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Growing up

Early-life circumstances and wellbeing throughout life, Sweden 1905–2016

Cormack, Louise

2025

Document Version:

Publisher's PDF, also known as Version of record

[Link to publication](#)

Citation for published version (APA):

Cormack, L. (2025). *Growing up: Early-life circumstances and wellbeing throughout life, Sweden 1905–2016*. [Doctoral Thesis (compilation), Lund University School of Economics and Management, LUSEM]. Lund University (Media-Tryck).

Total number of authors:

1

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PO Box 117
221 00 Lund
+46 46-222 00 00



Growing up

Early-life circumstances and wellbeing
throughout life, Sweden 1905–2016

LOUISE CORMACK

LUND STUDIES IN ECONOMIC HISTORY 117 | LUND UNIVERSITY



Growing up

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Early-life circumstances and wellbeing throughout life,
Sweden 1905-2016

Louise Cormack



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DOCTORAL DISSERTATION

Doctoral dissertation for the degree of Doctor of Philosophy (PhD) at the School
of Economics and Management at Lund University to be publicly defended on
Friday, 9th of May at 10.15 in EC3:210.

Faculty opponent

Professor Eric Schneider

Organization: LUND UNIVERSITY

Document name: DOCTORAL DISSERTATION

Date of issue: May 9, 2025

Author(s): Louise Cormack

Sponsoring organization: NA

Title and subtitle: Growing up. Early-life circumstances and wellbeing throughout life, Sweden 1905-2016.

Abstract:

The first years of life are a critical period of development, and circumstances during this period can affect individuals throughout life. But to what extent do disadvantaged circumstances in childhood affect individual wellbeing in later life and for whom? Can interventions in childhood break adversity over the life course? For whom are interventions most effective and why?

This thesis aims to investigate these questions by studying individuals growing up in the first half of the twentieth century in Sweden. Two types of disadvantaged childhood circumstances are considered: being born in times of disease outbreaks and growing up in a household with limited economic resources. Further, the effect of interventions aimed to improve childhood circumstances are analysed. First, the introduction of an unconditional cash transfer to widow-headed families, and second, the provision of formal childcare to low-income families.

The four studies included in this thesis utilise unique historical population data from a town in Southern Sweden and its rural surroundings between 1905-67. These data are linked to new historical sources with information on previously understudied circumstances and outcomes in childhood – pre-school attendance and school performance – as well as modern data which allows following individuals over time and into old age. State-of-the-art econometric methods of causal inference are applied in the analyses to disentangle the effect of each specific childhood circumstance from influences in the family and the surrounding environment.

This thesis finds that growing up in disadvantaged circumstances – being born in times of disease outbreaks and growing up in a household with limited economic resources – in the first half of the twentieth century had short- and long-term adverse effects on different measures of wellbeing, including school performance, socioeconomic outcomes and health. The results indicate that the negative effects persisted throughout the life course. Yet, providing additional economic resources and formal childcare to low-income families reduced adversities in the short-term, and broke long-term patterns of disadvantage. Household income in childhood emerges as an important mechanism. The four studies also show that heterogeneous effects by sex develop over the life course. The thesis's findings imply that economic and health circumstances experienced in adulthood partially have early-life origins.

Key words: childhood, disadvantage, disease, cash transfer, formal childcare, human capital, parental investments, Sweden, twentieth century, welfare state, socioeconomic status, poverty persistence, life course.

Language: English

Number of pages: 87 and four papers

ISSN and key title: 1400-4860 Lund Studies in Economic History 117

ISBN: 978-91-989641-8-9 (print) 978-91-989641-9-6 (pdf)

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Growing up

Early-life circumstances and wellbeing throughout life,
Sweden 1905-2016

Louise Cormack



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Lund University School of Economics and Management

Department of Economic History

ISBN 978-91-989641-8-9 (print)

ISBN 978-91-989641-9-6 (pdf)

ISSN 1400-4860

Printed in Sweden by Media-Tryck, Lund University

Lund 2025



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To my boys

*May you grow up to be righteous
May you grow up to be true
May you always know the truth
And see the light surrounding you
May you always be courageous
Stand upright and be strong
May you stay forever young*
Bob Dylan, Forever young

*I hid in the clouded wrath of the crowd
But when they said, "Sit down", I stood up
Ooh, ooh, growin' up*
Bruce Springsteen, Growin' up

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Acknowledgement

The last five years have been a journey. I am incredibly grateful to so many people who have been on this journey with me and made it into an unforgettable experience. I am immensely thankful for having been given the opportunity to pursue this education.

I would like to start with acknowledging FORTE (DNR 201700866) and Torsten Söderbergs Stiftelse (E26/22 Health inequality from a life course perspective) for funding different parts of my doctoral education. I would also like to thank the Centre for Economic Demography for funding in relation to conference travels.

Further, I would like to thank my main supervisor Luciana Quaranta for the past years. Luciana, I know I would not be where I am today without you. Thank you for taking me on as a PhD student and investing your time in me. You have patiently provided guidance and support to me in the past years. Your positivity has motivated me to keep going and to do my best even when I faced some of the most difficult and stressful times of the PhD program. Further, I would like to thank my assistant supervisor Volha Lazuka. Volha, already from the very start, you encouraged me to think above and beyond, challenge myself and to find my own path throughout the education. I have carried those words with me until the very end. To both of you I want to say a heartfelt thank you!

During my time at the Department of Economic History in Lund I have found myself in an inclusive workplace where I felt welcome from the start. I would like to thank the two heads of the Department of Economic History at Lund University during my times as a doctoral student, Mats Olsson and Anna Tegunimataka, for providing a dynamic work environment and for gathering so many brilliant people in one place. I would like to thank Martin Dribe for his leadership at the Centre for Economic Demography, which is where I have spent most of my time during the PhD. Having been part of the demography group has been incredibly rewarding and inspiring. Thank you for providing us PhD students with many opportunities to present our work and to attend interesting seminars. A big thank you goes to Ellen Hillbom, who was the director of PhD studies during my years in the department. Thank you for your guidance and leadership in the past years. A special thank you is passed on to the incredible administrative team at the department. Thank you Anneli Nilsson Ahlm, Madeleine Jarl, Tina Wueggertz and Mari Lundberg for your support and encouragement along the way. Thank you Sofia Brasjö for excellent research assistance.

There are many people I would like to thank for contributing to making my experience as a PhD student meaningful. Starting in the demography group, I want to thank all colleagues for being so generous with sharing your knowledge, experience and support along the way. No matter who I have turned to with a

question, I have always been met with positivity and a willingness to help. Thank you all!

A huge thank you goes to the wider group of colleagues at the Department of Economic History. I have learnt a lot about other topics in economic history than my own from you. My time being your colleague has been joyful and although making friendships was not in the job description, I feel incredibly lucky to be able to call so many of you my friends today. It was a pleasure to be part of the large family of super bright PhD students who shared this experience with me – you are amazing! Finally, a special thank you goes to all colleagues who supported me in the last months of finishing the PhD by knocking on my door and checking in how I was doing. Your words of encouragement have carried me through to the finishing line.

There is one person I spent significantly more time with than anyone else in the office in the past years. For over four years Marcos Castillo and I were officemates. Marcos, I cannot thank you enough for entering my life. In these years you have become one of my closest friends and I value our friendship deeply. You have been a huge support to me over the years and I hope our friendship only evolves as we both look ahead and take on new tasks after the PhD.

In the past years, I have been given the opportunity to present my work in seminars organised by the department and at various conferences. I would like to thank everyone sharing ideas and input on my work at these occasions. Special thank you's go to Helene Castenbrandt for giving valuable comments at my mid-way seminar, as well as to Erik Bengtsson and Therese Nilsson for doing the same at my final seminar. Your feedback has been very appreciated and helped me improve my work.

Luckily I did not spend all my time in the office. I have had a very supportive network of people in my life throughout these years. I want to start with thanking my parents, Maria and Per, for being so present in my life. A special thank you to my mum who has been an incredible support to my family in making day-to-day logistics work in stressful periods. I want to thank my siblings, Mette and Valdemar, for their eternal presence, patience and friendship. My childhood circumstances would probably have been very different if it was not for all of you.

Finally, my largest gratitude goes to my boys, to whom this book is dedicated. Alastair, Edward and Henry, you remind me every day of what is most important. You fill my heart and inspire me in life. And Rob, I cannot thank you enough for your support and patience in the last five years (and many years before!). You are the best!

List of Papers

- I. Early-life disease exposure and its heterogeneous effects on mortality throughout life: Sweden 1905-2016. *Co-authored with Volha Lazuka and Luciana Quaranta. Published in Demography (2024), 61(4).*
- II. Money matters: The 1938 Swedish child allowance and its impact on children's school performance. *Single authored.*
- III. Investments and opportunities: life-long effects from unconditional cash transfers in childhood, Sweden 1925-2007. *Single authored.*
- IV. Escaping adversity through pre-school attendance in early twentieth century Sweden. *Co-authored with Annika Elwert, Volha Lazuka and Luciana Quaranta*

In Papers I and IV, which are co-authored, the conceptualization, research design and final conclusions were done collectively. I have conducted the statistical analyses, drafted the first version of the papers and contributed to more than 50% of the final work in each of the two papers.

Introduction

Motivation and aim of the thesis

In 1900, Swedish writer and child education spokes-woman Ellen Key predicted that the twentieth century would be “*the century of the child*” in her book with the same title (*Barnets århundrade*). She envisaged a less authoritative upbringing of children, and greater responsibility taken by parents and society to provide improved circumstances for children. Her vision can serve as a reminder of childhood circumstances in the past and how they changed over the twentieth century. In this thesis, I study childhood circumstances in the beginning of the twentieth century and their later-life influences.

Childhood circumstances affect us throughout childhood but can also leave traces in our lives that remain long into adulthood. In the first several years of life, these circumstances are most commonly provided by the family. Parents invest their time and resources to warrant children’s wellbeing, with the intention of doing them life-long favours. Growing up, other actors become increasingly important, but during the early years, wellbeing relies mostly on circumstances within the family.

Over the past century, family circumstances have changed tremendously, not only in Sweden but across currently high-income countries. During the nineteenth century, infants and children were frequently exposed to high disease burden and food scarcity, and death in the first few years of life was a real threat (Fogel, 2004; Riley, 2001). Families were large and mostly lived in rural locations. The second half of the nineteenth and the start of the twentieth century, however, marks an important break in this pattern. Childhood became less and less a period of high death risk. With demographic and epidemiological transitions well underway; more and more children had a good chance of reaching adulthood (Omran, 1971; Riley, 2001). The incidence of infectious diseases, which had cost the lives of many infants and children, declined over time (Cutler et al., 2006). Families became smaller and parents had fewer children to take care of (Becker, 1960; Caldwell, 1976).

In tandem, modernisation and industrialisation processes increased living standards for populations across North Western Europe (Schön, 2013). GDP per capita, the most frequently used measure of living standards, doubled over the nineteenth century and then again from 1900 to 1960 in Western Europe (Bolt & van Zanden, 2020). New opportunities of growing upwards in the occupational ladder presented

themselves (Abramitzky et al., 2025). Access to primary schooling had spread since the mid-1800s and by 1930, 70-80% of primary school aged children were enrolled in schools across Europe (Goldin & Katz, 2009; Lindert, 2004). In the USA, the diffusion of the “high school movement” between 1910 and 1940 increased secondary school attendance and contributed to economic growth in the long-term (Goldin, 1998). But secondary schooling was still rare and restricted to few individuals in Europe at the time (Goldin & Katz, 2009). Following economic crises and wars in the first half of the twentieth century, unprecedented economic growth took place in Western Europe and North America during the golden decades of the 1950s-1970s (Schön, 2013). While there were large differences in living circumstances between children from different socioeconomic backgrounds to start with, income inequalities dropped from the 1920s-1940s up until the 1980s across today’s high-income countries (Alfani, 2024; Piketty & Saez, 2003; Roine & Waldenström, 2008). Children growing up during the first few decades of the twentieth century in currently high-income countries therefore experienced varying circumstances throughout their life. But how have the changing circumstances affected individuals growing up in the early twentieth century throughout their lives?

The overall aim of this thesis is to analyse to what extent circumstances in early life affect individuals’ wellbeing throughout life. The thesis specifically studies disadvantaged circumstances for individuals growing up in the first half of the twentieth century in Sweden. In this thesis, *disadvantaged circumstances* refer to economic (no or low household income) and health (exposure to disease) circumstances. *Early life* refers to the childhood years: from birth to age 16, depending on the specific study in the thesis. *Wellbeing* does not have a precise academic definition but what is captured in the term varies by discipline. In this thesis, wellbeing refers to economic, educational, social and health factors, which are considered to reflect a greater quality of life as per the United Nation’s Human Development Index (UNDP, 2024) and the OECD wellbeing framework (OECD, 2024). In the individual studies of this thesis, school performance, occupational attainment, earnings and survival are the main outcome variables analysed over the life course, and which all fall under the umbrella term wellbeing. The thesis studies individuals born in early twentieth century Sweden and follows them until adulthood and old age.

A large literature in the social sciences, including economic history, has documented that income and socioeconomic status, to varying degrees over time and space, are transmitted across generations. When the transmission is strong, it implies that children born into privileged circumstances are likely to remain privileged in adulthood, compared to children born into disadvantaged circumstances who are more likely to remain disadvantaged in adulthood. In such scenario of strong transmission, there are few or unequal opportunities for children to pursue the life

they want to live. At a country level, it also means that the economic potential of the population is not being fully utilised.

Economists theorise that the intergenerational transmission of socioeconomic status and income, as well as health, partially derives from parental investments during childhood (Becker & Tomes, 1979; Cunha & Heckman, 2007). Parental investments specifically relate to investments that parents make in their children's human capital and skill development (Cunha & Heckman, 2007). The terms human capital and skills will be used interchangeably in the thesis. Skills are multifaceted, and refer to health, cognitive and non-cognitive factors embedded in individuals, and which support economic productivity, but also better health (Cunha & Heckman, 2007; Heckman & Mosso, 2014). Parental investments can however be restricted by the level of resources in the household, meaning that well-resourced households have greater capacity to provide human capital investments than less-resourced households, which reinforces persistence in advantageous or disadvantageous circumstances across generations within families (Becker & Tomes, 1979, 1986). In sum, these human capital theories claim that the intergenerational transmission in socioeconomic status and income is partially explained by childhood circumstances provided by parents.

Nonetheless, parents are not the only actors influencing children's circumstances. Societies can decrease the influence of families by creating more equal opportunities for children independently of their familial resources, for instance by providing similar access to education and healthcare or by creating systems of income security (Corak, 2013; Esping-Andersen, 2002; Roemer, 1998). Further, in adulthood, labour market conditions and opportunities also determine whether initial parental investments can translate into economic productivity (Becker & Tomes, 1979). Lastly, lifestyle factors, access to medical care and treatments in adulthood influence survival to old age and creates health differences between groups with different resources and socioeconomic status (Cutler et al., 2006; Link & Phelan, 1995; Marmot & Wilkinson, 2005).

Compared to the large literature on intergenerational transmission of income and socioeconomic status, there is less research addressing persistence of growing up in disadvantaged circumstances in childhood in a consistent manner (Nolan, 2024). Yet, the existing research provides evidence of disadvantaged childhood circumstances affecting individuals' later-life economic wellbeing in various contexts over the twentieth century (Bavaro et al., 2024; Bellani & Bia, 2019; Chetty et al., 2014; Parolin et al., 2024; Sirniö et al., 2016), including twentieth century Southern Sweden (Brea-Martinez et al., 2023).

A growing economic literature shows how different types of childhood interventions aimed to reduce disadvantage have large effects on individuals not only in the short-term, but also over the life course. Such interventions include the provision of additional economic resources through cash transfers, access to formal

childcare and medical treatments to common childhood diseases. Recent reviews of this research come from e.g. Almond et al. (2018), Page (2024) and Duncan et al. (2023). However, it is debated in which settings, at which ages and for whom many of these interventions are most effective, which calls for more research (Attanasio et al., 2022; Duncan et al., 2017; Page, 2024).

The aim of the thesis – to analyse the extent to which growing up in disadvantaged circumstances affect later-life wellbeing – is approached by posing three overarching research questions.

- To which extent do disadvantaged circumstances in childhood affect later-life wellbeing and for whom?
- To which extent do interventions in childhood break adversity over the life course?
- For whom are interventions most effective and why?

In the four papers of this thesis, the questions are placed in the context of twentieth century Sweden. I analyse childhood circumstances at the start of the century by studying individuals born between 1903-37. I follow these individuals into adulthood and old age, spanning the entire twentieth century, and extending into the twenty-first.

Studying Sweden over the twentieth century means studying a context which in some respects is similar to other Western countries and in other respects is unique. Similarities imply that the results in the thesis could be generalisable beyond the borders of the country. For instance, the mortality decline over the nineteenth and twentieth centuries followed a similar pattern in Sweden as most of Northwestern Europe (Riley, 2001). Educational opportunities beyond primary school were quite limited in both Sweden and most of Western Europe, especially in comparison to the USA (Goldin & Katz, 2009). But from the 1950s to the 1970s, when individuals born in the early twentieth century had reached adulthood, the Swedish economy was flourishing and the supply for labour was large, a pattern which is shared across several Western countries (Schön, 2013).

Further, the universal welfare state that Sweden eventually became famous for, and which we know of today, was not yet established when most of the individuals in this thesis were born, but it gradually expanded during their lifetime (Åmark, 2011). Instead, in line with other European countries, social policy was more narrow, mainly targeted to specific groups and administrated locally (Lindert, 2004). Sweden (and Scandinavia) started standing out from other European countries with its universal welfare state in the 10-15 years after the Second World War (Esping-Andersen & Korpi, 1984). It was also not until the end of the 1960s that the Swedish female labour force participation started increasing significantly to eventually become one of the highest in the world (Pailhé et al., 2021; Stanfors & Goldscheider, 2017). Together these trends suggest that many of the childhood circumstances that

the individuals studied in this thesis experienced were not exceptional for Sweden. However, as these individuals grew up, Sweden developed into a more unique setting. The studies in this thesis carefully consider the historical context they analyse and make comparisons to other countries with different opportunities or barriers over the life course. The distinct Swedish circumstances also provide an opportunity for understanding the specific case of Sweden, which is one of the contributions of this thesis.

The research questions in this thesis are addressed in four individual papers. All four papers are concerned with the first question – to which extent do disadvantaged circumstances in childhood affect later-life wellbeing and for whom – but the analyses cover different types of disadvantaged circumstances. In the first paper, we study how an exogenous health insult in the first year of life – exposure to disease – creates different long-term effects for individuals from households with different socioeconomic status. In the second and third papers of this thesis I analyse the effect of providing additional economic resources to low-income widow-headed families, but also show that prior to the provision, families experience short- and long-term adversity with regards to health, school performance and adulthood economic outcomes. In the fourth paper, we analyse how formal childcare improves circumstances for children in low-income families.

