Essays on Social Norms and Economic Change

Mcshane, Karl

2017

Document Version:
Publisher's PDF, also known as Version of record

Essays on Social Norms and Economic Change

Karl McShane

Lund
Economic
Studies
Number 204

LUND
UNIVERSITY

Essays on Social Norms and Economic Change

Essays on Social Norms and Economic Change

Karl McShane

LUND
UNIVERSITY

DOCTORAL DISSERTATION
by due permission of the School of Economics and Management, Lund University, Sweden.
To be defended at Holger Craaford Ekonomicentrum, EC3:210, Lund
on 24 May at 10.15.

Faculty opponent
Thráinn Eggertsson, University of Iceland and Hertie School of Governance

Organization LUND UNIVERSITY Department of Economics, P.O. Box 7082, S 220 07 Lund Sweden	Document name DOCTORAL DISSERTATION Date of issue 24 May 2017
Author: Karl McShane	Sponsoring organization

Title and subtitle: Essays on Social Norms and Economic Change

Abstract

This dissertation consists of three empirical essays concerning social norms and their effect on economic outcomes. Each essays discusses a seperate subject.

The first paper, *Breaking the Glass Ceiling: Gender Norms and Women Executives in the United States* studies social norms as a distal cause of differences between genders in corporate executive recruitment strategies. Using census-level panel data covering executive positions of large U.S. corporations, and matching regional data on gender norms, we explore whether gender norms are causally related with recruitment patterns at the executive floor. Controlling for legal institutions and quality of labor supply, we show that gender norms do indeed have a substantial and significant impact on executive recruitment patterns. The norms of both men and women have an effect, although the channels through which they operate differ: while the former operates mostly only in tandem with increasing education among women the latter has a strong direct effect. Further, we find that norms take about 15 years to materially affect recruitment decisions and that national level norms have a greater effect than regional norms.

The second essay, *Getting Used to Diversity? Immigration and Trust in Sweden*, studies the effect of historical diversity on modern diversity's effect on generalized trust using Swedish individual level trust data and historical diversity data reaching back over a century. The results show that present-day increases in diversity lowers social trust only in those regions who had high levels of diversity in the past. This effect is driven by non-Nordic immigration while immigrants from the other Nordic countries do not have any negative effect on trust. This results suggests that the historical experiences of diversity increases the saliency of group dividers based on region of birth, even over time.

The third and last essay, *The Effect of Business Incubators on Firm Size and Performance: The Case of ICT Firms in Southern Sweden*, uses data on ICT firms both with and without incubator experience in Malmö and Lund, two towns in the very south of Sweden. The results show that the incubators located in these town do not positively affect their incumbents' returns, employment, level of assets, or sales. In fact, while still located at the incubator, incubated firms have lower returns and sell less than comparable firms outside of the incubator. Previous results on the effects of incubation differ depending on the region studied suggesting that local context, including local entrepreneurial culture, is an important determinant of the effectiveness of business incubators.

Key words: Social norms, Gender norms, Executive recruitment, Generalized trust, Immigration, Business incubators, Entrepreneurship

Classification system and/or index terms: JEL codes: B52; J16; L25; M13; M51; Z13

Supplementary bibliographical information		Language English
ISSN and key title: 0460-0029 Lund Economic Studies, no. 204		ISBN: 978-91-7753-208-8 (print) 978-91-7753-209-5 (pdf)
Recipient's notes	Number of pages: 149	Price
	Security classification	

Essays on Social Norms and Economic Change

Karl McShane

LUND
UNIVERSITY

LUND ECONOMIC STUDIES NUMBER 204

Lund University School of Economics and Management
Department of Economics

ISBN 978-91-7753-208-8 (print)
ISBN 978-91-7753-209-5 (pdf)
ISSN 0460-0029 Lund Economic Studies, no. 204

Printed in Sweden by Media-Tryck, Lund University
Lund 2017

To Linnéa

Content

Acknowledgements

So, it turns out that doing a PhD requires work. Quite a lot of work, actually[1]. Who knew? My time spent putting this thesis together has therefore at times been tough, and the occasional crisis has occurred. At the same time, however, the PhD program has also been one of the most rewarding and fun experiences I have ever had. To a large extent, this is due to all the people that I have met, worked, and hung out with during my PhD studies. This is an (incomplete) list of those people.

First of all, this thesis would not have been completed without the support of my main supervisor, Sonja Opper. Sonja, it has been a privilege to be your PhD student. I was fortunate enough to have you as a supervisor already while writing my master thesis. In a subject often overly fascinated with never-changing preferences and market transactions it was incredibly inspiring to meet and get support from a professor who shared my interest in social norms and culture. You always made time for me and my questions, and both me and my work has benefited greatly from your many (many!) comments and suggestions. Thank you for your tireless support and also for motivating me to apply to the PhD program in the first place.

Likewise, my assistant supervisor Fredrik NG Andersson has been essential in making this thesis into what it is. Thank you for your constantly open door. Countless hours have been spent in both your office and mine discussing theory and econometrics but also talking about life in academia in general, debating politics and whether one's spare time is better spent reading novels or government reports (a point I think we still disagree on).

During my time as a PhD student I have also been lucky enough to work together with some of my best friends. First and foremost, my time has been spent with those that started their PhD studies the same year as me: Margaret, the finest room-mate and table tennis doubles partner one could ever ask for; Anna, whom has been a constant inspiration even since before we started the program together; Aron, who will always be the one I think of when I hear *Total Eclipse of the Heart*; Lina, who kept me constantly provided with Törley,

[1] Growing a beard is optional, but recommended. It helps you look as old and world-weary as you sometimes feel.

whether I deserved it or not; Mårten, who left the program too early; Simon, who gave me econometrics advice and occasionally corrected my Swedish; Viroy, whom we never regretted adopting into our year; and Yana, even though she did knock me out of the karaoke cup. There is something special about a group people who, their first semester spent together, find it reasonable to arrange a PhD Student Christmas Dinner at the highest ranked restaurant in the world. Together, we made sure that the social life for junior researchers at this department will never be the same again.

I would also like to thank my co-supervisees Kasia, Ross and Usman. Thank you for the tough love you provided (and received with good humor) during our research meetings! And thank you especially Kasia, for coming back and providing the same tough love during my final seminar.

Many other colleagues deserve thanks for having made my stay both an easier one and a more enjoyable one: John (for countless beers and possible even more movies), Hilda (for helping to finish off all that Törley), Claes (for discussions on micro and how to explain it to muggles), Moricz (for trying to introduce the use of surnames in everyday conversations (although it failed)). Furthermore, my thanks goes out to all the past and present PhD students during my stay here: Alemu, Albin, Anton, Anna, Björn, Caglar, Cecilia, Chelsea, Danial, Daniel, Dominice, Dominika (sorry for making you responsible for all the traditions we started!), Graeme, Jim, Jörgen (for always disagreeing, but always being fun), Gustav, Hassan, Hong, Lina Maria, Margareta, Elvira, Emanuel, Emma, Erik, Fredrik, Hampus (for your probably unhealthy level of enthusiasm for board games), Hassan, Hjördis, Ida, Jens, Jens, Josefin, Kristoffer, Laura, Milda, Mingfa, Osmis, Palina, Pol, Sanna, Sara, Sofie, Thomas E, Thomas H, Valeriia, Veronika (for the karaoke!), Victoria, Vinh, Yana Pe, and Åsa.

I would also like to thank the wonderful admin staff at the department: Azra, Jenny, Karin, Maria (#1337 Tjutet), Marie, Nathalie, Mariana and Mårten. Your help has been invaluable throughout the years and if I had a krona for every time I knocked on one of your doors asking for help I could have financed this PhD by myself. My gratitude also goes out to the rest of the faculty, including the three consecutive heads of department David, Fredrik and Jerker. I am also grateful for the support from the two heads of doctoral studies during my time here, Jerker (again) and Tommy. I would also like to thank Pontus for giving me the opportunity to teach and for trusting me to take responsibility for my own course. I would also like to thank Andreas and Therese for help and guidance and also the junior faculty for travelling all the way from Alpha to join in the activities arranged by the PhD students.

I would further like to thank the Marcus and Marianne Wallenberg Foundation for funding a year of my studies within the project "The Making of Knowledge-based Metropolitan Economies: IT Start-ups in International Comparison" (MMW 2013.0006). I would also like to thank the Institute for Economic Research at LUSEM for providing additional funds. The research in this thesis has benefited from comments from participants at the 50th anniversary conference of the Public Choice Society (2013), the 2nd World Interdisciplinary Network for Institutional Research Conference (2015), the Migration and the European Welfare State (2016), as well as seminars and workshops arranged at LUSEM by the Comparative Institutional Analysis group. I would also like to thank my co-authors for paper 1: Sonja Opper, Fredrik Andersson, and Victor Nee. Furthermore, I would like to thank the discussant at my public defense, Thráinn Eggertsson, as well as the members of my thesis committee for taking the time to read my thesis and to travel to Lund to give me comments.

During my studies I have also occasionally spent time outside of work. When things were tough it was at times nice to be reminded that not only did there exist a world outside of the university, but also that this world cared surprisingly little about my results. Many friends have, knowingly or not, helped out throughout the years. These include the members of FN and Malmö Indiekör, Mattis, the IB crowd, and many others. My family has provided me with love, support, and distraction over the years. Thank you Mom, Dad & Maria, Alma, Ellen & Staffan, and Erik, Eugenia & Luna.

This thesis is dedicated to Linnéa. You have helped me out more times than I can remember, both before and during my time as a PhD student. When work did not go well you supported me, when impostor syndrome struck you told me to stop being silly, and when things occasionally went great you celebrated with me. You are the best thing that ever happened to me and I do not know what I would do without you (and hopefully I will never have to find out).

Lund, April 2017

Karl

Introduction

Introduction

Students in introductory microeconomics, traditionally the first economics course a student encounters, are initially introduced to a strange world. It is the world of traditional neoclassical economics, where the behavior of people and firms can be summarized by simple equations where the only variables are the prices of inputs and outputs. Information is free, contracts are always upheld, and the optimal solution to any problem faced by an individual is easy to calculate. In this world, firms act only to maximize profits and individuals are typically seen only as rational consumers, buying as many goods as they can, given their budget. Interactions between individuals take place almost exclusively through markets without transaction costs. Should any suboptimal situation nevertheless arise, all-knowing and hyper-efficient governments can step in and correct the situation. Most students quickly realize that the world presented in these theories is not the world in which we live, but a gross simplification of it. The real world is complex. Information is imperfect and so are contracts, markets and governments. People interact in a myriad of ways, of which only a tiny share takes place on a market. In the real world, the actions of humans are hard to predict: History, laws, norms and networks all influence behavior, as well as each other.

Obviously, the fact that a class in introductory microeconomics might not contain all the knowledge needed to understand the world comes as no surprise to economists. After all, economists do live in the real world and have been doing so for quite some time. Economists, not the least neoclassical economists, have always worked to incorporate more and more of the complexities of real life into economic analysis, trying to integrate more of the drivers of human behavior into the discipline. Students who continue beyond the introductory course find a plethora of disciplines and subdisciplines within economics, each contributing in its own way to our understanding of human behavior. One strand within economics that has been very successful over the past decades is the school of New Institutional Economics (NIE). The NIE is focused on analyzing the effects and causes of institutions, "the humanly devised constraints that shape human interaction" (North, 1990, p. 3). This definition covers a

wide range of phenomena, both "informal constraints (sanctions, taboos, customs, traditions, and codes of conduct) and formal rules (constitutions, laws, property rights)" (North, 1991, p. 97). While such a wide definition of institutions manages to cover much of what is missed in introductory economics, it also makes it hard to get an overview of what economist mean when they refer to *institutions* and *institutional analysis*. To explain institutional economics' position within economics, and this thesis's position within institutional economics, it is useful to study Williamson's (2000) division of social analysis.

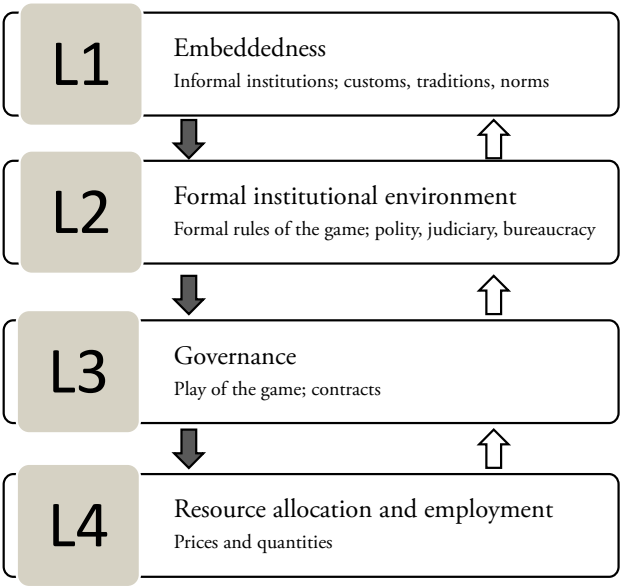

Figure 1. Four levels of Social Analysis (adapted from Williamson, 2000)

Williamson distinguished four levels of social analysis in a hierarchy, shown here in Figure 1. The first level consists of informal institutions like norms, beliefs and religion; rules that are unwritten and unofficial. Level 2 consists of formal institutions like laws and other written and official rules. Level 3 deals with *the play of the game*, how actors formally interact with each other given laws and rules, mostly in terms of governance and contracts. Lastly, the fourth level deals with the allocation of resources. This is the level analyzed by neoclassical economists. Each level is constrained by the levels above it (black arrows): Contracts constrain resource allocation; laws constrain the shape and

formulation of contracts; and norms and culture, in turn, shape laws. Similarly, lower levels can influence higher levels through feedback (white arrows).

The NIE has traditionally been focused on Levels 2 and 3 dealing with *getting the institutions right*, trying to find and implement the most beneficial formal institutions. Proper formal institutions and governance structures have been shown to be important, for instance, for financial markets and entrepreneurship (La Porta, Lopes-de-Silanez, Shleifer & Vishny, 1998; Stephen, Urbano & van Hemmen, 2005; Simón-Moya, Revuelto-Taboada & Fernández Guerrero, 2014), trade (Levchenko, 2007) and, perhaps most famously, economic development (North & Thomas, 1970; Acemoglu, Johnson & Robinson, 2001; Knack & Keefer, 1995; Rodrik, Subramanian & Trebbi, 2004).

In contrast, this thesis focuses on the informal institutions of Level 1, particularly social norms. While this level has traditionally received extensive attention from sociologists and other social scientists, economists often take informal institutions such as social norms as given (Williamson, 2000). However, as discussed in this thesis, not only can norms change fairly rapidly, but they can also have a decisive effect on economic outcomes, including economic development (Greif, 1994; La Porta, Lopes-de-Silanez, Shleifer, & Vishny, 1997), tax compliance (Posner, 2000) and the management of common resources (Ostrom, 1990). Therefore, norms' nature and effect require further study. The next section of this introduction introduces social norms, elaborates on some examples of their effects relevant to this thesis, and discusses norms' lifespan. Section 2 then previews the three remaining chapters of this thesis.

1. Social norms

Like all institutions, social norms are rules that constrain human behavior (North, 1990). They are informal institutions that "specify what actions are regarded by a set of persons as proper or correct, or improper or incorrect" (Coleman, 1990, p. 242). Unlike laws and other formal institutions, which are upheld by official third-party enforcement, like the police or military, social norms are unwritten and are upheld by informal sanctions. Such sanctions come from three sources: from people directly affected by a norm transgression, from people acting to uphold the norm even though they are not personally affected, and from within the person committing the transgression, as people often internalize norms and are reluctant to contravene them (Eggertsson, 2001).

