Fertility and Cohort Composition over the Business Cycle*

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September 16, 2018

Abstract: Using all births in the Netherlands between 1996 and 2016, we study the impact of changes in the provincial unemployment rate on fertility and cohort composition. We document a negative effect of an increase in the unemployment rate on fertility. The magnitude of the effect declines with parity and is particularly strong for lower educated women between the ages of 25 and 29.

Keywords: Fertility, Unemployment, Cohort Composition

JEL Codes: J11, J13.

Preliminary Version, Please Do Not Cite or Circulate

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1 Introduction

The relationship between business cycle fluctuations (i.e., booms and recessions) and fertility has been in the main stay of demographic, economic and epidemiological research for the better part of the past century.[1]. Arguably, a change in the fertility rate imprints the memory of a recession onto the demographic pyramid, thereby potentially prolonging the impact of a crisis to many years after recovery has taken place. While the literature is not unanimous, the general consensus is that fertility is pro-cyclical, in the sense that, recessions are associated with lower fertility rates (Sobotka et al., 2011).

The impact of business cycle fluctuations on fertility differs substantially across different sub-groups of the population (Sobotka et al., 2011). Arguing from the perspective of Becker (1960), such differential fertility effects may be attributed to changes in income or differences in the opportunity costs of fertility over the business cycle. Interestingly, these differential effects also impact the growing literature on early-life conditions and health at various later stages in the life-cycle. Indeed, while much of the literature in that field documents a negative impact of adverse early-life conditions on health later in life, only a selected number of contributions can differentiate between a change in the cohort composition and a 'true' effect of adverse early-life conditions on health later in life (see, for instance Dehejia and Lleras-Muney, 2004).

Recently, Currie and Schwandt (2014) have used the United States Birth Records for the period between 1975 and 2010 to analyze the relationship between national and state-level fluctuations in the unemployment rate – i.e., year-on-year differences – and fertility. They highlight that increases in the unemployment rate lead to a decrease in the fertility rate and that particularly women in the prime childbearing years between age 20 and 24 are affected.

In this paper we exploit the unique nature of the Dutch Administrative data to analyze the impact of national and province-level[2] fluctuations in the unemployment rate on fertility for the period between 1996 and 2016. The Netherlands are a relevant counterpart to the United States as the extensive welfare state assures that the income loss associated with involuntary unemployment is absorbed by unemployment insurance to a significant extent.[3] Using these data we revisit the results of Currie and Schwandt (2014) and compare and contrast the United States findings with those from the Netherlands.

Importantly, the Dutch data allow us to go beyond the age decomposition pursued by Currie and Schwandt (2014) and study differential effects across educational groups as well and we are able to differentiate the effect by parity (i.e., the impact on the first, second and third and higher order child). In concert, these additional analyses allow us to draw a clearer

[1] Even longer if we consider the work of Malthus (1798)
[2] The Netherlands are composed of 12 provinces.
[3] The Netherlands has a replacement rate of about 70 percent (OECD, 2015).

picture of the differential impact of unemployment fluctuations on the fertility of various socioeconomic groups in society.

The remainder of the paper is set up as follows. In the next section we outline our Data & Methods, Section 3 presents and discusses our main results, Section 4 discusses our results in regard to the current literature and interprets some limitations.

2 Data & Methods

We use administrative data from Statistics Netherlands covering all inhabitants in the Netherlands in the period between 1996 and 2016. From this universe of data we select all women in the childbearing age (i.e., between 14 and 40). Linking each woman to her children (if any), provides us with an account of the fertility profile of each woman in the Netherlands between 1996 and 2016. Importantly, this allows us to focus not only on the first child but also on the subsequent children. Moreover, by linking with the educational registry, we are able to associate the highest level of achieved education to each woman in our analyses. For the latter analysis, this feature will allow us to differentiate any impact by the education level of the mother. In a subsequent analysis we also consider the educational attainment of the father to be able to distinguish between the effect of a change in income (education of the father) and the opportunity cost of raising children (education mother).

For the unemployment rate we as well rely on data from Statistics Netherlands, who collect labor market statistics for the country as a whole as well as on the provincial level. While the Netherlands are a relatively small country, significant differences in the level and trend of the unemployment rate exist between the provinces. As the population registry also provides us with information on the residence of each individual, we can link the relevant unemployment rate to the time of birth of a child.

Following Currie and Schwandt (2014), we calculate the number of live births in calender year t of a cohort born in year y in province p. Going one step deeper we also break down the cohort education level e. In a similar vein, we calculate the number of first, second and third and higher order births in each year.