The second question – whether interventions can break adversity over the life course – is addressed in Papers II-IV. These three papers analyse two interventions which aimed to improve circumstances for children in low-income households, namely a cash transfer reform and formal childcare.

To address the third question – for whom interventions are most effective and why – Papers II-IV analyse specific childhood periods when both the initial economic adversity and the intervention take place. In Papers II and III, comparisons by age of parental loss are made within the papers. In addition, all four papers estimate effects for men and women separately to understand heterogeneity. Further, potential underlying mechanisms are explored in Papers II-IV and in Paper I, an analysis of scarring and selection effects is conducted. In other words, all papers aim to go beyond descriptive analyses and explain underlying mechanisms to the extent that the data allows for.

An outline of how the research questions translate into four individual papers is presented in Figure 1. The theories, methods and the data are to be discussed in coming sections in more depth.

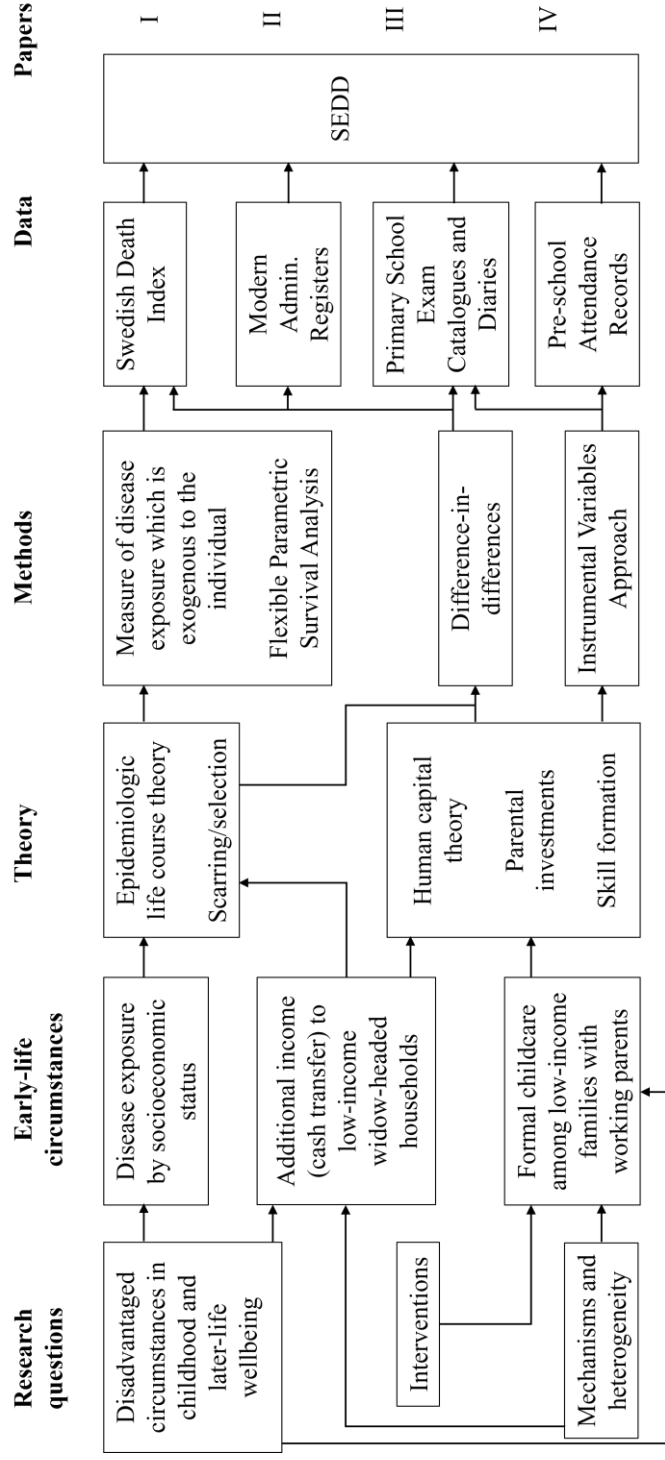


Figure 1. Thesis outline.
Source: Author's own illustration.

To study long-lasting effects from growing up in disadvantaged circumstances and effects of interventions over the life course, a couple of empirical concerns are to be considered. First, the study of childhood circumstances, persistence and later-life wellbeing is a study of families. As such, data including both individuals and their families is required. Although individual-level population data have become more accessible to researchers in recent decades, high-quality data that connect individuals to parents, follow them over the full life course, span multiple birth cohorts and simultaneously include detailed background characteristics are rarer.

Second, several important childhood circumstances affect one another, making it difficult to disentangle which childhood factor is responsible for specific later-life outcomes. Socioeconomic status and health are strongly correlated over the full life course, meaning that higher socioeconomic status is associated with better health and lower socioeconomic status with poorer health (Elo, 2009; Hayward & Gorman, 2004; Link & Phelan, 1995; Preston et al., 1998). The direction of the relationship goes both ways, and identifying whether it is health or socioeconomic factors in childhood explaining later-life wellbeing in descriptive analyses is challenging (Currie, 2009; Heckman & Mosso, 2014; Page, 2024). By applying quasi-experimental econometric methods to individual-level data, effects from specific variables of interest, such as income, can be isolated in the analysis and results can be interpreted as causal given that a number of assumptions hold. An alternative approach is to study specific exogenously driven circumstances, such as reforms or events that occur independently of individuals' characteristics. Examples include disease outbreaks affecting full populations or wealth shocks than individuals could not have foreseen.

In this thesis, I address the first empirical challenge by using unique and rich historical longitudinal individual data from Sweden, namely the Scanian Economic Demographic Database (SEDD) version 7.2 (Bengtsson et al., 2021). The SEDD includes individuals living in a Southern Swedish area consisting of a town (Landskrona) between 1905-67 and five rural parishes between 1813-67. In this thesis, individuals born 1903-37 are included in the analyses. In paper I, we analyse the town of Landskrona and the rural parishes, while in papers II-IV only the town of Landskrona is considered. The demographic and socioeconomic development in the study region corresponds overall very well to the development in both urban and rural parts of the country in the first half of the twentieth century (Dribe et al., 2024).

Further, in taking a full life course perspective, two of the four individual papers in this thesis (Papers I and III) have utilised not only the SEDD, but also existing linkages between the SEDD and national Swedish databases. The linkages mean that individuals are followed into adulthood in all of Sweden even if they move out of the study region. To analyse previously understudied childhood interventions and outcomes, new individual-level data have been collected, linked to the SEDD and used in two of the four papers. The research questions posed in the individual papers of this thesis could not have been addressed without these additional data.

The second empirical challenge is addressed by applying quasi-experimental econometric methods (Papers II-IV) or seeking exogeneity in the main variable of interest (Paper I). Both approaches imply that effects from specific childhood circumstances can be isolated from potential confounding factors in the family or in the surrounding environment.

This thesis begins with an introductory chapter followed by four individual papers. In addition to outlaying the motivation and aim, the introductory chapter presents the thesis's contributions and limitations, discusses the theoretical framework and previous research on which this thesis is based, places the research question within the historical context of early twentieth century Sweden, and introduces the data and methods used to fulfil its aim. It ends with a summary of the four papers and a concluding discussion on the collective findings in the thesis.

Contributions

This thesis makes several important contributions. First, it contributes to the economic history literature studying persistence of disadvantaged circumstances across life and across generations by identifying specific childhood circumstances which both explain the persistence and show how it can be broken. In each of the papers of the thesis, methodological choices are made to isolate short- and long-term effects stemming from three different childhood circumstances from other potential influences which may confound the effects. In practice it means that we use a measure of disease exposure which is exogenous to the individual in Paper I and employ state-of-the-art quasi-experimental methods from economics in Papers II-IV.

Much of the existing research on persistence of disadvantaged circumstances, especially poverty, is in fact of more descriptive nature and additional research is needed to understand causal mechanisms better (Duncan et al., 2017; Nolan, 2024). The four papers in this thesis have come closer to explaining why and how negative effects of disadvantaged health and economic circumstances experienced in childhood persist over the life course in a causal manner. As such, the thesis contributes with knowledge of how contemporary inequalities derive from childhood circumstances.

Through its collection and usage of new micro-level data that has either only been scarcely or not at all applied to research before, the thesis makes an empirical contribution. The new data, in combination with pre-existing high-quality historical population data, enable studying childhood circumstances which have been limitedly explored in economic history to date. For instance, the short- and long-term effects of attending pre-schools aimed at reducing the consequences of poverty (Paper IV) can be estimated precisely with newly collected data on individual pre-

school attendance. Likewise, the effect of providing additional economic resources to widow-headed families on children's school performance (Paper II) can be precisely studied with the individual school grades and absence data collected as part of this thesis. Further, to gain knowledge of how effects from childhood circumstances evolve over the complete life course, using individual-level historical data which start in the beginning of the twentieth century, and which span over the full century, is necessary. Such data is however very rare, and few studies are able to analyse the effects of childhood circumstances into old age. Usage of pre-existing high-quality data in combination with new sources and taking a full life course approach advances our knowledge of how inequalities in health and economic outcomes develop throughout life.

Third, the thesis contributes theoretically to the literature on long-term effects from disadvantaged circumstances in childhood and how these can be broken through external interventions. It tests if specific childhood interventions create different later-life effects on wellbeing for men and women and if different ages in childhood are more or less critical to either adversities or interventions. In several of the papers, additional mechanisms are analysed to gain a greater understanding of underlying factors explaining the results, e.g. school performance and educational attainment is studied in Papers III and IV, and family choices regarding remarriage and migration are studied as potential mechanisms in Paper II.

While the effects of early-life circumstances are frequently analysed for men and women separately in the intervention literature in the second half of the twentieth century, women are not always analysed in studies set in the early twentieth century (Aizer et al., 2016). Further, lack of studies analysing school ages – both as a period for interventions and for understanding outcomes from earlier interventions – means that more can be learnt about which childhood ages are most critical to disadvantaged circumstances and interventions (Almond et al., 2018). Therefore, in this thesis knowledge is added by not only studying three different types of childhood circumstances, but also different ages of exposure and interventions, as well as men and women separately. Both these points are also of importance for designing policy which aim to reduce unequal circumstances between individuals at all ages.

The thesis is placed in a historical period of early twentieth century Sweden. The specific setting makes a historical contribution and also adds to the theoretical contribution because some circumstances during the life course were unique to Sweden while others were not. Much of the previous demographic research on long-term effects from exposure to disease in early life is set in the eighteenth or nineteenth centuries when the disease environment was much harsher than in the twentieth century. Less is known about the long-term effects from growing up in “milder” disease environments in the twentieth century.

Further, most research on formal childcare and unconditional cash (or near-cash) transfers' long-term effects focuses on the second half of the twentieth century and the USA. Studying childhood circumstances in the first half of the twentieth century, when medical treatments or alternative sources of economic aid in times of income loss were scarce, helps isolate the effect of the main variable of interest and reduces the risk of other interventions influencing the results (Page, 2024). Moreover, the USA was a forerunner in providing educational opportunities beyond primary school to the masses in the first half of the twentieth century (Goldin & Katz, 2009), rendering the results of such studies less generalisable to other contexts. Estimating later-life wellbeing in the Swedish context therefore means that secondary education is less likely to be a mediating factor.

Finally, because the thesis is based on the same main dataset through all studies, a collective picture of different childhood circumstances in early twentieth century Sweden and their later-life effects is created. Results showing that improved childhood circumstances raise wellbeing across most stages of life, suggest that some of the socioeconomic and health conditions adults face today likely have childhood origins, and improved as childhood adversities were reduced. Only by taking a historical and full life course approach, such conclusions could be drawn.

Limitations

Despite several contributions made in this thesis, some limitations require further discussion. The main data source in the thesis (SEDD) covers a historical population living in one town and five rural parishes in Southern Sweden from the early nineteenth to the mid-twentieth century. The database is globally unique in its composition of rich and detailed socioeconomic and demographic variables and maintains high quality. Because the database has been linked to modern data, follow up is possible into the twenty-first century, and circumstances in the past can be connected to circumstances today. The SEDD is therefore an exceptional source to answer the set research questions.

Nonetheless, the geographical scope of the database naturally raises questions on its representativeness of Sweden as a whole. Several studies have assessed individual variables (e.g. mortality rates, socioeconomic composition, fertility rates) and concluded that although the SEDD population is not a randomized statistical sample of Sweden, the demographic and socioeconomic developments over the first half of the twentieth century are similar to rural and urban Sweden (Bengtsson & Dribe, 2006; Debiasi, 2020; Dribe & Svensson, 2024; Lazuka, 2017). In the individual papers, I have further compared specific circumstances in Landskrona to the rest of the country by consulting historical and archival sources. For instance, in Paper II, child allowance eligibility in Landskrona is compared to the child allowance

eligibility in all of Sweden. In Paper IV, the local pre-school in Landskrona is compared to pre-schools around the country. Throughout the thesis, there are no indications of the study area systematically representing different conditions than those existing in other Swedish areas during the study period, and findings can likely be generalised.

Further, the limited size of the SEDD means a risk of performing analyses with small samples, especially because to be able to follow individuals over the full life course only 30 birth cohorts are analysed. Small samples are of concern because statistical effects can be difficult to detect. This is particularly true when creating sub-groups in the population to study heterogeneities. Overall, the analyses in this thesis show that the sample size is not a major concern for inference. Some exceptions do exist though, e.g. women's earnings, which show large variance within the sample and cannot be easily interpreted (Paper III).

Ideally, a larger data set would be used in the analyses, but for the scope of this thesis, there is no better suited dataset than the SEDD. The Swedish censuses, which cover the full population in the country, are only available every five to ten years in the study period and would therefore not allow for proper identification of e.g. child allowance eligibility. An alternative option would be to use other longitudinal historical databases in Sweden. However, by expanding the geographic scope I would not be able to study school performance and pre-school attendance to the level of detail that I have been able to do in this thesis unless these data are collected in each location. Additionally, other Swedish historical population databases do not have information on income and have not yet been linked to all national databases used in the thesis. In other words, the SEDD is the most ideal dataset to use for answering the research questions of this thesis in a historical Swedish setting.

Childhood as a determinant for later-life wellbeing

To answer the set out research questions and to understand to which extent disadvantaged circumstances in childhood affect wellbeing over the life course and how adversity can be broken, this section goes through relevant theory and previous research on persistence, interventions, heterogeneity and mechanisms.

Theoretical considerations

Theory on childhood as a determinant for later-life wellbeing exists within several academic disciplines. To explain how disadvantaged circumstances in childhood affect wellbeing over the life course and how the process can be broken, this thesis relies on theory from economics and epidemiology. The two disciplines overlap in concepts and frameworks because early life is a critical period of human

development when the brain and body develop rapidly. Influences during the early years can affect both health and human capital formation in the immediate term but can also have lasting effects throughout life.

In epidemiology, the critical period is a limited time window of human development when individuals are most receptive to their surroundings. Experiencing either favourable or adverse circumstances in the critical period can start advantageous or disadvantageous biological processes, which can permanently influence health years and decades later (Kuh & Ben-Shlomo, 2004). In addition to a critical period, there is a sensitive period. The sensitive period reflects ages when the body continues to develop, but consequences of experiencing any favourable or adverse circumstances are not permanent, usually have smaller impact and can be reduced with later-life interventions (Kuh et al., 2003).

In human capital theory, critical periods refer to childhood ages when economic returns to human capital investments are largest, typically pre-school ages (Cunha & Heckman, 2007). Critical periods are followed by sensitive periods, in which human capital investments can take place, but they are less efficient and may cost more. In other words, critical and sensitive periods have slightly different meaning in the two fields but always refer to childhood ages when important human development takes place.

Human capital theory on parental investments and skill formation

Human capital theory explaining why childhood is a determinant for later-life wellbeing focuses on parents' ability to provide investments – material and time – in their children and therefore support their human capital development.

The concept of human capital – defined as resources embedded in individuals which increase their economic productivity in the long-term – was properly introduced in economics in the 1950s and 1960s. The first human capital theories focused on formal education and on-the-job training as the main explanatory factors influencing income and economic productivity, see e.g. Mincer (1958) and Becker (1962), but did not emphasise human capital investments occurring during early childhood.

In the late 1970s and mid-1980s, Becker and Tomes (1979, 1986) evolved previous human capital theories to explain income inequality and social mobility. They argue that differences in individuals' socioeconomic status and income in adulthood derive from parental endowments (genetic or social), as well as parental human and non-human capital investments during childhood.¹ The emphasis in their theory is on parental investments. Assuming that parents are altruistic and rational actors maximizing utility for themselves and their children, parents invest in children to raise their future incomes, but without sacrificing the family's consumption today.

¹ According to Becker & Tomes (1979), ability is an example of a genetic endowment. Examples of social endowments are the family's social network or reputation.

Because the level of economic resources and the type of endowments parents pass on differ between families, parental investments will also differ between families and eventually accentuate economic inequalities.

Solon (2004) expanded the Becker and Tomes model. He argues that persistence in income and socioeconomic status is also explained by contexts where the returns to human capital investments are high or where levels of public investments equalising circumstances for children from different backgrounds are low. In these contexts, parents are more incentivised to increase investments as the “gains” are larger and the potential counterfactual is worse.

But childhood circumstances do not explain all adulthood circumstances. Becker and Tomes (1979) discuss the importance of “market luck” for children’s future incomes and define it as favourable labour market conditions that enable individuals to earn specific incomes. Market luck is not known in childhood and parents can likely not adjust their investments based on predicted market luck, so it is seen as a stochastic factor. Market luck is however of relevance in this thesis and in contexts where individuals’ labour market outcomes could be restricted by macroeconomic circumstances such as economic downturns and high unemployment as well as norms and preferences on which household members should participate in the labour market. In these settings, individuals may not be able to realize their potential and additional skill formation from childhood may not translate into economic outcomes.

In the early 2000s James Heckman and colleagues developed the theories on human capital investments further. A model for understanding how formation of human capital (or skills) in childhood takes place and its later-life consequences is presented in a series of papers, see e.g. Cunha and Heckman (2007) and Heckman (2006, 2007).

The model presented by Cunha and Heckman (2007), which they call the technology of skill formation, has many similarities to previous work by Becker and Tomes. Skills are important for later-life economic and health outcomes. Skills can be inherited from parents, but above all, skills can be created. Cunha and Heckman (2007) also put families at the centre, and especially parents, in the formation of skills. As per Becker and Tomes (1986), Cunha and Heckman (2007) claim that parents provide children with endowments and social environments. Parents are altruistic and make investments in their children’s skill formation. Similar to Becker and Tomes, their theory suggests that skills levels are unequally distributed among children because parents have different levels of own skills and economic resources. They cannot invest equally because there is a budget constraint on skill investments. Heckman (2006) therefore claims that additional human capital investments are most effective among children in low-income families.

The main difference between the work by Heckman and Cunha and the previous theories from Becker and Tomes is the emphasis on how and when skill investments

generate the largest returns. While Becker and Tomes develop a model where childhood reflects one period of life, Cunha and Heckman split childhood into two periods: early childhood and later childhood (adolescence). Overall, they stress early childhood as an important period for human capital formation and investments, however later childhood is not ignored.