When people are seen as not adhering to a norm, they are punished through negative gossip, ostracization, or, in extreme cases, violence (Ellickson, 1986). Social norms can be very influential, and their effects and causes have received increasing attention from economists.

1.1 The effects of social norms

The constraints placed on people by norms can have a direct effect as people avoid certain behaviors to not risk social sanctions from their peers. Such behavioral control is powerful and norms can control behavior through this channel even if formal rules are in place (Macaulay, 1963; Bernstein, 1992). Social norms can also have an indirect effect by constraining and shaping formal institutions like laws and contracts (Axelrod, 1986). Without the support of social norms, such formal institutions become inefficient as the cost of enforcement increases (North, 1993). The number of norms in any society is vast, and this introduction can only give some examples of how different norms can affect economic outcomes. Therefore, the examples discussed here focus on areas relevant to the later chapters of this thesis: social gender norms, norms of trust and norms and cultures concerning entrepreneurship.

Social gender norms, the focus of Chapter 1, are those norms that concern what roles men and women are expected to fill. According to traditional gender roles, men are expected to act forcefully and actively and women are supposed to be caring and nurturing (Eagly, 1987). Because of these norms, women working in the corporate sector tend to be put in such staff positions as public relations and human resources instead of operations or marketing (Oakley, 2000). Women who display traditionally male characteristics, often just what company boards look for in an executive, receive less favorable attention than their male peers displaying those same characteristics (Eagly & Karau, 2002). This creates additional obstacles for women striving to reach executive positions as compared to men doing the same.

Chapter 2 focuses on trust. Norms concerning whether or not to trust others have an effect on economic and political outcomes (Uslaner, 2002). In a society with high levels of such social trust, the belief that people in general can be trusted, it is not necessary to spend much time on writing contracts covering every possible scenario of a future transaction, and fewer resources must be spent on monitoring and litigation (Knack & Keefer, 1997). Several studies have found that social trust is correlated to high levels of economic development (Algan & Cahuc, 2010; Tabellini, 2010) and political efficiency (La Porta et al.,

1997). High levels of trust are also negatively correlated with crime rates (Uslaner, 2012).

The last example covers the effects of norms and culture regarding entrepreneurship, which is part of the story in Chapter 3. Countries and communities with cultures that promote individual achievement and long-run investments have higher levels of entrepreneurship (Stephan & Uhlaner, 2010; Hopp & Stephan, 2012). Such regions have more entrepreneurs partly because they are simply more likely to have more individual members who are entrepreneurial, but also because entrepreneurs in such regions will face less informal opposition from their peers if they choose to start a firm (Davidsson, 1995). Furthermore, entrepreneurs also act differently depending on the culture in which they act. For instance, countries with more feminine cultures, where the norm is to cooperate rather than compete and to compromise rather than argue, small and medium-size firms are more likely to form technological alliances than in more masculine countries (Steensma, Marino, Weaver & Dickson, 2000).

Due to their pervasive nature, norms affect and constrain all actions taken by economic actors (Williamson, 2000). Although the examples listed here are but a few illustrations of the power of norms, they demonstrate how social norms can have very real effects on economic outcomes.

1.2 The durability of norms

Formal institutions, such as laws, can change quickly and repeatedly, but their origin, modification and termination must be accompanied by a formal decision such as a royal decree, a parliamentary decision, or a signed agreement. Changes in social norms are not accompanied by such decisions; because of this, the durability of individual norms is up for debate. Williamson (2000) considered informal institutions such as social norms to change only very slowly, over the time span of centuries and millennia. Norms certainly can last across centuries as parents instill their own norms and values in their children while other people in their vicinity at the same time socialize the children to conform to the current norms (Bisin & Verdier, 2001; Bisin, Topa & Verdier, 2004). As people punish those who defect from a norm, these channels can be very efficient. Norms can survive for long periods, even in the context of opposing formal institutions as formal enforcement becomes ineffective if laws and rules are incongruent with local norms (Eggertsson, 1998, 2001).

The longevity of norms is why many social scientists have considered this level of social analysis as fixed in their studies, instead focusing on more malleable institutions (Williamson, 2000). However, while some social norms undoubtedly have a long life, others change over relatively short timescales, even within generations. Norms can change spontaneously, evolving by random mutation or conscious individual changes (Axelrod, 1986). Norms can also change due to external shocks. An example of this can be found in the literature on trust and ethnic diversity: Social trust tends to decrease as the level of ethnic diversity in one's current surrounding increases (Knack & Keefer, 1997; Zak & Knack, 2001). As society becomes more heterogeneous, the norm that one should trust strangers breaks down (Putnam, 2007).

As norms change, spontaneously or due to external forces, these altered norms are transferred across generations through the same channels as the previous norms. Social norms are thus affected not only by the experiences of the present generation, but also those of past generations (Nunn & Wantchekon, 2011). The norms of today are thus an amalgam of past generations' norms as well as their and the present generation's experiences (Guiso, Sapienza & Zingales, 2008). Which type of external influence, and which time period, has the most impact on present-day norms is an empirical question.

2. Overview of the thesis

This thesis consists of three studies, all of which rely on empirical data and regression analysis to support their conclusions. The first two explicitly discuss two sets of norms while the third studies a public intervention aiming to help entrepreneurs in a specific region. The first paper, presented in Chapter 1, discusses the effects of gender norms on labor-market outcomes among executive positions in corporate America. The second paper, presented in Chapter 2, studies the effects of increasing ethnic diversity on social trust in Sweden and how this effect is, in turn, affected by past experiences of diversity. The third paper, presented in the closing chapter of the thesis, discusses the business incubation (BI) industry and specifically studies the effects of two BIs on their graduate firms' size and performance. While the services offered by BIs are similar around the world (Hansen, Chesbrough, Nohria & Sull, 2000), local culture and norms affect how firms act and, therefore, also plausibly what assistance they require from BIs (Stinchcombe, 1965; Steensma et al., 2000). This motivates the study of BIs in new regional contexts.

2.1 Chapter 1: Breaking the Glass Ceiling: Gender Norms and Women Executives in the United States.

Coauthored with Fredrik Andersson, Victor Nee and Sonja Opper

Chapter 1 contributes to the literature on the effects of informal institutions by empirically studying the relationship between gender norms and women's progress on the labor market. Despite great increases in women's labor market presence in recent years, women are still starkly underrepresented among executives in major firms in the United States. Even though the majority of business and finance-related college programs in the United States were already close to achieving gender equality in the early 1990s (Goldin & Katz, 2000; Goldin, 2006, 2014), this highest echelon of the labor market still seems to be barred by a *glass ceiling* that has only recently begun to crack. This chapter studies how shifting societal norms can explain both the recent increase in women executives and the continued dominance of men at the top of American firms.

Traditional gender norms can decrease the number of women in executive positions by decreasing both the supply and demand for women at this level of the labor market. To avoid the social penalization of acting counter to the norm—either through gossip, open accusation or outright discrimination—well-educated, married women with young children allocate their time between family needs and career differently from how their male colleagues do, leading to a widely noted gender gap in career interruptions (Haveman & Beresford, 2012). On the demand side, corporate directors commonly prefer to hire executives who pursue their careers uninterruptedly and who display strong agentic traits (e.g., assertive, competitive and independent; Eagly & Karau, 2002). These conventional preferences almost invariably favor men, while women—stereotyped as social, kind and supportive—are instead seen as best qualified for social, welfare and service-oriented professions.

To test the hypothesized causal link between social gender norms and the number of women executives, this study uses DDB Life Style Study survey data from the years 1975–1998 (DDB Worldwide Chicago, n.d.). The norm measure is based on the average response to what extent the respondent agrees with the statement, "[a] woman's place is in the home." Data on the average number of women executives per firm in each of the nine U.S. Census divisions during 1992–2012 come from Standard and Poor's (2013) *ExecuComp* dataset, which records the top executives among major firms listed on the NASDAQ Stock Market and the New York Stock Exchange.

The results show that norms have a substantial and significant impact on executive recruitment patterns, even when controlling for differences in legal access to contraceptives and differences in female educational attainment across regions. Changes in norms take approximately 15 years to materially affect the number of women in top positions. The increase of women executives is driven by changes in norms at the national level rather than regional deviations from this trend.

The findings in this chapter hold lessons for policymakers targeting labor-market equality. Even though antidiscrimination laws as well as improved educational access are effective in improving the opportunities provided to women, traditional gender norms are still an obstacle whenever recruitment decisions hinge on personal assessments. As norms are partly shaped by past experiences, they are not easily changed by policies. The long timespan found here between changes in norms and effects implies that the full effect of even successful policies would take more than a decade to materialize. Future research will have to determine what policies would be the most helpful in breaking the glass ceiling.

2.2 Chapter 2: Getting Used to Diversity? Immigration and Trust in Sweden.

The second chapter in this thesis is a contribution to the diversity and trust literature. Heterogeneity in terms of ethnic, linguistic, or national background is one of the most researched causes of low levels of trust (see, e.g., Knack & Keefer, 1997; Zak & Knack, 2001; Alesina & La Ferrara, 2002; Putnam, 2007). The papers in this literature in general, but not always, find a negative correlation between diversity and trust: A more mixed a population is less likely to have high levels of trust.

This chapter contributes to the literature by studying how the historic level of diversity in the region studied affects the relationship between present-day diversity and generalized trust. As norms are transferred from parent to child (Bisin & Verdier, 2001; Bisin et al., 2004), the experiences of previous generations are likely to affect what norms are transferred to the present generation. Therefore, past experiences can have long-lasting effects in a society. However, in this case, it is not obvious if regions with past experiences of diversity are more or less likely to be negatively affected by changes in present-day diversity. Putnam (2007) argues that past experiences of contact across

different groups will decrease the negative effect of present-day diversity by, over time, making the population disregard such group dividers as religion. On the other hand, group dividers can also become more salient over time if groups are in conflict with one another or were so in the past (Blumer, 1958).

To test what effect past experiences of heterogeneity have on how people react to recent changes in heterogeneity, the effect of present-day diversity on trust during the period 1998–2013 is compared across two groups of regions in Sweden: one group with low levels of past diversity and one group with high levels of past diversity. Modern diversity is measured as the recent increase in the share of the municipal population born abroad, as the levels of diversity do not have a statistically significant effect. The results show clear and consistent support for the hypothesis that past experiences increase the negative effect of present-day diversity. The effect is driven by non-Nordic immigration while immigration from Nordic countries has no effect. This effect is visible for splits of the samples based on historic diversity going as far back as 1900.

The results presented in this chapter have important policy implications. First, as a region's history of diversity has an effect on how present-day diversity affects trust, the immigration authorities should take this into account when locating refugees. Second, because increases in, but not levels of, diversity seem to affect trust, authorities should strive to equalize the former rather than the latter across municipalities to minimize the negative effect of, for instance, refugee immigration on trust. This appears not to be the case today (Swedish Migration Agency, 2016).

2.3 Chapter 3: The Effect of Business incubators on Firm Size and Performance: The Case of ICT Firms in Southern Sweden.

The final chapter deals with entrepreneurship and how public actors try to help fledgling firms grow and develop. BIs have become common tools around the world (Hansen et al., 2000). They offer new firms subsidized office space, shared amenities and business coaching. They also help incumbent entrepreneurs increase their networks (Aernoudt, 2004; Bøllingtoft & Ulhøi, 2005; Tötterman & Sten, 2005; McAdam & McAdam, 2008). Despite their widespread use, the effectiveness of BIs is still debated. Some empirical research finds that incubation increases a firm's employment and sales compared to similar firms (Colombo & Delmastro, 2002; Amezcua, 2010; Lasrado, Sivo, Ford, O'Neal & Garibay, 2015), others find that incubated firms do not outperform

unincubated firms (Allen & Bazan, 1990; Westhead & Storey, 1994; Chen, 2009).

The chapter contributes to the literature by studying business incubators in a new region, the two neighboring cities of Malmö and Lund in the very south of Sweden. The Malmö–Lund region has an up-and-coming cluster of information and communications technology (ICT) start-ups. Even in the already tech-heavy Swedish economy, the region stands out: One out every 20 employed persons in the region is working in the ICT sector (Statistics Sweden, 2015). However, despite a large pool of firms, few firms have succeeded dramatically, even among those that survive for several years (Statistics Sweden, 2010).

While BIs' services are similar across the world (Hansen et al., 2000), the needs of start-ups differ depending on local context (Stinchcombe, 1965). The success of economic policy requires a match between the policy and local informal institutions (Eggertsson, 1997). Local norms and culture affects both the propensity to become an entrepreneur and how entrepreneurs act (Steensma et al., 2000; Hayton, George & Zahra, 2002; Hofstede Noorderhaven, Thurik, Uhlaner, Wennekers & Wildeman, 2004; Stephan & Uhlaner, 2010; Hopp & Stephan, 2012), and thus plausibly which assistance they might most require. Such differences in cultural embedding exist even within Sweden (Davidsson, 1995). The effects of BIs could therefore differ from one local cultural context to another.

The chapter uses a dataset constructed from the universe of all ICT firms started in the region between 2005 and 2013. ICT firms that were located on local BIs were identified and local entrepreneurs and actors in the local BI network were interviewed. The results show that incubated firms do not significantly outperform similar but unincubated firms in terms of employment, sales, assets or returns. The entrepreneurs interviewed, both with and without experiences from incubation, also expressed skepticism about the project.

Considering that BIs put their incumbents through a vetting process to pick out the firms most likely to benefit from the services, this is a worrisome result for proponents of BIs in the region. These results should lead to some introspection among local politicians and officials concerning how to best support entrepreneurs and the local economy.

References

Acemoglu, D., Johnson, S., & Robinson, J.A. (2001). The Colonial Origins of Comparative Development: An Empirical Investigation. *The American Economic Review,* vol. 91, no. 5, pp. 1369–1401.

Aernoudt, R. (2004). Incubators: Tool for Entrepreneurship? *Small Business Economics,* vol. 23, pp. 127–135.

Alesina, A., & La Ferrara, E. (2002). Who Trusts Other? *Journal of Public Economics,* vol. 85, pp. 207–234.

Algan, Y., & Cahuc, P. (2010). Inherited Trust and Growth. *American Economic Review,* vol. 100, pp. 2060–2092.

Allen, D., & Bazan, E. (1990). *Value Added Contributions of Pennsylvania's Business Incubators to Tenant Firms and Local Economies.* Appalachian Regional Commission and Pennsylvania Department of Commerce.

Amezcua, A.S. (2010). *Boon or Boondoggle? Business Incubation as Entrepreneurship Policy.* Whitman School of Management, Syracuse University.

Axelrod, R. (1986). An Evolutionary Approach to Norms. *American Political Science Review,* vol. 80, no. 4, pp. 1095–1111.

Bernstein, L. (1992). Opting Out of the Legal System: Extralegal Contractual Relations in the Diamond Industry. *Journal of Legal Studies,* vol. 21, no. 1, pp. 115–157.

Bisin, A., Topa, G., & Verdier, T. (2004). Cooperation as a Transmitted Cultural Trait. *Rationality and Society,* vol. 16, no. 4, pp. 477–507.

Bisin, A., & Verdier, T. (2001). The Economics of Cultural Transmission and the Dynamics of Preferences. *Journal of Economic Theory,* vol. 97, pp. 298–319.

Blumer, H. (1958). Race Prejudice as a Sense of Group Position. *Pacific Sociological Review,* vol. 1, no. 1, pp. 3–7.

Bøllingtoft, A., & Ulhøi, J.P. (2005). The Networked Business Incubator-Leveraging Entrepreneurial Agency? *Journal of Business Venturing,* vol. 20, no. 2, pp. 265–290.

