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Net Fertility and Socioeconomic Status: the Swedish Case at the Onset of Fertility Decline. A Preliminary Look at 1890 and 1900 Censuses Data

Introduction

The decline of fertility in the demographic transition has been a major theme in the study of historical demography. Much of the literature has focused on measuring the demographic aspects of the decline by charting the process; other research has attempted to explain the decline, primarily at the macro level. Much less attention has been given to disaggregated patterns and micro-level analyses. Analyzing differences in fertility by socioeconomic status and geospatial context and documenting how these differences evolved during the fertility transition will lead to a better understanding of historical fertility decline.

There appears to be a generally accepted view that high social status was associated with high fertility in pre-transitional society but that this situation reversed during, or even just before, the transition (Livi-Bacci 1986; Skirbekk 2008). It is postulated that social groups with higher status acted as forerunners in the decline (Haines 1992; Livi-Bacci 1986) but it remains unclear whether the change happened because new incentives were affecting the elite groups first (adjustment) or because the diffusion of new ideas was first adopted by these high-status groups (innovation). Previous research has also shown that some of the differences in fertility between socioeconomic groups have been associated with geo-spatial factors rather than with social status as such (Garrett et al. 2001), making it vital to control for geographical context when analyzing socioeconomic stratification and fertility (see also Szreter 1996).

The aim of this paper is to identify socioeconomic differentials in fertility and assess the role of spatial heterogeneity during the fertility transition in Sweden. We use data from the Swedish censuses of 1890 and 1900 which cover the entire population of Sweden. This makes it possible to look at socioeconomic patterns while controlling for spatial heterogeneity. We also estimate a model of fertility that includes control variables at the individual, household and community level. This is a preliminary study using the 1890 and 1900 censuses. Upcoming research will include linkages between additional censuses which will make it possible to study the dynamics of this process in-depth.

Background

A previous study on the determinants of fertility decline using county level data (Dribe 2009) showed that fertility decline in Sweden was associated with both demand and supply of children, in line with the Easterlin-Crimmins framework (Easterlin and Crimmins 1985). A higher supply of children following lower child mortality was associated with lower marital fertility. Higher urbanization and stronger educational orientation were also associated with lower fertility as they were both related to higher costs and lower economic benefits of children.

Thus, previous research tends to support an interpretation that connects fertility decline with broad socioeconomic changes taking place in the late nineteenth and early twentieth century following the transition from an agriculturally based economy to an industrial one. This transition involved sustained mortality decline, increasing levels of urbanization, expansion of education and increased female participation in the labour market. The question that remains,

however, is how these changes affected different socioeconomic groups. Looking at the fertility decline in France, Germany, Britain, Norway and the United States, Haines (1992) showed that socioeconomic differentials, as measured by occupation, generally widened during the transition. Fertility decline in all of these countries with the exception of France was led by the middle and upper classes while the agrarian population was slower to change.

What is not well understood is whether this pattern was the result of socioeconomic change that initially affected the upper and middle classes and subsequently hit the lower classes as well or if it was part of an older pattern of innovation diffusion from the upper to lower social strata. Livi-Bacci (1986) showed that European elite groups often acted as forerunners in the fertility transition, adopting declining fertility long before the general population decline in fertility.

Data

The present study uses data from the 1890 and 1900 censuses of Sweden. Historical Swedish censuses were carried out differently from other countries. Instead of collecting information from people interviewed in their homes, data collection was carried out by parish priests who extracted the necessary information directly from parish record books. In all, the 1890 and 1900 Swedish censuses enumerated 5,200,111 and 4,846,124 individuals, respectively. Geographically, these data are from 2,533 parishes grouped in 24 counties.

