporting specific industries. However, crisis management may also involve amendments of labor-market, social, and family policies (see also Sobotka et al. 2011; Fishback et al. 2007). For example, the 1990s policy suggest that whether a country extends or cuts its social and family policies during an economic crisis may influence childbearing behavior during and after it. After 2010, even without an ongoing recession most of the Nordic countries have calibrated their social spending and tightened access to social benefits. This tends to affect the lower strata of the population more than others who are less dependent on social support. The steeper drop in first and second birth rates that was observed among low-educated women after 2014 might be an unintended consequence of the inequality produced by the combination of the recession and the post-crisis welfare cuts. This effectively explains the result that the younger women from 20-24 was the only group who was affected by the

According to the paper Family policy and fertility: fathers' and mothers' use of parental leave and continued childbearing in Norway and Sweden, In the Nordic countries, gender equality is an explicit policy goal. For example, Norway and Sweden both offer paid parental leave for approximately one year following childbirth with earningsrelated benefits and with certain periods reserved exclusively for the father. In this study, we examine the relationship between fathers' and mothers' use of parental leave and continued childbearing among couples in Norway and Sweden. The two countries offer largely similar family policies, but differ concerning family policy context. While Sweden has a consistent policy concerning gender relations, Norway has more ambiguous family policies giving incentives both to gender equality and childrearing at home (Gunnar, 2010).

To sum up, the analyses generally indicate a positive association between fathers' uptake of parental leave and continued childbearing. An increased paternal involvement in childrearing is thus associated with higher propensities for continued childbearing. This holds in a Nordic context where the distribution of parental leave still does not reflect true gender equality: mothers' uptake of parental leave is much larger than that of fathers. In addition, our findings for Nordic mothers do not entirely support the notion that gender equality and fertility are positively correlated necessarily.

Next article I referred to is "A review of policies and practices related to the 'highest-low' fertility of Sweden Author(s)" by Gunnar Andersson. This article reviews research on the role social and family policies play for fertility in Sweden. Swedish family policies are not directly aimed at encouraging childbirth. Their main goal has rather been to support women's participation in the labour force and to promote gender equality. They focus on enabling individuals to pursue their family and occupational pathways without being too dependent on other persons. The following measures have helped women to reconcile family and working life: individual taxation and individual-based social security systems, which make gendered segregation of work and care less attractive for couples.

For women, reconciling family and working life is facilitated by individual taxation and an individual-based social-security system, which makes gendered segregation of work and care less attractive for couples, an income-replacement based parental-leave system, which gives women incentives to establish themselves on the labour market before considering childbirth, the flexibility of this system, which allows parents to divide the leave between them on a full-time or part-time basis at any time until the child turns eight, subsidised child care, which allows mothers to return to work after parental leave, and the right to take paid leave from work to care for a sick child. The latter option is shared more equally among fathers and mothers than parental leave. The sharing fits reasonably well with the Swedish policy focus on gender equality, which aims not only at enhancing women's position on the labour market but also at encouraging men to engage more actively in childrearing tasks within the family(Gunnar,2008).

3. Data and Method

3.1. Data

Independent Variables			
ImW	female immigrants		
UnivW	Women with university		
HEduW	Higher Education Women		
AvgWHW_20to24	Average working hour aged 20-24		
AvgWHW_25to34	Average working hour aged 25-34		
AvgWHW_35to44	Average working hour aged 35-44		
NofEmOvertimeW_15to24	Number of women working overtime aged 15 to 24		
NofEmOvertimeW_25to54	Number of women working overtime aged 25 to 54		
AvgAgeofMarriageW	Average age of Marriage		
AvgMSalaryW_edu4	Average Salary of Women		
Dependent Variables			
Fertility rate	fertility rate		

Table 1. Dependent Variables and Independent Variables

I collected data from Statistics Sweden and in choosing the datavariables, I picked upon female variables since women have a major role in giving birth than men. I omitted male variables and added only female related variables in order to avoid multicollinearity which occurs when independent variables in a regression model are correlated. Since all the potential male variables have a high degree of correlation between female variables, I needed to isolate the relation to avoid problems when I fit the model and interpret the results.