There are two reasons why Cunha and Heckman (2007) split childhood into two periods. Those are *dynamic complementarities* and *self-productivity*. Dynamic complementarities mean that the largest long-lasting effects from early-childhood investments are expected if investments are followed up in later childhood. Providing multiple investments in both stages of childhood, which build on each other, results in augmented returns. For instance, high-quality pre-schools provide early-childhood human capital investments to attending children through their care and pedagogy. However, several pre-school studies find initial beneficial effects from attendance (e.g. school readiness) to fade out if children attend primary schools that do not provide the same high-quality program as the pre-schools do (Bailey et al., 2017; Bailey et al., 2020). According to the theory on dynamic complementarities, fade out may not have occurred had primary schools provided equally high-quality human capital investments in children.

Self-productivity refers to a process of skills gained in early childhood raising skill levels in later childhood. In other words, investments in later childhood have high returns if skill levels have already increased earlier in childhood. The most effective investments are therefore not those only occurring in early childhood (e.g. pre-school) or adolescent (e.g. monetary aid to enter university), but those that affect both early childhood and adolescence (Cunha & Heckman, 2007). Permanent investments that occur throughout childhood are thus expected to yield highest returns in terms of skill development and later-life outcomes than one-off investments. An example of a permanent investment throughout childhood is studied in Papers II-III of this thesis, where an unconditional cash transfer paid out during several years in childhood is analysed. An example of an age-specific investment is pre-school attendance in early childhood which is studied in Paper IV. By analysing different types of human capital investments in childhood, the thesis makes observations and draws conclusions about the importance of timing, ages and duration of human capital investments.

As outlaid at the start of this section, critical and sensitive periods reflect different phases of vulnerability when investments can be more or less effective. Despite the importance of early childhood, later childhood and adolescence are also important periods for development (Bundy et al., 2018) and as discussed by Cunha and Heckman (2007) investments in these ages should not be dismissed. Yet, less work has been done on understanding long-term effects from circumstances in later than early childhood (Almond et al., 2018).

Epidemiologic life course theory

In the epidemiologic literature, life-long effects from early-life health circumstances are explained by the antenatal period and the first years of life constituting a critical period of physiological development.

Adverse early-life health conditions such as malnutrition or exposure to infectious diseases in a critical period can have direct negative effects on health across the life course – a phenomenon called scarring (Preston et al., 1998). There are two main hypotheses on why scarring emerges. First, the foetal origins hypothesis (Barker, 1995, 1997; Barker & Osmond, 1986; Barker et al., 1989) proposes that foetuses exposed to undernutrition adapt to their adverse circumstances to be better equipped for survival in the post-natal environment. Because gestation is a critical period for cell and organ development, the adaptation permanently alters bodily functions that develop *in utero* such as blood pressure and cholesterol metabolisms. Since blood pressure and cholesterol influence the risk of heart disease and pre-mature death, the hypothesis is that the link between early-life undernutrition and increased later-life mortality rates is due to permanent impairments of important bodily functions caused by undernutrition.

Second, the inflammation hypothesis provides a potential explanation to why high exposure to disease in early life creates scarring effects (Crimmins & Finch, 2006; Finch & Crimmins, 2004). Inflammatory responses are initiated when the body combats infections. Because prolonged inflammation increases the risk of atherosclerosis and cardiovascular diseases, the hypothesis suggests that long-term negative health effects – such as disease and death – from exposure to infectious diseases in early life are due to chronic inflammation.

Undernutrition and exposure to infectious diseases are however not isolated health adversities but can affect one another and occur at the same time. Several infectious diseases reduce the body's nutritional uptake and poor nutritional status can lower the body's ability to cope with disease exposures (Floud et al., 2011; Fogel, 2004).

In addition to scarring, adverse early-life health conditions can result in seemingly “positive” indirect health effects on surviving populations – a phenomenon called mortality selection (Preston et al., 1998). Mortality selection is a statistical effect that emerges if the immediate mortality changes the health composition of the study population because the most vulnerable individuals die before entering the follow-up period. Mortality selection is therefore not related to any biological effects of the early-life exposure. Long-term health effects in surviving populations will always reflect the net effect of scarring and mortality selection, and the two can cancel each other out (Almond & Currie, 2011).

Life-long effects from childhood circumstances

Experiencing disadvantaged economic and health circumstances in childhood can have long-lasting adverse effects into adulthood. Economic and health circumstances also affect one another. In the following sections I will go through the main literature addressing long-term effects from these childhood circumstances.

Life-long effects from economic adversity in early life

Studying persistence of economic adversity over the life course means studying social mobility. There is a long tradition in the social sciences estimating how socially mobile or immobile societies are and have been over history, see reviews over the past three decades by Solon (1999), Black and Devereux (2011) and Abramitzky et al. (2025). Existing research shows that education, income, and occupational status are, to varying degree over time and space, passed down from parents to children and persist over generations. High persistence means that children born in lower-earning households are more likely to end up earning relatively lower incomes as adults compared to the rest of the population. Education is commonly called out as a key mechanism explaining the persistence (Blanden et al., 2023).

Much of the research on social mobility is descriptive. Focus has been on defining measurements and making comparisons of mobility levels across time or between countries. For instance by applying periodisation reflecting eras of industrialisation, demographic transition or the creation of the welfare state (Kaelble, 1984; Treiman, 1970), or by comparing countries with different levels of inequality or development (Blanden, 2013; Erikson & Goldthorpe, 1992). Long-term patterns of socioeconomic persistence are identified in several countries well into the twentieth century (Chetty et al., 2014; Long & Ferrie, 2013), including Sweden (Dalman, 2022) and the local region studied in this thesis (Brea-Martinez & Dribe, 2024; Dribe et al., 2015).

The degree of persistence varies across different contexts depending on the opportunities given to young people, the influence that parents and the state have on their later-life outcomes and income inequality levels (Corak, 2013; Roemer, 1998). In settings where the state or community provide equal opportunities to children, the influence of parents is smaller. The more egalitarian, Nordic countries generally have lower rates of intergenerational persistence compared to countries with high levels of income inequality, who spend less on education but have large returns to education (Blanden, 2013). In Sweden, the importance of family background on men's income reduced with the expansion of the universal welfare state in the second half of the twentieth century (Björklund et al., 2009). However, new evidence suggest that Swedish social mobility was relatively high already at the turn

of the twentieth century which is several decades before the welfare state expansion (Berger et al., 2023).

There is less research on intergenerational persistence of poverty.² Poverty persistence is present in some contemporary high-income countries, but in countries with more taxes and re-distributional policies, the persistence is weaker (Bavaro et al., 2024; Parolin et al., 2024). In a global perspective, poverty rates and poverty persistence are relatively low in the Scandinavian countries today (Bavaro et al., 2024), which Esping-Andersen (2002) argues is not because of specific cash transfer reforms, but because of their dual earner model raising family incomes. However, during the period of this thesis, the dual earner model was not yet in place and families consisting of two married parents generally relied on the father's income. Unemployment, disability or death of the father led to an income loss and increased the risk of poverty for the full family.

In the Swedish area of study in this thesis, Brea-Martinez et al. (2023) observe that experiencing poverty in childhood increases the risk of poor socioeconomic outcomes in adulthood among cohorts born 1933-67, so in a slightly later period than this thesis captures. They find similar patterns for men and women, but the largest negative effects in adulthood are among individuals experiencing poverty in early childhood. Despite recent research on poverty persistence, Nolan (2024) concludes in his summary that underlying causal channels are less explored and call for more research. Understanding these would also help policy makers identifying when and in which ways interventions aiming to break poverty persistence should be introduced.

The consequences of experiencing poverty in childhood are not limited to economic factors (Duncan & Brooks-Gunn, 1997). Childhood poverty is linked to lower scholastic outcomes and consequently lower later-life earnings (Case et al., 2005; Duncan et al., 2017). There is evidence of lower school performance from living in an overcrowded home in modern France (Goux & Maurin, 2005). Overcrowding was a concern at the start of the twentieth century in Sweden. In 1912-14, as much as a third of the population lived in overcrowded homes, often with just one room and a kitchen, and the overcrowding especially affected workers in the industrial towns (Elmér, 1963).

Experiencing poverty in childhood is also linked to poorer health. Poor health is a potential pathway to adverse economic outcomes in adulthood (Case et al., 2005; Case et al., 2002; Currie, 2009, 2020). Low socioeconomic status and stressful work conditions in adulthood are associated with poor health and increased mortality rates (Mackenbach, 2012; Marmot & Wilkinson, 2005). Link and Phelan (1995) claim that socioeconomic circumstances are “fundamental causes” of health and need to

² Relative poverty is usually defined as household incomes below 50% or 60% of the median income in a population (see Duncan et al., 2012 and Brea-Martinez et al., 2023).

be addressed to get to the bottom of some of the most common diseases in modern societies. But socioeconomic differences in mortality are also observed in egalitarian Sweden since the 1950s for women and 1970s for men (Bengtsson et al., 2020; Debiasi, 2020). In 2007 the gap in life expectancy at age 35 between the highest and lowest quintiles in the earnings distribution was seven (women) and nine (men) years in the country (Hederos et al., 2018).

Another consequence of experiencing economic difficulties is stress. Economic struggles can increase all family members' stress levels and trigger harsh parenting (Elder, 2018; Evans & Kim, 2013). Poverty increases the risk of living in badly resourced communities or neighbourhoods with higher crime levels or worse schools. These circumstances can increase the risk of mental ill-health in childhood (Visser et al., 2021) and disadvantaged economic circumstances in adulthood (Chetty & Hendren, 2018). Experiencing excessive stress in childhood can have detrimental effects on children's development (Currie, 2024; McEwen & McEwen, 2017). Unless appropriate interventions are introduced or solid coping mechanisms exist, the negative effects of stress exposures can accumulate over the life course and result in increased risk of cardiovascular diseases and chronic inflammation (Evans & Kim, 2013; McEwen, 1998) and chronic stress (McEwen & McEwen, 2017). Duncan et al. (2017) claim that increased stress is especially observed among parents (typically mothers) and less among children, but that stress could reduce parental investments. Stress is therefore a potential mechanism explaining why disadvantaged circumstances in childhood can affect individuals over the full life course.

A less discussed mechanism in the economic literature on poverty persistence relates to the transmission of welfare usage within families (Duncan et al., 2017). It implies that poverty persistence would be explained by children taking on parents' usage of welfare benefits in adulthood (Dahl et al., 2014; Page, 2004). Black and Devereux (2011) explain that while some intergenerational correlation in welfare receipt is documented in the existing literature, it is difficult to identify how much is due to parental influence compared to transmission of poverty. Research finding positive effects on later-life income from cash transfers or food stamps to children in low-income families suggest that family influences on welfare usage are not present, and that it is rather human capital investments or stress channels explaining persistence.

Life course effects from health adversity in early life

Experiencing adverse health circumstances in very early childhood can affect wellbeing (health and economic factors) throughout life because it is a critical period of development. To understand how early-life health adversity affects longevity, a historical approach needs to be taken.

Part of the literature on life-long effects from early-life health adversity goes back several hundred years in time. As discussed earlier, the historical approach is not only of relevance to historians, but other disciplines interested in life-long effects from childhood circumstances rely on historical data to be able to follow individuals over their full life course. In economic history and historical demography, the most frequently analysed health insults are undernutrition and exposure to infectious diseases, as both are primary factors explaining pre-mature death for most of human history (Fogel, 2004; Omran, 1971). In recent years, economists and epidemiologists have started examining life-long effects from additional health exposures, and which may be a larger threat today, e.g. air pollution, maternal stress and climate variation (Almond et al., 2018).

In several historical settings, the occurrence of famines is used to understand long-term effects from exposure to undernutrition in early life. Famine studies reveal mixed results in terms of long-term health and economic effects. On the one hand, *in utero* exposure to the 1846-47 potato famine in the Netherlands and the Dutch Hunger Winter in 1944-45 led to increased later-life mortality rates (Lindeboom et al., 2010). The latter also augmented the risk of hospitalisation and worsened labour market outcomes compared to individuals not exposed to the famine (Scholte et al., 2015). On the other hand, early-life exposure to the Finish famine in 1866-68 had no negative effects on later-life mortality rates (Kannisto et al., 1997). Exposure to the Estonian famine in 1844-46 mainly affected immediate mortality, although there were some heterogeneous scarring effects by SES and sex in the longer term (Lust & Jaadla, 2024). Lack of strong scarring effects can be due to mortality selection caused by the high death rate from the famine, resulting in changed health composition in the surviving population compared to the original population.

To study long-term effects from early-life exposure to infectious diseases, researchers have used information on national or regional infant and child mortality rates in the year before or of birth as exogenous measures of disease load. Disease exposure in early-life is linked to increased mortality rates in old age for cohorts born in high-mortality contexts such as eighteen and nineteen century Europe (Bengtsson & Lindström, 2003; Finch & Crimmins, 2004; Forsdahl, 1978; Kermack et al., 1934; Preston & Van de Walle, 1978; Quaranta, 2013; van Dijk et al., 2019).

There is less knowledge of how “milder” disease exposures affect later-life wellbeing. With “milder” I refer to a period in history when the incidence of infectious diseases had declined significantly, i.e. towards the end of the second phase of the epidemiologic transition, “the age of receding pandemics” (Omran, 1971). Studies find that early-life exposure to infectious diseases commonly present in the first half of the twentieth century USA led to negative educational and socioeconomic effects later in life (Almond et al., 2018). In fact, exposure to disease in early life is linked to lower cognitive skills, lower social mobility and increased mortality rates at older ages across different twentieth century contexts (Bengtsson & Quaranta, 2019; Case & Paxson, 2009; Palloni et al., 2009; van Dijk et al., 2019).

Adverse long-term health effects are even passed on to the next generation (van Dijk et al., 2024). Hence, despite a changing disease environment at the start of the twentieth century, exposure to disease in infancy is associated with disadvantages in a variety of wellbeing measures in later life.

Whether early-life disease exposure creates different later-life effects for different socioeconomic groups and by sex is less examined. Because both adverse health and economic circumstances in childhood can lead to adverse outcomes later in life, the interaction of the two factors can be expected to be most detrimental. Yet, this is not necessarily the case. High early-life disease exposure led to similar later-life mortality for individuals from all social groups among eighteenth and nineteenth century birth cohorts, likely because of the severity and virulence of the diseases at the time, which no group could escape from in childhood (Bengtsson & Lindström, 2003). However, in the same setting, larger life expectancy losses are found for men than women following high diseases exposure in early life (Griffin et al., 2018; Quaranta, 2014). But in twentieth century Utah, where infant mortality rates were lower, women lost more years in adulthood than men (van Dijk et al., 2019). Heterogeneous effects by social class and sex within populations therefore appear to vary depending on the severity of the disease environment in early life, but more research is needed to determine such associations.

Breaking life-long effects from childhood through interventions

There is a growing economic research field examining how long-term adversity stemming from childhood circumstances can be broken through external interventions and human capital investments. Research aiming to identify causal effects study exogenous interventions and/or apply quasi-experimental methods. The latest literature suggests that persistence of disadvantaged health and economic circumstances can be broken with the right interventions, but there is more research needed to understand heterogeneities and the importance of interventions at different childhood ages (Almond et al., 2018; Page, 2024). Many of the studies brought up in these recent literature reviews focus on North America, which may question their representativeness of other contexts. It is also quite rare in the recent literature that childhood circumstances as far back as the early twentieth century are analysed. Because the welfare state was more developed in the second half of the twentieth century, studying childhood circumstances in this period, or later, means that isolating effects from different childhood circumstances can be challenging and causal inference more difficult (Page, 2024).

In this section, I will start with presenting studies analysing interventions aimed to improve childhood circumstances through health and schooling efforts in the first half of the twentieth century in Scandinavia. I will then review studies analysing the effect of economic reforms raising household incomes in the same period, but without the Scandinavian focus. Lastly, I will present studies examining life course

effects from providing (especially) low-income households with formal childcare services, also without the Scandinavian focus. The health and school section is focused on Scandinavia because a significant amount of research on Scandinavian health and school reforms has been published in the last few years. There is much less research on income and childcare reforms in early twentieth century Scandinavia.

Health and school reforms in the first half of the twentieth century in Scandinavia

In her review of health interventions in this setting, Wüst (2022) summarizes that several interventions targeting infants produce higher educational attainment, earnings and better health in later life. Interventions focusing on circumstances in infancy range from the rise of qualified midwives assisting childbirth (Lazuka, 2018) and the opening of maternity wards (Lazuka, 2023) to improved infant care services towards mothers after childbirth (Bhalotra et al., 2017; Bhalotra et al., 2022; Bütikofer et al., 2019; Hjort et al., 2017). Several of these studies find similar effects for males and females with regards to health improvements in later life (Bhalotra et al., 2017; Lazuka, 2018, 2023). But Bhalotra et al. (2022) estimate larger effects on girls' than boys' school grades and earnings in adulthood from a 1930s Swedish home visiting nurse program in infancy. They argue that both greater skill acquisition and labour market opportunities explain the findings. Hjort et al. (2017) study a similar program in Denmark, but do not detect any educational or economic effects, although longevity gains are present. Research on the roll-out of primary and infant health care centres during the 1890s-1910s in Sweden (Lazuka, 2019) and 1910s-1940s in Norway (Bütikofer et al., 2019) find that children from households with lower socioeconomic status and who were affected by the roll-out experience larger economic and health gains throughout life.

There is evidence of some Scandinavian interventions in later childhood creating long-term beneficial effects over the twentieth century. Nutritional interventions in school ages through the provision of free school meals supported human capital formation and rose later-life incomes for both sexes (Bütikofer et al., 2018; Lundborg et al., 2022), but long-term effects from the introduction of local school doctors are harder to detect (Spika, 2023). Studying an extension of the school year from 34-36 weeks to 39 weeks in the mid-1930s Sweden, Fischer et al. (2020) find earnings to increase by 5% for affected individuals in adulthood, especially women. However, the expansion of compulsory schooling by a year had more modest impact. Combined, these studies show that in early twentieth century Scandinavia interventions increasing human capital had long-term beneficial effects on individuals. The studies reveal that these effects do not only emerge from interventions that occur in the first year of life. Interventions in school ages can equally support children's development and later-life wellbeing. Effects are sometimes strongest among individuals from households with least resources and girls/women, but not always.

Interventions raising household income

Studies causally estimating long-term effects of growing up in economically constrained households are quite rare (Duncan et al., 2017; Nolan, 2024). Isolating the effect of income is challenging because income is an endogenous factor correlating with a number of other circumstances which could result in similar outcomes over the life course, such as health, stress exposures, family stability and parents' educational attainment (Attanasio et al., 2022; Page, 2024).

To estimate long-term effects specifically from household income in childhood, one strand of the existing literature has turned to analysing cash or near-cash interventions – such as unconditional cash transfers, tax-refunds and food stamps – to low-income families. These studies both inform about the role of household income on later-life wellbeing and the influence of monetary interventions in breaking adverse patterns over the life course. As per studies analysing health interventions, research on life-long effects from childhood economic circumstances require a historical approach. This research is scarce as it relies on both high-quality longitudinal historical data and suitable historical reforms and interventions.

