

# ECO 2620 Critique: Douglas Almond (2006)

The fetal origins hypothesis draws links between the state of the mother during pregnancy and the ensuing, long-run effects from infancy into adulthood. In his paper **Is the 1918 Influenza Pandemic Over?** Douglas Almond (2006) utilizes the 1918 influenza episode as a natural experiment for testing the fetal origins hypothesis; in supporting claims that certain chronic health conditions may be traced to utero. In this paper, I will summarize Almond's work, and then outline criticisms by Ryan Brown (2011) on whether Almond's use of the 1918 influenza pandemic was a valid natural experiment to study the effects of maternal health on the long-term outcomes of children.

Almond views the 1918 episode as a perfect opportunity to study the effects of the prenatal environment. The possibility for omitted variable bias is very limited due to the unexpected occurrence of the pandemic and the randomness of infected mothers (Almond, 673). Since health and socioeconomic status may be strongly correlated, his research contributes greatly to the fields of health economics and human capital; as labor market outcomes can be very sensitive to fetal health. Almond analyzes the US Census micro data for the years 1960-80, with the state of birth and birth year identified for all individuals (683). This rich data source allows for a restriction of US-born citizens, so that the effects of the influenza pandemic on adult socioeconomic outcomes and differences in the severity within the US may be studied. Almond uses a regression discontinuity approach in graphing different factors exhibited by the treatment group, whom are the children born during this influenza episode, and surrounding birth cohorts. From the various figures provided, results indicate large negative shocks to the socioeconomic outcomes of individuals born during this time period (Almond, 691-92). Men, women, whites and non-whites, workers and non-workers, all experience a discontinuous reduction in the level of educational attainment, wages, and other outcomes in the 1960-80 Census data (675). Thus, Almond concludes that prenatal exposure to the 1918 influenza pandemic has had large negative effects on adult health and economic outcomes.

Dr. Ryan Brown, an Assistant Professor in Economics at the University of Colorado, revisits and critiques Douglas Almond's paper (2011). Brown agrees as the timing of the pandemic was unexpected, this restricts an individual's ability to change their behavior to avoid contracting the disease, thus potentially allowing this episode to be a natural experiment. However, Brown finds most of Almond's results striking. One such example is that though only 1/3 of the mothers contracted influenza, Almond concludes almost every single factor of interest, either economic, educational or health related: significantly and adversely

affected birth cohort in 1919. Brown responds with three different approaches using the 1920 and 1930 Census data, and implies the failure to control for the first order effect of parental characteristics on a child's long-run outcomes, eliminates Almond's ability to utilize the 1918 pandemic to make direct inference on utero long-term health. In addition, Brown highlights World War I, which was overlapping the same "treatment" period of the creation and spread of the 1918 influenza episode (Brown, 10). WWI significantly affected the types of individuals potentially susceptible to the fetal origins hypothesis, as conscription was assigned to certain subsets of the male population. Brown argues by overlooking this correspondence, researchers, in addition to Almond, whom choose to use the 1918 influenza pandemic as a natural experiment would face severe selection bias.

Parental characteristics by genetic inheritance are known to play a large role in the quality of the children conceived. Though Almond thoroughly argues for the randomness of infected mothers, Brown finds this assumption to be invalid (9). Men whom were forced to be conscripted were of higher human capital than those whom stayed behind. Lower income men were usually the primary breadwinners, and as such, of lower priority to enlist as they were necessary to stay and continue providing for their families. The hypothesis at the time, was that men could not pay for a proxy substitute in the face of conscription. So instead, the fathers left behind were of lower human capital, older, and from larger families (Brown, 11). Evidence follows from Figure 3, as Brown points out that the fathers of children conceived in 1919 had lower socioeconomic quality. It can also be assumed that these fathers were less likely to have served in WWI. As a result, the assumption of randomness for natural experiments is not satisfied, and the potential of selection issues leads to an upward and incorrect bias of the importance of fetal health (10).

In using different variations of the available data sets, Brown points to a strong case of the parents of the treatment group as being significantly different than the parents of the surrounding cohorts. After testing for robustness, Brown concludes the treatment group faced less desirable family conditions (16). In addition, under Becker's theory (1960) on child quantity versus child quality, Brown suggests high-income individuals may hold off on producing children until the adverse conditions of WWI subsided. Lastly, when Brown re-estimated regressions, one of the two supportive findings lost significance once controls for childhood environment were added; and the conclusive results could not be replicated (27). Once Brown added in proxies for parental characteristics, only 2 of the 16 estimates of the impact of in utero health on disability and entitlement payments remained significant at the 5% level (27). Brown's various results point to a strong opposition in the identification strategy used by Almond on the 1918 influenza pandemic and the impact of fetal health on long-term outcomes.