Figure 5. The Number of Immigration in Sweden

Another independent variable in this research is the number of immigration. As introduced in the purpose of research and background information above, it is proven that the immigrants have a higher fertility rate than the natives. As in the graph, Sweden is has had continual increase in the number o f immigrants whereas it dropped drastically starting from 2016. Since the fertility rate in Sweden also dropped from 2016, I supposed that there must be a correlation between those two variables and chose the immigrant number as one of the significant independent variables in the research.

The share of foreign-born in the population has increased in Sweden, and more and more children have a foreign-born mother. In 2015, 28 percent of the children were born to mothers who

were not born in Sweden. This share has increased, from 13 percent in 1980. In 1970, 8 percent of new-borns had a mother who was born in another Nordic country. The most recent projection from Statistics Sweden assumes that the proportion of children born to foreign-born women will increase in the next few years, to 28 percent. Then the percentage is assumed to decrease and reach a stable level of about 18 percent around 2050 (Statistics Sweden, 2015). This means that foreign-born women's childbearing has a greater impact on childbearing in the country as a whole. Therefore I set as a premise that immigrants tend to have a higher fertility than the natives.

In order to test the reciprocal association of women's economic participation and the change in fertility, I referred to the data as follows. I chose female immigrants as my first variable and due to the nature of the data I have refrained from using both male and female immigrants. The evidence available for all OECD countries shows that fertility rates are declining in countries where the share of temporary employment is increasing.

Therefore I used average working hours of women aged from 20 to 44 and specified the age structure from 20 to 24, 25 to 34, and 35 to 44. For the last variable I added the number of women aged from 24 to 54 working over time. The limitation here is lack of specified data in that there is no subdivision of age of the last variable, the number of women working overtime.

Having to choose from two different age data sets, 15 to 24 and 25 to 54, the latter was more appropriate taking into account the average fertility age of Sweden. It is said that the average fertility of women in Sweden is continuing to rise according to Statistics Sweden, the average age being 29 in 2016, and an increased number of women in their forties having their first child. The figure in the intro also shows that the average age of women getting married is increasing steadily. However, I hope I could find more specified data with 35 to 45 and 45 to 55 to have more accurate result. Since statistics Sweden is not providing with specified aged data, I had no choice but to use the 25 to 54 data.

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Among the various dimensions of women's socioeconomic status, education level, working hours, and average salary have drawn the most attention not only for pragmatic reasons, such as data availability and ease of measurement, but also because they shape women's experience and determine the social status and empowerment of women. Therefore the independent variables I chose are 1)the number of graduates with higher degrees 2)the number of women with master's/doctorate degrees 3)average annual salary of women with master's/doctorate degrees, 4)immigration. The only dependent variable is fertility rate. I supposed that these variables will have a negative effect towards fertility with the popular belief that young women may be discouraged from childbearing because they fear that once their educational enrollment is interrupted it may be impossible to continue their studies.

The phenomenon of constant increase in Sweden's immigrant population implies that Sweden has been undergoing social and demographic changes in recent years. The share of foreignborn in the population has increased in Sweden, and more and more children have a foreign-born mother. The most recent projection from Statistics Sweden assumes that the proportion of children born to foreign-born women will increase in the next few years, to 28 percent. Then the percentage is assumed to decrease and reach a stable level of about 18 percent around 2050 (Statistics Sweden, 2015). This means that foreign-born women's childbearing has a greater impact on childbearing in the country as a whole. With this generalized fact that foreign-born women tend to show higher fertility, I collected the data to run the analysis on fertility and immigration in Sweden covering the period from 2005 to 2020.

There was a limitation in the data since the more specified age data was not accessible. The variables including the Number of employees working overtime aged 25-54 is too broad into reflecting women's childbearing age. Studies say that there are risks for conceiving developing conditions that can negatively impact fertility, like endometriosis and tubal disease, which also increases as you get older. Therefore it is said that the fertility begins to gradually decline at around age 32 and starting

between 35 and 37, fertility begins to drop more quickly. Therefore I would have gotten a more plausible result if I could get more subdivided age data up to 40. The open source data from Sweden Statistics does not have a more specific age of women to clearly distinguish the childbearing age group.

