



*Demographic Research* a free, expedited, online journal  
of peer-reviewed research and commentary  
in the population sciences published by the  
Max Planck Institute for Demographic Research  
Doberaner Strasse 114 · D-18057 Rostock · GERMANY  
[www.demographic-research.org](http://www.demographic-research.org)

---

***DEMOGRAPHIC RESEARCH***

VOLUME 4, ARTICLE 4, PAGES 125-132

PUBLISHED 15 MARCH 2001

[www.demographic-research.org/Volumes/Vol4/4/](http://www.demographic-research.org/Volumes/Vol4/4/)

REFLEXION

**Changes in Swedish Women's Individual  
Activity Status and the Subsequent Risk  
of Giving Birth in the 1980s and 1990s:  
An Extension of Studies by Gunnar  
Andersson and Britta Hoem**

**Karsten Hank**

© 2001 Max-Planck-Gesellschaft.

## **Table of Contents**

1.	Introduction	126
2.	Data and Method	126
3.	Empirical results	127
4.	Conclusions	130
5.	Acknowledgements	130
	Notes	131
	References	131

## **Changes in Swedish Women's Individual Activity Status and the Subsequent Risk of Giving Birth in the 1980s and 1990s: An Extension of Studies by Gunnar Andersson and Britta Hoem**

**Karsten Hank**<sup>1</sup>

### **Abstract**

In this note the author uses Swedish register data to investigate changes in a woman's activity status and her subsequent propensity to give birth. This extends previous studies of female labor force participation and childbearing conducted by Andersson (2000) and B. Hoem (2000). Both of them found pro-cyclical patterns of fertility in Sweden during the 1980s and 1990s. The present analysis does not reveal any clear pattern in the effect of *changes* in women's activity status in general on their subsequent birth intensities. We do find, however, that Swedish women generally face a higher risk of giving birth in calendar year  $t$  if they experienced a spell of unemployment in year  $(t-2)$  or  $(t-1)$ . This holds even if the unemployment spell is followed by a change in the woman's activity status. The latter normally leads to a closer attachment to the labor market.

---

<sup>1</sup> Max Planck Institute for Demographic Research, Doberaner Str. 114, 18057 Rostock, Germany.  
Telephone: +49-381-2081-163. Fax: +49-381-2081-463. Email: hank@demogr.mpg.de

## 1. Introduction

Considerable fluctuations in total fertility rates could be observed in Sweden during recent decades (cf. Andersson 1999, for example). As in most Western countries, fertility declined rapidly after the mid-1960s, but in the late 1980s Swedish total fertility rates increased sharply and passed the replacement level in 1990 and 1991. The Swedish TFR then took a downward turn again until it reached its lowest level ever recorded in 1997. Hoem and Hoem (1996) describe this pattern by a roller-coaster metaphor. Social policy and economic trends, including changes in the labor market, are often cited as important determinants of the observed trends (e.g., J. Hoem 1993, Walker 1995).

In this paper, we use register data for 1.8 million women born in Sweden between 1945 and 1979 to study changes in a woman's activity status and her propensity to give birth at each parity. The same raw data have been used by Andersson (2000) and B. Hoem (2000). In his analysis of the impact of labor force participation on childbearing behavior, Andersson (2000) found a pattern of pro-cyclical fertility in Sweden during the 1980s and the 1990s. Levels of earnings among women were positively related to levels of childbearing. This finding is consistent with a study of the influence of economic factors on the rise and fall in Swedish fertility conducted by B. Hoem (2000), who found that first-birth rates rose and fell in step with municipal employment levels.

Our empirical procedure largely follows Andersson (2000), but we extend it to allow for changes in women's activity status (Note 1).