Existing studies on the long-term effects of cash or near-cash reforms to low-income families are primarily set in North America (Aizer et al., 2016; Dahl & Lochner, 2012; Hoynes et al., 2016; Milligan & Stabile, 2009, 2011). Although some of the studies follow individuals over time, very few go further back than the 1960s, meaning that follow-up is often limited to older adulthood ages at best. Among the just-mentioned studies, it is only Aizer et al. (2016) who study an earlier period and are able to follow individuals until old age. To my knowledge, there is just one study analysing long-term effects from low-income families and their children receiving cash transfers in the first half of the twentieth century in Sweden. Lorentzon (2020) studies widow-headed households receiving the first Swedish child allowance in Stockholm.³

Providing low-income families with this type of additional household income has shown to be beneficial instantaneously, which is manifested in improved school results (Dahl & Lochner, 2012; Milligan & Stabile, 2011), increased school attendance (Baird et al., 2014) and mental health gains (Milligan & Stabile, 2011) among children. In the longer-term, improvements in labour market outcomes in adulthood and survival to old age are found in the USA (Aizer et al., 2016) but the effect on survival is less apparent in Sweden (Lorentzon, 2020). By comparing these findings to food stamp reciprocity in ages 0-5, nutrition and schooling emerge as potential mechanisms explaining the long-term economic and health effects (Bailey et al., 2024; Hoynes et al., 2016).

³ There is a large literature studying modern, conditional cash transfers aimed to improve children's economic circumstances in especially low- and middle-income countries. In this thesis, I do not engage with this literature because of the conditionality.

Previous research finds that cash transfers generate different effects for boys and girls, both in the short and long term. They raise boys' school grades more than girls' but improve girls' health more than boys' (Dahl & Lochner, 2012; Milligan & Stabile, 2011). Beneficial long-term effects dominate among men in terms of earnings and adulthood health (Hoynes et al., 2016). There is no systematic pattern in outcomes based on children's age, but cash transfers received for several years produce larger positive effects than temporary cash transfers (Cooper & Stewart, 2021; Page, 2024).

Formal childcare to improve circumstances

Another strand of the literature has explored how formal childcare programs targeted to low-income families can support children's human capital development and thus support upward mobility for attending children. In the 1960s to 1980s USA, several high-quality formal childcare programs tailored for children from low-income families, and sometimes designed by researchers, launched to improve children's circumstances and school readiness. These programs lay the ground for multiple studies on the effects of early childhood education and formal care throughout life in the past twenty years (Almond et al., 2018; Duncan et al., 2023; Duncan & Magnuson, 2013).

Generally, these high-quality pre-schools programs augment school readiness and performance in the first school year among attenders (Heckman, 2006), but within a few years scholastic effects fade out (Bailey et al., 2017; Duncan et al., 2023). Nonetheless, educational attainment and economic gains are documented in later life (Bailey et al., 2021; García, Heckman, Leaf, et al., 2017). Long-term effects are explained by pre-schools supporting the development of specific skills – especially non-cognitive skills – which are attractive later in life in the labour market (Bailey et al., 2017; Heckman et al., 2013). In fact, for pre-schools to deliver lasting effects into adulthood, they need to support the development of skills that matter for later-life outcomes and which would not have developed had children not attended pre-school (Bailey et al., 2020).⁴

Studies analysing more contemporary universal pre-schools, i.e. pre-schools open for all children, find mixed results. Studying universal pre-school attendance in Boston, Gray-Lobe et al. (2023) identify positive cognitive and non-cognitive effects in school ages, and especially among boys. But in Denmark, Gupta and Simonsen (2010) do not observe differences in the outcomes of attenders and non-attenders in school ages. In Canada, Baker et al. (2008) even find negative effects on children's non-cognitive skills from universal pre-school attendance, which they explain is due to the low quality of the childcare and the fact that home

⁴ Typical non-cognitive skills brought up in the literature and which are beneficial in the long run are conscientiousness (Duncan et al., 2023), the ability to control attention and emotions as well as collaboration (Bailey et al., 2020).

circumstances were better for many of the attenders. In fact, Havnes and Mogstad (2015) analyse heterogeneous effects from universal childcare by household income and show that children from low-income families benefit most in the short and long term from attending. They argue that pre-schools increase intergenerational income mobility.

There is no consistent pattern of boys or girls benefitting most from high-quality pre-school programs (Duncan & Magnuson, 2013). Bailey et al. (2021) estimate similar effects on educational attainment and future income among male and female attenders. García, Heckman and Ziff (2017) find girls to be better off, but explains that it is mainly because girls in the control group came from families with less resources. Gray-Lobe et al. (2023) find that boys are better off than girls. It is therefore likely that a combination of the type of pre-school program, the counterfactual scenario and the context of each study influence which gender is most affected by formal childcare.

Research on formal childcare for children in low-income families earlier in the twentieth century also point to beneficial labour market effects from attending higher-quality pre-schools (Ager & Malein, 2024; Rossin-Slater & Wüst, 2020). Methodologically, these studies estimate intent-to-treat effects based on household and pre-school locations, as precise data on pre-school attendance is not available. Two different mechanisms are discussed in these studies: improved health from pre-schools in mid-century Denmark (Rossin-Slater & Wüst, 2020) and improved integration and language development among immigrant children in New York City (Ager & Malein, 2024). Yet, the exact mechanisms explaining long-term benefits from formal childcare in different contexts remain empirically quite unexplored and more research is needed (Duncan et al., 2023).

In fact, a potential mechanism which has not been studied in the historical literature on pre-school programs for children in low-income households is household income. Formal childcare does not only provide care, meals and potentially some pedagogical elements. Formal childcare also enable parents working (Cascio, 2009; García, Heckman, & Ziff, 2017). In a historical setting, pre-schools were specifically open for children in low-income households so their parents (often unmarried mothers) could work (Ekstrand, 2000). Following Cunha and Heckman (2007), material parental investments can therefore be expected to be larger for attending children. Working mothers can also become “role models” for children and inspire them to be gainfully working in adulthood (Galassi et al., 2024).

In sum, adverse early-life socioeconomic conditions can generate both direct and indirect effects on later-life schooling, socioeconomic outcomes and health. Health, economic and childcare interventions in early ages have however shown that long-term negative effects can be reversed. The research field is mainly covering a North American context in the late twentieth century but several Scandinavian health and educational reforms from earlier decades have advanced the knowledge of

interventions in other contexts. No clear gender pattern is shown in terms of persistence or interventions. The evidence is vaguely pointing to interventions in younger ages generating largest long-term effects, but it is not apparent if it is due to age or length of exposure. The research on interventions in school ages is more limited. Recent review articles suggest that more research is required to understand the importance of age and mechanisms explaining the patterns.

Historical context

This section presents the historical context of the thesis. The information in this section is important for understanding the characteristics of the study context as well as for providing evidence of the generalisability of the findings in the thesis to a broader context. It starts with describing family and societal circumstances in the 1900s-1940s, when the study population in this thesis were children. The starting point is Sweden, but the specific circumstances in the study region, especially Landskrona, are embedded where relevant. Extensive research has been done on the study region over the past couple of decades and recent work shows that both the town and the rural areas in the study region mirror the economic and demographic developments of the rest of urban and rural Sweden in the period of study very well (Dribe & Svensson, 2024). The following section also introduces less explored elements of the town, and which are studied in the thesis, such as formal childcare and primary schools. The section ends with describing labour market conditions when the study population reached adulthood.

Family circumstances

Children born in the first few decades of the twentieth century in Sweden grew up in rapidly changing demographic, economic and social circumstances. Although many of the new circumstances were improvements compared to the past, not everyone could take advantage of them. In this section, I discuss three changes within the family that would have affected children's circumstances: survival, family size and parents' work and family responsibilities.

First, the epidemiologic and demographic transitions – the long-term processes of falling mortality and fertility rates, as well as changing causes of death from infectious to chronic disease – were well underway when individuals in this thesis were born (Bengtsson & Ohlsson, 1994; Omran, 1971). Mortality rates at all ages had declined significantly and life expectancy at birth had increased from 42 in the 1850s to 57 in the 1910s and 64 in the 1930s in Sweden (HMD, 2017). The largest declines first occurred among infants and children. Similar epidemiologic patterns were present across Western Europe and North America, but infant mortality rates

dropped earlier in Sweden than elsewhere (Riley, 2001). In the Southern Swedish area studied in this thesis, infant, child and adult mortality rates followed the declining trend observed in the country as a whole (Dribe & Svensson, 2024; Lazuka, 2017).

Nonetheless, general health improvements did not benefit everyone in the population equally. Inequalities in who survived childhood, and who did not, existed between children from different socioeconomic backgrounds. A socioeconomic gradient in infant and child mortality existed around the turn of the century in the Southern Swedish area of this thesis (Dribe & Karlsson, 2022), but was also present in other parts of Europe (Antonovsky & Bernstein, 1977; Breschi et al., 2011). Infant mortality rates in all socioeconomic groups were higher among boys than girls throughout the period of study (Cormack et al., 2024). Because there is no present evidence of parental gender discrimination or preferences explaining this pattern (Tapia & Gallego-Martínez, 2017), the sex differences are likely explained by biological factors. In other words, infants and children were more likely than ever to survive their first years of life and eventually reach adulthood, but socioeconomic circumstances in the family determined to which extent they did so.

The demographic transition's third phase, with declining fertility, was still ongoing at the turn of the twentieth century in Sweden.⁵ Between 1880 and 1930, family size reduced significantly as women on average went from having over four to only two children in a lifetime and childbearing reached a record low level in the 1930s (Bengtsson & Ohlsson, 1994). In Sweden, childbirth was linked to marriage, which typically occurred for women around ages 26-27 and 86% of all children born 1901-40 had a married mother (Statistics Sweden, 1969).

The childbearing pattern in Sweden is in line with that in Landskrona. The total fertility rate in the town went from just over three in 1905 to just over one in 1930, the average age at marriage was lower than the rest of the country at 25.5 (Quaranta & Stanfors, 2024). For children themselves, lower fertility meant fewer siblings, and therefore potentially increased parental investments into each child (Becker & Lewis, 1973).

However, the pace of the fertility decline differed across socioeconomic groups. In Sweden, but also in North America and other Scandinavian countries, women in higher-income households reduced their childbearing first and only by the time the fertility decline was reaching its end in the 1930s, did women from all socioeconomic backgrounds on average give birth to two children (Dribe et al.,

⁵ Bengtsson and Ohlsson (1994) argue that the demographic transition consists of five stages in Sweden. In the first, mortality and fertility rates were both high, in the second phase mortality rates started declining (approx. 1850-1880). In the third phase (1880-1930), fertility rates declined. In the fourth phase (1930-1990), fertility rates were lower, but varied with economic cycles. Mortality rates were declining. During the fifth phase (still ongoing at the time of their research), especially old-age mortality rates decline, and a two-child norm establishes.

2014). Socioeconomic differences in family size may therefore have accentuated differences in parental investments as higher status households on average both had more economic resources and fewer children before 1930.

A small, and declining, share of children experienced parental death in childhood. Debiasi et al. (2021) report that 9% of children aged 0-9 in Sweden in 1880-90 had lost at least one of their parents. In 1930 in the town of Landskrona, 2.6% of children under age 10 lived with a widowed mother, 8.7% with an unmarried mother, and 1.6% with a divorced mother (own calculations from SEDD). Given the context of a male breadwinner model, children living without a father grew up in less resourced households. Specifically for cohorts studied in Papers I and IV (born between 1903 and 1929), the average income in families headed by a lone mother was a third of the average income in families with two married parents, measured when children were two years old (own calculations from SEDD).⁶

Second, on average, children growing up at the start of the twentieth century faced rising living standards throughout childhood. The latter half of the nineteenth century signified a breakthrough in Sweden's economic development and industrialisation. Sweden was a relatively poor country up until the mid-nineteenth century but in the last decades of the nineteenth century, economic growth accelerated more in Sweden than in many other Western countries (Schön, 2014). The development benefited children born at the start of the twentieth century in terms of greater access to nutritious food, as well as public health investments relating to clean water and improved sanitation in homes, which took place especially in the growing towns (Helgertz & Önnersfors, 2019; Sandberg & Steckel, 1997).⁷ Yet, despite urbanisation movements, it should be emphasised that half the population lived in the rural parts of Sweden until the 1950s (Statistics Sweden, 1969).

Children growing up at the start of the twentieth century did not equally take part of the macroeconomic gains though. There were larger income inequalities in Sweden than several other Western countries (e.g. Germany, the USA) in the 1910s (Bengtsson, 2020; Roine & Waldenström, 2008).⁸ Poverty was not uncommon and nationally 6-7% of the urban population received poor relief in the 1910s (Statistics Sweden, 1917) and 8% in 1938-39 (Statistics Sweden, 1942). The poor relief

⁶ The average family income includes zero incomes and untaxed incomes (below 500/600 SEK).

⁷ Because the mortality decline started before Sweden experienced significant economic growth and industrialisation, it has been argued that economic factors were not the primary determinants for the mortality decline that occurred prior to 1870. The mortality decline has instead been explained by the epidemiologic environment with lower virulence of infectious diseases (Bengtsson & Ohlsson, 1994; Sandberg & Steckel, 1997).

⁸ Income inequality is here defined as the share of total incomes that derived from the top 10% earners.

dependence rate was higher in Landskrona compared to other Swedish towns, e.g. in 1910 the rate was almost 9% (Dribe & Svensson, 2024).

The economic crises of the 1920s and 1930s resulted in record high unemployment rates across the country (Elmér, 1963; Schön, 2014). Poor relief reliance increased threefold in Swedish towns during the peak crisis years 1930-33 (Statistics Sweden, 1942). Although a large part of poor relief recipients were elderly who lacked sufficient income, the annual report from Statistics Sweden on poor relief usage in 1938-39 specifically calls out that large families were a growing group in need and among all families with five or more children a quarter had received poor relief (Statistics Sweden, 1942). Moreover, many female-headed households also relied on help from poor relief organisations. The share of lone mothers with children receiving poor relief was three times higher than their share in the total population (Statistics Sweden, 1942).

But circumstances changed. From the 1930s and 1940s income inequality in Sweden started falling and in the second half of the twentieth century Sweden eventually had among the lowest income inequality rates in the world (Roine & Waldenström, 2008). The same trend of diminishing income inequality is observed in Landskrona (Brea-Martinez & Dribe, 2024), and implies that living circumstances became more similar for children growing up in different socioeconomic circumstances towards the mid-century.

Some of the birth cohorts in this thesis were children during the 1918 influenza pandemic, the First or Second World War. As observed in Paper I, the pandemic and the First World War left exposed children with adverse health consequences: the pandemic through its direct effect on health, and the First World War through food scarcity. During the Second World War, families with young children would have been affected by food rations from 1939 and even up until 1951 on some goods (Åmark, 1952). The rations were introduced to maintain steady access to food in the country and considered different groups' caloric needs, for instance individuals with manual occupations and children had access to more food (Åmark, 1952). The critical food shortages experienced in other parts of Europe and Japan (Schneider et al., 2021; Scholte et al., 2015) during the Second World War were not present in Sweden. Compared to other Nordic countries, the caloric intake and nutritional effects on children in Sweden was negligible (Angell-Andersen et al., 2004).

Third, children growing up at the start of the twentieth century had parents whose labour market attachment and family roles were shaped by new demands and opportunities stemming from the growing economy and industry. Over the first half of the twentieth century, the share of employment in manufacturing rose gradually, but it was not until the mid-twentieth century that the share of employment in manufacturing surpassed the share of employment in agriculture (Schön, 2014).

In the agricultural setting, women's work had been largely placed in the home, but when the Swedish workforce transitioned into the manufacturing and service

sectors, women were faced with difficulties combining paid work and family responsibilities (Myrdal & Klein, 1957). Most women withdrew from the labour market upon marriage and a male breadwinner model dominated (Stanfors, 2014).⁹ The male breadwinner model meant that lone mothers were especially torn between the work and the home spheres. In the next section of the thesis I will present the development of formal childcare solutions in Sweden at the start of the twentieth century.

Throughout this period, the female labour force participation in Sweden was on par with several other European countries (France, UK, Germany and Denmark), and it was only in the latter part of the twentieth century that Sweden stood out as having a particularly high female labour force participation and a dual-earner model evolved (Jonung & Persson, 1994; Stanfors, 2014).

In sum, children growing up at the start of the twentieth century in Sweden had greater chances of surviving childhood than their parents. They most commonly lived with two married parents, where the father, but most often not the mother, performed paid work. Over time families moved into urban areas, and family size shrunk. However, this general description did not apply to all. Around 10% of children lived with a lone mother, which meant living with significantly less economic resources. Socioeconomic differences also existed between families not just in terms of resources but also family size and health.

Societal circumstances

In tandem to family circumstances changing, the inauguration of what was to become a universal welfare state was taking place in Sweden. New reforms and policies were introduced to reduce inequalities and raise the minimum standard of living in the country, not the least for families with children.

Sweden became famous for its universal welfare state over the second half of the twentieth century, but the initiation of the Swedish welfare state can be traced back to the end of the nineteenth century. The first social policies derived from the problem of economic security (*trygghetsproblemet*) (Åmark, 2011). As societies industrialised, economic security became increasingly reliant on formal employment. Because employers' responsibility for the economic wellbeing of workers was limited to the time at work, unemployment, illness or injury left workers at risk of no financial means (Åmark, 2011).

From the 1890s until the mid-twentieth century, social policy in Sweden, similar to several other European countries, focused on reducing poverty and consequences of income loss for industrial workers, who in a male breadwinner society were

⁹ Legislation to ban dismissal of women in the workplace due to marriage, pregnancy or childbirth was introduced in 1938.

primarily men (Elmér, 1963; Lundberg & Åmark, 2001). Voluntary sickness funds, limited workplace accident insurance and the unions' unemployment funds supported industrial workers in periods of income loss from around the turn of the century in Sweden (Edebalk, 1996; Lundberg & Åmark, 2001). Such efforts were already in place in e.g. Germany (Åmark, 2011). In 1913, Sweden introduced a universal pension which was the first in the world of its kind (Edebalk & Olsson, 2010). In several European countries, such as Britain and Denmark but also Sweden, poor relief was still the main source of aid in times of income loss between 1880 and 1930 (Lindert, 2004). In Sweden, a poor relief law was introduced in 1871, and renewed in 1918 (Linders, 1937). Yet, even after 1918, poor relief came with conditions and dependence, was deemed to be unreliable and the amounts inadequate, not the least for families with children (Rauhut, 2002; SOU, 1938:7). In fact, none of the just mentioned economic aid sufficiently replaced complete income loss nor specifically focused on improving children's circumstances at this time.