3.2. Methodology

In this research paper, there are totally four regression anlysis, which includes two regression model including the independent variable, immigration, and the latter two models without the immigration data.

My research process involved first running panel analysis and identifying the evidence that effectively supports the result by researching national policy documents and proceeding the crosscountry comparison. Since there is a lack of data in both Cross-Sectional and Time Series data for my research, I figured that Panel analysis was the most suitable for my paper. Panel analysis runs panel data sometimes referred to as longitudinal data, which contains observations about different cross sections across time. The lack of explanatory variables that are not observable are constant over time but correlated with the observed explanatory variables, panel data estimators allow to consistently estimate the effect of the observed explanatory variables.

Panel analysis can be divided into two data models, fixed effects and Random effects model depending on the way the intercepts are defined in the equation. Fixed effects are constant across individuals, whereas random effects vary. That is, in the random effects model, the individual-specific effect is a random variable that is uncorrelated with the explanatory variables. The fixed-effect model on the other hand, assumes that all effect sizes stem from a single, homogeneous population. It states that all studies share the same true effect size and the only reason the effect size varies between studies is sampling error. I chose a fixed effect model for my regression analysis since the studies included in the analysis are functionally identical and the goal of my research is to compute and analyze the common effect size for the identified population, and not to generalize the result to other populations.

With the log transferred variables, log(ImW), log(UnivW), log(HEduW), AvgWHW_20to24, AvgWHW_25to34, AvgWHW_35to44, log(NofEmOvertimeW_15to24),

log(NofEmOvertimeW_25to54, AvgAgeofMarriageW, log(AvgMSalaryW_edu4), the first method I used in the research is run Pooled OLS. Pooled OLS is used in order to derive unbiased and consistent estimates of parameters without considering the fixed effect of immigration undulation. So for the first analysis, I chose Pooled OLS and in the second analysis, I used the fixed effect model as in the tables below.

		Coefficients		
	Estimate	Std. Error	t value	p value
(Intercept)	24.60123	13.79103	1.785	0.13441
log(ImW)	0.42857	0.00937	4.313	0.00762**
log(UnivW)	-0.5262	0.25456	-2.067	0.09359
log(HEduW)	-0.35805	0.38572	-0.928	0.39587
AvgWHW_20to24	-0.27232	0.08304	-3.279	0.02197*
AvgWHW_25to34	-0.20003	0.12076	-1.656	0.15853
AvgWHW_35to44	0.01612	0.22038	0.073	0.94452
log(NofEmOvertimeW_15to24)	0.40228	0.24839	1.62	0.16626
log(NofEmOvertimeW_25to54	0.12005	0.45457	0.264	0.80224
AvgAgeofMarriageW	0.06132	0.06654	0.922	0.39901
log(AvgMSalaryW_edu4)	-0.81869	0.47961	-1.707	0.24854

4. Result (1)

Note. ***p* < 0.001, **p* < 0.01, *R*-squared =.94, adjusted *R*-squared = .84

Table 2. The Result of Pooled OLS model

 $FR_{it} = B_{0i} + B_1 log(ImW) + B_2 log(UnivW) + B_3 log(HEduW) + B_4 AvgWHW(20to24)$

 $+B_5AvgWHW(25to34)+B_6AvgWHW(35to44)+B_7log(NofEmOvertimeW(15to25))$

 $+B_8 log(NofEmOvertimeW(25to54)) + B_9 AvgAgeMarriageW + B_{10} log(AvgSalaryWedu4) + e_{it} + B_{10} log(AvgSalaryWedu4) + B_{10}$

Before running the analysis, in order to make the variables have the same value in their scale, I log transformed variables with skewed values to make the statistical analysis results from this data become more valid.

The log transformed independent variables are female immigrants, female college graduates, the number of women with master's and doctoral degrees, the number of women overworking aged 15 to 24, the average income of women with master's and doctoral degrees. In order to derive unbiased and consistent estimates of parameters without considering the fixed effect of immigration undulation, I used Pooled OLS. I arrived at the conclusion that the average working hour of women aged 20-24 is the only variable that turned out statistically significant across this model. However, since the immigration rate can serve as a catalyst to fertility, I ran another regression analysis including immigrant variables.

