Middle States Geographer, 2007, 40:32-38

HOW GOVERNMENT POLICIES INFLUENCE DECLINING FERTILITY RATES IN DEVELOPED COUNTRIES

Tari Glowaki and Amy K. Richmond*
Department of Geography and Environmental Engineering
United States Military Academy
West Point, New York 10996

ABSTRACT: *Declining fertility rates are increasingly common in developed countries, consequently causing them to enter the "fifth" stage of the Demographic Transition Model (DTM). There are many possible explanations for this phenomenon, including increased participation of women in the workforce and increased costs of having children. This study investigates government policies that have been implemented in attempt to increase fertility rates. Such policies include: extended leave periods after childbirth, compensation, better access to childcare, etc. We created a panel of developed countries. The panel includes the United States, which currently has one of the least progressive maternity and paternity policies. A series of statistical tests were conducted that attempt to determine which policy, if any, has the largest effect on fertility rates. The results show that compensation has the largest influence on fertility rates.*

Keywords: *Demographic Transition Model, Fertility rates, Developed countries*

INTRODUCTION

In order to understand the significance of the decline in fertility rates occurring throughout the countries studied, one must first discuss the various phases of the DTM as a basis for this study. The DTM was developed by the American demographer Warren Thompson by observing the demographic behavior of developed countries over the past two centuries. His model consists of four stages. The first stage consists of high crude birth rates and high crude death rates thus causing population to remain low. As a country moves into stage two, death rates begin to decline as a result of improved health care opportunities, sanitation, nutrition, and so on. This causes a surge in population because birth rates far exceed mortality rates. In stage three, birth rates begin to decline while death rates remain low. This causes population growth to level off. Finally, as a country enters stage four both birth and death rates level off, resulting in little population growth. In recent years, the possibility of a fifth stage in the DTM has begun to emerge as birth rates decline below death rates. This is causing population growth in several developed countries to decline. How do government policies regarding benefits for new parents influence fertility rates in the developed world? In order to understand the need to answer such a question, one must recognize the problems declining populations pose in many developed countries. The threat of population decline has begun to affect most of Europe as well as Russia and Japan. In future years, even more countries are expected to enter the fifth stage and experience similar declines in total fertility rates.

The problems brought about by declining populations run far deeper than simply a decrease in the number of people. As developed countries continue to age, a greater burden is placed on the working age members of society to support the elderly. With less and less people to fill their roles upon retirement, the elderly will be forced to work well beyond typical retirement age or seek outside financial assistance. There just simply will not be enough people to support them within their respective countries. In addition, the burden of social welfare will continue to increase as a greater number of elderly citizens put a strain on these programs.

One must look at why the populations are decreasing. In developed countries, the empowerment of women has led to an increase of females in the workforce, but also to a decline in birth rates for employed women. Many women are forced to make a choice between advancing in their career or taking time off to have children. In order to restore traditional fertility rates and prevent women from having to make this choice, countries such as Denmark, Norway, and Sweden (as well as the other countries included in the study) have created progressive policies regarding benefits for new

parents. These policies have been in place to reassert the importance of children and ensure that women are not forced to choose between a career and a child. It is essential that the success of these policies be evaluated to determine if other countries struggling with similar issues should consider adopting similar courses of action.

This research will evaluate the efficacy of these policies in nine countries (Sweden, Switzerland, Norway, Denmark, Italy, Germany, France, Belgium, and the United States). More specifically, the research draws upon these main questions:

- Has the proportion of women in the labor force had an impact on fertility rates?
- Have government fertility policies had an effect on fertility rates?