Chen, C. (2009). Technology Commercialization, Incubator and Venture Capital, and New Venture Performance. *Journal of Business Research,* vol. 62, pp. 90–103.

Coleman, J.S. (1990). *Foundations of Social Theory.* Cambridge, Massachusetts: Belknap Press.

Colombo, M.G., & Delmastro, M. (2002). How Effective Are Technology Incubators? Evidence from Italy. *Research Policy,* vol. 31, pp. 1103–1122.

Davidsson, P. (1995). Culture, Structure and Regional Levels of Entrepreneurship. *Entrepreneurship and Regional Development,* vol. 7, no. 1, pp. 41–62.

DDB Worldwide Chicago. (n.d.). The DDB Life Style Study. Available online: http://bowlingalone.com/?page_id=7. [Accessed 13 September 2013].

Eagly, A.H. (1987). *Sex Differences in Social Behavior: A Social Role Interpretation.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Eagly, A.H., & Karau, S.J. (2002). Role Congruity Theory of Prejudice Toward Female Leaders. *Psychological Review,* vol. 109, no. 3, pp. 573–598.

Eggertsson, T. (1997). The Old Theory of Economic Policy and the New Institutionalism. *World Development,* vol. 25, no. 8, pp. 1187–1203.

Eggertsson, T. (1998). Sources of Risk, Institutions for Survival, and a Game against Nature in Premodern Iceland. *Explorations in Economic History,* vol. 35, pp. 1–30.

Eggertsson, T. (2001). Norms in Economics, with Special Reference to Economic Development. In M. Hechter and K.-D. Opp (eds.) *Social Norms,* pp. 76–104. New York, NY: Russell Sage Foundation.

Ellickson, R.C. (1986). Of Coase and Cattle: Dispute Resolution among Neighbors in Shasta County. *Stanford Law Review,* vol. 38, no. 3, pp. 623–387.

Goldin, C. (2006). The Quiet Revolution that Transformed Women's Employment, Education, and Family. *American Economic Review,* vol. 96, no. 2, pp. 1–21.

Goldin, C. (2014). A Grand Gender Convergence: Its Last Chapter. *American Economic Review,* vol. 104, no. 4, pp. 1091–1119.

Goldin, C., & Katz, L.F. (2000). Career and Marriage in the Age of the Pill. *American Economic Review: Papers and Proceedings,* vol. 90, no. 2, pp. 461–465.

Greif, A. (1994). Cultural Beliefs and the Organization of Society: A Historical and Theoretical Reflection of Collectivist and Individualist Societies. *Journal of Political Economy,* vol. 102, pp. 912–950.

Guiso, L., Sapienza, P., & Zingales, L. (2008). Alfred Marshall Lecture: Social Capital as Good Culture. *Journal of the European Economic Association,* vol. 6, no. 2–3, pp. 295–320.

Hansen, M.T., Chesbrough, H.W., Nohria, N., & Sull, D.N. (2000). Networked Incubators—Hothouses of the New Economy. *Harvard Business Review,* vol. 78, no. 5, pp. 74–84.

Haveman, H.A., & Beresford, L.S. (2012). If You're so Smart, Why Aren't You the Boss? Explaining the Persistent Vertical Gender Gap in Management. *Annals of the American Academy of Political and Social Science,* vol. 639, no. 1, pp. 114–130.

Hayton, J.C, George, G., & Zahra, S.A. (2002). National Culture and Entrepreneurship: A Review of Behavioral Research. *Entrepreneurship Theory and Practice,* vol. 26, no. 4, pp. 33–52.

Hofstede, G., Noorderhaven, N.G., Thurik, A.R., Uhlaner, L.M., Wennekers, A.R.M., & Wildeman, R.E. (2004). Culture's Role in Entrepreneurship: Self-Employment Out of Dissatisfaction. In T. Brown and J. Ulijn (eds.) *Innovation, Entrepreneurship and Culture: The Interaction between Technology, Progress and Economic Growth,* pp. 162–203. Cheltenham, UK: Edward Elgar.

Hopp, C., & Stephan, U. (2012). The Influence of Socio-cultural Environments on the Performance of Nascent Entrepreneurs: Community Culture, Motivation, Self-Efficacy and Start-Up Success. *Entrepreneurship and Regional Development,* vol. 24, no. 9–10, pp. 917–945.

Knack, S., & Keefer, P. (1995). Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures. *Economics and Politics,* vol. 7, no. 3, pp. 207–227.

Knack, S., & Keefer, P. (1997). Does Social Capital Have an Economic Payoff? A Cross-Country Investigation. *Quarterly Journal of Economics,* vol. 112, no. 4, pp. 1251–1288.

La Porta, R., Lopes-de-Silanez, F., Shleifer, A., & Vishny, R.W. (1997). Trust in Large Organizations. *American Economic Review Papers and Proceedings,* vol. 87, no. 2, pp. 333–338.

La Porta, R., Lopes-de-Silanez, F., Shleifer, A., & Vishny, R.W. (1998). Law and Finance. *Journal of Political Economy,* vol. 106, no. 6, pp. 1113–1155.

Lasrado, V., Sivo, S., Ford, C., O'Neal, T., & Garibay, I. (2015). Do Graduated University Incubator Firms Benefit from Their Relationship with University Incubators? *Journal of Technology Transfer,* vol. 41, no. 2, pp. 205–219.

Levchenko, A.A. (2007). Institutional Quality and International Trade. *Review of Economic Studies,* vol. 74, pp. 791–819.

Macaulay, S. (1963). Non-contractual Relations in Business: A Preliminary Study. *American Sociological Review,* vol. 28, no. 1, pp. 55–67.

McAdam, M., & McAdam, R. (2008). High Tech Start-Ups in University Science Park Incubators: The Relationship between the Start-Up's Lifecycle Progression and Use of the Incubator's Resources. *Technovation,* vol. 28, pp. 277–290.

North, D.C. (1990). *Institutions, Institutional Change and Economic Performance.* Cambridge, UK: Cambridge University Press.

North, D.C. (1991). Institutions. *Journal of Economic Perspectives,* vol. 5, no. 1, pp. 97–112.

North, D.C. (1993). Institutions and Credible Commitment. *Journal of Institutional and Theoretical Economics,* vol. 149, no. 1, pp. 11–23.

North, D.C., & Thomas, R.P. (1970). An Economic Theory of the Growth of the Western World. *The Economic History Review,* vol. 23, no. 1, pp. 1–17.

Nunn, N., & Wantchekon, L. (2011). The Slave Trade and the Origins of Mistrust in Africa. *American Economic Review,* vol. 101, pp. 3221–3252.

Oakley, J.G. (2000). Gender-Based Barriers to Senior Management Positions: Understanding the Scarcity of Female CEOs. *Journal of Business Ethics,* vol. 27, pp. 321–334.

Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action.* Cambridge, UK: Cambridge University Press.

Posner, E.A. (2000). Law and Social Norms: The Case of Tax Compliance. *Virginia Law Review,* vol. 86, no. 8, pp. 1781–1819.

Putnam, R.D. (2007). *E Pluribus Unum:* Diversity and Community in the Twenty-First Century—The 2006 Johan Skytte Prize Lecture. *Nordic Political Science Association,* vol. 30, no. 2, pp. 137–174.

Rodrik, D., Subramanian, A., & Trebbi, F. (2004). Institutions Rule: The Primacy of Institutions over Geography and Integration in Economic Development. *Journal of Economic Growth,* vol. 9, pp. 131–165.

Simón-Moya, V., Revuelto-Taboada, L., & Fernández Guerrero, R. (2014). Institutional and Economic Drivers of Entrepreneurship: An International Perspective. *Journal of Business Research,* vol. 67, pp. 715–721.

Standard and Poor. (2013). ExecuComp. August, 2013.

Statistics Sweden. (2010). *De Små och Medelstora Företagens Ekonomi 2008.* Statistiska meddelanden. NV 19 SM 1004.

Statistics Sweden. (2015). Employed Population 16–64 Years by Region of Work (SSYK3). Available online: http://www.statistikdatabasen.scb.se/pxweb/en/ssd/?rxid=9fd6f336-40e7-411e-88e5-1382088bd530. [Accessed 7 March 2015].

Steensma, H.K., Marino, L., Weaver, K.M., & Dickson, P.H. (2000). The Influence of National Culture on the Formation of Technology Alliances by Entrepreneurial Firms. *The Academy of Management Journal,* vol. 43, no. 5, pp. 951–973.

Stephan, U., & Uhlaner, L.M. (2010). Performance Based vs. Socially Supportive Culture: A Cross-National Study of Descriptive Norms an Entrepreneurship. *Journal of International Business Studies,* vol. 83, pp. 717–38.

Stephen, F.H., Urbano, D., & van Hemmen, S. (2005). The Impact of Institutions on Entrepreneurial Activity. *Managerial and Decision Economics,* vol. 26, pp. 413–419.

Stinchcombe, A.L. (1965). Social Structure and Organizations. In J.G. March (ed.) *Handbook of Organizations,* pp. 142–194. Chicago, IL: Rand McNally.

Swedish Migration Agency. (2016). *Kommuner—Mottagna och Anvisade 2016-11-01.* Available online: http://www.migrationsverket.se/Om-Migrationsverket/Statistik/Aktuell-statistik.html. [Accessed 20 December 2016].

Tabellini, G. (2010). Culture and Institutions: Economic Development in the Regions of Europe. *Journal of the European Economic Association,* vol. 8, no. 4, pp. 677–716.

Tötterman, H., & Sten, J. (2005). Business Incubation and Social Capital. *International Small Business Journal,* vol. 23, no. 5, pp. 487–511.

Uslaner, E.M. (2002). *The Moral Foundations of Trust.* New York, NY: Cambridge University Press.

Uslaner, E.M. (2012). *Segregation and Mistrust—Diversity, Isolation, and Social Cohesion.* New York, NY: Cambridge University Press.

Westhead, P., & Storey, D.J. (1994). *An Assessment of Firms Located on and off Science Parks in the UK.* London, UK: HMSO.

Williamson, O. (2000). The New Institutional Economics: Taking Stock, Looking Ahead. *Journal of Economic Literature,* vol. 38, no. 3, pp. 595–613.

Zak, P.J., & Knack, S. (2001). Trust and Growth. *The Economic Journal,* vol. 111, pp. 295–32.

Chapter 1

Chapter 1
Breaking the Glass Ceiling: Gender Norms and Women Executives in the United States

Coauthored with Fredrik NG Andersson, Victor Nee and Sonja Opper

1. Gender norms and women executives

A revolution in labor-force participation for women, beginning in the 1970s following a long period of evolutionary change, has paved the way for transformative shifts in women's expectations and beliefs, and in labor market gains attained by women in all sectors of the economy (Goldin, 2006). Widespread availability of birth control pills, abortion rights and antidiscrimination laws contributed to societal changes accompanying women's expanded horizons, altered identities and occupational gains (Goldin & Katz, 2002; Goldin, 2014). Convergence in the societal roles of men and women is evident in young women's expectations regarding lifetime employment, the later age of first marriage, the large numbers of women who maintain both career and family, and the narrowing of the gender wage gap as human capital capabilities of men and women have equalized and women have advanced steadily into professions and occupations at the high-end of the labor market (Goldin, 2014; Bertrand, Goldin & Katz, 2010). Despite the remarkable pace of labor-market advances in this revolution, however, a glass ceiling continues to constrain women's rise to the highest executive and corporate board positions of large American corporations (Morrison & Glinow, 1990; Bertrand & Hallock, 2001; Arfken, Bellar & Helms, 2004).

A glass ceiling is in effect when not only is it more difficult for women to be selected into the highest executive positions, but women also face increasing barriers as they move up the corporate hierarchy of authority. In the 1990s, women made slow but significant advances onto the boards of directors of America's largest companies when the number of Fortune 500 companies with no women as board members declined sharply from 155 to 67 (Catalyst, n.d.). Yet, closer analysis of recruitment patterns suggests continuing discrimination, albeit less so in smaller corporations (Bertrand & Hallock, 2001). Generally, the likelihood of a firm adding a woman to its board is still negatively affected by the number of women already on the board (Farrell & Hesch, 2005). Similarly, women are more likely to enter relatively large boards, where a woman's voice in corporate decision making weighs relatively less (Agrawal & Knoeber, 2001; Carter, Simkins & Simpson, 2003). For top executive positions, progress is even slower. By 2011, only 29% of the S&P 500 firms employed a woman in at least one such position; only 7% of the S&P 500 firms employed two or more women at this top executive level (Standard and Poor's, 2013).

Why is it that women in greater numbers have not been able to penetrate the glass ceiling of executive leadership? Why does this gender discrepancy continue in these top-level positions, even though gender equality was almost accomplished already in the early 1990s in the majority of business- and finance-related college programs in the United States (Goldin & Katz, 2000; Goldin, 2006, 2014)? This question has inspired considerable research identifying a variety of proximate causes. These include gender differences in the type and structure of social networks (Lalanne & Seabright, 2016), variation in career interruptions to attend to family needs and child raising (Bertrand et al., 2010; Correll, Benard & Paik, 2007), gender differences in employment preferences (Goldin, 2014; Ragins, Townsend & Mattis, 1998) and, finally, different preferences for competition (Niederle & Vesterlund, 2007; Reuben, Sapienza & Zingales, 2015; Buser, Niederle & Oosterbreek, 2014) and performance in competitive environments (Gneezy & Rustichini, 2003; Mendelberg, 2016; Gneezy, Niederle & Rustichini, 2003). But what are the deeper causes of these differences? Why do they persist in these times of effective antidiscrimination laws and in light of the closed gap in educational attainments?

This study shifts attention to the role of gender norms and related social beliefs as a distal cause explaining slow progress toward gender equality at the executive level. The idea that such norms and beliefs influence women's career choices and prospects as a deeper underlying schema is not new. Gender norms—socially transferred by parents, teachers and peers—shape behavioral preferences from

early childhood on through the school years and continue to influence expectations throughout the adult working life. Traditional gender roles, commonly associated with the working husband striving for career success as the bread earner and the wife who devotes a majority of her time to her household and family, thereby have a long shelf life (Eagly, 1987). Nonetheless, gender norms obviously do evolve, and sometimes dramatically, as has been the case in recent decades (Donnelly, Twenge, Clark, Shaikh, Beiler-May & Carter, 2016). Gender norms, changing and unchanging, may thus underlie both social progress and the slow pace (or lack) of progress toward gender equality. It has been widely acknowledged that social beliefs redefining the legitimate interests of women are crucial to understanding the changes toward their greater labor-market participation (Goldin & Katz, 2002).

Prescriptive gender norms as to what women and men should do are likely to exert decisive influence on both sides of the labor market—though most likely through different mechanisms. Social penalization—either through gossip, open accusation, or outright discrimination—of women who subvert such norms helps to explain why well-educated, married women with young children allocate their time between family needs and career differently from how their male colleagues do, leading to a widely noted gender gap in career interruptions (Haveman & Beresford, 2012). Perhaps partly for this reason women rising to top executive positions are more likely than their male peers to be unmarried or to forego parenthood altogether (Davidson & Burke, 2000).

Conventional social preferences, in turn, strongly influence the male-dominated executive and corporate boards that are crucial in defining corporations' vision as regards promotion and recruitment. These corporate directors commonly prefer to fill executive positions with candidates who will pursue their careers uninterruptedly and who display strong agentic traits (e.g., assertive, competitive and independent; Eagly & Karau, 2002). These conventional preferences almost invariably favor men, while women—stereotyped as social, kind and supportive—are seen as best qualified for social-, welfare- and service-oriented professions (Eagly & Karau, 2002). A self-reinforcing process of male dominance at the executive level is therefore hard to break (Eagly & Karau, 2002; Rudman, Moss-Racusin, Phelan & Nauts, 2012; Mendelberg, 2016).