According to a study by Tollebrant (2015) the average fertility of women born in Sweden turned out to be 1.79 whereas female immigrants to Sweden were hitting well above 2.19(Tollebrant 2015). Therefore I divided into two separate time sets to run a fixed effect model and defined 2005 to 2012 where the number of immigrants increased drastically as period =1 and 2013 to 2019 in which the number of immigrants was more than 100,000 as period = 2, then I excluded the specific period 2020 where approximately 82,000 immigrants fell due to the coronavirus pandemic.

		Coefficients		
	Estimate	Std. Error	t value	p value
log(ImW)	-0.43814	0.35342	-1.2398	0.28281
log(UnivW)	-0.49534	0.54147	-0.9148	0.41205
log(HEduW)	-0.28048	0.09139	-3.0098	0.03956*
AvgWHW_20to24	-0.30959	0.30078	-1.0293	0.36151
AvgWHW_25to34	-0.02412	0.26107	-0.0924	0.93082
AvgWHW_35to44	0.47265	0.32277	1.4644	0.21694
log(NofEmOvertimeW_15to24)	0.23864	0.57756	0.4132	0.70065
log(NofEmOvertimeW_25to54	-0.01687	0.20610	-0.0819	0.93869
AvgAgeofMarriageW	-0.33236	1.30910	-0.2539	0.81210
log(AvgMSalaryW_edu4)	0.37855	0.16451	2.3011	0.08284

Note. **p < 0.001, *p < 0.01, R-squared =.92, adjusted R-squared = .72

 Table3. The result of fixed effect model

In the fixed effect model, the female immigrant variable turned out statistically insignificant with the p-value higher than 0.05. Still the correlation between immigration and fertility was positive(+) and provided support for my hypothesis that the immigrants tend to have a higher fertility rate. In both models the average working hour of women aged 20-24 turned out statistically significant.

This result can be supported by the fact that the fertility is constantly decreasing ever since 2010 along with the economic recession(Comolli et al.2021). Empirical research have generally shown that TFRs tend to decline during economic downturns in response to increasing unemployment and labor-market insecurity, dropping prices in the housing market, declines in consumer confidence, and increased financial uncertainty (Schneider 2015; Comolli 2017; Örsal and Goldstein 2018). With the onset of the financial crisis during 2007, the Nordic countries underwent a communal economic downturn since the countries are small, export-oriented economies, and vulnerable to external financial and demand shocks.

Since childbearing entails substantial expenses, with the rise of financial and labor-market insecurities, incomes drop, and deteriorated career prospects, individuals started to postpone decisions to have a child. The age group of 16 to 29 particularly showed a greater decline in fertility rate compared to the age group of 30 to 45. Not only that, women with primary education were more vulnerable to the economic downturn than women with tertiary education(Comolli et al. 2021). With this, I could assume that the women who started working in their earlier ages in 20 to 24 would have been able to get a job that does not require a high degree of education level comparatively and fertility would even decline to a larger amount when the workload gets higher. The even steeper drop in first and second birth rates that was observed among low-educated women after 2014 clearly has shown to be an unintended consequence of the inequality produced by the combination of the recession and the post-crisis welfare cuts. According to a study SWEDEN--RECENT CHANGES IN

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WELFARE STATE ARRANGEMENTS, (Bo Burström 2015), the Swedish welfare state, once developed to create a new society based on social equality and universal rights, has taken on a partly new direction. Extensive choice reforms have been implemented in social services and an increasing proportion of tax-funded social services, including child day care, primary and secondary schools, health care, and care of the elderly, is provided by private entrepreneurs, although funded by taxes. Private equity firms have gained considerable profits from the welfare services. The changes have taken place over a 20-year period, but at an accelerated pace in the last decade. Sweden previously had very generous sickness and unemployment insurance, in terms of both duration and benefit levels, but is falling behind in terms of generosity, as indicated by increasing levels of relative poverty among those who depend on benefits and transfers. Increasing income inequality over the past 20 years further adds to increasing the gaps between population groups. In some respects, Sweden is becoming similar to other Organisation for Economic Co-operation and Development countries. c

Apparently these results do not conform to my predictions that go together with the standard economic theories, that women with a higher socio-economic status or income normally would show a lower propensity to give birth. Quite on the contrary, there is not a significant impact about the system that works toward forcing mothers to stay home and take care of their children since the way that Sweden puts great store on gender equality in family policy did not come to halt till today.

