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Economic downturns and infant health

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ABSTRACT

We study the gender-specific impact of macroeconomic conditions around birth on infant health. We use a sample of over 50,000 respondents born between 1950 and 1994 from Lifelines—a cohort and biobank from the northern Netherlands. Our results show that high provincial unemployment rates decrease fertility and lead to a lower birthweight in boys. The negative impact of high unemployment on birthweight is particularly strong for boys born to older mothers and for babies born to smoking mothers.

1. Introduction

Health insults early in life and even *in utero* persist through the lifetime and even a minor exposure early in life can increase the risk of chronic diseases later in life (Barker, 1995; Van den Berg et al., 2006). Moreover, infant health is an important determinant of a host of outcomes later in life such as accumulation of human capital, labour market outcomes, marital status and welfare dependency (Behrman and Rosenzweig, 2004; Almond et al., 2010; Brandt et al., 2016; Cruces et al., 2012; Nilsson, 2017). In addition, poor infant health is transmitted to the next generation (Currie and Moretti, 2007). In this sense infants born with poor health are set on a lifetime trajectory of inferior outcomes that can potentially spill over to the next generations.

Important determinants of infant health are the socio-economic status and income of the family (Currie, 2009; Catalano et al., 2011). To understand the relationship between health at various stages of the life-cycle and economic conditions around birth, a number of studies have analysed how life-course health outcomes are affected by the state of the business cycle at the time of birth since the state of the business cycle represents exogenous variation in the economic conditions families face (Van den Berg et al., 2006, 2009, 2011).

Focusing especially on infant health Dehejia and Lleras-Muney (2004) and Aparicio and González (2014) demonstrate that fewer babies are born with low birthweight during economic downturns than during booms in the United States and Spain respectively. Angelini and Mierau (2014) document that recessions are associated with higher levels of childhood health in European countries and Van den Berg and Modin (2013) find no relationship between economic conditions and birthweight in Sweden. By contrast, Kaplan et al. (2017) and Margerison-Zilko et al. (2011) show that elevated levels of unemployment led to an increase in the likelihood of babies being born with low birthweight in Memphis, TN and the National Longitudinal Survey of Youth 1979, respectively. In the context of developing countries, Bhalotra (2010) and Bozzoli and Quintana-Domeque (2014), among others, has shown that recessions have a negative impact on infant health.

Additionally, it is well established in the medical and epidemiological literature that male foetuses and infants are more sensitive to harsh conditions than female foetuses (e.g. Bruckner et al., 2010) – possibly due to differences in intra-uterine growth strategies (Eriksson et al., 2010). It has been documented in the US and various European countries that increased unemployment levels and business cycle fluctuations can lead to changes in sex ratios, male fetal deaths and low birthweight in males (Catalano and Serxner, 1992; Catalano, 2003; Catalano et al., 2005, 2010, 2012; Catalano and Bruckner, 2005, 2006). Remarkably, some studies suggest selection against the least fit males in utero during economic downturns, which results in better average health of surviving infants (Catalano et al., 2010, 2012). Interestingly, the

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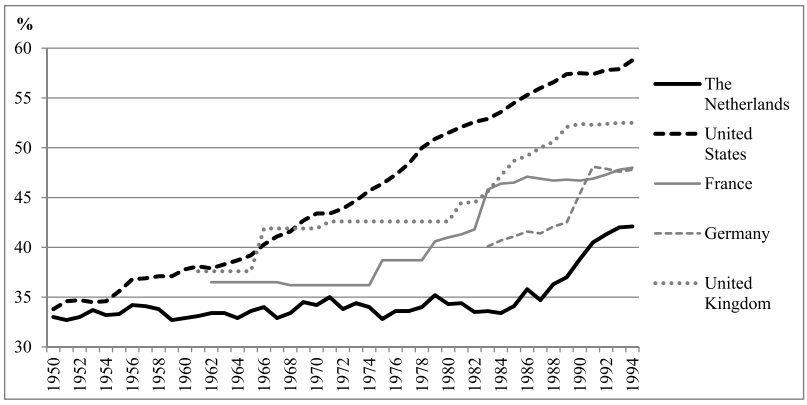

Fig. 1. Female labour participation rate, for selected countries (1950–1994).
Data source: Compiled from Statistics Netherlands (www.cbs.nl), US Bureau of Labor Statistics (www.bls.gov), and World Bank (databank.worldbank.org).

economic literature on business cycle fluctuations and infant health, to the best of our knowledge, has not accounted for such gender differences.