The micro census data were digitalized by the Swedish National Archives using the same format as the North Atlantic Population Project (NAPP) database (Ruggles, Roberts, and al., 2011). The great advantage of the census data is national coverage and the possibility of studying fertility differentials by social status across space without the problems associated with small sample sizes. Information about individual occupation is registered in the micro data according to the Historical International Standard Classification of Occupations (Van Leeuwen, Maas and Miles, 2002), with alphabetic occupational titles for each person-record. Based on this occupational information it is possible to adopt the Historical International Social Class Scheme (Van Leeuven and Maas 2011).

Indirect Fertility Measures

Census data do not permit the computation of standard fertility rates (ASFR, TFR, etc) by socio-economic status so we rely on indirect measures such as the child-woman ratios (CWRs) and the own-children method (OCM). The CWR is defined as the number of children aged 0-4 per 1,000 women aged 15-49 (Shryock and Siegel 1980). We assume that children under 5 would have been born during the 5-year period before the census date, when the women were up to 5 years younger. The OCM was developed by Grabill and Cho (1965) and further elaborated by others (Cho et al. 1986; Retherford et al. 1984). It is exclusively based on micro stock data (for instance census or household surveys) and was mainly developed to measure fertility levels in developing countries, where flow data about birth were difficult to find, unreliable or almost inexistent. An advantage of CWR and OCM methods is that they can also provide fertility estimates by socio-economic characteristics. In Table 1, CWR and OCM estimates by SES are provided for the entire Swedish population from the 1900 census.

Table 1. Child-Woman Ratios and TFRs by Socio-Economic Status, Sweden 1900

	Elite	Skilled	Farmers	Lower Skilled	Unskilled	No SES	Total
CWR	396.1	400.0	533.2	720.3	642.9	291.1	473.5
TFR	3.2	3.6	4.7	6.0	5.1	1.7	4.0

These estimates are not, however, adjusted for mortality since data on mortality risks by socio-economic status are not available from that time. Indeed, CWRs and OCM estimates may underestimate the fertility levels of those social groups that suffered from higher infant mortality since the number of living children at the time of the census is likely to be less than the actual number of children ever born.

Multilevel Regression

Since micro census data are available, we can estimate the effects of socio-economic status on net fertility using multilevel regression models. We consider the influence of the geographical context (unobserved spatial heterogeneity) by including fixed effects at the parish level. The dependent variable is the number of their own living children under age 5 for married women age 15-54. The main covariate is the socio-economic status of the husband, relying on the declared occupations at the census. Control variables for class, age, the working status of the woman, migrant status and household structure are also included. Micro census data have been aggregated at the parish levels providing rich contextual variables on rates of industrialization, education, migration and female labour participation.

Preliminary results

In Table 2, we present preliminary results from multivariate regression models for Sweden at the time of the 1900 census (preliminary analysis of the 1890 census is ongoing). The results of these preliminary models show evidence of differential socio-economic effects on fertility. Women married to farmers (reference category) have higher net marital fertility (higher coefficients) than the other socio-economic groups (see model 2). Women married to men in the upper classes register lower net fertility (model 2), whereas the wives of lower and unskilled workers show intermediate coefficients. Interestingly, however, the results of the fixed effects model (6) suggest that when controlling for spatial heterogeneity at the parish level, socio-economic differences in fertility decrease.

Figures 1a and 1b show the predicted CWRs by age and socio-economic status calculated from selected estimated models in Table 2. Figure 1a is based on model 2, which does not control for unobserved heterogeneity at the parish level, and figure 1b is based on model 6 (fixed effects) which does control for unobserved local factors. The results show that when we include fixed effects in the model, the differences in CWRs between farmers, lower skilled workers and unskilled workers are clearly reduced, confirming the impact of geographical determinants on fertility decline.