Referring to Beyond the Economic Gaze: Childbearing During and After Recessions in the Nordic Countries, this paper is comparing country-specific annual childbearing risks relative to a baseline at the onset of two economic critical junctures in each Nordic country. Moreover, even though in most Nordic countries, the more recent crisis in 2008 was milder and lasted shorter than that in the 1990s, the latter seems to have had more persistent and uniform scarring effects on childbearing intensities across countries, parities, ages, and educational groups. Further, our findings show that the decline in first birth rates accelerated in the second half of the 2010s in three out of four countries for

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which we have data for these years, and that first and second birth rates to low educated women dropped at an increasing rate in these more recent years.

After 2010, even without an ongoing recession most of the Nordic countries have calibrated their social spending and tightened access to social benefits. This tends to affect the lower strata of the population more than others who are less dependent on social support. The steeper drop in first and second birth rates that was observed among low-educated women after 2014 might be an unintended consequence of the inequality produced by the combination of the recession and the post-crisis welfare cuts.

In order to support this result I looked closer at the policy measures adopted after 2010. Unlike the recession in the 1990s, the globally shared recession of 2008 and the crisis background has been more similar inside the Nordic countries and less "national" compared to the 1990s crisis. Explanatory models for the decline in birth rates that demographers have identified in the past are linked either to economic trends and the labor market situation or to family policy according to Gunnar Andersson, Professor in Demography at the Department of Sociology at Stockholm University. This correlation has been particularly strong in Sweden. The fall in fertility in the 1990s was directly related to the economic crisis of that decade. But this time researchers do not see the same link as in 2010. "This time the pattern of lower birth rates started in 2008, which may indicate that it has something to do with the latest financial crisis. But if we look at the economic parameters, that crisis had limited impact in Sweden. It was just a blip in the curve, the economic parameters have looked good during subsequent years and unemployment has been low," he says(CL Comolli 2021).

The policy after 2010 slightly varied among the Nordic countries. While Finland adopted austerity measures and welfare cuts after 2011, Sweden and Norway did not implement any significant welfare retrenchment. However, just prior to the crisis Sweden had strengthened the benefit for those in employment and trimmed down benefit levels of those outside employment. As

mentioned above in the literature review, in fact, the introduction of earned-income-tax deductions just prior to the Great Recession lowered the fiscal pressure on those in employment. As a consequence, and despite some reductions of social-transfer programs, financial hardship on the population remained modest and affected mostly the low educated and those outside employment (Palme 2019).

This therefore supports the outcome of my regression analysis in that the variable of average working hours among women aged 20-24 was the only variable that negatively affected fertility rate. Further support for such results is shown by detailed examination of patterns in the childbearing of women in Sweden. Andersson (2000) and Hoem (2000) demonstrated, for example, that women who are well established on the labor market and have a decent level of income are much more inclined to become a mother than childless women with a weaker attachment to the labor market. This pattern underlines that Swedish women by no means consider parenthood and work as competing activities. The pattern is probably strengthened by the design of the Swedish parental-leave system with its distinct income replacement character, such as a leave allowance amounting to 80% of a person's earnings prior to childbirth. This system seems to be conducive to higher fertility levels in that it raises the compatibility of childbearing and employment. For a woman in Sweden, a decent level of income is therefore considered a prerequisite for her childbearing and certainly not as an obstacle to it.

