# Contents

Acknowledgements vii  
List of Contents ix  
List of Figures x  
List of Tables xi  

1 Introduction 1  

2 Long-Run Effects of Gestation During the Dutch Hunger Winter Famine on Labor Market and Hospitalization Outcomes 9  
2.1 Introduction ........................................ 9  
2.2 The Dutch Hunger Winter famine .......................... 12  
2.2.1 Historical context ................................... 12  
2.2.2 Literature on long-run health effects of the Dutch Hunger Winter famine .................................. 14  
2.3 Data .................................................. 15  
2.3.1 Population registers ................................... 15  
2.3.2 Outcome variables .................................... 16  
2.4 Estimation results ...................................... 17  
2.4.1 Results based on between-cohort variation in the famine-stricken cities ........................................ 17  
2.4.2 Results based on variation within and between cohorts ............................... 19  
2.4.3 Sensitivity analyses .................................. 20  
2.4.4 Cohort size and selection effects ......................... 21  
2.5 Discussion ........................................... 23  
2.6 Conclusions .......................................... 25  
Appendix ................................................ 27
3 Do Early-Life Conditions Influence the Extent to Which Individuals’ Physical Health Suffers from Adverse Events Later in Life? 43
3.1 Introduction ........................................................................... 43
3.2 Data description .................................................................... 46
3.3 Model specifications .............................................................. 50
3.4 Estimation Results ................................................................. 52
3.5 Robustness analyses .............................................................. 54
3.6 Discussion and conclusions ................................................... 56
Appendix ...................................................................................... 59

4 The Magnified Impact of Major Family Events on Later-Life Health after In Utero Malnutrition 77
4.1 Introduction .......................................................................... 77
4.2 Related literature ................................................................. 79
4.3 Historic information of the famine ........................................ 82
4.4 Description of the data ......................................................... 83
4.5 Empirical analyses ............................................................... 84
  4.5.1 The occurrence of major events ...................................... 85
  4.5.2 Health effects of the major events .................................... 86
4.6 Robustness analyses .............................................................. 90
4.7 Discussion and conclusions ................................................... 92
Appendix ...................................................................................... 94

5 Conclusion ............................................................................. 113

References .............................................................................. 117

Summary ................................................................................... 127

Samenvatting (summary in Dutch) ............................................. 131
List of Figures

1.1 Disability among the elderly ........................................ 1
1.2 Percent reporting excellent or very good health status by age-specific household income quartiles ........................................ 3
1.3 Education and mortality: the increase in annual mortality risk among adults over 40 associated with having less than upper-secondary education compared with at least upper-secondary education ........................................ 3
1.4 Indirect effects of conditions early in life on later-life morbidity and mortality ........................................ 6

2.1 The Netherlands by inhabited region, 1945 ............................. 27
2.2 Daily kcal averages of the official food rations by month, Western Netherlands, 1941-1945 ........................................ 28
2.3 Monthly mortality per 1,000 inhabitants, the Netherlands, 1944-1945 ........................................ 29
2.4 Yearly mortality per 1,000 inhabitants, the Netherlands, 1935-1949 ........................................ 30
2.5 Deaths within the first year of life per 1,000 live births, the Netherlands, 1940-1949 ........................................ 31
2.6 Composition of mortality by age and birth year, the Netherlands, 1943-1947 ........................................ 32
2.7 Yearly mortality per 1,000 inhabitants by region, 1941-1949 ........................................ 33
2.8 Live births per 1,000 inhabitants, the Netherlands, 1940-1949 ........................................ 34

3.1 Early-life conditions, adverse life events and later-life physical health ........................................ 59
3.2 The cyclical part of log GDP in the years of birth of respondents ........................................ 60
3.3 The magnifying effect of early-life conditions on the impact of an adverse life event ........................................ 61
3.4 The cyclical part of log GDP for different values of the smoothing parameter ........................................ 62

4.1 Monthly national mortality per 1,000 inhabitants, 1944-1945 ........................................ 94
4.2 Yearly national mortality per 1,000 inhabitants, 1935-1949 ........................................ 95
4.3 Map of the Netherlands ........................................ 96
4.4 Yearly mortality per 1,000 inhabitants of famine and non-famine cities, 1943-1947 ........................................ 97
## List of Tables

2.1 List of outcome variables .............................................. 35  
2.2 Descriptive statistics .................................................. 36  
2.3 Cohort means of outcome variables - cities West .................. 37  
2.4 Cohort means of outcome variables - cities rest ................... 38  
2.5 Estimates of famine exposure effects, based on between-cohort variation in the famine-stricken cities .............................................. 39  
2.6 Estimates of cohort variation in outcomes in cities in the rest of the country .................................................. 40  
2.7 Estimates of famine exposure effects, based on within- and between-cohort variation .................................................. 41  
3.1 Specification of the non-response in the LASA dataset ................ 63  
3.2 Mean frequencies of relevant variables ................................ 64  
3.3 Frequencies of life events .............................................. 65  
3.4 Observed within-person changes in the number of functional limitations .................................................. 66  
3.5 Effects of a birth in a recession on functional limitations by cycle of birth .................................................. 67  
3.6 Functional limitations related to a recession at birth, adverse life events and background characteristics by cycle of birth .................................................. 68  
3.7 Effects of a birth in a recession on the number of adverse life events by cycle of birth .................................................. 69  
3.8 Effects of adverse life events and their interactions with recessions at birth on functional limitations .................................................. 70  
3.9 Effects of adverse life events and their interactions with recessions at birth on functional limitations by gender .................................................. 71  
3.10 Fixed effects regressed on indicators of business cycle conditions at birth and background characteristics .................................................. 72  
3.11 Effects of adverse life events and their interactions with the cyclical value of the HP-filter at birth on functional limitations .................................................. 73  
3.12 Effects of adverse life events and their interactions with births in troughs of business cycles on functional limitations .................................................. 74  
3.13 Effects of adverse life events and their interactions with recessions at birth on functional limitations for different values of the smoothing parameter of the HP-filter .................................................. 75
3.14 Effects of the specific chronic diseases and their interactions with recessions at birth on functional limitations ..................................................... 76

4.1 Descriptive statistics I - hospitalization and the major events ............ 98
4.2 Descriptive statistics II - background characteristics .......................... 99
4.3 The occurrence of the major events by group of birth in the period 1995-2005 ......................................................................................... 100
4.4 Effects of in utero famine exposure on the occurrence of the major events in the period 1995-2005 ......................................................... 101
4.5 Hospitalization rates and major events - exploratory analysis .......... 102
4.6 Hospitalization rates and major events by in utero famine exposure status - exploratory analysis ............................................................... 103
4.7 Effects of the major events on hospitalization .................................. 104
4.8 Effects of the major events on hospitalization by in utero famine exposure status ......................................................................................... 105
4.9 Effects of the major events on hospitalization by cohort of birth ........ 106
4.10 The occurrence of hospitalization and the major events - non-famine cities 107
4.11 Background characteristics - non-famine cities .................................. 108
4.12 Effects of in utero famine exposure on the occurrence of the major events in the period 1995-2005 - non-famine cities .............................. 109
4.13 Effects of the major events on hospitalization by in utero famine exposure status - non-famine cities ......................................................... 110
4.14 Effects of in utero famine exposure on the occurrence of the major events in the period 1995-2005 - married and unmarried individuals .......... 111
4.15 Effects of the major events on hospitalization by in utero famine exposure status - married and unmarried individuals .......................... 112