We then regress the various fertility measures on the unemployment level in the year proceeding birth. We start by considering the overall effect and then break the effect down by age, parity and education of the mother.

3 Results

We exhibit our first set of results in the four graphs contained in Figure 1, where we show the relationship between the year-on-year change in the unemployment rate and the fertility rate. While the upper left graph displays results for the overall fertility rate, the remaining three graphs show the results by parity. An increase in the unemployment rate leads to a

Figure 1: Unemployment and fertility

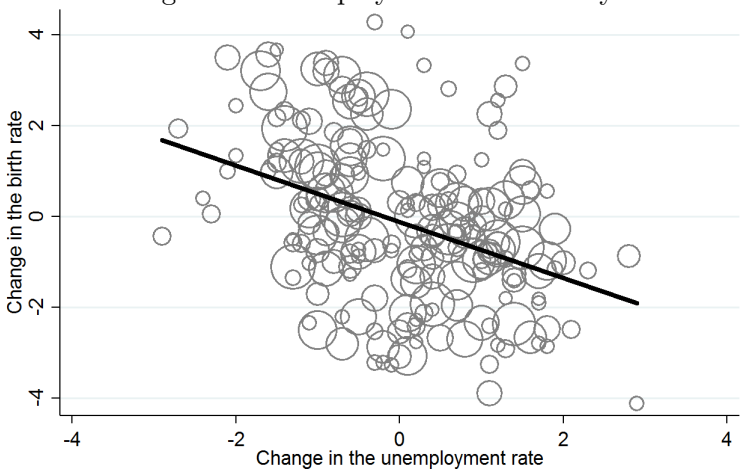

Table 1: Unemployment and fertility -age 15-39

	Age 15-39	1st child	2nd child	subsequent children
	-0.91	-0.48	-0.28	-0.16
	(0.00)	(0.00)	(0.00)	(0.00)
N	204	204	204	204

decline in the overall fertility rate. The effect is statistically significant at the 1 percent level and the order of magnitude implies that a one percentage point change in the unemployment rate around conception leads to a reduction of about 0.90 births per 1000 woman, which is higher than the association found for the United States. Focusing on the remaining graphs reveals that the effect is particularly strong for the first child and that it declines with each successive child.

The results are further summarized in Table 1, where we also highlight that our specifications was estimated using standard errors clustered on the province level. Formal tests substantiate that, indeed, the impact of a change in the unemployment rate on fertility declines with parity.

In Table 2 we break down the overall effect by maternal age. These results indicate that while fertility at each age is affected, it is particularly the group aged 30 to 34 and aged 25-29 where the effect is most pronounced.

Table 2: Unemployment and fertility by age

	age 15-19	age 20-24	age 25-29	age 30-34	age 35-39	age 40-44
	-0.22	-0.56	-1.19	-1.69	-0.59	-0.18
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
N	204	204	204	204	204	204

Figure 2: Fertility age profiles by education

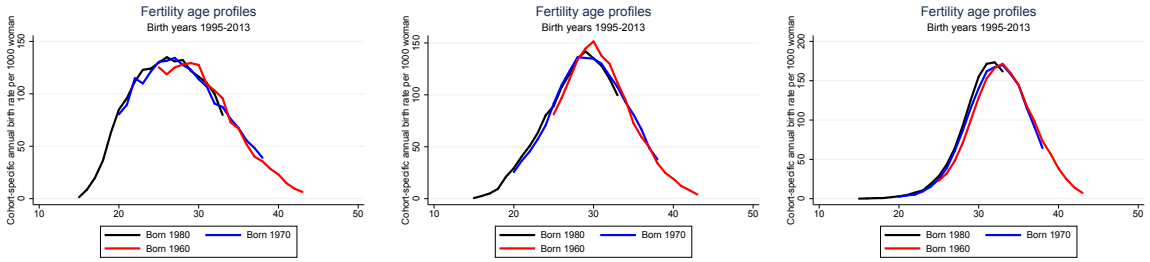

Table 3: Unemployment and fertility by education

	age 25-29	age 30-34	age 35-39	age 40-44
		Lower educated		
	-1.44	-1.73	-0.59	-0.17
	(0.00)	(0.00)	(0.01)	(0.00)
		Higher educated		
	-1.12	-1.46	-0.84	-0.47
	(0.00)	(0.00)	(0.00)	(0.00)
N	204	204	204	204

Moving forward we consider the differential impact of changes in the unemployment rate on fertility by the education of the mother. To prepare for this analysis, we first display how the age-fertility profile differs by level of education in Figure 2. There we see that, while overlapping, the age-fertility profiles for higher educated mothers are shifted toward higher ages.