Result (2)

Independent Variables			
UnivW	Women with university		
HEduW	Higher Education Women		
AvgWHW_20to24	Average working hour aged 20-24		
AvgWHW_25to34	Average working hour aged 25-34		
AvgWHW_35to44	Average working hour aged 35-44		
NofEmOvertimeW_15to24	Number of women working overtime aged 15 to 24		
NofEmOvertimeW_25to54	Number of women working overtime aged 25 to 54		
AvgAgeofMarriageW	Average age of Marriage		
AvgMSalaryW_edu4	Average Salary of Women		
Dependent Variables			
Fertility rate	fertility rate		

Table 4. Dependent Variables and Independent Variable of the second regression anlysis

In the previous analysis I included Sweden's immigrants as one of the variables and ran the fixed effect model setting 2005 to 2011 as the first wave and 2012 to 2020 second wave. Therefore I implied that the female immigrant independent variable was a direct impact towards the dependent variable which is fertility rate. However I decided to run another regression analysis since the average

conception period takes about 10 months which cannot clearly imply the exact period. If I could get a cohort analysis but the data was not available for the regression analysis.

		Coefficients		
	Estimate	Std. Error	t value	p value
(Intercept)	67.47335	15.61136	4.322	0.00756
log(UnivW)	-0.34641	0.26447	-1.310	0.24720
log(HEduW)	-0.96540	0.45051	-2.143	0.08501
AvgWHW_20to24	-0.28261	0.08680	-3.256	0.02255*
AvgWHW_25to34	-0.39165	0.13018	-3.008	0.02981*
AvgWHW_35to44	-0.49903	0.21997	-2.269	0.07256
log(NofEmOvertimeW_15to24)	0.72464	0.25983	2.789	0.03849*
log(NofEmOvertimeW_25to54	-0.24414	0.51407	-0.475	0.65487
AvgAgeofMarriageW	-0.08319	0.07417	-1.122	0.31297
log(AvgMSalaryW_edu4)	-0.98591	0.49167	-2.005	0.10126

Note. **p < 0.001, *p < 0.01, R- squared =.91, adjusted R-squared = .77 **Table 5.** *The result of Pooled OLS estimation without the Immigration variable*

Therefore I ran additional regression analysis without the female immigrant variable to see the difference in the result. Just like the previous analysis, I ran OLS for the entire period and fixed effect model considering the period where the immigration rate increased. Therefore, with the same variables, I ran Pooled OLS without the Immigration variable for the first analysis, and then ran another regression analysis using the fixed effect model. The statistically significant vfiariable in the analysis without the immigrant variable is 'the average working hour of women from 20 to 24' which is the same result as the previous analysis. This turned out negative correlation to the fertility rate. Additionally, the average working hour of 25 to 35 women also was shown statistically significant.

Apparently these results do not conform to my predictions that go together with the standard economic theories, that women with a higher socio-economic status or income normally would show a lower propensity to give birth. Quite on the contrary, there is not a significant impact about the system that works toward forcing mothers to stay home and take care of their children since the way that Sweden puts great store on gender equality in family policy did not come to halt till today.

Referring to Beyond the Economic Gaze: Childbearing During and After Recessions in the Nordic Countries, the more recent crisis in 2008 was milder and lasted shorter than that in the 1990s, the latter seems to have had more persistent and uniform scarring effects on childbearing intensities across countries, parities, ages, and educational groups. Further, our findings show that the decline in first birth rates accelerated in the second half of the 2010s in three out of four countries for which we have data for these years, and that first and second birth rates to low educated women dropped at an increasing rate in these more recent years. Some reductions of social-transfer programs, financial hardship on the population remained modest and affected mostly the low educated and those outside employment.

Interestingly, in this analysis, 'the number of overtime worker from age 15 to 24' variable showed a positive correlation with the fertility. The average age of marriage in Sweden is close to 35 and the average first delivery is around 30. However, Sweden has the highest percentage of single

mother with 34%, which is a lot higher compared to 14 which is the average percentage of single mothers in the EU. Considering the average age of first birth, the percentage of giving birth before 25 is not high. Also, there is not many overtime workers under 24 either which implies that the two variables showing positive correlation means that the younger women under 24 had no choice but to apply for another work or work overtime in order to afford the child rearing expenses. The reductions of social-transfer programs, revised tax policy, worker friendly welfare policy would have benefited those who are employed including the women aged higher than 35. That is, the employed women aged over 35 was not affected by the policy reform and did not give up on having a child whereas the comparatively younger women aged from 20 to 35 had no choice but to give up on their childbearing or work overtime in order to afford the rising childbearing expenses.