The strength and relative stability of norms—passed on over many generations—has been associated with weak law enforcement and mismatches between formal and informal rules in many other cases, suggesting a systematic and "striking persistence of so many aspects in society in spite of a total change in the rules" (North, 1990, p. 36; Nee, 1998). Even inefficient norms can

remain after long periods of opposing formal institutions (Eggertsson, 2005). Deeply ingrained gender norms are unlikely to pose an exception (Haveman & Beresford, 2012). Notwithstanding, over the past 40 years, long-held norms and beliefs have gradually changed as increasing numbers of young women enter graduate and professional schools and as larger numbers of women engage in paid employment after marrying and having children (Goldin, 2014).

Here, we explore the association between changing gender norms prescribing "a woman's place in life" and recruitment into top executive positions. Our approach allows us to explain simultaneously with the same explanatory variables both 1) observed progress in gender equality and 2) continuing inequalities at corporations' top echelons. Here, we differ from prior research that draws on different factors to explain advancements in gender equality, on the one hand, and interfering roadblocks closing certain career pathways on the other. In our analytical approach, we first disentangle gender norms from more proximate economic, political and legal factors identified in the prior literature. We subsequently shed light on the dynamics of changing norms by introducing various lag lengths connecting gender schemas with labor-market outcomes. Such temporal explorations underscore that gender norms cast a long shadow on future labor-market outcomes. This helps to explain both 1) observed improvements and 2) the specific slow and gradual nature of progress.

2. Method and data

To verify the hypothesized causal link between gender norms and corporate recruitment practice, we use a macroeconomic panel-data model that combines longitudinal data on gender norms with data on women's representation in top executive positions over both time and geographic area. This setup allows us to test how differences in regional norms (surveyed for each of the nine U.S. census divisions) affect average recruitment patterns in those same regions over time, while controlling for educational and legal conditions—factors previously shown to influence women's career chances. We construct the model to capture the long-term trend increase in numbers of women executives rather than the year-to-year fluctuations. All explanatory variables exhibit a positive trend increase over time similar to the dependent variable. All variables included in the regression model are nonstationary and integrated of the order I(1). A potential concern with such data is spurious results caused by the series' nonstationarity. Cointegration results show that the average number of women executives per

firm is cointegrated (see Appendix B) with our norm variables, which confirms a significant long-run correlation between the variables (Pedroni, 1999; Westerlund, 2007). Because the data are nonstationary, the estimated parameter vector represents long-term developments.

Specifically, we estimate the regression model

$$women_{it} = \alpha + \beta_1 norms_{i,t-j} + \beta_2 education_{it} + \beta_3 contraception_{it} + f_t + \varepsilon_{it}, \quad (1)$$

where $women_{it}$ is the average number of women top executives per firm in region i at time t. Executive data are collected from the Standard and Poor's (2013) *ExecuComp* Database. Included in the database are the 1,500 firms listed on NYSE or NASDAQ from the S&P 500, S&P 400 mid-cap and S&P 600 small-cap indices, over the period 1992–2012, as well as firms previously listed on one of the indices. ExecuComp reports a listed firm's top executives named on its proxy statements. The SEC asks for the CEO (or equivalent), CFO (or equivalent) and the top three other executives by compensation.[2] From the list of top executives, we then check for the presence of women executives. For consistency, only firms with complete information during the entire time period are included in our sample. This leaves us with a minimum of 29% of the complete firm population in 2007 and 39% of the total population in 1992. The obvious advantage of a balanced panel of firms is that an increase in the average share of women over time signals that existing firms recruit more women for top positions. We thereby rule out change due to newcomer firms representing a different organizational culture linked to sector or founding date. However, the norm effect is also confirmed when using the full sample including all firms.

Norms is a measure of the prescriptive gender norm "[a] woman's place is in the home." Data come from the DDB Life Style Study (DDB Worldwide Chicago, n.d.), previously employed by Robert Putnam (2000). The study was conducted annually between 1975 and 1998 in all nine U.S. Census divisions. In total, we use 24 annual surveys, each covering between 2,100 and 3,200 individual observations, to construct a range of average gender norms (regional, national and gender-specific views) based on individual-level perceptions (DDB Worldwide Chicago, n.d.).[3] Respondents were asked to indicate their level of

[2] Many firms report more than required by SEC rules. In our sample one third of the firms report five top executives and 90% report five to eight.

[3] Respondents are selected annually from a large group of people that have previously accepted the possibility of being contacted. The respondents are selected so as to be demographically representative at the level of the census divisions. The response rate is between 70%–80% and the overall sample size is 3,500 each year. Only married individuals were included prior to 1985.

agreement with the statement that "[a] woman's place is in the home" using a Likert scale from 1 (*Definitely disagree*) to 6 (*Definitely agree*). We have rescaled the answers from the survey so that 1 means *Definitely agree* and 6 means *Definitely disagree.* A higher number on our norms index thus reflects more liberal gender norms.

We constructed matching division-level data on *education*, defined as the share of the adult female population with at least a bachelor's degree. Data come from the U.S. Census. Finally, following earlier studies highlighting the importance of the pill not only as a crucial innovation facilitating a woman's career planning, but also signifying the growing importance of women's rights (Bailey, 2006), *contraception* proxies the legal environment with an index rating the ease of access to—or social acceptance of—oral contraception. The index is based on four separate components, each of which—if in place—receives a value of 1, thereby offering an index range of 0 to 4. Specifically, we have coded i) states that were early adopters of access for minors, ii) states that introduced access for minors through their own law system instead of through a supreme court decision (Bailey, 2006), iii) states that require insurance companies to cover contraception and iv) states that do not allow exemptions from such coverage (National Conference of State Legislatures, n.d.). Given our interest in the dynamic effect of gender norms over time, we have lagged *norms* up to *j* years, while we use contemporaneous measures for *education* and *contraception*. Lagging education and legal up to *j* years has no significant effect on our results. Table A1 in Appendix A offers an overview of all variable definitions and source material.

All variables trend over time, so a standard OLS estimator yields biased parameter estimates in the panel-data–model setting except under very strict exogeneity assumptions. Therefore, the model is estimated using a Dynamic OLS (DOLS) to solve this problem (Nelson & Sul, 2003).[4] Included in the model are also fixed time effects to control for cross-sectional dependence across regions (i.e., in the form of common shocks) and fixed regional effects to control

For consistency we only include married individuals for the 1986–1998 period as well. Putnam (2000) has compared the data with that of the General Social Survey and found the DDB to be of the same quality.

[4] More specifically, standard OLS would produce biased results if the data are nonstationary, the explanatory variables are not strictly exogenous and the short-run dynamics are not the same across all regions. The DOLS corrects for this problem by including leads and lags of the variables in the model as additional regressors. We have used up to two leads and lags in the models with regional data. In models with national data we limit the number of leads and lags to one due to the smaller sample.

for time-invariant regional heterogeneity. Given that we keep a fixed set of firms in our dataset, the inclusion of region-specific effects takes care of a wide range of time-invariant regional differences including regional variation in industry composition as well as average voting patterns reflecting *red* and *blue* states.

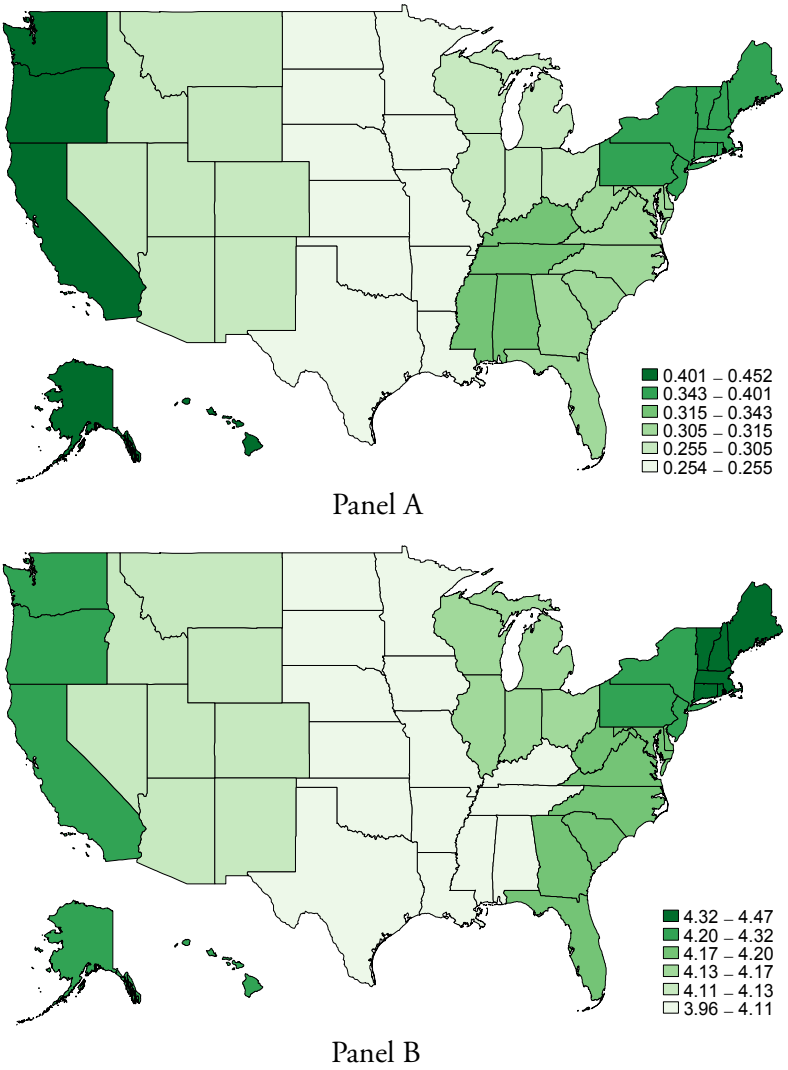

Figure 1. Norms and average number of women top executives by Census divisions (Standard & Poor's, 2013; DDB Worldwide Chicago, n.d.). Panel A: Average number of women top executives per firm. Panel B: Average value for *norms*.

3. Results

3.1 Descriptive statistics

Summary statistics regarding women in top executive positions show slow progress over time. The average number of women executives per firm increased across all regions from 0.08 in 1992 to 0.51 in 2012. The average number of men executives per firms fell from 5.05 to 4.85 during the same time period. The regional variation is illustrated in Figure 1 Panel A. A darker (lighter) shade implies more (fewer) top women executives. Firms in New England and the Pacific have the highest average numbers of women executives; 0.40 and 0.45 respectively. Firms in the West North Central (0.25) and firms in the West South Central (0.25) have the lowest numbers of women executives. The increase in the number of women executives is primarily driven by an increase in the number of firms with one such woman (see Table 1 Columns 1 to 3). In 1992, 94% of the firms did not employ any women at the top executive level. By 2012 that share had decreased to 61%, while only 8% of all firms had more than one women executive.

Panel B of Figure 1 illustrates the regional distribution of average gender norms between 1975 and 1998, suggesting a close correlation between prescriptive gender norms and evolving recruitment patterns. In this panel, a darker (lighter) shade implies more liberal (conservative) norms. Over these years, these gender norms became somewhat more liberal (by 0.8 units on average). They tend to be the most liberal in New England and the least liberal in East South Central.

Bivariate scatterplots (see Figure 2) confirm the suggested correlation between recruitment patterns and norms measured in preceding periods and offers a closer look at the time it takes for norms to show in executive-recruitment patterns. Comparing different historical measures of *norms* lagged by 5 (Panel A), 10 (Panel B), 15 (Panel C) and 20 (Panel D) years, the strength of the correlation is maximized for a 15-year lag, confirming our assertion that internalized norms carry on over extended periods of time. *Norms* lagged 20 years are slightly less correlated with executive recruitment patterns. Panel cointegration tests show that the correlation between women and norms is significant for the 15- and 20-year lag lengths, see Appendix B. For the following empirical analysis, we therefore continue with a 15-year lag length as the most suitable specification.

For our control variables (*education* and *contraception*), Table 1 (columns 5 and 6) documents a parallel upward trend. Between 1992 and 2012, the national share of women age 25 and older holding a bachelor's degree increased by 9%.

Table 1. Distribution of sample firms by number of women executives

Region	Year	Distribution (%) of firms with			Norms[a]	Education	Contraception
		0 women	1 woman	≥2 women			
		(1)	(2)	(3)	(4)	(5)	(6)
East North Central	1992	95	5	0	3.9	16.9	1.0
	2012	65	32	3	4.4	26.7	2.0
East South Central	1992	92	8	0	3.5	14.4	1.4
	2012	54	38	8	4.3	22.3	1.4
Mid-Atlantic	1992	95	4	1	3.9	20.1	1.0
	2012	59	31	10	4.8	31.6	1.7
Mountain	1992	88	8	4	3.7	19.4	1.3
	2012	64	32	4	4.3	27.9	2.4
New England	1992	90	7	2	4.0	23.7	1.0
	2012	61	27	12	4.8	36.1	2.1
Pacific	1992	89	11	0	3.8	21.0	1.0
	2012	55	31	14	4.6	30.2	2.1
South Atlantic	1992	94	5	1	3.7	18.5	1.3
	2012	65	23	12	4.6	28.4	2.1
West North Central	1992	98	2	0	3.7	18.5	0.7
	2012	55	38	8	4.4	28.8	1.2
West South Central	1992	97	3	0	3.5	17.1	1.2
	2012	64	31	5	4.5	24.5	2.7
National[b]	1992	94	5	1	3.7	18.9	1.1
	2012	61	31	8	4.5	28.3	2.0

[a] *Norms* have been lagged 15 years. Value for *norms* in 1992 thus corresponds to norms in 1978.
[b] National norms, education, and contraception are cross-sectional averages.

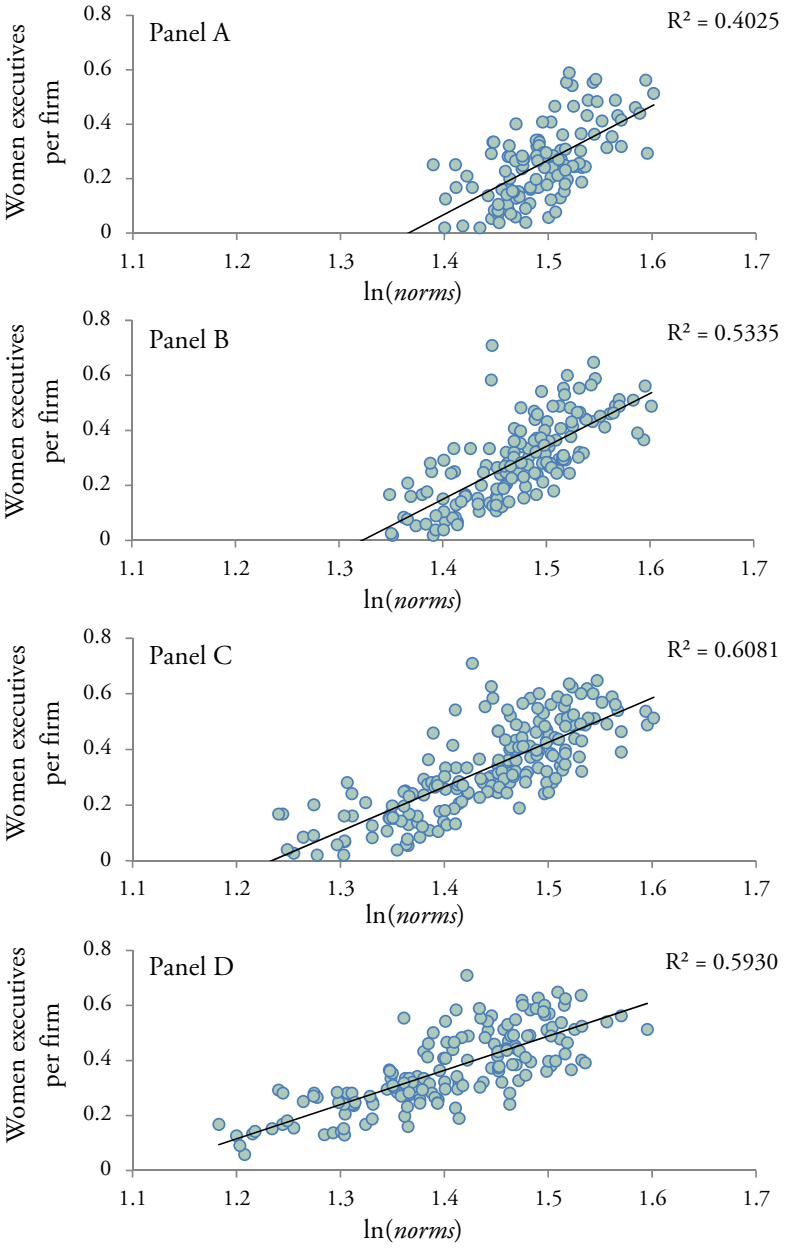

Figure 2. Scatterplots between *women* and *norms* (Standard & Poor's, 2013; DDB Worldwide Chicago, n.d.). Panel A: *norms* lagged 5 years; Panel B: *norms* lagged 10 years; Panel C: *norms* lagged 15 years; Panel D: *norms* lagged 20 years.