Sweden's path towards becoming a universal welfare state, not least with an increasing focus on families, evolved a few decades into the twentieth century. In 1921, suffrage became universal in Sweden.¹⁰ But the 1920s were characterised by political instability, high unemployment rates and labour market conflicts (Schön, 2014). The 1930s were the start of a long period of increased stability. Following the 1932 election, the social democratic party formed a minority government with the farmers' party, which allowed for increased social spending. The social democrats remained in governance for 44 years.

During the 1930s, political emphasis lay in addressing poverty and raising living standards among individuals who otherwise would have had to turn to the poor relief organisations. Improved pensions and unemployment benefits were introduced (Åmark, 1999). Social spending, including expenditure on unemployment benefits, pensions and public health investments, rose from less than 1% of GDP in 1880-1920, to 2.5% in 1930 and 11% in 1960 (Lindert, 2004). As part of these initiatives, the first Swedish child allowance arrived in 1938. It was an unconditional cash transfer targeted to widows with children, families where the father was unable to work and received disability pension and orphans. The aim was to provide improved economic circumstances to children in families who had experienced sudden income loss (SOU, 1936:6). In the same year, an allowance was created for lone mothers with children (*bidragsförsäkring*). Thus, economic circumstances for some groups of lone mothers and their children improved.

In parallel, the fertility rate in Sweden had fallen and reached a bottom low level at the start of the 1930s. In their 1934 book *Crisis in the Population Question*, Alva

¹⁰ "Universal suffrage" refers to both women and men being able to vote. Previously only men could vote. Some groups in the population were still excluded though. For instance, individuals at poor relief institutions were exempt voting rights until 1945, see Sundevall (2022). Lindert (2004) argues that the rise in social transfers prior to the 1930s can be explained by countries democratising.

and Gunnar Myrdal famously expressed concerns about the cost of starting a family preventing couples from having children. It attracted nation-wide attention, and a population commission was put together by the government to create new family-friendly policies. Hatje (1974) explains that there were three aims with the commission's work: one demographic, one social and one relating to equity. The demographic aim was to increase the low fertility rate. The social aim was to provide a minimum level of living standards to all children and the equity aim related to reducing disparities in how childbearing affected high-income compared to low-income families.

Between 1935-38, the population commission presented 16 proposals and investigations addressing these aims, but far from all become policy (Elmér, 1963). In 1938, many mothers started receiving a small cash transfer after childbirth (*moderskapshjälp* or *moderskapspenning*). Women in low-income households also received in-kind support through essential items for the infant, and practical household assistance (Elmér, 1963). In 1938, a tax reduction was introduced to families with many children, but it was constructed in such a way that only high-income families with many children benefited from it and the reform was later dropped. The work of the population commission constituted important steps towards social and family-focused policy expanding in Sweden. However, most of the new policies in the 1930s still reflected the different spheres for men and women; where men were the main breadwinners and would be affected by, for instance, income loss insurances while women had greater domestic responsibilities and would be affected by policies relating to childbirth (Hirdman, 1992; Lundberg & Åmark, 2001).

Much of the roll-out of new social and family policy was put on hold during the Second World War. From the late 1940s, several universal policies towards families and children were introduced. From 1946, free and nutritious school lunches to all children were rolled out in Sweden. More basic food options had been provided locally to children from low-income households since the start of the century in some parts of the country, e.g. in Landskrona (Sjövall, 1942). In 1948, the first universal child allowances were introduced to all families. In the end, Elmér (1963) summarizes that the proposals from the population commission which eventually turned into policy did not concern fertility, but focused on providing better economic circumstances for families. In fact, by the time many of the policies were ready, fertility rates in Sweden had already started to rise and low childbearing was no longer the concern it once had been.

In sum, economic aid to families in times of income loss existed from the late nineteenth century, but amounts were modest. From the 1930s, Sweden introduced several new policies to improve families' living standards. Despite increased focus on families and children over time, relatively little attention was drawn to formal childcare solutions for children who had not yet started school.

Formal childcare improving children's circumstances?

With inspiration from England and France, the first formal childcare establishments opened in the 1830s in Sweden. Between the 1830s and the 1930s there were three main types of pre-schools in Sweden: infant schools (*småbarnsskolor*), cribs (*barnkrubbor*) and kindergartens (*barnträdgårdar*). All three types were privately run by local charities and often by middle-class women's organizations. For a long time, formal childcare was only provided to children from low-income families, but the three types of childcare establishments differed from one another in terms of which children attended, the pedagogy and care provided and the main aim of the establishment.

The infant schools were the earliest types of pre-schools and opened in urban areas with growing industries where women were most likely to enter the formal labour market outside of the home to be able to provide for the family. The infant schools aimed to provide children from low-income families with better circumstances than if they had been left at home or in the care of others during the day. Children to lone mothers were overrepresented at the infant schools. The infant schools had some educational elements and some play, offered daily meals and donated clothes to children. The infant schools stressed good health and behaviour (Ekstrand, 2000). In Paper IV, we study the only infant school in Landskrona, which is described in more detail in the paper. The infant school in Landskrona shared many characteristics of other infant schools in Sweden at the time, in terms of its management, objective and funding. It primarily served children from low-income families, and children to lone mothers were overrepresented compared to the rest of the population (Elwert & Quaranta, 2023).

The cribs were a more direct response to poverty in society and provided families with an additional support when poor relief organizations could not (Hatje, 2013; Holmlund, 2013). The cribs emerged in the mid- to late-nineteenth century with the mission of creating "*order in society*" (pp. 45-46) by compensating for lack of care at home (Holmlund, 1996). There were no formal educational demands on the staff in the cribs, the wages were low, the working days were long and finding well-suited staff was difficult (Holmlund, 1996). Children stayed for shorter periods of time as families moved often or the childcare needs changed in the family (Holmlund, 2013). There were no scheduled educational elements, the cribs lacked basic equipment such as toys for children, and instead focus was on looking after the children (Lindgren & Söderlind, 2019).

The kindergartens were mainly present from the turn of the twentieth century. They differed from the two previous forms of childcare establishments in that they had a clear pedagogical focus and requirements on the staffs' formal education and training. The kindergartens primarily served children in upper- and middle-class families with a few hours a day of pre-school education, because parents deemed it to be beneficial for their children's development (Holmlund, 1999). The

kindergartens applied a pedagogy focused on play, creativity and music (Westberg, 2019).

With time, the supply of formal childcare grew. State subsidies increased the childcare capacity and pre-schools served five times as many children in the 1960s than the 1950s, but only half of the demand was met (Elmér, 1963). For women born in the first four decades of the twentieth century, the expansion of formal childcare solution meant that they had increased ability to combine paid work outside the home with having a family. The supply of formal childcare continued to rise in the coming decades through daycare centres and municipality-employed women taking care of children in their homes (*dagmammor*), but Swedish municipalities still struggled to meet the ever-growing demand of childcare well into the 1980s and 1990s (Hatje, 2013; Jonung & Persson, 1994).

In sum, when children in this thesis were born, formal childcare was rare, open for children in low-income households and operated with the aim of providing better circumstances for these children. In Paper IV, we study to which extent a local pre-school helped children, and their families, escape disadvantaged circumstances in the short (childhood) and long term (adulthood).

Schools in the first half of the twentieth century

In 1842, primary school (*folkskola*) became compulsory for all children in Sweden. Children started at age seven and primary school lasted six years. Each parish had to have a school, but because the schools were not centrally governed, there was great variance in their quality, attendance was often irregular and many children, especially in rural areas, only attended part time (Ljungberg & Nilsson, 2009).

At the turn of the century, up to half the children in Sweden were still part-time pupils, but a new school reform in 1919 increased the primary school quality and the share of full-time pupils rose (Richardson, 2010). Yet, it was not until the 1930s that almost all Swedish children attended primary school full time and on a daily basis (Ljungberg & Nilsson, 2009). The 1919 school reform entailed a new curriculum which put higher demands on the students, who were required to reach specific learning goals to be able to move up to the next school year (Richardson, 2010). The previous focus on memorizing facts was replaced with new teaching material and books, pedagogically trained teachers were required and the number of pupils per class was reduced (Richardson, 2010). In 1937, compulsory schooling expanded to seven years of primary school, but many municipalities had already increased the number of compulsory years. In Landskrona, seven years were compulsory from 1922 (Sjövall, 1942).

The school system was a so-called parallel system, where all children attended primary school but much fewer proceed to lower-secondary school (*realskola*) and higher-secondary school (*läroverk/gymnasium*). During the period of this thesis, both boys and girls could attend lower-secondary school and did so at quite similar

rates (Schånberg, 1993). In the 1930s, around 20% of Swedish children in primary school continued to lower-secondary school, upon passing an entry exam and attaining complete school grades (Schånberg, 1993). In the 1940s, the share of children continuing was slightly higher at 25%, and 8% of children went on to higher-secondary education (Holmdahl, 2000). From 1927, both boys and girls could attend state-run higher-secondary schools. Girls could only attend private higher-secondary schools prior to 1927 (Schånberg, 2001). Students from privileged homes were overrepresented in higher-secondary schools. Elmér (1963) shows that in 1944 50% of the students came from “upper-class” homes but they only represented 6% of the population.

The Swedish parallel system was not unique. Across Europe, similar school systems operated and education beyond primary school was limited. The frontrunner in expanding the access to secondary schooling was the United States, where over half of the 14–17-year-olds were enrolled in secondary schools in 1930 and almost 70% ten years later (Goldin, 1998). But the Swedish school system eventually shifted from a parallel to a comprehensive system. Between 1949–62, a gradual roll-out of nine years of compulsory schooling occurred across the country, with the aim of reducing educational inequalities and increasing the amount of theoretical education among the youth (Holmlund, 2020; Marklund, 1982; Statistics Sweden, 1974). The increased number of compulsory school years did not affect individuals studied in this thesis as they had already passed school ages by then.

In the town of Landskrona, there were three centrally located primary schools and one just north of the town in the first four decades of the twentieth century. In his report of the primary schools in Landskrona from 1842 to 1942, school inspector Hugo Sjövall shows that the town’s schools played an important role in providing improved social circumstances for children in low-income households (Sjövall, 1942). A school doctor was employed from 1907 and an additional nurse from 1931. They monitored children’s growth and general health, performed tuberculin tests, checked their eyesight, and provided those in need with free glasses. From 1912, a dentist opened a practice in one of the schools and from 1937, the school dentist provided dental care to all school children. Between 1910 and 1922, children from low-income households were provided with warm milk and light school lunches during the day, which was made possible through charity donations. School lunches were provided every second day up until 1931, which then increased to everyday for those in need.

The Landskrona schools also donated free books and school material (from 1911) as well as clothing from charity organisations (from 1920). Parents applied for this type of aid at the start of the year and a school committee decided who would receive it. Between 1933–41, parents of 27% of all children in school ages (7–14) in Landskrona had applied for this aid through the school. 85% of all applications were granted and almost all of them (99%) related to free schoolbooks, half (51%) to school meals and 76% to free medical care (author’s own calculations from data

presented by Sjövall, 1942). In other words, the need for additional economic and material help was present, and the school contributed to saturating this need through in-kind support.

Despite several equalizing efforts made by the school, there were clear socioeconomic differences in children's average school grades in the period of study in Landskrona. Using a seven-step scale, where 3.58 was the mean grade in the fourth year of primary school, shown in Figure 2, children from higher status households clearly stood out with significantly higher grades. Children from households headed by a medium-skilled worker were just above the mean, while children from households headed by lower-skilled or unskilled workers were below the mean. Figure 2 also shows that children growing up with only a mother (unmarried, widowed or divorced) received lower grades than all other groups. In other words, children in the least resourced households had the lowest grades.

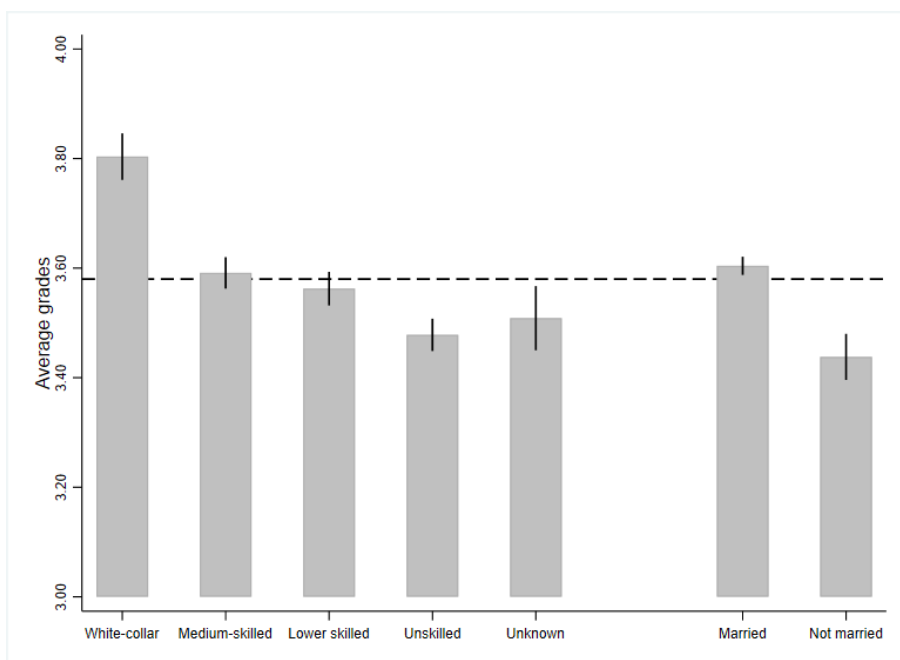


Figure 2. Average school grades by the socioeconomic status of the household head and mother's marital status.

Notes: Grades reflect the fourth school year in Landskrona. Birth cohorts 1906-37 are included. 88% of individuals have a married mother. *Sources:* own calculations from SEDD v. 7.2 and diaries and exam catalogues from Landskrona primary schools.

In sum, children born in the early twentieth century faced several new circumstances, some of which were improvements compared to the past. Yet, there were large differences within the population, and which were determined by the household's socioeconomic status and resources.

Adulthood labour market opportunities

Labour market opportunities for individuals born in the first three to four decades of the twentieth century varied over time. Upward social mobility rose in Sweden (Björklund et al., 2009) and locally in the area of study (Brea-Martinez & Dribe, 2024; Dribe et al., 2015) over time. Higher education was still quite limited to a small share of the population until the 1960s (Richardson, 2010), but individuals not proceeding to secondary school could take part-time vocational education at technical, commercial and domestic schools or correspondence institutes while also working, and some firms offered internal apprenticeships and training for specific jobs (Nilsson, 2014).

The first birth cohorts in this thesis would have entered the labour market during the 1920s-1930s, when unemployment rates were high. Later-born cohorts would have entered adulthood in a more favourable period. However, it was not until the 1950s-1960s that Sweden begun a period of exceptional economic growth, unemployment rates fell and remained very low up until the 1990s (Schön, 2014). The service sector grew, and more women entered the workforce (Schön, 2014). At first, employment was available for young adults irrespective of previous training or higher education, but in the 1960s, with the growth of the service sector, higher demands were put on formal education (Nilsson, 2014).

Studying individuals born 1903-29, Figure 3 shows that the occupational attainment – measured using the HISCAM scale (Lambert et al., 2013) – among individuals present in Landskrona both in childhood and in ages 25-29, differed by their early childhood circumstances.¹¹ Individuals coming from white-collar households had on average a HISCAM score which was up to nine points higher than other individuals, and seven points higher than the mean. The pattern was similar for men and women, but women had occupations ranking lower on the HISCAM scale than men. Figure 3 reflects a time period spanning from 1928 until 1958.

¹¹ As explained in the Data and variables section in Paper IV, “*HISCAM is a continuous scale of occupations ranked by prestige in an occupational hierarchy ranging from 39.9 to 99, where a higher number reflects a higher occupational prestige*”.

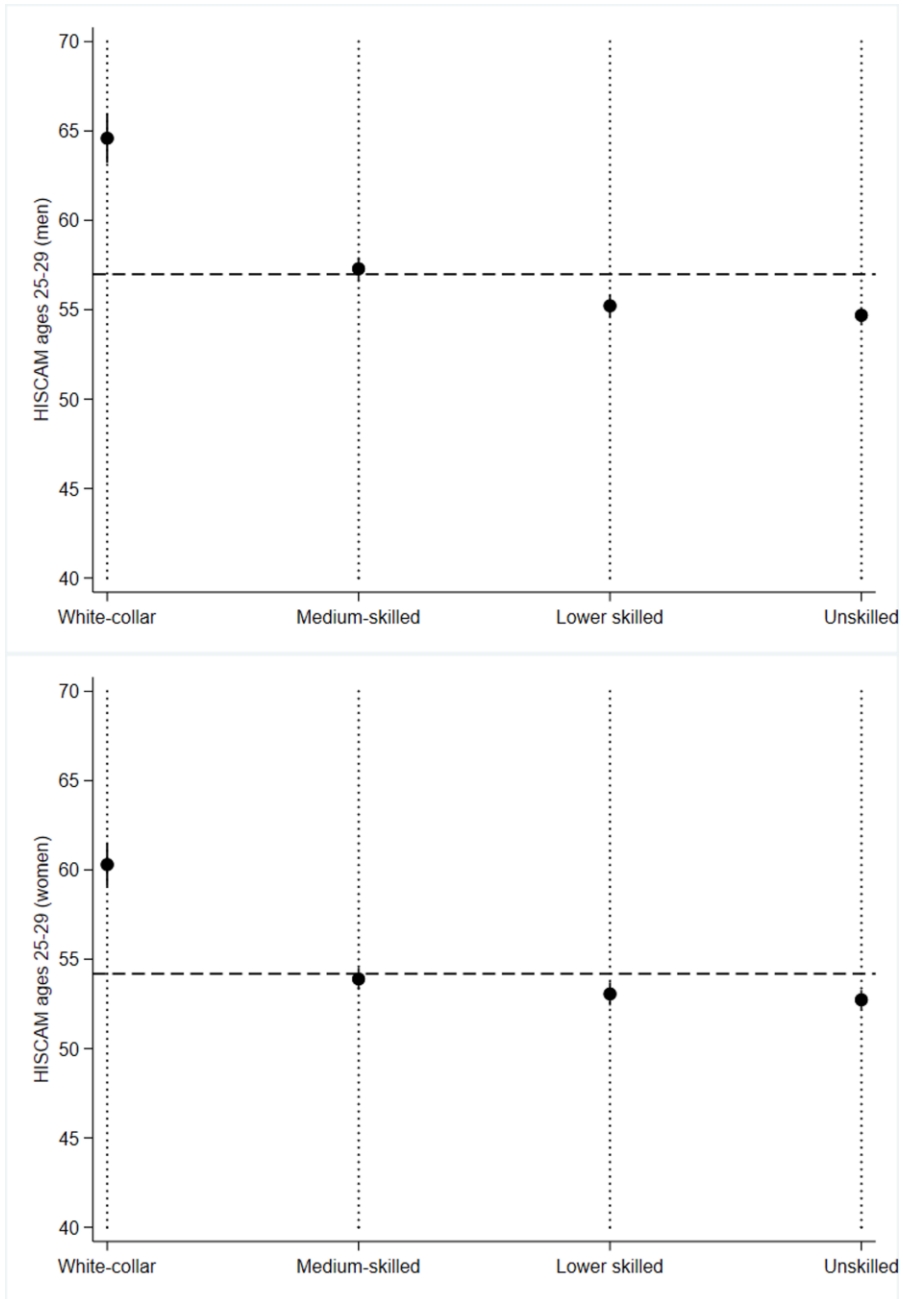


Figure 3. Adulthood (ages 25-29) occupational attainment (HISCAM) by socioeconomic status of the household head when the child is two years old.