In Table 3 we display the estimation results of our main effect by educational groups (e.g. high or low educated) mothers aged 25 and older. This reveals that it is the fertility of low educated mothers that is most strongly affected by an increase in the unemployment rate at lower ages. While higher educated mothers are more strongly effected on higher ages.

Breaking the results further down by parity in Table 4 reveals that for the first child among high educated mothers it is the group between 25 and 34 that is most affected, while low educated mothers in the group between 25-34 are less affected. For subsequent children, however, we find that higher income woman are much less effected by changes in the unemployment rate than lower educated woman. This suggests that high income mothers are more averse to career breaks during periods of low employment while lower educated mothers particularity react to changes in income.

Table 4: Unemployment and fertility by education and parity

	age 25-29	age 30-34	age 35-39	age 40-44
Lower educated - 1st child				
	-0.87	-0.72	-0.04	0.01
	(0.00)	(0.00)	(0.46)	(0.67)
Lower educated - 2nd child				
	-0.34	-0.85	-0.28	-0.12
	(0.00)	(0.00)	(0.01)	(0.00)
Lower educated - subsequent children				
	-0.23	-0.15	-0.28	-0.06
	(0.03)	(0.08)	(0.03)	(0.15)
Higher educated - 1st child				
	-1.09	-1.34	-0.09	0.11
	(0.00)	(0.00)	(0.48)	(0.11)
Higher educated - 2nd child				
	-0.08	-0.06	-0.05	-0.18
	(0.22)	(0.82)	(0.79)	(0.03)
Higher educated - subsequent children				
	-0.06	-0.06	-0.71	-0.18
	(0.27)	(0.60)	(0.00)	(0.04)
N	204	204	204	204

4 Discussion & Limitations

Our paper has shown that an increase in the unemployment rate leads to a decline in the fertility rate. The magnitude of the effect declines with parity and it is particularly women with lower education who are affected.

Our analysis is line with much of the extant literature reviewed in Sobotka et al. (2011) showing a negative relationship between an increase in the unemployment rate and fertility. Our results can most directly be compared to Currie and Schwandt (2014), who use United States birth registry data.

Moving beyond the analysis of Currie and Schwandt (2014) by breaking the results down further by the education of the mother connects our analysis with that of Dehejia and Lleras-Muney (2004). Using US data they show that during times of high unemployment there is positive selection into the birth cohort of black mothers. That is, when unemployment is high, it is particularly higher educated black mothers who give birth. Our analysis adds to this insight by showing that, in the Dutch context, women with lower education are particularly sensitive to changes in the unemployment rate. Higher educated woman are in particular sensitive to changes in unemployment with respect to the decision to take a first child.

As suggested before, the impact of changes in the unemployment rate on the composition of the birth cohort has implications for the large literature on early-life conditions and health outcomes later in life. With few exceptions, this literature shows that adverse economic conditions early in life lead to poor health outcomes later in life. The mechanisms behind this relationship are, however, not yet well understood. One such potential mechanisms is the possibility that the composition of the birth cohort is altered in a way to select relatively unhealthy individuals. In this regard our results suggest that, as measured by the education of the mother, there is positive selection into the birth cohort. This implies that, on average, a cohort born when the unemployment rate was increasing has a higher health potential. Hence, the finding that adverse early-life conditions lead to poor health outcomes later in life cannot be attributed to negative selection into the birth cohort.

To the best of our knowledge, a novel finding of our analysis is the breakdown by parity. Here we observe that the magnitude of the impact of unemployment decrease with parity. One interpretation of this result is that, conditional on deciding to have children, couples have a 'desired' number of children and are, hence, less likely to deviate from this target when economic conditions change.

Our analysis is not without limitations. Primarily, while we know the date of birth, we do not actually know when the decision to have a child was made. For a variety of reasons there may be a significant delay between the moment that a couple decides to have a child and the actual birth of a child. Therefore, throughout the analysis we associate the of the year before to the fertility rate (e.g., the unemployment rate in 1997 as determinant of the fertility rate in 1998). As an alternative specification we have also considered associating the

unemployment rate in the year of birth with the fertility rate in that year resulting in similar outcomes.

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