Chapter 5

Conclusion

This thesis focuses on long-run effects of adverse conditions very early in life on health and labor market outcomes. It also examines whether major events have a larger impact on the health of individuals after a birth in an adverse early-life environment. This final chapter summarizes the results and provides implications for policy.

The first part of this thesis, Chapter 2, analyzes the long-run effects of gestation during the Dutch Hunger Winter famine of 1944-1945 on labor market and hospitalization outcomes for males. The analyses of labor market outcomes indicate that the males who were exposed to the famine during the first trimester of gestation have a lower participation rate. No effects are found for the males who were exposed during the second or third trimester of gestation. For the males who are active on the labor market, we find no effect of exposure to the famine on labor income. The results for hospitalization outcomes show that the aggregated number of hospitalizations of those males who were exposed to the famine during any stage of gestation is higher. The cardiovascular-specific hospitalization rate of those who were exposed in the second trimester of gestation is also higher. In contrast, there is no evidence of significant effects on cancer-specific hospitalizations. Finally, the relatively small sizes of the famine affected cohorts point to selection at the moment of conception, during gestation or over the course of life. The reduction of fertility was less strong among higher socioeconomic classes (Stein et al., 1975). These three selection mechanisms, therefore, presumably result in an underestimation of the true famine effects.

This chapter provides further evidence that in utero nutrition has a long-run impact on health and labor market outcomes. This is of relevance for developing countries where food scarcity is an apparent problem. Moreover, socioeconomic inequality and nutritional deficiencies also remain a policy issue within developed nations. For example, the Women, Infants and Children program of the Food and Nutrition Service still provides nutritional aid to approximately 9.1 million disadvantaged individuals in the US in 2009. Hence, the long-run effects of inequalities in prenatal nutrition that are likely to be related to socioe-
economic class may be one of the determinants of the observed association between health and socioeconomic outcomes later in life (see Chapter 1). Moreover, this study provides by indicating the long-run impact of an adverse in utero environment a further rationale for educational programs for pregnant women. Such programs promote beneficial health behavior, like adequate nutrition and the restriction of alcohol and cigarette consumption.

The long-run effects of adverse in utero conditions on health also indicate that we may expect to find mortality differences among cohorts. Similar effects may, for instance, be found among the Great Depression cohort.\(^1\) Furthermore, this study is relevant in the light of the current plans to raise the mandatory retirement age in developed countries. The effects on labor market participation and hospitalization point at a decrease in labor productivity. This decrease indicates a possible restriction of the extent to which individuals who are born in countries which are currently developed but that used to be poor in the 1940’s and 1950’s, like Portugal and Ireland, are able to continue working at minimum productivity levels at ages beyond the current mandatory retirement threshold. This is driven by the probability of exposure to a poor nutritional environment early in life. Finally, an examination of the long-run effects of a shortage of appropriate nutrients, i.e. qualitative malnutrition, instead of exposure to an overall food shortage during gestation is an interesting topic for further research.

The second part of this thesis, Chapters 3 and 4, examines the interplay between adverse events later in life and early-life conditions as joint determinants of health. Chapter 3 analyzes whether the effects of the onset or relay of a chronic disease, the death of a spouse, the death of a family member and the illness or accident of a partner on physical health later in life are magnified after exposure to adverse economic conditions early in life. The main result is that the impact of the onset or relay of chronic diseases on the number of functional limitations is magnified for those born during a recession. This implies that adverse economic conditions at birth exacerbate the impact of adverse shocks later in life and this interaction effect is substantial in magnitude. A recession at birth also appears to have effects on the later-life health stock of the respondents. We do not find effects of economic conditions early in life on the occurrence of adverse life events. The estimated fixed effects of the respondents born in recessions also do not significantly show health impairments. These results jointly indicate that a birth in adverse economic conditions has a long-run impact on physical health and this is primarily via a larger impact of the shocks for those who are born in a recession.

Chapter 4 examines whether the effects of the death of a spouse, a divorce and the death of a child on health later in life are magnified after in utero malnutrition. The results point at effects on the occurrence of the major events. Those who were in utero exposed to the famine are, in particular, more likely to face the death of a spouse. Next, the analyses indicate that the impact of the death of a spouse on hospitalization is magnified after in

\(^1\)However, Cutler et al. (2007) do not find long-run effects of the changes in America’s Dust Bowl era on health outcomes.
utero malnutrition. This result indicates that adverse in utero conditions exacerbate the effects of shocks on health later in life. These findings hold for both males and females. These results jointly imply that the increased occurrence and magnified impact of shocks contribute to the long-run relation between in utero malnutrition and health later in life.

The first policy implication from the second part of this thesis is that health care workers may focus attention on individuals after the death of a spouse, the death of a child and the onset or relay of chronic diseases. These events seem to affect health outcomes and the use of health care. Deaths of close family members may have an impact on formal care usage in two ways. The shock results in a deterioration of health and limits the supply of informal care due to the loss of an important care provider. Fortunately, these events are readily observable and may therefore be applied as triggers for the onset of health care programs. Second, the impact of the onset or relay of chronic diseases and the death of a spouse on health is larger for those individuals who faced a poor nutritional or economic environment early in life. This implies that the negative effects of a birth in adverse conditions are reinforced when facing adverse events at later ages. This provides a motivation for interventions at the earliest stages of life to compensate for the negative effects of adverse early-life conditions. The benefits of such interventions accumulate over time and are reaped over a long period. This finding also supports the monitoring of the individuals who face these events and who were born under adverse conditions. Indicators of such adverse conditions early in life are, for instance, low birth weight, lower socioeconomic class households and mothers who use harmful substances during pregnancy. These findings indicate that the increased impact of major events at later ages is a mechanism underlying part of the observed relation between adverse conditions early in life and later-life health as well. Chapter 3 provides a further rationale for macroeconomic stabilization policies. This study supports the earlier empirical findings on the short- and long-run effects of economic fluctuations (see, for instance, Ruhm, 2000 and Van den Berg et al., 2006). Finally, Chapter 4 gives further evidence of long-run effects of an adverse in utero environment on later-life outcomes (in line with Chapter 2). Therefore, this chapter supports a larger emphasis on educational programs for pregnant women as well.

This thesis provides two main conclusions. In utero malnutrition has long-run effects on hospitalization rates and labor market participation. Furthermore, a differential impact of major adverse life events is underlying part of the widely documented relation between early-life conditions and health later in life.