Notes: Upper plot depicts men and lower plot depicts women. The plots reflect individuals born 1903-29 present in Landskrona both at age two and ages 25-29. The unskilled group also includes individuals from households with unknown SES. The mean is marked in the dotted line. *Source:* Author's own calculations using the SEDD v. 7.2.

Men and women were not equally represented on the labour market in Sweden. A male breadwinner model dominated up until the late 1960s (Stanfors & Goldscheider, 2017). Between 1930 and 1960, just under a third of adult women were gainfully employed (Stanfors, 2014). Throughout the period, most of the female workforce was unmarried. Married women's labour force participation was under 10% up until the 1940s but started rising thereafter. By 1960 almost a quarter of married women were gainfully employed (Stanfors, 2014). There are two peaks in women's labour force participation over the life cycle for the studied birth cohorts: in their early twenties and in their later forties/early fifties (Stanfors, 2014). From the 1960s, Swedish women's labour force rose to be one of the highest in the world reaching 79% twenty years later, but women were more inclined to work part-time than men (Pailhé et al., 2021).

Given these developments, it is expected that many women studied in this thesis started a gainful employment in their youth, left the workforce upon marriage and then returned in later adulthood. Women's varying labour force participation is a concern in studies assessing later-life economic outcomes, unless the specific ages where most women work are studied. In this thesis, socioeconomic outcomes reflecting paid work are analysed between ages 25-29 (Paper IV) and age 50-54 for both men and women (Paper III). Both age ranges should therefore reflect when women's labour force participation would have been highest.

The most common occupations held by men and women differed over time. Brea-Martinez and Dribe (2024) present occupations in Landskrona between 1930-74, when the individuals studied in this thesis would have been in working ages. For men, the most common higher white-collar occupations were connected to the industry: engineer, industry manager and accountant. For women, higher white-collar occupations were teacher and journalist. Lower white-collar occupations for both men and women were connected to retail and the service sector. Among the lowest skilled occupational groups, labourers and factory workers dominate among men and women. All occupational groups became more diversified over time (Brea-Martinez & Dribe, 2024).

Methods

In this chapter, I present the general methodological approach taken to answer the research questions of the thesis. I present the econometric methods used, motivate the choice of method in each paper and discuss limitations.

General empirical approach

This thesis aims to analyse to which extent disadvantaged circumstances in early life affected wellbeing in later life among birth cohorts growing up in early twentieth century Sweden. In each of the papers in the thesis a life course approach is taken. Life course analyses assess how events occurring in different phases of life are connected to one another and utilise the clear order and timing of events to identify in which direction circumstances affect one another (Kuh et al., 2003). By establishing how and when specific circumstances in early life influence educational, socioeconomic or health-related outcomes in later life, appropriate interventions can be introduced in a timely manner (Elo & Preston, 1992). In all studies of the thesis specific circumstances and interventions are identified on an individual level, which allows for precise estimations of their effects without relying on reduced-form estimates.

The research questions in this thesis are asked with the intention of isolating causal effects from specific early-life circumstances. Because health, childcare and socioeconomic circumstances correlate and affect one another, regression analyses will suffer from endogeneity, making it difficult to make causal claims. In this thesis, the empirical challenge and one of the contributions, is to disentangle effects from different early-life circumstances from one another. To address endogeneity in the statistical analyses and to be able to make causal interpretations of the results, two different empirical strategies are implemented: 1) quasi-experimental econometric methods are applied in Papers II-IV and 2) a measure of early-life disease exposure which is exogenous to the individual is used in Paper I.

First, quasi-experimental econometric methods are commonly used in contemporary economic research, are momentarily evolving at a rapid pace and have found their way into the economic history literature. Quasi-experimental methods provide an alternative to the gold standard of causal studies – randomized control trials (RCT) or experiments. Quasi-experimental methods rely on several assumptions, and if those are met, researchers can draw causal conclusions from phenomena that cannot be set up as RCTs due to financial, ethical or historical reasons (Angrist & Pischke, 2010). In this thesis, two different quasi-experimental methods are applied: difference-in-differences (Papers II and III) and instrumental variables (Paper IV). Each method is further outlined in the following section.

Second, by using an exogenously defined measure of the variable of interest, researchers can reduce the risk of endogeneity in statistical analyses and isolate effects from the variable of interest. As such, in Paper I, we use a measure of disease exposure which reflects the disease load of the population and is exogenous to the individual.

Econometric methods at the micro-level

The individual papers in this thesis use three different econometric methods to answer the research questions: flexible parametric survival analysis, difference-in-differences and instrumental variables. Each one is presented in the individual papers in full detail. In this section I summarise them and discuss why they are appropriate to use in each of the papers in the thesis.

Flexible parametric survival analysis

Flexible parametric survival models (Royston & Lambert, 2011) are applied in Paper I. They are used to estimate the hazard of death and life expectancy over the full life course (ages 1-85) in relation to the disease load individuals were exposed to in infancy. The flexible parametric survival models use multiple polynomial functions (restricted cubic splines) over survival time to model the hazard function.

Using flexible parametric survival models in Paper I, rather than the more commonly used Cox proportional hazard models, is motivated by three factors. These three factors make the flexible parametric survival models ideal for estimating mortality effects over the full life course and studying heterogeneities across sub-groups. First, by construction, flexible parametric survival models are not held by the proportional hazard assumption, meaning that effects over long periods of survival time (such as ages 1-85) can be studied without violating fundamental model assumptions.

Second, they allow for straightforward estimations of several types of measures of survival (absolute and relative) over the full life course. The function contains one part that reflects the constant hazard of death (baseline) and one part that reflects the time-varying hazard of death over survival time. The flexible parametric survival models therefore estimate the hazard relative to the baseline (similarly to the Cox proportional hazard model) as well as the baseline hazard itself.

Third, the flexible parametric survival models allow for graphical interpretation of time-varying hazard of death, meaning that patterns can easily be detected across all ages of the life course. Despite their advantages, flexible parametric survival models have not been used in demography, or social sciences more broadly, before but have to date primarily been applied to cancer epidemiology.

A potential weakness with the flexible parametric survival models lies in the model specification (the number of splines in the model or its degrees of freedom), because it is determined by the researcher. Flexible parametric survival models are however not overly sensitive to the specification and formal tests, such as Akaike and Bayesian information criteria (AIC and BIC), can be used to inform the best model fit (Royston & Lambert, 2011). Thus, the benefits of using the flexible parametric survival models dominate over their potential weaknesses and they are a suitable choice of method in Paper I.

Difference-in-differences

A difference-in-differences methodology is implemented in Papers II and III. The difference-in-differences method has evolved rapidly in the past five to ten years, and is one of the most used quasi-experimental methods in economic studies (Roth et al., 2023).

In this thesis, the difference-in-difference model is used to estimate later-life effect from the 1938 child allowance. In Papers II and III, the difference-in-difference model compares the group of individuals eligible for the child allowance (“treatment group”) with a control group ineligible for the child allowance (first difference), before and after the child allowance reform is implemented (second difference). In Papers II and III, individuals’ birth years determine if they belong to the before or after reform groups. The core model is a two-way fixed effects model interacting the two differences, while accounting for group and birth cohort fixed effects. The model is specified in more detail in each of the two papers.

The difference-in-differences model gives causal estimates of the average treatment effect of the treated, that is the effect of the child allowance on the eligible group, if several assumptions are fulfilled. The assumptions and their relevancy to Papers II and III are discussed in the individual papers. The main takeaway though is that the construction of the model and its assumptions reduce the risk of time-varying and group-specific confounding. Treatment effects can therefore be isolated, and causal interpretations can be made.

Because the introduction of the child allowance occurred in the same year for the full sample (year 1938), I rely on two-way fixed effects models in the main analyses in Papers II and III. I further use a doubly robust estimator in sensitivity analyses to confirm that the introduction of control variables does not create biased estimates (Sant’Anna & Zhao, 2020).

The usage of a difference-in-differences method in Papers II and III is motivated by the design and timing of the 1938 child allowance. First, only a specific group of families were eligible for the child allowance, and with the usage of the SEDD, factors determining eligibility (mother’s marital status and income as well as children’s age) can be used to construct accurate treatment and control groups in the data. Second, the clear-cut arrival of the child allowance in 1938 in combination with information on children’s birth year means that treatment and control groups can be further split into two distinct groups reflecting 1) individuals in eligible ages (0-15) in 1938, and 2) individuals in ineligible ages (16+) in 1938.

Instrumental variables

An instrumental variables (IV) approach is employed in Paper IV. The IV-approach is suitable for estimating causal effects when there is selection into treatment status (which in Paper IV is pre-school attendance). The selection in pre-school attendance comes from the studied pre-school operating mainly for children in low-income

households and often with lone mothers. In other words, attenders are not representative of the full population of children in the study region but represent a select group which grows up in particularly disadvantaged circumstances.

Following the IV-approach, and to estimate causal effects from pre-school attendance despite the selection, an instrument for attending pre-school is created based on the distance between each individual's home and the pre-school. Distance is commonly used in studies assessing returns to schooling. Distance reflects one of the "costs" of attending preschool – time spent to the pre-school – and which influences individuals' probability of attending (Imbens, 2014). Individuals living close to the pre-school are assumed to have higher probability of attending than those living farther away. In Paper IV we also find this to be the case, and distance is therefore a suitable instrument for attendance.

With the IV-approach the local average treatment effect (LATE) is estimated. The LATE reflects individuals affected by the instrument (Angrist et al., 1996). In our case in Paper IV, it translates into individuals who only attend pre-school because they live close to it. The IV-approach entails estimations using a two-stage least squares (2SLS) model. The econometric details of the IV-model are presented and discussed in Paper IV to a greater extent. The LATE from the IV-model is considered causal if four assumptions hold, which are presented in Paper IV. We argue for how all four assumptions are fulfilled in Paper IV.

Data

This section describes the data sources used to answer the research questions, where and by whom they have been collected, as well as their strengths and limitations. I first introduce the main data source and then discuss complementary data sources used.

Main quantitative data source

This thesis studies a population growing up in Southern Sweden in the first part of the twentieth century and their educational, socioeconomic and health outcomes over the full life course. To answer the thesis's research questions, all four studies primarily rely on quantitative data. The main source in the analysis is the individual-level data from the Scanian Economic Demographic Database version 7.2, SEDD (Bengtsson et al., 2021).

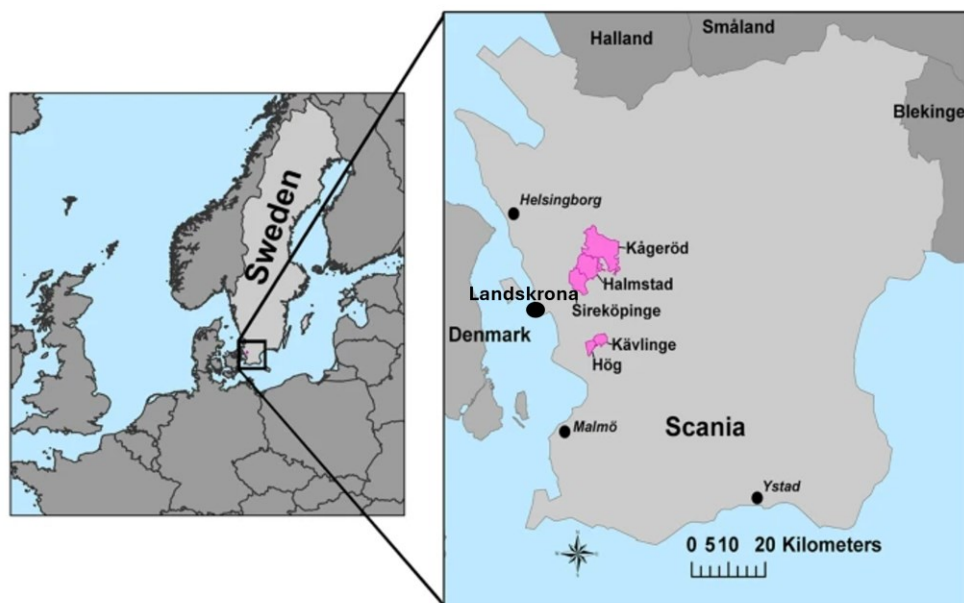


Figure 4. Map of the area of study: the town of Landskrona and the five nearby rural parishes situated in Southern Sweden.

Notes: Map created by Finn Hedefalk.

The SEDD is a longitudinal historical population database including residents in the Southern Swedish port town of Landskrona and five rural parishes situated in the countryside nearby from 1813 (rural parishes) and 1905 (Landskrona) until 1967. Paper I uses data from both the rural and the urban areas from 1905, while Papers II-IV only use the urban sample. It is in this database that the study populations of each of the four papers are identified. In 1900, the population in the town of Landskrona was 14,000, in 1930 18,500 and in 1950 25,000 (Statistics Sweden, 1969).

The SEDD is unique in containing a wide range of socioeconomic and demographic variables on an individual, family and household level over time. The database has been constructed by digitising multiple local population records, such as church books including information on all residents' births, marriages, deaths and migration, as well as poll-tax and income registers including information on occupation, earnings and taxes (Dribe & Quaranta, 2020). The database has a hierarchical structure, meaning that individuals can be connected to other family and household members. The SEDD was first created in the early 1980s as a collaboration between the National Archives in Lund and researchers at the Department of Economic History at Lund University. It has developed into a large historical population database over the past decades, is currently administered by

the Centre for Economic Demography at Lund University and is part of the national research infrastructure SwedPop (Dribe & Quaranta, 2020).

Because of its longitudinal nature, individuals in the SEDD can be followed from birth or first in-migration into the area until death or out-migration. The inclusion of in- and out-migration date stamps means that researchers can accurately understand which individuals are present in the geographical area at a specific point of time.

Additionally, the SEDD has recently been linked to nation-wide Swedish population data. The linkages entail following individuals growing up in the SEDD region even if they moved to other parts of Sweden, meaning that the potential risk of stayer bias in analyses is reduced and later-life outcomes occurring after 1967 can be studied. In this thesis, I utilise such pre-existing linkages in the later-life follow-up analyses on mortality in Paper I and III, and on socioeconomic outcomes in Paper III.

The alternative to using an area-specific micro-level database like the SEDD in historical population studies, before national registers existed, is to turn to census data. However, censuses only exist in Sweden every ten years between 1900-1930 and every five years 1940-1950, and the timing of events such as death or migration cannot be accurately determined unless they are linked to other sources. Time-varying demographic and socioeconomic information on migration, marital status, household composition, occupation or earnings would also not be captured as accurately. The censuses in the early twentieth century therefore lack some of the key information required for the analyses in this thesis.

All these reasons make the SEDD a unique and powerful database for researchers working to connect historic Swedish circumstances with present times. For all the above reasons, the SEDD is also a well-suited source of quantitative data for addressing the research questions posed in this thesis. Despite the geographical limitations of the SEDD, the demographic and socioeconomic conditions in the rural parishes and Landskrona mirror the general trend of rural and urban Sweden during the period that this thesis covers, and Landskrona can be considered to be a typical Swedish middle-sized town (Bengtsson & Dribe, 2006; Dribe & Svensson, 2024). It is therefore plausible that the results from the analyses in this thesis can be generalisable to populations growing up in other medium-sized Swedish towns at the start of the twentieth century. Many of the previous studies conducted using the SEDD are presented in Bengtsson and Dribe (2021).

Additional data sources

To answer the research questions and to conduct each study in the thesis, the SEDD has been complemented with additional information from external sources containing individual-level data. I have had an active role in collecting, digitising and linking some of these sources to the SEDD. In other cases, the collection,

digitisation and linkage have been done by other researchers. This is outlined below. At the end of this section, I also present the archival data used to study in several of the studies.

The Swedish Death Index

The Swedish Death Index (SDI, 2019) contains the date of most deaths that occurred in Sweden from 1860 until 2016 and was created by the Federation of Swedish Genealogical Societies. The individual information in the SDI was linked to the SEDD by other researchers at the Centre for Economic Demography in Lund and has been used by e.g. Debiasi (2020) and Dribe and Eriksson (2018). From 1947, Sweden implemented an administrative system using personal numbers for all individuals. Anyone who lived in the SEDD area from 1947 onwards would have received such a number, meaning they could be directly linked to the SDI. Individuals out-migrating from the SEDD region before 1947 have been linked to the SDI using probabilistic linking and information on names, birthplace and birth date, see further description in Debiasi (2020).

I use the already existing linkages between the SEDD and the SDI to examine mortality rates and survival in the analyses in Papers I and III. Because the SDI contains death dates for deaths in all of Sweden during the period of study, the risk of selection bias caused by migration in and out of the study area is reduced.

Modern Swedish administrative registers

I study the effect of the child allowance on later-life socioeconomic outcomes such as earnings, occupational status and educational attainment by using high-quality data from 1968 to 2015 from modern Swedish administrative registers hosted by Statistics Sweden in Paper III.

The SEDD has been linked to these national administrative registers through the usage of unique personal identification numbers by Statistics Sweden. Similar to the SDI, anyone who lived in the SEDD area from 1947 onwards would have received such a number, meaning they are directly linked to the modern registers, and can be included in follow-up analyses. Among individuals out-migrating from the SEDD region before 1947, additional probabilistic linkages through the 1950s census and the SDI have been created by other researchers to obtain personal identification numbers and then be able to link individuals to the modern registers (Dribe & Quaranta, 2020).

Diaries and Exam Catalogues from the Landskrona Primary Schools

The effects of the child allowance and pre-school attendance on primary school performance are studied in Papers II and IV. Detailed school performance (school year completion, grades and absence) is not well-studied historically, likely due to such data being rare. Several studies examining school outcomes in the early to mid-

twentieth century instead rely on information on the highest level of educational attainment (Aizer et al., 2016; Bailey et al., 2024). Educational attainment is also valuable to study but is at risk of reflecting educational circumstances and opportunities rather than individual-level scholastic performance or wellbeing.

The SEDD is complemented with data from school diaries and exam catalogues covering the first and fourth year of primary school in Papers II and IV. Primary schools in Landskrona used diaries and exam catalogues to keep a record of all enrolled students per class and school year. The diaries and exam catalogues contain each student's name, date of birth and in most years the name and profession of one of their parents and home address. They include individual information on daily school attendance or absence and term-specific grades.