## 2. Data and method

The data for this study have been extracted from the Swedish population register and have been linked to registered income information (see Andersson 2000). Both sources are rich in terms of size and accuracy, but provide a rather limited number of variables only. Thus a woman's activity status needs to be approximated by the character of her sources of annual income and can only be given on a yearly basis. We are able to distinguish between unemployment benefits, allowances for participation in vocational-training programs (AMU), pensions (e.g. in the case of sickness or disability), study allowances (public grants or loans), and earned income (including income replacement during periods of parental leave, for example). Thus, changes in the type of registered income allow us to track changes in the woman's activity status (Note 2). Information on the level of income in calendar year ( $t-1$ ) and the activity status in years ( $t-2$ ) and ( $t-1$ ) is used as a determinant of the woman's propensity to give birth in year  $t$ . With the

available data, such an analysis can be performed for single years in the period 1987 through 1996 (Note 3), taking into account the woman's childbearing parity.

For the empirical analysis, we used the software package RocaNova (Version 2.0; cf. Martinelle 1993) to fit multiplicative main-effects intensity models. Multiplicative intensity regression models are also known as proportional-hazard models and are standard tools for the analysis of individual-level time-dependent data (cf. J. Hoem 1987, for example). In the present analysis, multiplicative main-effects models of the following form are estimated:

$$h(t) = u_k v_l p_m s_n i_q c_r a_w y_x,$$

where  $h(t)$  represents the woman's birth intensity in year  $t$ . It depends on the woman's activity status, measured by whether in year  $t-1$  she received unemployment benefits (with a multiplicative effect  $u$ ), got monetary support for vocational training ( $v$ ), received money from a pension ( $p$ ), or received public student benefits ( $s$ ). We also include changes in these income factors between years  $(t-2)$  and  $(t-1)$ . For each factor, these changes are measured at four levels, namely (1) retention of the same status in both periods, (2) exit from or (3) entry into a specific status, and (4) no experience of a certain status at all. In addition, we included the annual income in the year  $(t-1)$  (measured by the factor  $i$  in the intensity function), the calendar year itself ( $c$ ), the woman's current age ( $a$ ), and – for mothers only – the age of their youngest child ( $y$ ). We estimated separate models for different subgroups of women, namely for childless women in their 20s, childless women in their 30s, one-child-mothers, and mothers with two children.

Among our factors, the calendar year, the age of the woman herself, and the age of her youngest child (for mothers) appear as control variables only (Note 4), and our results concerning them are not reported here. The relative risks for our main covariates are displayed in Table 1.

### 3. Empirical results

Since we have gained no substantially new insights concerning the variables that indicate vocational training, pensions, student enrollment, or the level of earned income, we will not discuss their outcomes in detail and will only briefly note the main results. The "risk" of entering motherhood increases strongly with earned income, and that the propensity to progress to higher parities increases weakly with this covariate. Participants in vocational training generally display only slightly lower birth intensities than other women, while enrolled students have substantially lower birth intensities

**Table 1:** Relative risk of childbearing in year  $t$  by type of income in years  $(t-2)$  and  $(t-1)$ , and by level of earned annual income in  $(t-1)$ , standardized for calendar year, age of woman, and age of youngest child (for mothers) (Note 5).

Labor-market attachment	First births (21-30 yrs.)	First births (31-40 yrs.)	Second births	Third births
<b>Unemployment</b>				
Not at all	1.00	1.00	1.00	1.00
Exit <sup>a)</sup>	1.11	1.08	0.99	1.16
Entry <sup>b)</sup>	1.22	1.17	0.99	1.12
Yes, in both periods <sup>c)</sup>	1.34	1.15	0.94	1.09
<b>Vocational training</b>				
Not at all	1.00	1.00	1.00	1.00
Exit	0.94	0.91	0.89	1.08
Entry	1.09	0.96	0.79	0.81
Yes, in both periods	1.19	0.99	0.85	0.95
<b>Pension</b>				
Not at all	1.00	1.00	1.00	1.00
Exit	1.03	0.45	0.91	1.20
Entry	0.55	0.54	0.56	0.85
Yes, in both periods	0.26	0.23	0.56	0.96
<b>Student</b>				
Not at all	1.00	1.00	1.00	1.00
Exit	0.79	1.04	0.97	1.29
Entry	0.51	0.80	0.60	0.62
Yes, in both periods	0.50	1.00	0.74	0.84
<b>Earned annual income in 1000 SEK</b>				
<sup>d)</sup> 0-59	1.00	1.00	1.00	1.00
60-119	1.49	1.30	1.22	0.87
120-179	1.93	1.61	1.22	0.90
180+	1.68	2.00	1.27	1.00