CURRENT TRENDS IN FERTILITY AND SOCIAL POLICY (1980-2000)

Over the past few decades fertility rates throughout the developed world, especially those noted in this study (with the exception of the US), have begun to decline to levels below replacement. Fertility rates in 15 European Union countries reached an average low of 1.45 in 1999 (Neyer, 2003). The exact reason for this decline has been the subject of much recent study. Rindfuss and Brewster (1996) suggested that as female participation in the labor force increases, total fertility rates decrease. This finding has been supported by subsequent studies such as Hoem (2000) which investigates total fertility rates in Sweden. Hoem focuses on Sweden because there are strong fluctuations in total fertility rates and women hold jobs almost as often as men do. The study concludes that total fertility rates are linked to both economic fluctuation and public policies. The number of women in the workforce is frequently linked to an increase in women obtaining high levels of education. Lappegard (2000) and Kravdal (2001) investigate the effects of women's education on their fertility. Both conclude that women who complete high school or a four year college experience a delay in the birth of their first child and thus they had lower incidences of three or more children because of their age. The postponement of childbirth until a later age is another cited cause for decreasing fertility rates; this is directly linked to women in the labor force. (Bongaarts, 2002; Kravdal, 2001; Lesthaeghe and Moors, 2000). This is most likely a result of women establishing themselves in the labor market before they have children. By waiting to have children, women have fewer fertile years in which to have children, and the risk associated with childbirth increases above the age of 35. Rindfuss and Brewster (1996) show that that there is a strong correlation between the growth in the use of organized childcare facilities and the cessation of fertility decline.

Regardless of the cause, it is clear that fertility rates are stabilizing at a level below replacement in the majority of developed countries (Andersson, 2002). With fertility rates below replacement level, several countries have tried to nullify or at least decrease the loss of human capital accumulation during childbirth periods (Gupta and Smith, 2000). In Scandinavia, this has been accomplished in three ways: facilitate mothers' employment, alleviate maternal care work, and change gender relations in care and employment (Neyer, 2003). The policies are not only aimed at increasing mothers' benefits, they also mandate leave time for fathers. In 1995, Sweden allotted one month of leave time for both parents and in 2002 extended that to two months for the mother and two for the father with the remainder of the leave time shared between the two (Alfredsson, 2005). In addition to the initial leave periods, Sweden has allotted 60 days per year per child for each parent to care for a sick child. This benefit has been fairly even in its usage with fathers using 43% of the days (Alfredsson, 2005). According to Laat and Sanz (2004), policy along with a social acceptance of part-time employment and more flexible hours has made it easier for Scandinavian women to work and have children. Sweden's policies are some of the most progressive; however many other countries in our study have also implemented policies in attempt to increase the total fertility rate. The notable exception it the US, which has the least progressive maternal leave policy (three months unpaid) and no paternal leave.

The question thus arises, how effective have these policies been at increasing fertility rates? Several studies have been conducted to assess the effects in Europe (Hoem, 1990; Ruhm, 1998; Ronson, 1999; and Ronson, 2004). Most studies on the effects of social policy on fertility have focused on Sweden (Ronson, 1999). More recently Ronson (2004) conducted studies on Finland, Norway, and Sweden which statistically analyzed the effects of parental leave and public daycare coverage on the average amount of time women take off work after child birth and its impacts on fertility. Ronson concludes that generous leave programs will encourage more mothers to work up leave eligibility

and to remain in the labor market throughout the child bearing years.

Fertility rates for the countries studied have remained below replacement levels since 1980. Below replacement fertility rates have several consequences in terms of demographics and social order. As these populations continue to age younger generations are expected to fill jobs as the older generations reach retirement. Unfortunately, with fertility rates below replacement, there are not enough working age people to fill these jobs. This also places a burden on the working generations in terms of social welfare programs. There are simply not enough younger people to support all of the older generations. Therefore, this is clearly an issue that warrants careful consideration in terms of possibly ways to stimulate population growth.

METHODOLOGY AND DATA

Before considering social policy, one must look at several factors affecting each country's total fertility rate. The factors used in this study are the total fertility rate, the proportion of women in the labor force, the Index of Disposable Income, the duration of maternity and paternity leave in weeks, the proportion of maternity/paternity leave benefit as a percentage of the average women's wages for manufacturing, and the total duration of parental leave benefit. The data gathered for this study are a compilation of databases from Organization for Economic Cooperation and Development (OECD) databases, World Bank World Development Index (WDI) databases, as well as social policy data from studies done by Gauthier and Bortnik of the University of Calgary in 2001.