	Coefficients			
	Estimate	Std. Error	t value	p value
log(UnivW)	-0.17351	0.26548	-0.6536	0.54905
log(HEduW)	-1.19347	0.43416	-2.7489	0.05143
AvgWHW_20to24	-0.30684	0.07986	-3.3842	0.01842*
AvgWHW_25to34	-0.61774	0.19316	-3.1981	0.03296*
AvgWHW_35to44	-0.46362	0.19949	-2.3240	0.08078
log(NofEmOvertimeW_15to24)	0.81915	0.24247	3.3769	0.02786*
log(NofEmOvertimeW_25to54	0.07219	0.51024	0.1415	0.89432
AvgAgeofMarriageW	-0.24283	0.12732	-1.9072	0.12916
log(AvgMSalaryW_edu4)	0.27745	0.96538	0.2874	0.78808

Note. **p < 0.001, *p < 0.01, R-squared =.92, adjusted R-squared = .74

Table 6.

The result of fixed effects model without the Immigration variable

The result of fixed effect model also turned out almost the same as the OLS. The variable of 'average working hour of 20 to 24 women' and additionally 'the average working hour of 25 to 34' turned out statistically significant and showed negative correlation with the fertility variable. To sum up, in the four regression analysis, the only statistically significant variable was the 'average working hour of 20 to 24 women' which showed negarive correlation with the dependent variable 'fertility rate'.

5. Conclusion

5.1. Limitation

In my study, I suppose there is a lack of accuracy in the explanation of the result with the limitations on the data collection in Sweden. For instance, the total fertility rate of a certain year reflects the average number of children born to each woman for that year. However this does not accurately reflect the TFR of a year to be the average number of offspring a woman has for that year. Rather it is possible to say that the total fertility rate for a certain year can only indicate the fertility standards for that year. I cannot take the total fertility rate of a certain year to predict a woman's fertility decision, nor evaluate the birth control work which takes time.

Not only that, the fertility data of immigrants is also inadequate to explain the effect of immigration on fertility. The way I divided the time sets where the immigrants started to increase in Sweden does not necessarily reflect that the immigrants show a higher fertility in that certain year since there must be time spacing after emigrating and actually giving birth. It also takes some time for the ultimate delivery of a baby after deciding to have one. Research shows that the symptoms of early pregnancy can start as early as a week after having sex, but most often take several weeks to start. More specifically, it takes time for the fertilized egg to travel from the fallopian tubes and find a landing area in the uterus. In order to reflect the reality better there needs to be a cohort analysis of the immigrants and Sweden born women. Since in the result of my regression analysis, the R-Squared was higher in the fixed model than in the Pooled OLSI cannot say that the time sets of immigrants have a powerful fixed effect.

Also there is a limitation in estimating the size of the immigrant population as of nationality and country of birth. These are insufficient to deliver precise estimates, as foreign populations may in fact include people born in the host country. In many countries the native-born children of foreign parents are foreigners and may obtain nationality only later – typically at the age of majority. In other countries the principle of "law of blood" determines nationality – so the host country's nationality can be transmitted only by parents of that nationality. Therefore, some adults who have foreign parents – even grandparents – may still be of foreign nationality.

Estimating the size of the immigrant population would be to use the country of birth as a solution, this also has its limitations. The country of birth considered is the country in its current boundaries. In countries that have experienced changes in their borders, a significant proportion of the population may have been born in a region that was once, but is no longer, part of their country. They are now automatically classified as foreign-born even though they have never actually migrated internationally, only internally.

For these reasons, identifying the country of birth would be a less biased criterion to define the notion of "immigrant population". It should ideally be confined to people born abroad who have foreign nationality at birth. Such a view is not affected by acquisitions of nationality or border changes in the country of birth. Unfortunately, The Swedish data is approximated based on the share of newborns who have two Swedish parents; actual TFR-by-ancestry data is not available from Sweden's public statistical website.