Figure 1. Predicted Child-Woman Ratios by class age and SES based on model 2 and 6

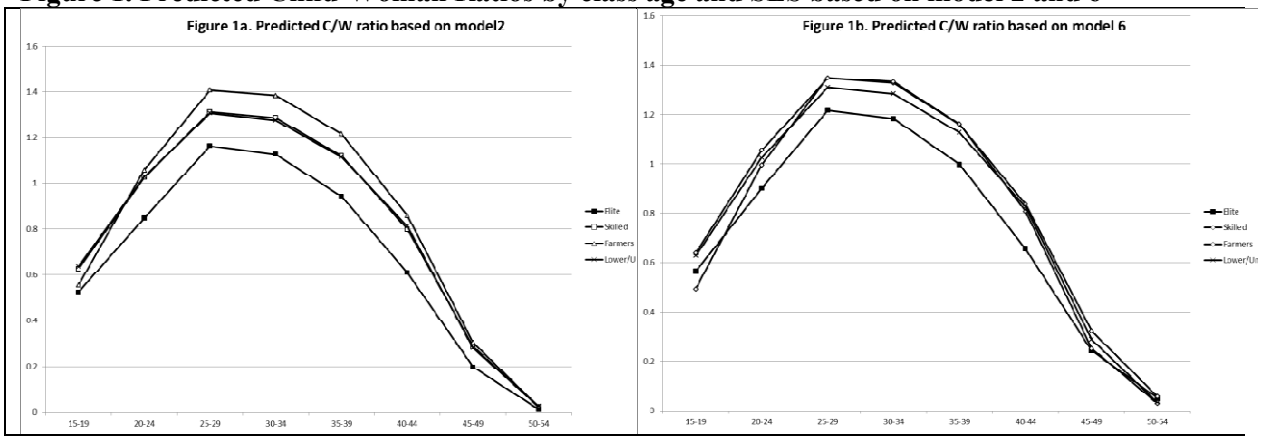

Table 2. Regression models with number of children 0-4 as the dependent variable, 1900 Swedish census