Total fertility rate is the average number of times a woman will give birth in her lifetime. For the post-industrial world, replacement level is 2.1. If fertility rates are below 2.1, the population will begin to decline because mortality rates will begin to exceed birth rates. Fertility rates have been rather constant over the period studied. Which begs the question, have leave programs had any effect? Data for total fertility rates come from the World Bank WDI databases.

The next variable, the proportion of women in the labor force, was also gathered from World Bank WDI databases. If having children will be detrimental to a woman's career or may cause her to lose her job because she has to take maternity leave, she will be less likely to have children thus contributing to the decline in total fertility rates. Over the study period, which is from 1980-2004, the percentage of females in the labor force has risen but women still do not make up 50% of the labor force in any of the countries studied. By the year 2004, all countries have reached the range of 40-50%. Although this reflects an increase in women's equality in the workplace, it does mean more women will be forced to possibly compromise their career in order to have children.

The next factor is the Index of Disposable Income. In their 2001 study, Gauthier and Bortnik calculated this index as a part of their Comparative Family Cash Benefit Database. According to their definition, the Index of Disposable Income measures, the additional disposable income (after taxes and cash transfers) of a one-earner-two-parent-two-child family as compared to the disposable income of a childless single earner. This is expressed as a percentage of the disposable income of the childless single earner. For instance, if the index is 21.1, it indicates the disposable income of the one-earner-two-child family was 21.1% higher than the disposable income of the childless earner (Gauthier and Botnik, 2001).

Maternity and paternity leave is the number of weeks leave both the mother and father receive prior to and immediately following the birth of their child. This variable does not include any time off for child care leave or any other extra days. If a country does not offer any form of child care leave, then this value is the same as the total leave variable. The amount of leave time given could potentially have a significant impact on a woman's decision to have a child. Many women rely upon their career as a sole source of income or a vital part of their family income. If they are unable to take off an adequate amount of time for work without losing their job, they may be forced to decide against having a child thus contributing to low fertility. Maternity and paternity data came from the OECD.

The next variable is the proportion of maternity/paternity leave benefit as a percentage of the average woman's wage for manufacturing (Gauthier and Botnik, 2001). The cash benefit during the maternity/paternity leave is calculated as a percentage of average earnings for a female employed in the labor sector of the respective country. If cash benefit is implemented as a flat rate benefit, it was transformed into a proportion of the female labor wages by using wages from the International Labour Organization, *Yearbook of Labour Statistics.* The index assumes that the benefit for the first child is the same for all subsequent children (Gauthier and Bortnik, 2001). If parents receive a relatively high proportion of their usual wages, it is more likely that they will choose to have

a child than if they would be financially burdened by having to take time off work to have a child. These data show policies on how to compensate parents as a part of their maternity leave benefit. Sweden, with very generous leave in terms of time off, offers one of the most conservative amounts of wage compensation. This is an example of distinct differences amongst the countries of what they value as important in helping women balance career and family.

The final indicator is the total duration of parental leave benefit in weeks, which is the sum of both maternity and paternity leave time for childbirth as well as any sick leave or additional paid leave that parents might be guaranteed by the government. This variable is from the OECD. If a longer leave benefit is guaranteed, having a child is less likely to interrupt a parent's career, and thus, it logically follows that they will be more likely to have children since they will not be forced to compromise their career as a result of becoming a parent. The maternity and paternity leave benefits have increased or remained constant throughout the entire period studied. Sweden by far offers the longest leave time while Belgium, France, Germany, and Switzerland all have fairly conservative policies.

THEORETICAL FRAMEWORK, MODELING, AND DATA

The relationship between total fertility rates and government policies were estimated from a panel that includes the nine aforementioned nations with observations for 1980-2004. The panel was restricted to these nations because of the availability of data. The relationship between total fertility rates and government polices is specified by the following model:

$$TFR_{it} = \alpha + \beta_1 PF_{it} + \beta_2 L_{it} + \beta_3 ID_{it} + \beta_3 LD_{it} + \beta_4 LB_{it} + \beta_5 TL_{it} + \mu_{it}$$

In which TFR is total fertility rate, PF is the population of women, L is the proportion of women in the labor force, ID is the index of disposable income, LD is the duration of maternity and paternity leave in weeks, LB is the proportion of maternity/paternity leave benefit as a percentage of the average women's wages for manufacturing, and TL the total duration of parental leave benefit. The α, β, and μ are regression coefficients and are estimated using fixed effects regression.