Lastly the variables including the Number of employees working overtime aged 25-54 is too broad into reflecting women's childbearing age. Studies say that there are risks for conceiving developing conditions that can negatively impact fertility, like endometriosis and tubal disease, which also increases as you get older. Therefore it is said that the fertility begins to gradually decline at around age 32 and starting between 35 and 37, fertility begins to drop more quickly. Therefore I would have gotten a more plausible result if I could get more subdivided age data up to 40. The open source data from Sweden Statistics does not have a more specific age of women to clearly distinguish the childbearing age group.

5.2. Discussion

To sum up, my regression analysis substantiates that women's educational advancement and economic activity are not that of powerful agents of social change and a promising catalyst for fertility decline. The reciprocal association between fertility and women's socioeconomic participation is not clear enough regarding the data analysis. This can be explained a lot by the female friendly education and labor policy that Sweden has taken for a while. In Sweden, including other Nordic countries, with their flexible educational systems, exits from and entries into education are common features of a person's life course. Therefore educational attainment taken in early years is not simply a pre-set determinant of subsequent childbearing. In fact, a particular education may even promote students in giving birth considering the importance that Nordic countries give to welfare and childcare.

Moreover, as of labor market participation, developments in family policy in Sweden have provided means to facilitate the combination of childrearing and female employment and therefore make the choice between the two unnecessary. However, looking at the only statistically significant variable 'the average working hour of women aged 20-24', the fertility decline would have been attributed to their decision to postpone or not have a child at all. After 2010, even without an ongoing recession most of the Nordic countries have gone through welfare cuts tightened access to social benefits. This affected the lower strata of the population more than others who are economically less dependent on social support. The steeper drop in first and second birth rates that was observed among low-educated women after 2014 might be an unintended consequence of the inequality produced by the combination of the recession and the post-crisis welfare cuts.

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Welfare retrenchment may be one factor behind the drop in childbearing intensities for the low educated in the second half of the 2010s. However, welfare restrictions are as unsatisfactory an indicator as that of macroeconomic indexes in explaining why childbearing propensities have declined among groups that are not affected by tightened welfare support, such the highly educated. Therefore the sudden drop in 2010s has to be explained by a combination of reasons other than the welfare cutback. The easier access of mass media than the 1990s, such as smartphones and social media, may be a possible factor since it can serve as a catalyst to increase the perception that the future bears unknown economic uncertainties that cannot easily be controlled.

Further support for the result that women's educational advancement cannot be a key factor for the fertility decline is shown by detailed examination of patterns in the childbearing of women in Sweden(Andersson and Hoem. 2000). They demonstrated that the women well established on the labor market with higher levels of income are much more inclined to become a mother than childless women with a weaker engagement to the labor market. This has a lot to do with the women friendly policy in Sweden. That is, there had not been a striking change in the social family policy during the period of steep fertility downturn, rather it grew to benefit the employed females. However a combination of public campaigns for responsible parenthood and a new desire for self-realization and stable career among the employed must have been the forces driving the postponement of entry into parenthood. This effectively explains the phenomenon in Sweden, where the average paternal age at first birth has increased from 27 years in 1970 to almost 33 years today.

Thus, I conclude that the traditional theory that the more educated women tend to have a tendency of giving up childbearing is not so true anymore in Sweden. However since the 20-24 aged women variable turned out significant in every regression models, I can conclude that the younger women in Sweden with a lower income will get affected by the childbearing expense and be hesitant to have a child. Also the immigration variable turned out statistically insignificant which means that there is not any direct impact on the fertility rate in Sweden. Therefore future research on the links

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between economic recessions and fertility development needs to expand the explanatory framework considerably, and that much theoretical and empirical work is still to be done to fully grasp the relationship between economic cycles and fertility outcomes. It remains to be seen whether the falling figure in birth rates in recent years will grow, or whether it is simply a temporary phenomenon in Sweden. Since it is not yet down at crisis-level fertility, although if this trend does persist, it will have negative effects on the welfare system and create an imbalance in the population age structure, causing economic deterioration. New studies are needed to better understand the reasons for the downturn and also need to consider Sweden single mother welfare policy and how this may be related to subsequent fertility behavior.

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