<sup>a)</sup> The woman was unemployed in year  $(t-2)$ , but not in year  $(t-1)$ .

<sup>b)</sup> The woman was unemployed in year  $(t-1)$ , but not in year  $(t-2)$ .

<sup>c)</sup> The woman was unemployed in both years  $(t-2)$  and  $(t-1)$ .

<sup>d)</sup> Earnings are reported in fixed prices as of 1995, when 5,000 Swedish kronor approximately equaled 1,000 German Marks or 750 US\$.

than those who do not take any kind of education. Women who receive some kind of pension also have much lower birth risks than others; presumably they are in bad health. (See Andersson 2000 for more information about these factors.) We cannot detect any clear pattern of consequences of changes in these factors for women's subsequent birth intensities.

We find what we believe to be a new result regarding entries into and exits from unemployment. Spells of unemployment, even if they occurred in year ( $t-2$ ) only, are followed by an increased childbearing intensity relative to women who were not unemployed at all in any of the two years that precede the current year of observation. This result is most pronounced for young childless mothers. In this group, the first-birth risk is highest (with a relative risk of 1.34) when the woman received unemployment benefits in both the two years before  $t$ . Older childless women who were unemployed in year ( $t-1$ ) face about the same risk to have a first birth in year  $t$ , independently of their activity status in year ( $t-2$ ) (with relative risks of 1.17 and 1.15, respectively). Mothers of two children are most likely to have a third child when they were unemployed in year ( $t-2$ ) and did not receive unemployment benefits in year ( $t-1$ ) of observation (1.16), and if the reverse chain of events occurred (1.12). These results hold except for mothers at parity 1. For such women we find almost no association between an unemployment spell and the propensity to have another child.

One can think of basically two different explanations for the relationship between unemployment spells and fertility that we have found for childless women and for mothers of two children (Note 6). On the one hand, women might want to secure employment before they have a(nother) child. If they do establish (or re-establish) themselves on the labor market, they can benefit the most from the generous Swedish parental-leave regulations. Thus, women might postpone having a child they intend to bear until after the end of unemployment. – On the other hand, a spell of unemployment might be an inducement to having a child during a period in which the opportunity costs of motherhood are relatively low. B. Hoem (2000), for example, argues that in times of better labor market prospects (and in the presence of sufficiently extensive provision public day-care), women would then be able to enter (or re-enter) the labor market without any further interruption due to childbearing.

Which one of the two suggested explanations possibly applies to a particular woman most likely depends on characteristics which we were not able to observe with the available data. It might have been important, for example, to account for the partner's labor-market situation and his income as well. Unfortunately the Swedish register does not contain any information on the individual's family (as already noted by B. Hoem 2000).

## 4. Conclusions

Our empirical analysis does not reveal a clear pattern of impacts of changes in women's activity status in general on women's subsequent childbearing decisions. Where comparisons are possible, our results are consistent with previous studies by Andersson (2000) and B. Hoem (2000), who considered women's labor market attachment in year ( $t-1$ ) only, measured in the same manner as we have done. The association we have found between exits from and entries into unemployment spells and fertility seems to be new. A straightforward theoretical framework to explain this pattern has not been developed yet. There is only relatively little empirical evidence concerning the relationship between a woman's unemployment and her childbearing behavior, and what exists is sometimes contradictory. Murphy (1992) concludes that the reasons for the observed behavior are more complex than what one can incorporate into simple explanatory models, since they are associated with wider – and usually unobserved – social relations. Thus researchers should be particularly careful in their interpretation of such findings to avoid drawing rash inferences from a priori theorizing.