We analyzed the above model using a panel regression estimation by fixed effects. Using fixed effects implies that the means for each country are removed, thus making it possible to see any relationship between variables. The fixed effects regression model accounts for omitted variables from a cross section of data that vary from country to country but remain unchanged over time. The use of this model implies that the only factors affecting fertility rates are those mentioned in the study. Any other possible factors are unchanging over the time period and thus are accounted for by the fixed effects. The unknown variables are intercepts, like the observed data, but are estimated at a fixed value for each country over time.

RESULTS AND DISCUSSION

Estimation results of this analysis show that there is indeed a relationship between each of the variables studied and total fertility rates. This indicates that each of the variables caused either an increase or a decrease in total fertility rates in the countries studied (Table 1). The variables shown to have a positive correlation (those which are related to an increase in fertility rates) were population of females, index of disposable income, maternity/paternity leave benefit, and proportion of maternity/paternity leave benefit as a percentage of the average woman's wage for manufacturing. The variables shown to have a negative correlation (those which are related to a decrease in fertility rates) were proportion of females in the labor force and total duration of parental leave benefit.

Table 1. Results from Model 1

Variable	Coefficient (β)
Population of Females	4.42E-06**
Proportion of Women in the Labor Force	-0.02**
Index of Disposable Income	6.39E03**
Maternity/Paternity Leave Benefit	9.37E03**
Proportion of Maternity/Paternity Leave Benefit (% Woman's Wage Mfg.)	0.01**
Total Duration of Parental Leave Benefit	-7.131*

Coefficients are statistically significantly different from zero at the: **1%, *5%

The population of females is a statistically significant variable, indicating that an increase in female population will increase total fertility rates. The logic behind this relationship is fairly basic. If there are more women in the population of child bearing age, it is likely that more children will be born and thus fertility rates will increase. There is not much a government can do to affect the proportion of females in Europe or the United States. In other cultures where male children are valued more than females, the government could have an impact on fertility rates if it were to take actions to reward having female children thus perhaps spurring fertility rates in future years. The time it would take for this policy to affect fertility rates would be long term due to the time lag between the birth of a child and when it reaches child bearing years.

The proportion of women in the labor force is also statistically significant. As the proportion of women in the labor force increases, total fertility rates decrease. This result is similar to that found by Laat and Sanz's (2004). They proved that households with less egalitarian views toward gender roles had higher fertility rates and lower female labor force participation. Women not part of the labor force do not face the difficult situation of weighing the impact of having a child on their career or the impact of having a career on their family. These issues clearly weigh heavily on a woman's decision to have children as evident by the negative correlation between proportion of women in the labor force and fertility rates. Governments facing low fertility rates must consider the impact of having children on a woman's career and try to ease the burden which currently exists for women attempting to balance career and family.

The index of disposable income is another variable that explains some of the variation on total fertility rates. This relationship indicates that women take their financial situation into account prior to having children. The relationship shows a positive correlation, suggesting that women with higher amounts of disposable income are more likely to have a child, than those who are financially unstable, struggling to make ends meet. Since such fiscal responsibility is exhibited by women in the nine countries, it is clearly important to ensure that having children does not burden their financial situation and that women are assured that they will be able to financially care for a child while maintaining their current status. Social policy should reflect this important point, ensuring that women are not punished by losing wages for having a child. With another person to support, it is almost counterintuitive to expect that social policies not ensuring wage compensation while on maternity leave would have a positive impact on fertility rates. Simply giving extra time off is not enough to allow women to have children without being punished in their career. A woman must be able to support her child, especially during the important weeks immediately prior to and following birth. Thus, social policy should reflect this by ensuring that disposable income remains at a reasonable level for new parents.