There are three broad mechanisms by which an economic downturn might affect babies' health. First, economic downturns might affect the decision to become pregnant differently for different population groups, thus affecting the cohort composition of the babies born in a given year. Indeed, the positive relationship between being born in a recession and babies' health documented by, for instance, Dehejia and Lleras-Muney (2004) and Aparicio and González (2014) can be partially explained by different fertility responses across women with different skill levels. Moreover, Orsini and Avendano (2015) show that age-related selection into motherhood explains why the relationship between business cycle fluctuations and infant mortality in the United States differs by race and period. Aside from the fertility decision, the state of the business cycle may influence the probability of spontaneous abortions differently across groups, thereby also affecting the cohort composition (see, for instance, Bruckner et al., 2016).

The second mechanism concerns the fact that, conditional on the decision to become pregnant, a decrease in income due to an economic downturn can lead to changes in health-related consumption by pregnant women, including changes in the quality and quantity of nutrition, but also changes in unhealthy consumption such as smoking or alcohol. Exploring this mechanism, Ruhm (2000, 2003) shows that recessions are associated with a positive change in health behaviour. Margerison-Zilko (2014), however, shows that economic contractions are associated with an increased risk of alcohol use among pregnant women.

Third, economic downturns can lead to changes in the environment that, in turn, affect the foetus. Focusing on the beneficial effects, Chay and Greenstone (2003) show that pollution decreases during recessions. Reassessing and extending the analyses of Ruhm (2000, 2003) who shows that the health behaviour improves during recessions, Miller et al. (2009) highlight that a lion's share of the mortality gains experienced during recessions can be traced back to a decrease in traffic accidents. Focusing on negative effects, Bruckner et al. (2014) using data from California and Pedersen et al. (2005) with Swedish data show that maternal stress – a risk factor for foetal development (Kuh and Hardy, 2002) – increases during economic downturns.

Against the background of the above literature we use this paper to analyse the relationship between economic downturns and babies' health using individual level data from the Netherlands for cohorts born between 1950 and 1994. The Netherlands is an interesting country for exploring the mechanisms behind this for several reasons. First, the Netherlands is a small and homogeneous country with high income. Second, female labour force participation in the Netherlands has been strikingly low throughout the 20th century (see Fig. 1) due to Christian-conservative beliefs (Becker, 2000) and started to increase only in the late'80 s while, for example in the US, female labour participation has been steadily increasing since the' 50 s. Third, a generous social security scheme was introduced in the Netherlands in 1949 which is right before our period of analysis (see Becker, 2000 for a discussion of the Dutch welfare state and employment).

For our analysis, we use Lifelines—a large-scale cohort study and biobank. Lifelines provides us with a sample of over 50,000 respondents born between 1950 and 1994 who are currently residing in one of the three northern provinces of the Netherlands. While the participants of Lifelines currently reside in the northern Netherlands, they can have been born in other parts of the Netherlands. Nevertheless, a lion's share of our sample was actually born in the northern Netherlands. To circumvent any inference problems arising from this data structure we employ various techniques to deal with the clustering of data. Combining Lifelines data with provincial unemployment data from Statistics Netherlands allows us to analyse the relationship between unemployment at the provincial level and birthweight – a standard measure of babies' health. Importantly, Lifelines also provides us with information on the age of the mother at birth as well as on her health behaviour – smoking in particular. We exploit this information to analyse who gives birth during economic downturns and how health behaviour of pregnant women is related to unemployment levels.

Using the data outlined above in combination with various econometric techniques allows us to conclude that an increase in the unemployment rate leads to a decrease in the birthweight of boys. While statistically significant, the effect is small in the sense that a 5 percentage point increase in the unemployment causes a 30 g decline in boys' birthweight. This implies that the birthweight remains within the normal range and, accordingly, we do not find an increase in the likelihood of being born with low birthweight (<2500 g). While in line with the findings of Kaplan et al. (2017) and Margerison-Zilko et al. (2011), our results contrast the findings of Dehejia and Lleras-Muney (2004); Aparicio and González (2014) and Angelini and Mierau (2014) who documented a positive relationship between adverse economic conditions surrounding birth and infant health.

The remainder of the paper is set up as follows. The next section provides a discussion of the relationship between economic downturns and babies' health within the context of the intertemporal fertility model and its implications for the Dutch setting. Section 3 describes the study population and the empirical