New England and the Mid-Atlantic register the highest shares of educated women, and the East South Central and West South Central score lowest. The contraception index has almost doubled during the time period. By 2012, West South Central was home to the most liberal and West North Central home to the least liberal laws.

3.2 Regression results

Regression results using a 15-year lag for our norm measure are presented in Table 2, Model 1 (M1). As predicted, prescriptive gender norms have a significant and positive effect on the number of women who are top executives. A 10% increase in the norm index increases the number of women executives by 0.09. Approximately half of the increase in the number of women since 1992 is explained by changing norms in our model. Neither of the control variables, *contraception* or *education*, has any statistically significant direct effect in this model.

Table 2. Regression results, regional norms

	M1	M2	M3	M4
Norms held by:	All	All	Men	Women
$Norms_{t-15}$	.93***	.72**	.25	.83***
	(.29)	(.29)	(.18)	(.24)
$Education_t$	.00	.28	.67	.28
	(.02)	(1.5)	(1.48)	(1.57)
$Contraception_t$	-.02	-.01	.01	.00
	(.06)	(.06)	.06)	(.06)
$Norms_{t-15}$*		15.7*	15.5***	12.1
$Education_t$		(8.76)	(5.2)	(7.63)
Regional effects	Y	Y	Y	Y
Time effects	Y	Y	Y	Y
R^2	.237	.240	.275	.271

Dependent variable: *women*. Lagging *education* and *contraception* does not change the results. Lagging norms 10 or 20 years instead produce similar results. * indicates 10% significance, ** 5% and *** 1%.

Regions with more liberal norms also have higher educational levels. The correlation between *norms* and *education* may indicate that the norm effect on the number of women executives operates through higher education. More

liberal norms may increase the likelihood that women complete higher education, which increases the share of educated women and hence the pool of women from which the firms can recruit. By including the interaction variable $norms_{t-15}$*$education_t$, we test whether the effect of norms is of direct or indirect nature. In M2 of Table 2, the interaction effect is included. The parameter for norms (general norm effect) is reduced from 0.93 to 0.72 and the significance level changes from the 1% level to the 5% level. The interaction effect between norms and education is positive and significant at the 10% level, suggesting the presence of both direct and indirect norm effects.

To distinguish whether shifts in gender norms are more likely to operate through the supply side (what women think) or through the demand side (what men prescribe as the appropriate role of women), we distinguish in our analysis between norms specified by female respondents and norms specified by male respondents. These regression results are summarized in M3 and M4 of Table 2. The explanatory power of the model with the male-specified norms is slightly higher than the explanatory power of the model with female-specified norms. The differences are, however, small. Notably, the channels through which norms affect the number of women executives are different for women and men, suggesting that the findings presented in M2 are due to different driving forces. As indicated by M3, norms expressed by men only operate through the education channel but lack a direct effect, while norms expressed by women show a direct effect but lack an indirect effect operating through the education channel as estimated in M4.

These findings suggest a number of possible interpretations. First and foremost, men do not merely give in to different societal beliefs by shifting recruitment decisions at the executive floor. It is rather the joint effect of shifting norms in combination with improved educational attainment that leads to tangible effects. For norms maintained by women, however, the direct norm effect remains significant, suggesting that role-model effects and shifting beliefs on the proper and legitimate place in life play an important role.

Finally, our analysis account for the likelihood that candidate searches to fill executive positions will be carried out at the national level, involving a fair degree of labor mobility for women. Whether corporate headquarters respond to local norms or therefore rather follow national trends in their recruitment decisions is an open empirical question. To test the relative weight of national and regional norms, we decompose all variables into a national component and a regional component. National norms are estimated as the cross-sectional average during each time period. Regional norms refer to the difference between

observed norms and the national average. A downside is that we cannot control for common time shocks once we include a national average as an explanatory variable. Further, to avoid overparametrizing the model, we do not include any interaction variables.

Table 3. Regression results, national norms

		M5	M6	M7
National level	$Norms_{t-15}$	.78**	.78***	.68
		(.36)	(.23)	(.64)
	$Education_t$	4.50***	4.50***	-20.4***
		(.76)	(.48)	(4.55)
	$Contraception_t$	-.07	-.07	
		(.07)	(.04)	
	$Norms_{t-15}$ *$education_t$			13.68***
				(3.03)
Regional level	$Norms_{t-15}$	.37		
		(.28)		
	$Education_t$	.69		
		(1.45)		
	$Contraception_t$	.00		
		(.06)		
Regional effects		Y	n/a	n/a
Time effects		N	n/a	n/a
R^2		.780	.981	.989

Dependent variable: *women.* Lagging education and contraception does not change the results. Lagging norms 10 or 20 years produce similar results. Model 7 does not include *contraception* to save the number of degrees of freedom due to the small sample. *Contraception* does not have any significant effect in any of the other regression models. * indicates 10% significance, ** 5% and *** 1%.

Table 3 summarizes our results from using national norms, confirming that national norms are clearly more important than regional norms. Once national norms are included all regional variables become insignificant (M5). National education also has a significant effect, but contraception remains insignificant. Reestimating the model using only national data (M6) confirms these results from M5.

As with the regional models, we next include an interaction effect between norms and education. Due to the small number of observations, we exclude contraception from the model, which seems appropriate as contraception has not had any significant results in our previous estimations. These results show no general norm effect, but the interaction variable between *norms* and *education* is significant at the 1% level (M7). Education is also significant at the 1% level, though with a slightly unexpected negative parameter. These two results demonstrate that educational attainment per se is not enough for women to arrive at the top corporate echelon; what is needed is a preceding liberalization of norms to allow woman to actually capitalize on their education and advance their careers to the very top of corporate leadership. These findings closely resemble the regional specification for male norms (Table 2, M3), which already pointed at the close linkage between education and norms.

3.3 Robustness checks

Given the admitted challenges in detecting norms through survey questions, we introduce an alternative survey question (*liberation*) capturing a respondent's attitude toward the following statement "I think the women's liberation movement is a good thing." While the two indices *liberation* and our main previous index *norms* are highly correlated (0.85), *liberation* lacks the character of a prescriptive norm and incorporates to some extent a value judgment on the means of goal realization. Nonetheless, *liberation* shows a similar bivariate relation (see Figure C1 in Appendix C) with average executive recruitment patterns. Also, *liberation* shows a similar dynamic over time, with the strongest mutual correlation realized for a 15-year lag length as seen in Table B1.

Table C1 in Appendix C summarizes the replication of our benchmark estimations. The direct effect of *liberation* is confirmed with a parameter estimate of a similar magnitude as estimated for *norms*. Here again, the average national measure is more important than the regional variations. Unlike *norms*, however, *liberation* seems not to operate through the education channel. A possible explanation is that the inclusion of a political value judgment presents a narrower (and politics-centered) definition operating through different causal channels than the general notion of a prescriptive gender norm.

4. Conclusion

Our results provide insights about the distal causes for the glass ceiling that women encounter with regard to top-level executive positions, specifically in large-scale corporations. Using a balanced sample covering the average numbers of women in corporate top executive positions between 1992 and 2012, we show that gender norms exert a powerful impact on gender representation. By using different lag-lengths for gender norms, we are able to show, that prescriptive norms defining "the appropriate place in life" maintain a significant impact over extended periods. Norms internalized 15 to 20 years ago continue to influence the labor market through both the supply and demand sides. We also show that it matters whether prescriptive norms are held by women or men. While changing gender norms held by women do display a sizable direct effect on executive representation, this effect is less powerful for men. For men, more liberal views concerning women increase the representation of female executives in corporations only when the average educational attainment for women in the region also increases. Finally, we show that national gender norms are more powerful in explaining the glass-ceiling effect than regional norms. To further solidify our results, we hope to inspire future research to disentangle the pure norm effect from parallel changes in hours in domestic work and a general increase in female labor-force participation.

Our findings have important practical implications and hold lessons for policymakers and society at large. While realization of equal opportunity goals has mainly relied on antidiscrimination laws and improved educational access for women, gender norms continue to obstruct women's careers. This is in spite of the fact that equality is realized in most educational subject areas. Current antidiscrimination laws are clearly effective in protecting and guaranteeing access to opportunities, but whenever career decisions hinge on personal assessments, social beliefs and norms continue to play a powerful role. That these beliefs have been shaped and internalized in the past makes this challenge particularly vexing.

Whether quota systems, as exercised for instance in Norway's supervisory boards, are an appropriate response to break with old beliefs, or whether voluntary programs are preferable, is beyond the scope of this study. But our results do encourage the search for novel solutions to—as a minimum—help align current labor-market outcomes with current beliefs rather than with the dated beliefs of the past.

References

Agrawal, A., & Knoeber, C. (2001). Do Some Outside Directors Play a Political Role? *Journal of Law and Economics,* vol. 44, pp. 179–198.

Arfken, D.E., Bellar, S.L., & Helms, M.M. (2004). The Ultimate Glass Ceiling Revisited: The Presence of Women on Corporate Boards. *Journal of Business Ethics,* vol. 50, pp. 177–184.

Bailey, M.J. (2006). More Power to the Pill: the Impact of Contraceptive Freedom on Women's Life Cycle Labor Supply. *Quarterly Journal of Economics,* vol. 121, no. 1, pp. 289–320.

Bertrand, M., Goldin, C., & Katz, L.F. (2010). Dynamics of the Gender Gap for Young Professionals in the Financial and Corporate Sectors. *American Economic Journal: Applied Economics,* vol. 2, no. 3, pp. 228–255.

Bertrand, M., & Hallock, K.F. (2001). The Gender Gap in Top Corporate Jobs. *Industrial and Labor Relations Review,* vol. 55, no. 1, pp. 3–21.

Buser, T., Niederle, M., & Oosterbreek, H. (2014). Gender, Competitiveness, and Career Choices. *Quarterly Journal of Economics,* vol. 129, no. 3, pp. 1409–1447.

Carter, D.A., Simkins, B.J., & Simpson, W.G. (2003). Corporate Governance, Board Diversity, and Firm Value. *Financial Review,* vol. 38, pp. 33–53.

Catalyst. (n.d.). Catalyst Charts Growth of Women on America's Corporate Boards. Available online: http://www.catalyst.org/media/catalyst-charts-growth-women-americas-corporate-boards. [Accessed 5 May 2016].

Correll, S.J., Benard, S., & Paik, I. (2007). Getting a Job: Is There a Motherhood Penalty? *American Journal of Sociology,* vol. 112, no. 5, pp. 1297–1339.

Davidson, M., & Burke, R. (2000). *Women in Management: Current Research Issues.* Vol. II. London, UK: Sage.

DDB Worldwide Chicago. (n.d.). The DDB Life Style Study. Available online: http://bowlingalone.com/?page_id=7. [Accessed 13 September 2013].

Donnelly, K., Twenge J.-M., Clark M.-A, Shaikh S.-K, Beiler-May, A., & Carter N.-T. (2016). Attitudes toward Women's Work and Family Roles in the United States, 1976–2013. *Psychology of Women Quarterly,* vol. 40, pp. 41–54.

Eagly, A.H. (1987). *Sex Differences in Social Behavior: A Social Role Interpretation.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Eagly, A.H., & Karau, S.J. (2002). Role Congruity Theory of Prejudice Toward Female Leaders. *Psychological Review,* vol. 109, no. 3, pp. 573–598.

Eggertsson, T. (2005). Imperfect Institutions—Possibilities and Limits of Reform. Norms in Economics, with Special Reference to Economic Development. In M. Hechter & K.-D. Opp (eds.) *Social Norms,* pp. 76–104. New York, NY: Russell Sage Foundation.

Farrell, K.A., & Hesch, P.L. (2005). Additions to Corporate Boards: The Effect of Gender. *Journal of Corporate Finance,* vol. 11, pp. 85–106.

Gneezy, U., Niederle, M., & Rustichini, A. (2003). Performance in Competitive Environments: Gender Differences. *Quarterly Journal of Economics,* vol. 118, no. 3, pp. 1049–1074.

Gneezy, U., & Rustichini, A. (2003). Gender and Competition at a Young Age. *American Economic Review: Papers and Proceedings,* vol. 94, no. 2, pp. 377–381.

Goldin, C. (2006). The Quiet Revolution that Transformed Women's Employment, Education, and Family. *American Economic Review,* vol. 96, no. 2, pp. 1–21.

Goldin, C. (2014). A Grand Gender Convergence: Its Last Chapter. *American Economic Review,* vol. 104, no. 4, pp. 1091–1119.

Goldin, C., & Katz, L.F. (2000). Career and Marriage in the Age of the Pill. *American Economic Review: Papers and Proceedings,* vol. 90, no. 2, pp. 461–465.

Goldin, C., & Katz, L.F. (2002). The Power of the Pill: Oral Contraceptives and Women's Career and Marriage Decisions. *Journal of Political Economy,* vol. 110, no. 4, pp. 730–770.

Haveman, H.A., & Beresford, L.S. (2012). If You're so Smart, Why Aren't You the Boss? Explaining the Persistent Vertical Gender Gap in Management. *Annals of the American Academy of Political and Social Science,* vol. 639, no. 1, pp. 114–130.

Lalanne, M., & Seabright, P. (2016). The Old Boy Network: The Impact of Professional Networks on Remuneration in Top Executive Jobs. SAFE Working Paper No. 123.

Mendelberg, T. (2016). *The Silent Sex.* Princeton, NJ: Princeton University Press.

Morrison, A.M., & von Glinow, M.A. (1990). Women and Minorities in Management. *American Psychologist,* vol. 45, no. 2, pp. 200–208.

National Conference of State Legislatures. (n.d.). Insurance Coverage for Contraception Laws. Available online: http://www.ncsl.org/research/health/insurance-coverage-for-contraceptionstate-laws.aspx. [Accessed 22 July 2014].

Nee, V. (1998). Norms and Networks in Economic and Organizational Performance. *American Economic Review: Papers and Proceedings,* vol. 88, no. 2, pp. 85–89.