Information from diaries and exam catalogues in 1905-47 were collected from the Landskrona city archive and linked to the SEDD. Diaries and exam catalogues between 1926-47 had already been collected and digitised for the first school year and between 1918-25, 1932-36 and 1941-43 for the fourth school year as part of another research project studying several Swedish parishes and towns, see Bhalotra et al. (2022) and Cattani et al. (2023).

For Papers II and IV in this thesis, we first linked the existing school data to SEDD and then collected and linked the missing years between 1905-47. The existing data was linked to the SEDD using probabilistic linkage based on individuals' names and birth dates. The newly collected data and the unlinked individuals were manually linked to the SEDD based on individuals' names, birth dates, parents' names and the home address as part of the digitisation process. Overall, during the period of study, 98% of individuals in the school records are linked to the SEDD.

The diaries include students' school presence and absence on a daily basis, which the main class teacher filled in. The causes of the absenteeism were recorded throughout the period, but with some inconsistencies over time in terms of how much detail was given. Nonetheless, in all years, the number of absent days due to illness and the total number of absent days were noted. The detailed daily recording of absenteeism indicate that the total number of absent days should be highly accurate.

The exam catalogues include students' individual grades for the autumn semester (registered in December) and for the full school year (registered in June). Consistently through the period 1905-47, grades were reported in mathematics, reading and christianity in the first and fourth school years. Grades in writing were also reported in the fourth year. No exam catalogues were preserved in the Landskrona city archive for school years 1912-17. Except for these years, throughout the full period of study, there are few gaps in the data. In individual years there are instances of individual classes missing from the diaries and exam catalogues (for unknown reasons), which is called out in the books. Because the gaps are random and of complete classes, not select individuals, they likely do not

constitute a concern to the analyses of this thesis. School grades are usually interpreted as a measure of cognition in research, but can also reflect non-cognitive traits (Borghans et al., 2016).

I was actively involved in the process of collecting and linking the data from the school diaries and exam catalogues together with associate professor Luciana Quaranta and a research assistant. Quaranta and I both worked on the probabilistic linkages of the first material. The research assistant and I collected the data which had not been collected before at the Landskrona city archive. The research assistant digitised the information and did the manual linking. Quaranta and I both worked on the data management of the complete linked data so the information could be accurately used for statistical analyses.

Records of pre-school attendance in Landskrona

Attendance lists from the only pre-school in Landskrona in 1905-36 were collected and digitised from the Landskrona city archive by Elwert and Quaranta (2023). They also linked the attendance list to individuals in the SEDD. It is therefore possible to identify which individuals in the SEDD ever went to pre-school and in which years. The linking was both probabilistic based on name and birth date and manual when few individuals remained unlinked. 98% of the pre-school attenders in this period were linked to the SEDD, making it a precise and unique source to use for historical studies of pre-schools in Sweden. In this thesis, the linked data from the pre-school records are used in the analysis in Paper IV. I did not take part in any of the data collection, digitisation or linking of this material to the SEDD.

Archival sources and historical national statistics

To study the 1938 child allowance (Papers II-II), I conducted extensive research on the design of the reform and its execution. I consulted a number of historical qualitative sources to gain a complete understanding of the significance of the reform above and beyond the estimated effects from the econometric models. The primary source is the official governmental investigation into what became the 1938 child allowance, SOU (1936:6). It is a comprehensive report including a brief background, a comprehensive proposal and motivation of the new policy and detailed estimations and calculations on the costs of the allowance. It was created by the 1934 commission for the child allowances (*1934 års barnpensionerings-sakkunniga*), which consisted of a small group of experts from the ministry of social affairs.

Further, to understand which parts of the investigation translated into policy, I have consulted the 1936 child allowance law and supporting commentary to it (Bergholtz & Bylander, 1940). I have compared the law to other sources describing the child allowance reform to verify the coherence in its description across different outlets. For instance, I researched how the child allowance reform had been reported in the most common Swedish newspapers. Through the Lund University Library's access

to the Royal Swedish Library's catalogue of digitized newspapers, I searched for "child allowance" (in Swedish *barnbidrag*) in Swedish newspapers 1937-39. I also examined information produced by the social democratic party, which the party used at meetings and speeches across the country to inform the public of the reform (Social democratic party information office, 1938). Moreover, I went through prominent periodicals addressing social and gender issues at the time (*Hertha*, *Idun*, *Tidevarvet*) to see if and how they discussed the child allowance between 1934-40. I found that the female authors of the commission for the child allowances were active in debating for the child allowance in one of these outlets where they described the benefits of the new policy (Eklund, 1936; Nordgren, 1937). Interpreting these sources, the reform was likely implemented in line with the legislation as there were no descriptions deviating from what was legislated.

To estimate how many families would be eligible for the child allowance reform, I also used historical aggregated national statistics from the pension boards (Statistics Sweden, 1939a), and national statistics on poor relief (Statistics Sweden, 1935, 1936, 1937, 1939b, 1940, 1942, 1944, 1945). Together, these sources give a comprehensive view of the reform and its introduction. There is no reason to suspect systematically inaccurate records. Poor relief and pensions were administered by local municipalities who were obliged to report their activities on an annual basis to Statistics Sweden (up until 1937) and the National Board of Social Affairs (after 1937). To secure accuracy in the statistics, municipalities had to provide detailed information to the national organisations who published aggregate statistics each year (Statistics Sweden, 1942). These sources are therefore considered reliable. The Landskrona pension board kept local records of child allowance payments 1938-48, which are archived in the Landskrona city archive (Landskrona Pension Board, 1937-1947). I therefore also reviewed this source material to verify that the child allowance was paid out in Landskrona to the same extent as the rest of the country.

I also consulted archival sources as part of the analyses in Papers I and IV, but less extensively. For Paper I, I collected the annual incidence of infectious diseases reported by the local district physicians in 1905-30. The annual disease data was used as a comparison to the main analysis in the paper to verify that the years identified with the most infant deaths corresponded to peak years in the incidence of specific diseases. For Paper IV, my co-authors had collected archival information on the pre-school in Landskrona, and which I used in the descriptive background of the paper, e.g. relating to what type of pedagogy was conducted. Additional information on the pre-school's annual accounts were gathered from the Landskrona city archive to understand the pre-school's expenses and services (food, teacher wages and donations of clothing).

Summaries of papers

In this section I present summaries of the thesis's four individual papers.

Paper I. Early-life disease exposure and its heterogenous effects on mortality throughout life: Sweden, 1905-2016.

Co-authored with Volha Lazuka and Luciana Quaranta.

In high mortality settings, populations exposed to infectious diseases *in utero* or in the first year of life have experienced increased risk of death not only in early life, but also in later stages of the life course. The observed effects are explained by the disease exposure negatively affecting biological developmental processes in childhood and which leave permanent marks on individuals' health throughout life (Crimmins & Finch, 2006; Gluckman & Hanson, 2006).

There is limited knowledge of how exposure to disease in early life affects populations born in the first decades of the twentieth century, when the incidence of infectious diseases and the infant mortality rate had declined, but effective treatments to severe childhood diseases were not yet available. At the same time, socioeconomic differences in infant and child mortality either emerged or strengthened across Europe (Antonovsky & Bernstein, 1977; Breschi et al., 2011), including Southern Sweden (Dribe & Karlsson, 2022). In the case of Southern Sweden, similar birth cohorts also experienced a socioeconomic gradient in adulthood mortality (Bengtsson et al., 2020). The question arises if health inequalities in adulthood have an early-life origin and if these emerge when the early-life disease burden does not affect all social groups equally.

We examine effects from early-life disease exposure in early-twentieth century Sweden on mortality rates over the life course by socioeconomic status at birth and sex. We use data from the SEDD and the SDI, and identify individuals born 1905-29 in the SEDD region who were exposed to low/medium or high disease burden in the first 12 months of life and follow them until age 85 or death. We create a measure of early-life disease exposure which is exogenous to each individual by utilizing peaks in the local post-early neonatal mortality rate (8-365 days). We estimate the hazard of death and life expectancies for men and women with high and medium/low early-life disease exposure by socioeconomic status at birth through flexible parametric survival analysis (Royston & Lambert, 2011).

The results show that early-life disease exposure had heterogenous effects on mortality over the full life course. We observe a gradient in the hazard of death in ages 1-85 by socioeconomic status at birth which is very similar for males and females. However, when considering the effect of socioeconomic status interacted with early-life disease exposure, different patterns emerge for males and females.

For females, the early-life disease exposure accentuates the existing socioeconomic differences in the hazard of death in ages 1-85 in a similar way for all groups. There is a statistically significant difference in the hazard of death between females born to unskilled workers (lowest socioeconomic status) exposed to high levels of disease and females born to white-collar workers (highest socioeconomic status) exposed to low/medium levels of disease (the reference group in the analysis). In absolute terms, the life expectancy in ages 1-85 is 3.5 years lower for females with high disease exposure born to unskilled workers than females with low/medium disease exposure born to white-collar workers. A life expectancy difference of this magnitude equals to over a decade of life expectancy gains in Sweden at the time and is thus very large. We conclude that scarring effects throughout life from early-life disease exposure are present in the group of females from households with lowest socioeconomic status.

For males, the early-life disease exposure does not have any significant or consistent effects on later-life mortality rates. The combination of early-life disease exposure and socioeconomic status at birth does not show any clear patterns either. We find suggestive evidence of mortality selection among males, and which likely cancels out underlying scarring effects.

Taken together, socioeconomic status at birth is a larger determinant for later-life mortality rates and life expectancy than early-life disease burden. Exposure to disease in early life does not explain the adulthood socioeconomic gradient in mortality, but for women disease exposure augments the socioeconomic gradient in mortality at all ages in the life course. The specific components of socioeconomic status at birth creating this pattern calls for future research.

Paper II. Money matters: The 1938 Swedish child allowance and its impact on children's school performance.

Following where Paper I ends, that socioeconomic circumstances in early life can affect later-life health and mortality rates, I explore the effect of one specific component of socioeconomic status at birth, namely household income, and its immediate and long-term effects on several measures of wellbeing (school performance, earnings, occupational attainment and health) in Papers II and III.

In Paper II, I study the introduction of the 1938 child allowance in Sweden and its effect on children's school performance. The child allowance was an unconditional cash transfer restricted to very low-income families experiencing income loss due to death, illness or disability of the father of the family in a male breadwinner context. In Paper II, I study widow-headed households, and the effects reflect additional incomes in this group only.

There is an immense literature analysing the design of cash transfers and their effects on low-income households, but it primarily addresses contemporary

conditional cash transfer reforms in low-income countries (Cooper et al., 2020; Nores & Barnett, 2010). A smaller research field explores unconditional cash transfers and has found these cash transfers to improve children's schooling and health (Baird et al., 2014; Cooper & Stewart, 2021; Dahl & Lochner, 2012; Milligan & Stabile, 2011). Potential mechanisms explaining positive outcomes are increased material investments and time from parents, increased household stability and reduced (financial) stress, leading to improved mental and physical health (Almond et al., 2018; Cunha & Heckman, 2007; Evans & Kim, 2013; Heckman, 2006; Milligan & Stabile, 2011). To my knowledge there are no studies that assess the effect of unconditional cash transfers on children's school performance in a historical setting with limited alternative economic aid.

I use the SEDD combined with diaries and exam catalogues from the local primary schools in Landskrona and apply a difference-in-differences approach in the analysis. Individuals born 1922-37 and living in the town of Landskrona 1923-47 make up the study sample and their school performance is measured in ages 10-11.

The study finds that the child allowance was a significant source of additional income for eligible families, which likely removed the negative aspects previously associated with economic aid (from poor relief) because of how it was designed and administered. The child allowance led to higher school completion rates and improved both boys' and girls' school performance in the fourth year of primary school. The child allowance closed the gap in school grades that existed between children of widows and children of married, lower-earning parents.

The child allowance did not affect school absence in significant ways overall, but children experiencing parental loss in pre-school ages (0-5) had lower absence in the fourth year of primary school. Because school absence at the time was mainly due to illness, this result suggests that the child allowance created opportunities for improved childhood health in a critical period of development.

Without exact data on how the child allowance was consumed, it is difficult to determine exact mechanisms. By exclusion, the paper concludes that the mother's material investments in their children's nutrition, clothing and living conditions (items which low-income families were lacking at the time) is the most likely explanation to the school performance gains. There is no clear evidence of the child allowance affecting mothers' probability of remarrying, moving households within Landskrona or altering their labour force participation. Reduced stress is another potential mechanism, but one which I cannot examine with the data available.

Overall, the findings suggest that providing low-income households with additional economic resources led to better circumstances during childhood in 1930s and 1940s Sweden. The fact that school performance improved also raises the question whether the child allowance opened up for new educational opportunities which could lead to long-term economic benefits. This is explored further in Paper III.

Paper III. Investments and opportunities: life-long effects from unconditional cash transfers in childhood, Sweden 1925-2007

Growing up in economically adverse circumstances is linked to greater risk of experiencing adverse educational, socioeconomic and health outcomes throughout life. Yet, it is empirically difficult to identify that it is specifically income explaining the relationship because income is correlated to other factors which could affect the same outcomes.

To address this endogeneity issue, there is a small economic research field studying the long-term effects of household income in childhood by utilizing the introduction of historical cash transfer reforms from as far back as the 1910s, see e.g. Aizer et al. (2016); Bailey et al. (2024); Hoynes et al. (2016); Lorentzon (2020). The field is however focused on the USA in the second half of the twentieth century and due to scarcity of longitudinal data, most studies are limited to following individuals until mid-adulthood. The existing studies have either not analysed sex-specific effects or have found mixed results.

In Paper III, I continue to analyse the 1938 child allowance. Building on Paper II, I study low-income widow-headed households with children under 16, but in this paper, I estimate later-life effects on adulthood socioeconomic outcomes and survival to old age.

Similar to the design of Paper II, I use individual-level longitudinal data from the SEDD to identify children eligible and ineligible for the child allowance. In this study, I focus on children living in the town of Landskrona in school ages (aged 6-15) and who were born 1919-32. Despite later childhood and adolescence being periods of important development (Bundy et al., 2018), interventions in school ages are less explored than early ages (0-5) in the existing literature (Almond et al., 2018). To analyse later-life effects from the child allowance, I utilise links that have been created between the SEDD and modern Swedish administrative registers and the SDI. Individuals are followed into adulthood (ages 50-54) to assess socioeconomic outcomes, and until age 75 to study survival, no matter where they lived in Sweden. In the analysis I apply a difference-in-differences methodology.

I find that the 1938 child allowance had positive long-term effects on later-life socioeconomic outcomes and survival to old age. The effects differed by sex though: socioeconomic gains were present among men, while the probability of surviving to old age (up to 75) rose among women. Lack of sex-specific effects in Paper II indicate that parental investments into essential items that low-income families were missing at the time (food, clothing, housing) were likely similar for boys and girls. The different effects for men and women in later life observed in the analyses in Paper III point to adulthood circumstances, which varied by sex, affecting the outcomes. For instance, in the study context, labour force participation, family roles and adulthood health behaviours (e.g. smoking) differed between men and women.

The child allowance improved later-life socioeconomic outcomes only among male individuals experiencing paternal loss in younger childhood (ages 0-9) but not older childhood (ages 10-15). The result is in line with theory emphasizing the importance of early childhood for later-life outcomes. In this case, the long-term effects from early life adversity could be reduced with an intervention in school ages. The child allowance increased women's probability of surviving to old age independently of when they experienced paternal loss. The lack of a specific "critical age effect" on long-term survival could be the result of the allowance reducing families' stress exposures, whose effects can accumulate over time and negatively affect adulthood health. The specific timing of the intervention may therefore not be of importance.

Overall, the findings in Paper III indicate both that disadvantaged economic circumstances in childhood influence adulthood socioeconomic outcomes and survival to old age, and that cash transfers to low-income families can reduce later-life adversities stemming from those. While context-specific circumstances in Sweden could explain differences in men's and women's outcomes, the fact that the child allowance could make a difference for children in low-income families, as observed in a North American context, also points to cash transfers' effects being more universal and less-context specific than what the existing research frontier has been able to show to date.

Paper IV. Escaping adversity through pre-school attendance in early twentieth century Sweden.

Co-authored with Annika Elwert, Volha Lazuka and Luciana Quaranta.

Lastly in Paper IV, I explore, together with my co-authors, if another type of childhood intervention altered the future wellbeing of children in low-income households. Paper IV analyses if formal childcare (ages 2-7) helped children escape disadvantaged circumstances during later-childhood and into early adulthood.

High-quality pre-schools can support young children's human capital development (Cunha & Heckman, 2007; Heckman, 2006). Studies have found attendance to high-quality pre-schools to have lasting beneficial effects on individuals' labour-market outcomes in early adulthood. The positive later-life effects are likely due to pre-schools forming non-cognitive skills which are beneficial in the labour market and society overall, such as motivation and conscientiousness (Bailey et al., 2017; Heckman et al., 2013).

The research on long-lasting effects from formal childcare is however quite limited to high-quality pre-school programs aimed at providing tailored education for children in low-income households and set in the last 50-60 years. There are fewer studies analysing socioeconomic effects over the life course from pre-school attendance at the start of the twentieth century, when pre-school programs were less developed, whether it is in Sweden or in other currently high-income countries, see

e.g. Ager and Malein (2024) and Rossin-Slater and Wüst (2020). This is of relevance because it reveals if less-invested pre-school institutions could change childhood disadvantageous circumstances and beneficially affect individuals in the long term.

In Paper IV, we study if pre-school attendance in early twentieth century Sweden impacted different measures of wellbeing in later life. At the time, pre-school attendance was rare, for instance less than 1% of children attended pre-school in the capital city Stockholm (Nyberg, 1995). Socioeconomic and demographic factors determined attendance and children in low-income families and/or with lone mothers were overrepresented (Ekstrand, 2000; Elwert & Quaranta, 2023). The aim of the studied pre-school was to provide children with improved circumstances during the day while parents were away from the home working. The pre-schools were often underfinanced and hosted many children (Ekstrand, 2000).

In Paper IV, we analyse whether attendance to pre-school in early twentieth century Sweden improved children's circumstances in the short and long term. We use individual-level longitudinal data from the SEDD to study birth cohorts 1914-29 living in Landskrona between ages two and seven. Because the SEDD is linked to individual-data on pre-school attendance at the start of the century, we can accurately identify which children ever attended pre-school and which ones did not in the analyses. None of the existing studies analysing effects from pre-school attendance historically use precise attendance information but utilise e.g. the opening of pre-schools near the home as an intent-to-treat measure of attendance.

Because pre-school attendance was selective and children from low-income household were more likely to attend than children from high-income households, regression analyses estimating the effect of pre-school attendance could be biased. Thus, we apply an instrumental variables (IV) approach and use the distance from each individual's home to the pre-school at age two as an instrument for attending pre-school, in addition to controlling for a rich set of observable individual and household characteristics.

We find that pre-school attendance increased the family income and lowered children's school absence in the short term. By early adulthood, attending individuals had higher occupational status. No significant differences in the effects are observed by sex. The long-term impact of pre-school is plausibly explained by parents' increased labour supply, which allowed them to increase consumption for their children, as well as the additional resources that the pre-school provided in terms of care, meals and clothing. We conclude that formal childcare at the start of the twentieth century helped children escape adversity in the early twentieth century Sweden.