	Descriptives		Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
Variable	Women %	Mean C/W	Coef.	P>	Coef.	P>	Coef.	P>	Coef.	P>	Coef.	P>	Coef.	P>
HISCLASS														
Higher mangers	2.6	0.68	-0.134	0.000	-0.126	0.000	-0.115	0.000	-0.117	0.000	-0.085	0.000	-0.081	0.000
Higher professionals	1.4	0.67	-0.149	0.000	-0.269	0.000	-0.237	0.000	-0.219	0.000	-0.161	0.000	-0.146	0.000
Lower managers	3.6	0.75	-0.066	0.000	-0.171	0.000	-0.152	0.000	-0.157	0.000	-0.110	0.000	-0.089	0.000
Lower professionals	3.9	0.73	-0.085	0.000	-0.223	0.000	-0.204	0.000	-0.205	0.000	-0.127	0.000	-0.119	0.000
Lower clericals	1.3	0.66	-0.155	0.000	-0.272	0.000	-0.250	0.000	-0.259	0.000	-0.141	0.000	-0.117	0.000
Foremen	1.1	0.73	-0.080	0.000	-0.149	0.000	-0.123	0.000	-0.132	0.000	-0.076	0.000	-0.058	0.000
Medium skilled workers	13.7	0.86	0.048	0.000	-0.081	0.000	-0.068	0.000	-0.084	0.000	-0.013	0.000	0.002	0.627
Farmers and fishermen [Ref.]	32.6	0.81	-	-	-	-	-	-	-	-	-	-	-	-
Lower skilled workers	10.5	0.95	0.139	0.000	-0.039	0.000	-0.027	0.000	-0.049	0.000	0.010	0.009	0.022	0.000
Lower skilled farm workers	1.7	0.91	0.094	0.000	-0.026	0.002	-0.022	0.007	-0.029	0.000	-0.017	0.034	-0.009	0.277
Unskilled workers	9.6	0.85	0.036	0.000	-0.099	0.000	-0.085	0.000	-0.106	0.000	-0.014	0.001	-0.008	0.066
Unskilled farm workers	13.5	0.91	0.093	0.000	-0.042	0.000	-0.035	0.000	-0.040	0.000	-0.030	0.000	-0.009	0.012
Non-SES	4.5	0.49	-0.322	0.000	-0.384	0.000	-0.377	0.000	-0.178	0.000	-0.147	0.000	-0.130	0.000
Class Age														
15-19	0.4	0.59			-0.651	0.000	-0.656	0.000	-0.611	0.000	-0.615	0.000	-0.619	0.000
20-24	6.5	0.97			-0.277	0.000	-0.280	0.000	-0.251	0.000	-0.250	0.000	-0.255	0.000
25-29	13.6	1.28			0.019	0.000	0.017	0.000	0.031	0.000	0.031	0.000	0.028	0.000
30-34 [Ref.]	15.8	1.27			-	-	-	-	-	-	-	-	-	-
35-39	18.2	1.11			-0.162	0.000	-0.162	0.000	-0.171	0.000	-0.172	0.000	-0.172	0.000
40-44	17.4	0.79			-0.490	0.000	-0.489	0.000	-0.507	0.000	-0.507	0.000	-0.507	0.000
45-49	15.0	0.28			-1.003	0.000	-1.003	0.000	-1.028	0.000	-1.029	0.000	-1.027	0.000
50-54	13.0	0.02			-1.256	0.000	-1.256	0.000	-1.288	0.000	-1.289	0.000	-1.287	0.000
Class Age Difference														
Wife Older [Ref.]	26.1	0.77			-	-	-	-	-	-	-	-	-	-
Husband 0-3 years older	22.7	0.87			-0.012	0.000	-0.013	0.000	-0.019	0.000	-0.021	0.000	-0.018	0.000
Husband 3-6 years older	26.3	0.87			-0.018	0.000	-0.019	0.000	-0.026	0.000	-0.030	0.000	-0.027	0.000
Husband >6 years older	24.9	0.79			-0.075	0.000	-0.075	0.000	-0.088	0.000	-0.093	0.000	-0.094	0.000
Migrant Status														
Both Migrant [Ref.]	17.8	0.76					-	-	-	-	-	-	-	-
Only wife mig	9.2	0.85					-0.067	0.000	-0.082	0.000	0.001	0.682	-0.001	0.838
Only husband mig	10.4	0.85					-0.021	0.000	-0.032	0.000	0.002	0.615	0.006	0.088
Both Non-migrant	62.6	0.83					-0.010	0.005	-0.025	0.000	0.009	0.008	0.010	0.004
Woman in Labour Force														
No [Ref.]	99.5	0.83					-	-	-	-	-	-	-	-
Yes	0.5	0.61					-0.174	0.000	-0.165	0.000	-0.157	0.000	-0.177	0.000
Head of household														
No	3.1	0.27							-0.720	0.000	-0.742	0.000	-0.738	0.000
Yes [Ref.]	96.9	0.84							-	-	-	-	-	-
Women over 54 in household														
No [Ref.]	93.0	0.84							-	-	-	-	-	-
Yes	7.0	0.68							-0.079	0.000	-0.082	0.000	-0.065	0.000
Servants in the households														
No [Ref.]	87.5	0.83							-	-	-	-	-	-
Yes	12.5	0.78							-0.050	0.000	-0.026	0.000	-0.015	0.000
Residence Area														
Rural [Ref.]	79.5	0.85									-	-		
Urban	20.5	0.73									-0.077	0.000		
Industrial Rate * 100	17.2										-0.001	0.000		
Female in Labour Force Rate*100 (%)	18.8										-0.003	0.000		
Teacher/Children (%)	1.5										-0.016	0.000		
Migrants Rate (%)	20.3										-0.002	0.000		
Const			0.814	0.000	1.373	0.000	1.380	0.000	1.434	0.000	1.530	0.000	1.363	0.000
Fixed Effects														
Sigma_u													0.131	
Sigma_e													0.786	
Rho													0.027	

Note: 621,397 married women aged 15-54 are included