Nelson, C.M., & Sul, D. (2003). Cointegration Vector Estimation by Panel DOLS and Long-Run Money Demand. *Oxford Bulletin of Economics and Statistics,* vol. 65, no. 5, pp. 655–680.

Niederle, M., & Vesterlund, L. (2007). Do Women Shy away from Competition? Do Men Compete too Much? *Quarterly Journal of Economics,* vol. 122, no. 3, pp. 1067–1101.

North, D.C. (1990). *Institutions, Institutional Change and Economic Performance.* Cambridge, UK: Cambridge University Press.

Pedroni, P. (1999). Critical Values for Cointegration Tests in Heterogeneous Panels with Multiple Regressors. *Oxford Bulletin of Economics and Statistics, Special Issue,* vol. 61, no. 4, pp. 653–670.

Putnam, R. (2000). *Bowling Alone. The Collapse and Revival of American Community.* New York, NY: Simon and Schuster.

Ragins, B.R., Townsend, B., & Mattis, M. (1998). Gender Gap in the Executive Suite: CEOs and Female Executive Report on Breaking the Glass Ceiling. *Academy of Management Executive,* vol. 12, no. 1, pp. 28–42.

Reuben, E., Sapienza, P., & Zingales, L. (2015). Taste for Competition and the Gender Gap Among Young Business Professionals. NBER Working Paper 21695.

Rudman, L.A., Moss-Racusin, C.A., Phelan, J.E., & Nauts, S. (2012). Status Incongruity and Backlash Effects: Defending the Gender Hierarchy Motivates Prejudice against Female Leaders. *Journal of Experimental Social Psychology,* vol. 48, pp. 165–179.

Standard and Poor. (2013). *ExecuComp.* August, 2013.

U.S. Census Bureau. (n.d.a). The Decennial Census. Available online: https://www.census.gov/hhes/socdemo/education/data/census/index.html. [Accessed 3 February 2014].

U.S. Census Bureau. (n.d.b). U.S. Census American Community Survey. Available online through the Digest of Education Statistics: https://nces.ed.gov/programs/digest/. [Accessed 3 February 2014].

Westerlund, J. (2007). Testing for Error Correction in Panel Data. *Oxford Bulletin of Economics and Statistics,* vol. 69, pp. 709–748.

Appendix A Variable descriptions

Table A1. variable description

Variable	Definition	Source
Women	The average number of women top executive officers (as reported in *ExecuComp*) per firm in each U.S. Census division each year	Standard & Poor's (2013)
Norms	Within-census division average response on a 1 (*Definitely agree*)-6 (*Definitely disagree*) Likert scale on how much the respondent in the DDB Life Style Study agreed to the statement "[a] woman's place is in the home". The variable has been recoded from the original survey to make high values correspond to more liberal values. In the original survey, 1 indicates *Definitely disagree* and 6 *Definitely agree*.	DDB Worldwide Chicago (n.d)
Liberation	Within-census division average response on a 1 (*Definitely disagree*)-6 (*Definitely agree*) Likert scale on how much the respondent in the DDB Life Style Study agreed to the statement "I think the women's liberation movement is a good thing".	DDB Worldwide Chicago (n.d)
Education	Share of the female population 25 years or older in the region with a bachelor degree or higher. Missing years are interpolated.	US Census Bureau (n.d.a, b)
Contraception	Index based on the sum of four subindices aggregated from the state to the Census division level by their population weighted means. The final index ranges from 0-4 where high values indicate liberal laws. 1) Early adopters of access to minors, coded 1 for those states that introduced access to minors (unmarried, childless women under the age of 21) before 1970. 2) Method by which access to minors was introduced, coded 1 for those states that increased access to minors through their own legislative system instead of through a Supreme Court decision. 3) State laws on insurance, coded 1 if a law is in place requiring insurance companies that cover prescription drugs to also provide coverage for any FDA-approved contraceptive. 4) Exemption from state insurance law, coded 0 if exemptions from the insurance law above are allowed.	1) and 2): Bailey (2006), 3) and 4): NCSL (n.d.)

Appendix B Panel cointegration tests

Time series included in the analysis are integrated of the order I(1). To avoid spurious regression results, we therefore test if *women* and *norms* are cointegrated using two sets of panel cointegration tests (Pedroni, 1999; Westerlund, 2007). Cross-sectional dependence is controlled for in the cointegration test by fixed time effects (i.e., the data are time demeaned).

Results of the cointegration tests are shown in Table B1. The table presents the *p*-values from the tests. The null hypothesis is that there is no cointegration whereby a *p*-value of less than 5% is interpreted as evidence for that the series are cointegrated and that there consequently is a significant long-run relationship between *women* and *norms*. The tests reject the hypothesis of no cointegration once norms have been lagged at least 15 years.

Table B1. Panel cointegration tests, *p*-values

	Pedroni	Pedroni	Westerlund	Westerlund
			Norms	
5 years	.086	.811	.138	.308
10 years	.152	.802	.661	.574
15 years	**.004**	**.002**	**.002**	**.001**
20 years	**.019**	**.020**	**.003**	**.003**
			Liberation	
5 years	.123	.198	.286	.434
10 years	.175	.603	.322	.295
15 years	**.010**	**.009**	**.005**	**.003**
20 years	**.034**	**.022**	**.002**	**.002**

The null hypothesis is no cointegration. *P*-values in bold implies that we reject the null hypothesis at the 5% significance level and thus that the test indicates that the series are cointegrated.

Appendix C Robustness check

Table C1. Regression results using *liberation*

		M8	M9
National level	$Liberation_{t-15}$		1.17***
			(.26)
	$Education_t$		4.86***
			(.56)
	$Contraception_t$		-.16**
			(.08)
Regional level	$Liberation_{t-15}$	.77***	.46*
		(.25)	(.24)
	$Education_t$	-.00	.45
		(1.56)	(.15)
	$Contraception_t$	.04	.02
		(.06)	(.06)
	$Liberation_{t-15}$*	4.10	
	$Education_t$	(6.91)	
	$Liberation_{t-15}$*	1.48*	
	$Contraception_t$	(.88)	
Regional effects		Y	Y
Time effects		Y	N
R^2		.258	.792

Dependent variable: *women.* * indicates 10% significance, ** 5% and *** 1%.

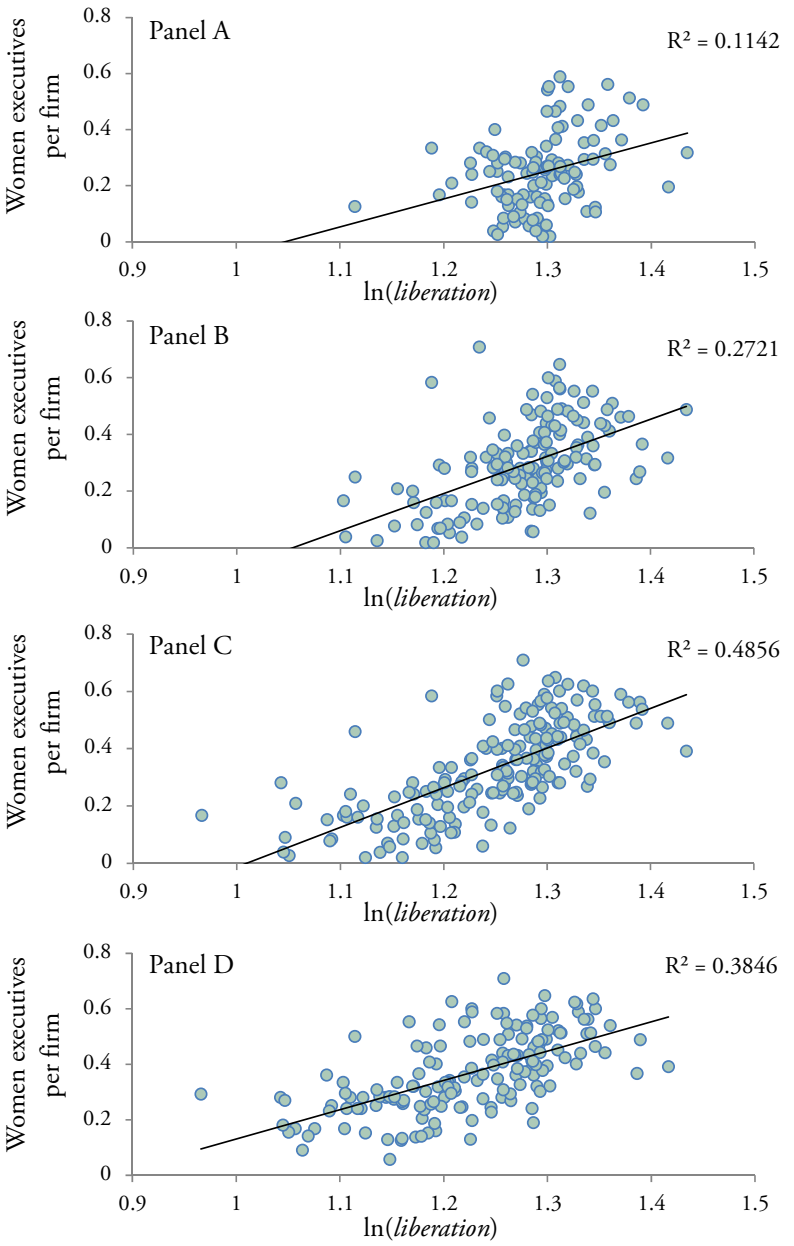

Figure C1. Scatterplots between *women* and *liberation* (Standard & Poor's, 2013, DDB Worldwide Chicago, n.d.). Panel A: *liberation* lagged 5 years; Panel B: *liberation* lagged 10 years; Panel C: *liberation* lagged 15 years; Panel D: *liberation* lagged 20 years.

Chapter 2

Chapter 2
Getting Used to Diversity? Immigration and Trust in Sweden

1. Introduction

The share of the population born abroad has increased markedly in Western countries since the 1960s (Özden, Parsons, Schiff & Walmsley, 2011; United Nations, 2015). This share is likely to increase even further in the future as labor migrants, foreign students and refugees continue to immigrate to Western societies, thereby contributing to rapidly growing diversity. The social implications of these population movements can be far-reaching. This is true not the least for the levels of generalized trust, the belief that people in general can be trusted, in the destination countries. Several empirical studies show a negative correlation between ethnic diversity and a population's level of such trust (e.g., Knack & Keefer, 1997; Zak & Knack, 2001; Alesina & La Ferrara, 2002; Putnam, 2007). This is a cause for concern because high levels of trust in a society also correlate with economic development (Knack & Keefer, 1997; Algan & Cahuc, 2010; Tabellini, 2010) and political efficiency (La Porta, Lopes-de-Silanez, Shleifer & Vishny, 1997).

Lower social trust[5] in more diverse societies corresponds well with experimental evidence confirming an in-group bias in a wide range of behavioral games. It is widely confirmed across different cultural contexts that people discriminate between groups they consider themselves members of (the *in-group*) and groups that they do not belong to (*out-groups*; e.g., Allport, 1954). Individuals are more willing to share, cooperate and trust other members of their own group than members of out-groups (see Balliet, Wu & De Dreu, 2014, for a meta-analysis)

[5] Social trust and generalized trust are used interchangeably in this paper.

which explains the negative correlation between diversity and trust. Diversity also lowers social trust by making people feel less connected to society, making them *hunker down*: They withdraw from social life and trust everyone less, including members of their own in-group (Putnam, 2007).

However, the delineations between in- and out-groups may change over time, as Putnam (2007) claims. Groups living side by side over extended periods of time intermingle, and the borders between them can slowly dissipate; once-salient dividers can become irrelevant, and others can take their place. Through intergenerational transfers of norms from parent to child and through assimilation from the general population, the experiences of past generations shape the norms and trust of the present generation (Bisin & Verdier, 2001; Bisin, Topa & Verdier, 2004; Guiso, Sapienza & Zingales, 2008; Tabellini, 2010). Over the span of generations, changes to norms can accumulate and groups once considered isolated from each other can be brought closer until "our new 'us' incorporate[s] 'them'" (Putnam, 2007, p. 162). This would suggest that past experience with immigrants, potentially reaching back over several generations, could moderate the negative effect of present-day immigration on trust. If this hypothesis is correct, the levels of trust in countries or regions with a history of immigration should be less affected by new immigration. However, group membership is not easily eroded (Akerlof & Kranton, 2000). If initial contacts between different groups lead to conflict (Blumer, 1958), cross-generational transfers could instead increase the saliency of different groups over time. If this is true, regions with high levels of immigration in the past should react more negatively to new immigration.

Despite the wealth of studies on the relationship between diversity and generalized trust (e.g., Knack & Keefer, 1997; Zak & Knack, 2001; Costa & Kahn, 2003), the potentially moderating effects of historical diversity remains untested. This study aims to bring a long-term perspective into the diversity-and-trust literature by studying how past immigration moderates the effect of present-day immigration on trust. The goal is to identify whether past experience can indeed influence modern-day effects. Are individuals that are embedded in localities that have historically been strongly exposed to diversity in fact better able to cope with the challenges of contemporary migration movements?

To offer an initial test, the paper uses data from Sweden, a country with a varied experience of immigration across time and regions. The country has a high and increasing rate of diversity, having Europe's fourth highest share of population

born abroad,[6] an increase from the 12th position in 1990 (United Nations, 2015). Sweden is still regarded as a high-trust society (Delhey & Newton, 2005; European Social Survey, 2010) and previous research is split on whether a negative relationship exists between present-day diversity and trust in the country (Gustavsson & Jordahl, 2008; Wallman Lundåsen & Wollebeak, 2013; Lundstedt & Nissling, 2016). However, no study has yet examined whether past differences in regional experiences of immigration could moderate or worsen the effect of present-day diversity in the country. The single-country design applied here offers the additional advantage of keeping many potentially confounding variables constant, such as political and legal institutions as well as historical development trajectories. It also deals with the issue of potentially poor cross-country comparability of survey measures of trust caused by cultural differences in the interpretation of survey questions (Reeskens & Hooghe, 2008).

Data for this study come from the annual Swedish Society, Opinions, and Mass Media (SOM) survey over the period 1998–2013 and the final sample covers in total 42,072 individual observations. Statistics Sweden provided the diversity data, which stretch back to the beginning of the 20th century. The paper uses panel specifications accounting for fixed municipality and year effects as well as a host of individual and regional controls.

The results show that past experiences of diversity do affect the impact of new immigration on trust: The negative effect of new diversity on trust is greater in regions with a long history of immigration than in regions without such a history. This implies that earlier generations' exposure to out-group members makes a person more likely to be negatively affected by new immigration. The observed effect is driven by non-Nordic immigration and the effect reaches from as far back as the beginning of the 1900s. This is possibly due to a reinforced in-group mentality caused by early exposure, which is transferred across generations.

The paper is organized as follows: The following section discusses the connection between diversity and social trust and highlights how the experiences of previous generations could affect this relationship. Section 3 gives an overview of the Swedish experience of immigration in the 20th century and presents the data and method. Section 4 presents the results after which Section 5 concludes with a discussion of the results and their implications, as well as suggestions for future research.

[6] The three with a higher share are Austria, Switzerland, and Luxembourg, not counting micro nations and other small regions listed by the UN.