Concluding discussion

Childhood circumstances improved in several ways in the first half of the twentieth century in Sweden. But although many families became increasingly better off in terms of living standards and health, inequalities in these factors also created large differences in living conditions within the country. Because childhood is an important period of development, in which both adversities and investments can affect individuals for life, this thesis explored to which extent circumstances in early-life affect individuals' wellbeing throughout life by analysing individuals born in 1903-37 in Southern Sweden. Individuals are followed for a period of over 100 years across the twentieth and into the twenty-first century.

The thesis's starting point is to explore how disadvantaged childhood circumstances relating to health and the socioeconomic status of the family affects individual wellbeing at later ages (see especially Paper I). Further, in three of the four studies (Papers II-IV), interventions, which sought to improve circumstances for low-income families, are studied to understand if long-term adversity could be broken.

All four studies in the thesis use high-quality individual, longitudinal data from the SEDD to identify childhood circumstances. Through pre-existing linkages to national databases, the SEDD also allows for follow-up analyses over time and independently of where in Sweden individuals live in adulthood (Papers I and III). The complete life course can hence be studied without limiting analyses to stayers in the study region. Further, the SEDD is linked to new individual data on pre-school attendance in the local area of study in the first three decades of the twentieth century. These data are used in Paper IV. As part of this thesis, the SEDD has also been linked to newly collected and digitised individual-level data on school performance, which is analysed in Papers II and IV. Hence, a rich set of data has enabled this thesis to address new research questions and contribute with new findings on long-term effects from specific childhood circumstances with increased precision and level of detail compared to existing historical studies.

In all four papers of the thesis, a quantitative approach is taken to answer the research questions. Through usage of state-of-the-art econometric methods (Papers II-IV) and the creation of a variable of interest which is exogenous to the individual (Paper I), all four studies have the intention of analysing causal effects from specific childhood circumstances and interventions. By doing so, the studies contribute to existing research on persistence of disadvantaged circumstances over the life course with estimations of underlying pathways and mechanisms. A diagram summarizing the findings of this thesis in relation to how the studied childhood circumstances and interventions affect later-life wellbeing is presented in Figure 5. The text that follows refer to the diagram.

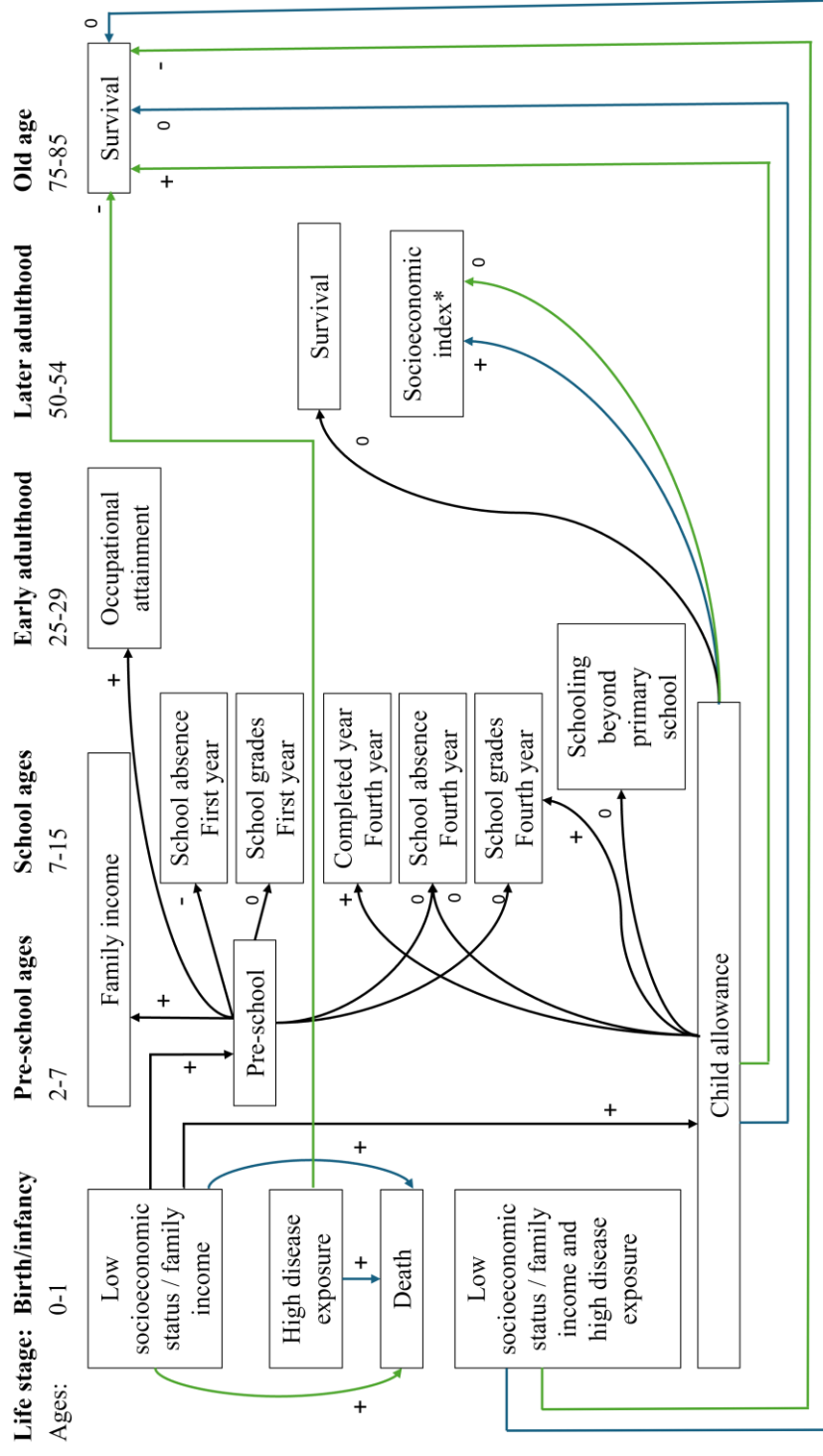


Figure 5. Life course effects from each of the studied childhood circumstances in the thesis.

Notes: Green arrows reflect women, blue men and black both sexes. Positive signs reflect a positive effect, negative signs reflect a negative effect and zeros no effect. Source: Author's own illustration based on the findings in the four papers.

Responding to the first research question – to which extent do disadvantaged circumstances in childhood affect later-life wellbeing and for whom – the four papers collectively show that being born into or growing up in disadvantaged circumstances can negatively affect wellbeing throughout life. By studying different early life circumstances, childhood ages and sub-groups in the population, it is apparent that disadvantage both in terms of health and economic circumstances have long-term adverse effects on survival, school performance, and socioeconomic outcomes.

In Paper I we show that being born into the most adverse circumstances, both in terms of low socioeconomic status and high disease exposure, has implications during the full life course. The combination of the two adversities increases women's, but not men's, mortality between ages 1-85 and creates a gap of 3.5 years in life expectancy between women from the most disadvantaged and most privileged circumstances. The magnitude of the life expectancy gap is comparable to over a decade of life expectancy gains for the full Swedish population in the first half of the twentieth century. As brought up in the summary of Paper I, this is a large gap and implies that mortality differences that exist in contemporary times between different socioeconomic groups have some origin in early life.

While the analyses in Papers II-IV put most emphasis on the impact of interventions, they also show descriptively that growing up in disadvantaged circumstances leads to worse school performance, socioeconomic outcomes in adulthood and survival to old age. Both sexes experience adverse influences from childhood disadvantage in school ages and into adulthood.

This leads to the second research question – whether interventions can break adversity over the life course – which is addressed in Papers II-IV. Collectively, the three studies find that by raising families' incomes, both through an unconditional cash transfer (child allowance to widow-headed households) and by providing free formal childcare so parents can work, long-term patterns of adversity can be broken. Additional income to low-income families enables parents to increase consumption in essential items important for children's development and which low-income families at the start of the twentieth century were lacking, such as nutritious food, clothing and adequate housing conditions. This expenditure is therefore a human capital investment in children.

The analysis in Paper II shows that the child allowance increased boys' and girls' school performance in terms of higher completion of the fourth school year and higher school grades. Completion rates went from being 10% lower than the control group before the child allowance was introduced, to being on par with the control group after. In absolute terms it means that almost all children in widow-headed households eligible for the child allowance completed the fourth school year. Further, children to widows had significantly lower school grades than other children, but the child allowance closed this gap by raising school grades 0.3

standard deviations. Because school grades differed by socioeconomic status of the household, such an increase is of similar magnitude as the difference in school grades between 1) children from lower skilled and white-collar worker households and 2) children from households with married parents and not married mothers (see Figure 2).

As shown in Paper IV, in addition to rising household incomes, children attending pre-school are also presented with additional care and health services, which would not have been provided had the children not attended pre-school. The influence of pre-school attendance on adulthood occupational attainment is an increase of over seven points on the HISCAM scale for men and women. This magnitude can be compared to the difference in HISCAM score between individuals from white-collar worker households and the mean of the population (see Figure 3). Increasing household incomes could further reduce stress levels in the family and improve household stability. These effects are challenging to detect with the existing data but are plausible mechanisms in the three studies.

While interventions analysed in all Papers II-IV increase household income, two important differences between the circumstances studied in Papers II and III (cash transfer to low-income widow-headed families) compared to Paper IV (formal childcare to low-income families) are that 1) children studied in Papers II and III were not necessarily born into poor circumstances and 2) the income increase observed in Paper IV comes from parents working, not only in pre-school ages but also in later childhood. On the first point, in most cases, paternal death occurred after infancy, while children attending pre-school were more likely to be born into disadvantaged circumstances. On the second point, there was less pressure for widowed mothers eligible for the child allowance to work than for the parents who had sent their children to pre-school. In fact, widows could not work too much, otherwise they would lose the allowance, but parents to pre-school children had to work to provide for the family.

With this in mind, the main effect that differs between the results of the pre-school and cash transfer studies – school grades – could be explained by either, or both, of the two points. First, school grades rose for children of widows following the introduction of the cash transfer, but school grades were unaffected for children attending pre-school. Cunha and Heckman (2007) state that human capital investments in later childhood have high returns if skill levels earlier in childhood also are high (“self-productivity”). Therefore, addressing the first point, the positive grade effect among children in widow-headed households could be explained by their early childhood circumstances, before the death of the father, being better. Second, children who had attended pre-school may have been more exposed to parental stress and absence because parents had more pressure to work, which in turn was reflected in their school grades. It can be assumed that the widowed mothers were more present in the household and could support children’s schooling. Further research is required to ascertain these speculative explanations.

In the context of the studies of this thesis, early twentieth century Sweden, few children attended more than six or seven years of primary school and entrance to secondary school was restricted. It is therefore particularly interesting that family income in childhood affected later-life wellbeing. The findings in this thesis suggest that human capital investments in childhood produced skills that were beneficial much later in life on the labour market independently of educational attainment. Most of the previous studies on unconditional cash transfers or formal childcare interventions in childhood throughout the twentieth century are set in a North American context where barriers to secondary schooling were lower. This thesis therefore makes a theoretical contribution to the existing research by finding that human capital investments in childhood can lead to later-life economic and labour market gains even without the influence of higher education.

The findings in this thesis contribute to the existing literature on intergenerational persistence of poverty by reducing sources of endogeneity and identifying that household income per se, and how it is consumed, is an essential explanatory factor to the persistence. Therefore, transmission of family welfare usage cannot explain poverty persistence in this setting.

By addressing the third research question – who is most affected by childhood interventions and why – all papers in this thesis analyse adversities and interventions which affect children at different ages. It is well-documented that adversities and interventions in very early life can have permanent long-term effects, but there is a knowledge gap in understanding how interventions in school ages pan out. This is important as schools are a common place for children where unequal circumstances could potentially be addressed efficiently. Additionally, and as discussed previously in this section, human capital theory argues that investments which only take place in early ages may not be sufficient to break adverse circumstances, but should be followed up with similar support throughout childhood (Cunha & Heckman, 2007).

This thesis therefore makes another theoretical contribution to the literature on childhood interventions by being able to analyse different types of interventions at different ages of childhood. The results indicate that providing cash transfers in school ages can be effective for both short- and long-term wellbeing (Papers II and III), and long-term socioeconomic gains are especially strong for children experiencing economic adversity in early childhood. In addition to the discussion on different types of interventions and their effects on school grades when addressing the second research question, it is plausible that either the pre-school services were not sufficient enough to increase children's later school performance or the benefits from pre-school faded out very quickly (Bailey et al., 2017; Bailey et al., 2020). Complementing with additional support or interventions in school ages may have resulted in school performance gains (see dynamic complementarities from Cunha & Heckman, 2007). Nonetheless, even in the setting we study, where formal childcare was much underinvested compared to many of the previously studied pre-school programs in the USA, formal childcare had positive effects on

occupational attainment in adulthood. The results suggest that attending children developed skills which were favoured in the labour market, as per the literature on skill formation (Bailey et al., 2017; Heckman et al., 2013).

Still addressing the third research question – who is most affected by childhood interventions and why – the analyses in all papers are conducted separately for men and women. The results in Papers II and IV, which analyse outcomes in childhood and early adulthood, suggest that outcomes from the interventions do not differ by sex. Yet, Paper III, which analyses outcome variables in later adulthood (ages 50-54) and until old age (age 75), reveal different patterns for men and women, which are likely not explained by differences in childhood investments or outcomes. Socioeconomic outcomes improve for men but not for women. Women's probability of reaching age 75 increases while men's is unaffected. For both men and women, the gains translate into closing the gap between the disadvantaged group and the control group in these outcome variables.

The sex-specific outcomes observed in the analysis of Paper III indicate that once individuals get married, health behaviours and norms on work and family responsibilities – which differ between men and women – determine their outcomes. As a consequence, equal investments from childhood matter less for women in terms of economic and men in terms of health outcomes, as later-life influences are stronger. That is however not to say that the childhood investments are in vain, but in the specific context studied in Paper III, such benefits cannot be observed. The study therefore provides indications of childhood circumstances interacting with the later-life context, potentially altering the effects.

In fact, in all studies in this thesis, additional archival and non-archival work is conducted to complement the quantitative analyses and to gain a richer understanding of the historical setting under study, which is essential for interpreting each study's results. This is of importance as the existing literature finds mixed results depending on the type of intervention that is introduced and in which setting (Almond et al., 2018; Duncan et al., 2017; Page, 2024). Economic historians can contribute to this gap in the intervention literature by studying context-specific circumstances in detail and connecting them to context-specific mechanisms and outcomes, which is what this thesis has aimed to do.

This thesis studies effects from childhood circumstances in early twentieth century Sweden and contributes to a research field dominated by North American studies set in the latter half of the twentieth century. Few studies analysing childhood circumstances and their later-life effects on wellbeing are set in the early twentieth century. This period is not only of historical interest, but it is also methodologically beneficial. At the time, there were few and often very modest economic benefits paid out to families facing economic difficulties. The risk of the estimated effects from the specific childhood circumstances in each study being influenced by other

welfare state initiatives is therefore reduced compared to if the study had been set in a later period.

To answer the research questions in this thesis, the main analyses in the papers of the thesis are quantitative. In all four papers, I have used data from the SEDD, a unique historical population database from a region in Southern Sweden. As discussed in the data chapter, the studies conducted in this thesis could not have been done without such detailed, longitudinal historical data. Despite the SEDD covering a limited geographical area in Southern Sweden, researchers have found the economic and demographic development of the study region to reflect urban and rural Sweden very well during the first half of the twentieth century. In each of the studies of this thesis I have further explored specific circumstances in Landskrona, which were particularly relevant to each study, and made comparisons to the same circumstances nationally. Given the similarities, I argue that the results in this thesis are generalisable to other settings in Sweden. Moreover, as discussed in the historical background section, several of the societal developments affecting children in Sweden were similar to other Western European countries at the start of the twentieth century. The results in this thesis could therefore even be generalisable to other countries, but more research is needed to ascertain to which extent this is the case.

In sum, the thesis has shown that in early twentieth century Sweden, both disadvantaged circumstances and interventions aimed to break those, affected individuals throughout life, albeit in different ways. The findings imply that economic and health circumstances which adult populations face today – and have faced in the past 50 to 70 years – in part originate in early life.

There are two main opportunities for future research to build on the results in this thesis and advance knowledge of how circumstances in early life affect wellbeing throughout the life course. The first opportunity is to go deeper into mechanisms and mediators. For instance, in relation to the findings of Paper I, further research is needed on understanding the role of adulthood socioeconomic status on mortality over the life course. Additionally, more work can be done to understand how childhood interventions affect economic outcomes before and after marriage for women and, with the right source material, also examine the role of reproductive health on longevity. Moreover, despite usage of rich data in all four studies, such data do not include suitable indicators of mental health or stress in families. Stress has been pointed as a key mechanism of poverty persistence (Duncan et al., 2017), and is a plausible explanation to the results of Papers II-IV. Yet, with appropriate data, future research can study its role in the transmission of disadvantaged circumstances better. The second opportunity relates to increasing the geographical scope of the studies. Studying similar questions by using other historical databases will provide further proof of this thesis's generalisability. This includes analysing the same interventions in other areas of Sweden and similar interventions in other countries.

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Growing up

The first years of life are a critical period of development, and circumstances during this period can affect individuals throughout life. But to what extent do disadvantaged circumstances in childhood affect individual wellbeing in later life and for whom? Can interventions in childhood break adversity over the life course? For whom are interventions most effective and why?

This thesis aims to investigate these questions by studying individuals growing up in the first half of the twentieth century in Sweden. Two types of disadvantaged childhood circumstances are considered: being born in times of disease outbreaks and growing up in a household with limited economic resources. Further, the effect of interventions aimed to improve childhood circumstances are analysed. First, the introduction of an unconditional cash transfer to widow-headed families, and second, the provision of formal childcare to low-income families.

The four studies included in this thesis utilise unique historical population data from a town in Southern Sweden and its rural surroundings between 1905-67. These data are linked to new historical sources with information on previously understudied circumstances and outcomes in childhood – pre-school attendance and school performance – as well as modern data which allows following individuals over time and into old age. State-of-the-art econometric methods of causal inference are applied in the analyses to disentangle the effect of each specific childhood circumstance from influences in the family and the surrounding environment.

This thesis finds that growing up in disadvantaged circumstances – being born in times of disease outbreaks and growing up in a household with limited economic resources – in the first half of the twentieth century had short- and long-term adverse effects on different measures of wellbeing, including school performance, socioeconomic outcomes and health. The results indicate that the negative effects persisted throughout the life course. Yet, providing additional economic resources and formal childcare to low-income families reduced adversities in the short-term, and broke long-term patterns of disadvantage. Household income in childhood emerges as an important mechanism. The four studies also show that heterogeneous effects by sex develop over the life course. The thesis's findings imply that economic and health circumstances experienced in adulthood partially have early-life origins.