Another statistically significant variable influencing fertility rates is maternity/paternity leave benefit. This basic benefit, consisting of only the leave prior to and immediately following child birth, has a positive effect on total fertility rates. For all countries in the study with the exception of Sweden, this portion of the family policy allots less than 45 weeks of leave with the United States only offering 12 weeks of unpaid leave.

The proportion of maternity/paternity leave benefit as a percentage of woman's wage in manufacturing is positively correlated to total fertility rate. This suggests that total fertility rates will increase as financial compensation increase. Consequently, governments should take this factor into account when formulating their policies regarding family policy. Interestingly, some countries such as Belgium have actually decreased this amount during the time period, and others such as Sweden, have seemingly arbitrarily adjusted this proportion with no regular pattern. Clearly, this information could have a strong impact on governments struggling to find ways to increase fertility rates.

The final variable is the total duration of leave benefit. Unlike maternity/paternity leave benefit; this factor includes sick leave for parents and any other additional leave time benefits. Seven of the nine countries studied have total leave benefits well over 45 weeks with some as high as 162 weeks total leave by the end of the period studied. Our results indicate that there is a statistically significant negative relationship between parental leave and total fertility rates. This suggests that long leave periods actually decrease total fertility rates. Ruhm (1998) found a similar correlation showing that lengthy leave entitlements led to a decrease in relative wages. Such liberal leave policies also appear to cause a decrease in fertility rates. Governments must take this into account when determining the length of their leave policies.

SUMMARY AND CONCLUSION

Throughout the developed world, fertility rates are declining to levels below replacement. With populations exploding in other areas of the world, it may seem as though this is not a problem. This could not be farther from the truth. As developed countries enter the fifth stage of the DTM, they face many problems with an aging population. In an effort to combat this issue, governments have implemented social policies, which provide maternity and paternity leave standards as well as subsidized public daycare.

Such social policies have been implemented to make it possible for both women and men to work. However, if a society does not value the role of women in the workplace, it is likely that policies allowing them to continue to collect pay and hold their jobs would not be well received. Additionally, if the birth of many children is not valued in the given society, it is likely that policies that allow women to have children while maintaining their job and receive benefits will not be well received. Under these conditions it is likely that the society will expect the women to do one or the other but not both. In our view, however, women form a valuable asset to our workforce and future policy should accommodate working mothers to be able to fulfill both roles without having one negatively affecting the other.

This study showed that our variables were statistically significant and helps explain some of the variation in total fertility rates. The most important conclusion that can inform policy is that it is not the length of leave policy that affects fertility rates the most, in fact long leaves actually have a negative effect on fertility rates and make it much harder for women to successfully return to their careers (Ruhm, 1998). Rather then relying solely on time off work to stimulate fertility rates, governments should concentrate their efforts on better wage compensation. Through such an economic approach, government policy is far more likely to have a positive impact and make strides towards mollifying the effects of stage five of the DTM. One must keep in mind that there are external factors influencing a woman's decision to have a child. Although career and finances may be significant contributors, there are also other events, such as the very sharp economic recession which devastated Sweden during the 1990s and caused a decline in fertility rates (Andersson, 2002). While such incidents can affect fertility rates regardless of social policy, it is essential that governments concentrate on factors that are within their control and make every effort to avoid the problems of population decline and increase fertility rates to replacement level to ensure that future generations are able to support the aging generations.

This study serves as a preliminary analysis of basic statistical indicators associated with family policy. The models used in this study have several shortcomings which should be improved upon in future analyses. First, one must take into account lag times. From the time when a policy is implemented, it takes forty weeks for a child to be born. In addition, the decision to have a child is not one to be taken lightly. Much thought and careful consideration is put into planning families. Thus, there could be a lag of a year or more until the impact of policies is reflected in actual births.

Another shortcoming that future research must take into account is the possibility of other externalities. The use of a fixed effects regression did help in accounting for externalities; however, the model is still relatively simple. In order for more accurate results to be obtained, a much more complex model is necessary in order to avoid false conclusions or overemphasized relationships.