2. Diversity, history and trust

The effect of increasing diversity on trust in the Western world has gathered considerable attention among social scientists. In general, a negative connection is expected: As diversity in one's surrounding increases, people stop identifying with their neighborhood and withdraw from society. In Putnam's (2007) words, they hunker down and lose trust in everyone, including members of their own group. Several studies found a negative relationship between diversity and trust using both aggregate country-level studies (Knack & Keefer, 1997; Zak & Knack, 2001; Delhey & Newton, 2005) and cross-country individual-level studies (Anderson & Paskeviciute, 2006; Gesthuizen, van der Meer & Scheepers, 2008; Stolle, Soroka & Johnston, 2008; Hooghe, Reeskens, Stolle & Trappers, 2009; Kesler & Bloemraad, 2010). Others have also found a similarly negative correlation in individual-level single-country studies in the United States (Alesina & La Ferrara, 2002; Costa & Kahn, 2003; Putnam, 2007), Great Britain (Duffy, 2004; Pennant, 2005; Letki, 2008), Canada (Soroka, Helliwell & Johnston, 2007), Australia (Leigh, 2006) and, more recently, also in the different Nordic countries (Gustavsson & Jordahl, 2008; Wallman Lundåsen & Wollebeak, 2013; Ivarsflaten & Strømsnes, 2013; Dinesen & Sønderskov, 2015).[7] However, while most studies on the topic find a negative correlation between diversity and generalized trust, a few studies do not. These include both cross-country (Paxton, 2002; Bjørnskov, 2006; You, 2012; Ariely, 2014) and single-country studies conducted in the Netherlands (Tolsma, van der Meer & Gesthuizen, 2009), Great Britain (Sturgis, Brunton-Smith, Read & Allum, 2011) and Sweden (Lundstedt & Nissling, 2016).[8] As such, the debate on diversity and trust is not settled.

So far, the literature has focused only on the effect of contemporary diversity on trust. However, given the dynamic nature of the saliency of group membership, diversity in a society could also have long-lasting effects. The experiences of one

[7] The studies listed here only include studies with generalized trust as an outcome. Other authors have found a negative relationship between diversity and related outcomes, e.g. participation (Alesina & La Ferrara, 2000), a broad social capital index (Hero, 2003), and expenditure on public goods (Goldin & Katz, 1999). Van der Meer and Tolsma (2014) give an overview of much of this wider empirical literature on ethnic diversity's effect on social cohesion.

[8] Two studies, Marschall and Stolle (2004) and Kazemipur (2006) even find a significantly positive effect in Detroit, Michigan, and Canada, respectively. However, the former result appears to be driven by increases in trust among the minority population and the latter by the Quebec province, which has low levels of both trust and ethnic heterogeneity.

generation can have effects on the norms and preferences in a society lasting across decades, even centuries (Tabellini, 2010; Nunn & Wantchekon, 2011). Parents try to raise children with preferences and norms similar to their own and children also adapt to the general norms of the population through socialization (Bisin & Verdier, 2001; Bisin et al., 2004; Dohmen, Falk, Huffman & Sunde, 2012; Ljunge, 2014). Societal norms, therefore, result from the experiences of not just the present population, but also of past generations (Guiso et al., 2008).

Together with other norms and preferences, the saliency of group identifiers may also change over time. Even though initial interactions between groups could lead to conflict and hunkering, as shown by the empirical literature, over time the group delineations could become blurred as people intermingle across distinct groups (Putnam, 2007). The negative effect of diversity on trust could therefore dissipate over time. Putnam exemplifies this argument with the decreasing importance of religion as a group divider in the United States. Having grown up in the American Midwest in the 1950s, he still recalls the religious background of almost every member of his high school class; at that time and place, religion was one of the most salient group identifiers and the vast majority of marriages occurred within these groups. Just 30 years later, religion had lost its saliency as a group divider (at least between Catholics, mainline Protestants and Jews), and for romantic interests it had become "hardly more important than left- or right-handedness" (p. 160). In a single generation the population had intermingled enough across groups to make this once important identifier irrelevant. The change was not necessarily caused by religion losing importance in individuals' lives over this period; rather the change reflected which dividers were deemed important for identifying out-groups[9] (Putnam, 2007). A logical inference is that other group identifiers can also become irrelevant over time as people interact across groups. If this hypothesis were correct, the saliency of group identifiers based on country of origin and ethnicity should decrease over time as natives and immigrants intermingle and thereby reduce between-group boundaries. As a result, one would expect trust levels of individuals located in regions with high levels of immigration in the past to be less affected by contemporary immigration, simply because individuals have become accustomed to intergroup exchange. This also suggests Hypothesis 1.

[9] This theory resembles Allport's (1954) contact hypothesis, that increased interaction across groups increases trusts between groups as interaction enables members to see beyond the stereotypes connected to the different groups. However, in Putnam's (2007) theory, the crux of the argument is not that intergroup trust increases, but that the group borders themselves change.

H1: The negative effect of immigration on social trust is greater for people in regions that experienced low levels of immigration in the past.

On the other hand, group identifiers do not automatically erode, even over time. Group membership is an important determinant of behavior and individuals largely shape their identity based on their group memberships (Akerlof & Kranton, 2000). Members of a group form positive views of the qualities of the other members of the same group, especially in relation to out-group members (Tajfel & Turner, 1979). Experiments have shown that, as a result of in-group bias, people are more willing to trust and cooperate within their groups than across group boundaries and also act more fairly toward in-group members (Balliet et al., 2014). Studies have found such biases across groups based on various dividers, including ethnicity (Whitt & Wilson, 2007), fraternity membership (Kollock, 1998) and randomly assigned groups of conscripts (Goette, Huffman & Meier, 2006). In experiments, participants are quick to identify themselves as members of groups, and even group allocations based on intentionally meaningless categorizations leads to in-group biases (Chen & Li, 2009).

Each person has several in-groups simultaneously and the relative importance of group memberships is affected by the context and the proximity of other groups (Putnam, 2007). According to conflict theory (Blumer, 1958), interaction between different groups leads to conflict and prejudice as the different groups seek control over limited assets like public resources, property and power. As conflict arises between groups, the distinction between them becomes more important. If interactions between groups led to increased saliency of in- and out-groups, as suggested by conflict theory, this saliency could also be transferred across generations through parent–child socialization (Bisin & Verdier, 2001; Bisin et al., 2004; Guiso et al., 2008). As such, the relative importance of different group dividers is the result of both personal experience and intergenerational transfers of norms. If this is the case, regions with a history of diversity should react to new diversity even more negatively than those regions where previous diversity has not increased the saliency of the native–immigrant group identifier. This suggests Hypothesis 2.

H2: Immigration's negative effect on social trust is greater for people in regions that experienced high levels of immigration in the past.

Not all diversity is expected to have the same effect on trust (Hooghe et al., 2009). People are more likely to trust those that they are familiar with and whose behavior they can predict (Lewis & Weigert, 1985). The negative effect of diversity on trust is therefore thought to increase with cultural distance

(Uslaner, 2002): An immigrant from a geographically and culturally neighboring country is expected to have a smaller effect on trust than an immigrant from across the world. This should hold true in both of the cases described by the two previous hypotheses. This leads to the last hypothesis of this paper.

H3: Immigration has a greater negative effect on trust as its originating distance increases.

Most of the previous research on diversity and trust does not differentiate between different cultural backgrounds more than as different groups in a fractionalization index. However, there is some prior evidence that the effect of immigration on trust differs depending on the origin of the immigrants: Immigration from countries that are not former colonies have a more negative effect on trust in the old colonial powers than that from former colonies, and Muslim immigrants have a greater negative effect than total immigration in countries who are predominantly Christian (Hooghe et al., 2009). Previous research in Nordic countries has shown no major difference between the negative effects of Western immigration and total immigration (Dinesen & Sønderskov, 2015) or between Western immigration and a fractionalization index (Ivarsflaten & Strømsnes, 2013). Other possible divisions of immigration remain to be tested.

3. Method and data

3.1 Research setting: Sweden's immigration experience in the 20th century

Sweden has a long and varied history of immigration with evidence of Belgian, Dutch and German settlers dating back to the Middle Ages (Harrison, 2009). During the 1800s, immigration to Sweden was overshadowed by large-scale emigration to the United States, but immigration quickly picked up from the start of the 1900s (Swedish Migration Agency, n.d.). Figure 1 presents the share of the Swedish population that was born abroad at different points in time. By the beginning of the last century, about 1% of the population was born abroad. This was approximately the same level of diversity as in other Scandinavian countries at the same time; slightly higher than in Iceland (0.4%) and slightly below Norway (3%, two thirds of whom were Swedes). The Scandinavian rates at this time were well below those of traditional immigrant countries like

Canada and the United States (both at 13%; Minnesota Population Center, 2016).[10] Since then, the share of the Swedish population born abroad gradually increased to approximately 15% by 2010.

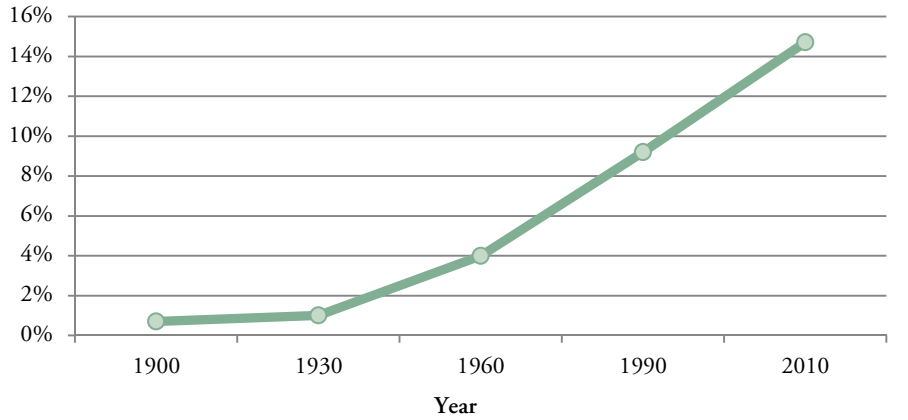

Figure 1. Share of population born outside of Sweden (SCB, 2015a)

Figure 2 shows an overview of how the composition of foreign-born residents in Sweden has changed during the 20th century. Figure 3 shows the relative distribution of foreign-born population across the 21 counties in 1900 and 2012. In summary, immigration to Sweden has turned from labor migration from nearby countries moving to rural areas in the beginning and middle of the 20th century, to a more diverse refugee population from culturally and geographically distant countries settling in urban areas today (Harrison, 2009).

In the year 1900, the foreign-born population consisted to a large extent of people from the other Nordic countries and Western Europe (mainly Germany). The main group of immigrants from outside of Northern Europe was from the United States, presumably children of Swedish settlers returning to their ancestral home. Diversity steadily increased up to the 1930s with some variations, the biggest being an inflow of immigrants from the newly formed Soviet Union. Immigrants coming in the early 1900s were often headed toward the logging and mining industries, which were located in the middle and north of the country (Institute for Social Sciences, Stockholm University, 1941). After

[10] The figures are based on national censuses from the following years: Norway 1900 (The Digital Archive, Norwegian Historical Data Center (University of Tromsø) & the Minnesota Population center, 2008), Iceland 1901 (Gardarsdóttir, n.d.), Canada 1901 (Canadian Families Project, 2002), and United States 1900 (Ruggles, Genadek, Goeken, Grover & Sobek, 2015).

the Second World War, immigration rapidly increased. Following the war, Sweden experienced an economic boom and large groups of labor migrants from the other Scandinavian countries, Greece, Yugoslavia and Italy settled in Sweden with their families (Swedish Migration Agency, n.d.). These coincided with war refugees from the Baltics and Finland. This emigration mainly concentrated in southern Sweden, including the counties surrounding Stockholm.

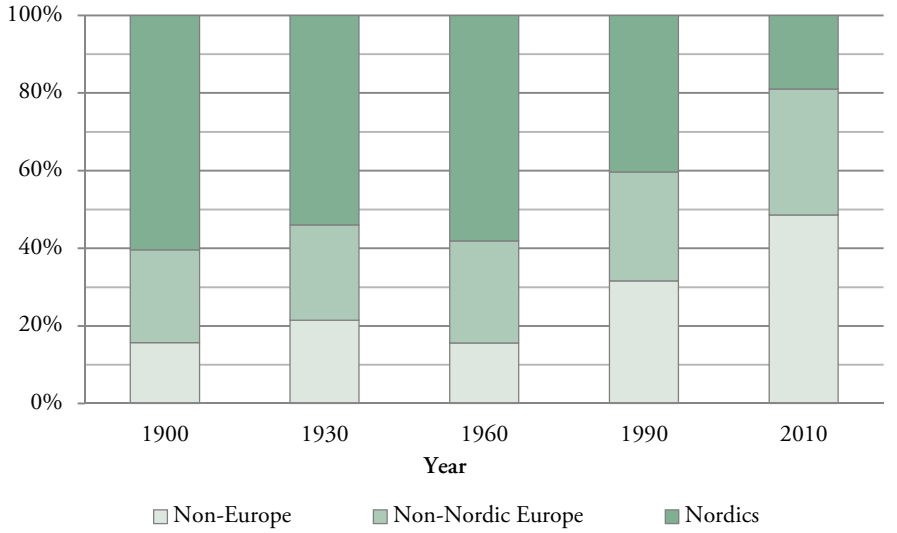

Figure 2. Composition of foreign-born population across time (SCB, 2015a)

In the 1960s, the number of refugees increased markedly. To a large degree, these refugees settled in cities, boosting the immigrant population in the counties home to Sweden's three largest cities: Skåne, Västra Götaland and Stockholm. Several political crises, including the coups in Greece (1967) and Chile (1973), led to punctuated peaks of refugees fleeing to Sweden (Harrison, 2009). From the 1980s and onwards, this trend intensified as large numbers of refugees from the Iranian Revolution came in the 1980s, followed by people fleeing the Yugoslavian Wars in the 1990s. These refugees were followed by refugees from the Iraq war in the 2000s (Swedish Migration Agency, n.d.). In total, people born in the Middle East and Yugoslavia or its resulting republics made up a third of all people born abroad in Sweden in 2010 (Statistics Sweden, 2015a). The main exception to these general trends is Norrbotten, the northernmost county. Due to the long border it shares with Finland,

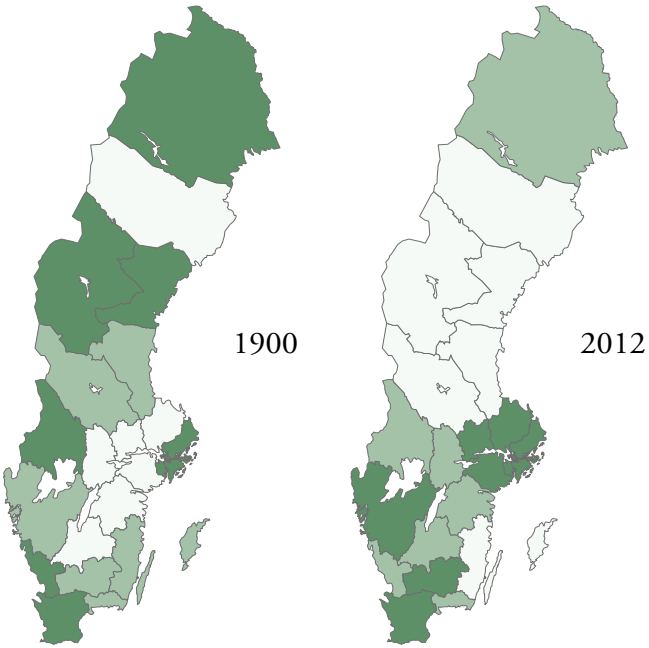

Figure 3. Concentration of foreign-born population in different counties 1900 and 2012 (SCB, n.d.a, b, c). Darker areas represent relatively higher shares of foreign-born population at the time.

Norrbotten has a large Finnish-born minority which has been present for centuries.

In summary, Sweden's immigration history reaches back several centuries, with different immigrant groups coming to the country for different reasons. But the experiences have differed across the different counties. Some of the counties with large foreign-born shares today have a long history of such diversity, whereas others have seen this share increase only recently. Likewise, some of the counties that today have comparatively low levels of diversity once had among the highest levels in the country.