## 5. Acknowledgements

This paper is based on work done in the context of the course “*Introduction to Regression Analysis of Duration Data*”, given by Jan M. Hoem at the MPIDR, Rostock, from January through March 2000. The author would like to thank him for his encouragement and editorial help, two anonymous referees for their comments on an earlier draft, and in particular Gunnar Andersson for preparing the data set and for suggesting the present analysis. The great efforts of Britta Hoem in setting up the original database at Statistics Sweden are also gratefully acknowledged.

The views expressed in this paper are the author's views and do not necessarily reflect those of the Max Planck Institute for Demographic Research.



## Notes

1. Cf. Zuev (2000) for a discussion of the impact of changes in income on childbearing behavior in contemporary Sweden.
2. A woman may have several types of recorded income in any single year. However, in our data set we cannot distinguish sequences of activity transitions within single years. Therefore, we may have to deal with identification problems that cannot be solved in this analysis.
3. The allowance for participation in vocational-training programs (AMU) was only introduced in the 1990s. Therefore an inclusion of this factor is not possible before 1992.
4. Unfortunately, information on other potentially relevant factors, such as educational level or social background, was not provided with the data. Moreover, information on municipal employment levels – as was used by B. Hoem (2000) – was not available for this project. We believe, however, that period effects, such as changes in the general economic situation or social policies, are sufficiently controlled for by entering the calendar year into the regression (cf. Berinde 1999, for example).
5. The data set is sufficiently large to ensure statistical significance of almost any visible difference in risk levels.
6. Second-birth intensities may be less sensitive towards unemployment due to the strong tendency of Swedish women to have two children (cf. Berinde 1999, for example) in combination with the ‘speed premium’ on the next child, which has encouraged a closer spacing of births (J. Hoem 1993).

## References

- Andersson, G. (1999): Childbearing trends in Sweden, 1961(71) – 1997. *European Journal of Population* 15: 1-24.
- Andersson, G. (2000): The impact of labour-force participation on childbearing behaviour: pro-cyclical fertility in Sweden during the 1980s and the 1990s. *European Journal of Population* 16: 293-333.
- Berinde, D. (1999): Pathways to a third child in Sweden. *European Journal of Population* 15: 349-378.

- Hoem, B. (2000): Entry into motherhood: the influence of economic factors on the rise and fall in fertility, 1986-1997. *Demographic Research*, online journal available at <http://www.demographic-research.org/Volumes/Vol2/4>.
- Hoem, B. and J.M. Hoem (1996): Sweden's family policies and roller-coaster fertility. *Jinko Mondai Kenkyu* (Journal of Population Problems, Tokyo) 52: 1-22.
- Hoem, J.M. (1987): Statistical analysis of a multiplicative model and its application to the standardization of vital rates: a review. *International Statistical Review* 55: 119-152.
- Hoem, J.M. (1993): Public policy as the fuel of fertility: effects of a policy reform on the pace of childbearing in Sweden in the 1980s. *Acta Sociologica* 36: 19-31.
- Martinelle, S. (1993): RocaNova – A Program for Intensity Regression (Version 1.2), Statistics Sweden, Stockholm.
- Murphy, M. (1992): Economic models of fertility in post-war Britain – a conceptual and statistical re-interpretation. *Population Studies* 46: 235-258.
- Walker, J.R. (1995): The effect of public policies on recent Swedish fertility behavior. *Journal of Population Economics* 8: 223-251.
- Zuev, S.M. (2000): The impact of changes in income on childbearing behavior in contemporary Sweden. Mimeo, MPIDR, Rostock.