REFERENCES

Alfredsson, K. 2005. *At Home with Dad.* Swedish Institute. Available at: http://www.sweden.se/templates/cs/CommonPage12898.aspx

Andersson, G. 2002. Fertility Developments in Norway and Sweden since the Early 1960s. *Demographic Research* 6:67-86.

Bongaarts, J. 2002. The End of the Fertility Transition in the Developed World. *Population and Development Review* 28(3):419-443.

De Laat, J. and Sanz, A.S. 2004. Working Women, Men's Home Time and Lowest-Low Fertility in Europe. *The Society of Labor and Economics*, Brown University. May 21 2004. Available at: http://gsbwww.uchicago.edu/labor/A.02.5.%20Sevilla%20Sanz%20&%20Laat.pdf

Demeny, P. 1986. Pronatalist Policies in Low-Fertility Countries: Patterns, Performance, and Prospects. *Population and Development Review* 12. Supplement: Below-Replacement Fertility in Industrial Societies: Causes, Consequences, Policies, pp. 335-358.

Gauthier, A.H. and Bortnik, A. 2001. Comparative Maternity, Parental, and Childcare Database, Version 2. University of Calgary. Available at: http://www.soci.ucalgary.ca/fypp/family_policy_databases.htm

Gauthier, A.H. and Hatzius, J. 1997. Family Policy and Fertility: An Econometric Analysis. *Population Studies*. 51:295-306.

Gupta, N.D. and Smith, N. 2000. *Children and Career Interruptions: The Family Gap in Denmark Center for Labour Market and Social Research*. Denmark. Available at: http://www.cls.dk/workingpapers/docfiles/68.pdf

Hoem, J.M. 1990. Social Policy and Recent Fertility Change in Sweden. *Population and Development Review* 16. 4:735-748.

Kravdal, O. 2001. The High Fertility of College Educated Women in Norway: An Artifact of the Separate Modeling of Each Parity Transition. *Demographic Research* 5:187-216.

Lappegard, T. 2000. New Fertility Trends in Norway. *Demographic Research*. Vol. 2, Article 3 (March). Available at: http://www.demographic-research.org/Volumes/Vol2/3

Lesthaeghe, R. and Moors, G. 2000. Recent Trends in Fertility and Household Formation in the Developed World. *Review of Population and Social Policy* 9:121-170.

Neyer, G. 2003. Family Policies and Low Fertility in Western Europe. *MPIDR Working Paper*. WP 2003-021. Database on-line. Available from Max Planck Institute for Demographic Research, http://www.demogr.mpg.de

Organization for Economic Co-operation and Development. 2000. Online Database. Available at: http://www.oecd.org/home/0,2987,en_2649_201185_1_1_1_1_1,00.html

Rindfuss and Brewster. (1996). Childrearing and Fertility. *Population and Development Review.* 22(Suppl.):258– 89.

Ronson, M. 2004. Fertility and Public Policies–Evidence from Norway and Finland. *Demographic Research* 10:143-170.

Ronson, M. 1999. *Impacts on Fertility and Female Employment of Parental Leave Programs*. Evidence from Three Nordic Countries' Division for Social and Demographic Research-Statistics, Norway. Paper presented at the European Population Conference, The Hague, Netherlands. August 30-September 3. Available at: http://www-les-lundis.ined.fr/textes/maritronsen.pdf

Ruhm, C.J. 1998. The Economic Consequences of Parental Leave Mandates: Lessons from Europe. *The Quarterly Journal of Economics* 113(1):285-317.

Waldfogel, J. 1998. The Family Gap for Young Women in the United States and Britain: Can Maternity Leave Make a Difference? *Journal of Labor Economics* 16(3):505-545.

The World Bank Group. 2007. WDI Online. Online Database. Available at: http://ddpext.worldbank.org/ext/DDPQQ/member.do?method=getMembers&userid=1&queryId=6

Wright, R.E. 1989. The Easterlin Hypothesis and European Fertility Rates. *Population and Development Review* 15, No. 1.