3.2 Method

To find if the effect of present-day immigration on social trust is affected by previous regional experiences of immigration, this paper uses regressions in split

samples, studying if the effect differs between regions with high and low levels of historical diversity. The OLS regressions take the form

$$Trust_{it} = \alpha + \beta_1 X_{mt-1} + \beta_2 I_{1it} + \beta_3 Z_{mt-1} + Municipality_m + \beta_4 YEAR_t + v_{it}, \quad (2)$$

where $Trust_{it}$ is the trust level, measured on a scale from 0–10, of individual i at time t. X_{mt-1} is the diversity in municipality m at time $t-1$. Diversity is lagged one year to lower the risk of endogeneity.[11] I_{1it} and Z_{mt-1} are vectors of individual- and municipal-level controls, respectively. The individual-level independent variables are not lagged as the data only include one observation per person. $Municipality_m$ are municipality fixed effects controlling for any time-invariant differences between municipalities, such as proximity to neighboring countries and nearby international harbors. $YEAR_t$ are year dummies controlling for shocks common to all municipalities like legal reforms, national public policy and national economic trends. The v_{it} are individual errors clustered at the municipal level, and the β's are parameters to be estimated.

To capture historical differences in diversity across regions, the sample is split between those regions with above-average levels of diversity in the past and those with below-average levels.[12] According to H1, β_1 is expected to be negative and larger (in absolute value) in regions with little previous-immigration experience. According to H2, β_1 is still expected to be negative, but to instead be larger (in absolute value) in regions with extensive previous-immigration experience. Finally, according to H3, β_1 is expected to be more negative as the origin of the immigrant group studied is more distant. Alternative ways to split the sample are discussed in the robustness section, but the main results are robust to these splits.

Using a limited dependent variable like the 11-point trust measure brings the use of an OLS estimator into question, instead suggesting an ordered-logit regression. However, following previous research using 11-point scales as the dependent variable (Gustavsson & Jordahl, 2008; Dinesen & Sønderskov, 2015), this paper will use the more easily interpreted OLS regressions as the

[11] Results are similar if diversity and the contextual controls are lagged further, even if the sample then decreases due to a lack of data for some of the controls.

[12] An alternative specification would be to include past levels of diversity in the regressions together with a multiplicative interaction term between past and present diversity. However, the interaction variables have very high correlations with the diversity variables and the regressions are likely to suffer from multicollinearity. The use of split samples also puts fewer restrictions on the relationship between trust and diversity and with the control variables, letting their effect differ across samples.

main specification. The robustness check presents results from ordered-logit regressions, which mirror the main results.

3.3 Data

Sample

The individual data are gathered from the national SOM survey. The SOM survey is conducted annually with a sample of Swedish residents by the SOM institute at Gothenburg University, Sweden.[13] Respondents are between the ages of 15 and 85. The sample used in this paper includes only respondents who were raised in Sweden and whose parents were both raised in Sweden.[14] This group is the one most likely affected by present and historical levels of diversity in the region as the trust levels of both first- and second-generation immigrants are positively correlated to the trust levels of their country of origin (Ljunge, 2014).[15] The final sample is a repeated cross-section with 42,072 respondents from 1998 to 2013. A full list of variables from the SOM survey and other sources can be found in Table A1 in Appendix A.

The sample used by SOM is nationally representative and is based on registry data of all Swedish residents. The responding sample represents the Swedish population well in terms of location within Sweden and education levels, even though women are slightly overrepresented in the later years, as are people aged 50–75 compared to people aged 15–29 (Markstedt, 2014). People with foreign citizenship are also somewhat underrepresented (Vernersdotter, 2014). However, as the sample used here excludes those with a foreign background, this is of less importance. These small differences from the population distribution have only negligible effects on the share of high- and low-trust respondents (Markstedt, 2014).

[13] More information is available at the SOM webpage, www.som.gu.se.

[14] The data do not identify country of birth. Therefore, respondents whose parents were raised in Sweden but born elsewhere cannot be separated from those with parents born and raised in Sweden. The former are therefore considered third-generation immigrants and are included in the sample.

[15] The data does not include information on the grandparents of the respondents and third-generation immigrants cannot, therefore, be identified. However, the difference in trust between the native population and third-generation immigrants is likely to be small as the trust level of the region of destination has a strong effect on even the first generation of immigrants (Dinesen, 2012; Dohmen et al., 2012). For second-generation immigrants, the effect of local trust is stronger than even that of the trust levels of the parents' country of origin (Ljunge, 2014).

Trust

The SOM survey includes a question eliciting responses on generalized trust: "In your opinion, to what extent is it generally possible to trust people?" Answers are given on a scale ranging from 0 (*People cannot generally be trusted*) to 10 (*People can generally be trusted*). The use of survey data to capture the levels of generalized trust in a population is standard in the trust literature (e.g., Knack & Keefer, 1997; Alesina & La Ferrara, 2000; Zak & Knack, 2001; Costa & Kahn, 2003). While some surveys (such as, for instance, the World Value Survey) use a binary response, the scale used by the SOM survey provides more information of how trusting respondents are.[16]

Glaeser, Laibson, Scheinkman and Soutter (2000) criticized the use of survey questions to assess trust levels: In an experiment on Harvard graduates, they found that such questions have a higher correlation with the respondent's trustworthiness than with their trust in other people. However, in the general population, respondents seem to interpret and answer the question as intended: Uslaner (2002) points to the fact that the respondents in the American National Election Survey, when asked about their interpretation of the question, in general responded that they interpreted the question literally and motivated their answer with arguments specifically about trust in other people. Furthermore, using phone surveys including trust games with German households, Fehr, Fischbacher, von Rosenbladt, Schupp and Wagner (2002) find the opposite result from Glaeser et al. (2000). That is, trust questions predict trust, not trustworthiness.

Present-day diversity

Diversity is measured as the change in the share of the population born abroad (Statistics Sweden, n.d.a). Earlier studies for the most part use static measures, but there is prior evidence that dynamic ones have a greater effect (Hooghe et al., 2009). The share of population born abroad was also considered as a measure of diversity here, but proved to have less statistical significance in all instances. The paper therefore only presents results from the regressions using change in diversity as the variable of interest.[17] The change is measured as the change in the share of the population born abroad over five years as a sudden increase of diversity could plausibly have an effect over more than just one

[16] Other surveys that use similar 11-point scales are the ESS (used by Dinesen & Sønderskov, 2015), and the Swedish Election Studies (used by Gustavsson & Jordahl, 2008).

[17] The results from using the share of population born abroad are available upon request.

year.[18] Diversity is measured at the municipal level, the lowest level of government in Sweden. There are 290 municipalities in Sweden with an average population of 34,000 people and a median population of 17,000. Due to this small size, municipal-level measures are likely to be more precise when it comes to measuring an individual's actual exposure to diversity than measures at, for instance, the state or country level.[19]

To test the hypothesis that the effect of trust differs depending on geographical and cultural distance, the foreign-born population is split into subgroups. The groups are Nordic-born and non-Nordic-born immigrants. The Nordic countries (Sweden, Norway, Finland, Denmark and Iceland) share a long history and many cultural similarities. Immigration from these countries is, therefore, expected to have less of an effect on trust than more distant immigration. The robustness section also discusses a split between Nordic, non-Nordic European and non-European immigrants.[20]

Besides the share of immigrants in a society, one of the more popular measures of diversity is a fractionalization index (see, e.g., Delhey & Newton, 2005; Anderson & Paskeviciute, 2006; Putnam, 2007). These measures capture diversity by studying the relative sizes of all groups in a society. Although the share of immigrants has been shown to be the more relevant measure in Sweden (Gustavsson & Jordahl, 2008), the robustness section presents results from regressions using change in fractionalization[21] to improve comparability with the previous literature. These results are in line with the main specification.

Historical experience of diversity

The split between those regions with high shares of immigration in the past and those with low shares is made at the county level to ensure comparability across time. While people often move across municipality borders, about 85% of all moves are made within the same county (Statistics Sweden, 2015b), making comparisons over time more reliable at the latter level. There are 21 counties in Sweden, the borders of which are more or less the same as in 1810, with the

[18] Results are similar using the change over four or six years.

[19] Results using a county-level measure of diversity follow the same pattern as the main results, but are much less precisely estimated.

[20] Turkey is not included in Europe

[21] As with the share of foreign-born population, the level of fractionalization has less of an effect than the change.

exception of three mergers.[22] Besides these mergers. some smaller border changes have occurred over time (Andersson, 1993). Twenty-six municipalities were affected by these changes and so are removed from the sample.[23] Throughout, the modern borders (i.e., the post-merger borders) are used for historical data to create consistency.

The sample is split in two based on the share of their population that was born abroad at different points in the past. The split is made between those with a higher share than average and those with a lower share than average. As historical diversity could theoretically have an effect over several generations, splits are made based on the situation at four different points in time. The four points are the years 1900, 1930, 1960 and 1990[24] (Statistics Sweden, n.d.b, c, 1960). These time periods cover the pre-World War I, Interwar and post-World War II periods, as well as more recent experiences, covering the spectrum of the Swedish 20th century experience of immigration.

To ensure that the specific choice of division is not driving the result, the robustness check presents results using two alternative ways to split the samples. The first is a split based on the median share of historical immigration. These results point in the same direction as the main specification, but with generally smaller differences between the samples, indicating that the counties with the highest share of past immigration are driving the results. The second split is based on historical levels of non-Nordic immigration instead of all immigration (Statistics Sweden, n.d.a, b, e, 1936, 1960). These results are very much in line with the main results except for the split based on data from 1990, where the difference between the samples is smaller than before. This difference is presumably due to the large influx of non-Nordic immigrants just after 1990.

Controls

The regressions include individual-level controls previously found to affect trust and commonly used in the diversity-and-trust literature. The respondent's age is correlated to trust as older respondents in general trust more than young ones (Putnam, 2000; Rothstein & Stolle, 2003). However, this general trend hides

[22] The resulting counties from the three mergers were Stockholm, Skåne, and Västra Götaland County.

[23] For the most part the changes only affected a small part of the municipality, but, as the data are available only at the municipal level, the entire municipality is still dropped in such a case. Including these municipalities in the sample does not change the result.

[24] Data are also available for 1910, 1920, and 1980. Results for 1910 and 1920 are in between those for 1900 and 1930 and the results for 1980 are very similar to those for 1990.

differences across different cohorts (Uslaner, 2002), which motivates the inclusion of decade-of-birth dummies. The regressions also include a dummy for the gender of the respondent. In general, women are expected to trust less than men, possibly due to women being more likely to have experienced discrimination (Alesina & La Ferrara, 2002). However, women have come out as more trusting in some studies (Putnam, 2007). A control for the residential area of the respondent is included as people living in cities are expected to trust less compared to people living in more rural communities, as the latter are more likely to be familiar with most people they see in their day-to-day life (Putnam, 2000). However, people living in rural areas in Sweden have lower trust than people living in the large cities (Gustavsson & Jordahl, 2008). Income, schooling and employment situation have all been shown to correlate with trust with richer, more educated and employed people being more likely to trust than their counterparts (Rothstein & Stolle, 2003; Gustavsson & Jordahl, 2008). The regressions, therefore, include controls for a person's income, whether he or she has had any university education, and a set of labor-market situation dummies.

To control for local context, the regressions also include a set of municipal-level controls of economic and demographic factors that could covary with both a large share of foreign-born population and the level of trust in a county. Immigrants to Sweden are on average less likely to be employed than native Swedes (Statistics Sweden, 2013). Municipalities with a high share of foreigners could therefore be expected to have on average higher rates of unemployment and a more unequal spread of income, both of which decrease trust (Knack & Keefer, 1997; Alesina & La Ferrara, 2002; Li, Pickles & Savage, 2005; Putnam, 2007; Gustavsson & Jordahl, 2008). Furthermore, perceived competition for jobs and other resources between natives and immigrants could increase the saliency of group dividers, if the lack of resources leads to conflict between groups (Blumer, 1958). This could further increase the effects of diversity on trust. Therefore, the controls include the unemployment level in the municipality,[25] the county-level GDP per capita and the Gini coefficient. As immigrants, in Sweden and elsewhere, disproportionately locate in densely populated areas (Edin, Fredriksson & Åslund, 2003) and because living in close proximity to a large group of people is expected to lower trust (Putnam, 2000),

[25] The unemployment figure is that of the Swedish-born population, to avoid multicollinearity issues with the diversity and individual-level employment variables which could otherwise be a problem (Gustavsson & Jordahl, 2008; Wallman Lundåsen & Wollebeak, 2013). The data only stretches back to 1997, which means that the trust data from 1996 and 1997 cannot be used. However, using county-level controls for unemployment and crime (for which the municipal-level data only stretches back to 1996) that cover the entire period produces similar results.

the controls also include the population in each municipality. To control for the fact that historical immigration was centered toward regions that offered industrial jobs, and that industry structure predicts trust (Paxton, 2002), the regressions include controls for the share of the employed that work in goods-producing sectors (including agriculture and the extraction of raw materials). The regressions also include a control based on the level of housing segregation in each county (Statistics Sweden, 2014) to control for the fact that regions with higher levels of immigration also could be more segregated, which would then confound the results. Finally, the control vector also includes the reported crime rate at the municipal level (Gustavsson & Jordahl, 2008), as crime is expected to be positively correlated with diversity and negatively correlated with trust (Putnam, 2007).

4. Results

4.1 Summary statistics

Table 1 presents summary statistics of the variables, as well as their correlation with *Trust.* The correlations between control variables can be found in Table A2 in Appendix A. Swedes on average have high levels of trust with an average response of 6.57 on the trust question. This is in line with results from the ESS in 2010, which used a similar trust question.[26] In the ESS, the average trust level in Sweden was 6.7. For comparison, the other Nordic countries fall in the range 6.5–7.0 in the same ESS survey, whereas most other European countries have much lower trust, such as France (4.4) and Greece (4.0).

During the sample period, the share of the population born abroad on average increased one percentage point every five years. This increase is split quite evenly between immigrants from non-Nordic Europe and from outside of Europe. A five-year average decrease of 0.1 percentage point of immigrants from the Nordic countries outside of Sweden makes up the difference between the non-Nordic and total immigration. The fastest increase took place in small municipalities in the 2010s. The steepest increase in the sample was recorded in

[26] The exact wording of the ESS question is, "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?" Just like in the SOM survey respondents are asked to respond on an 11-point scale from 0 to 10.

Table 1. Descriptive statistics

	Mean	Std. dev.	Min.	Max.	Median	Corr. With Trust
Variables of interest						
Trust	6.57	2.20	0	10	7	
Change in foreign share	.010	.010	-.029	.065	.009	-.05
Change in Nordic share	-.001	.004	-.018	.043	-.001	-.07
Change in non-Nordic	.010	.010	-.029	.072	.009	-.02
Change in non-Nordic Europe share	.004	.006	-.038	.051	.003	-.03
Change in non-Europe share	.006	.008	-.021	.057	.005	-.01
Change in fractionalization index	.016	.016	-.050	.109	.014	-.04
Individual level variables						
Woman	.51	.50	0	1	1	.04*
Age	49.4	17.69	15	85	51	.06*
Rural	.40	.49	0	1	0	-.05*
Retired	.26	.44	0	1	0	-.02*
Unemployed	.05	.22	0	1	0	-.07*
Students	.08	.27	0	1	0	-.05*
Low income	.27	.44	0	1	0	-.13*
Medium income	.33	.47	0	1	0	-.01*
University	.33	.47	0	1	0	.16*
Contextual controls						
Segregation	.20	.08	.00	.47	.19	-.02
Unemployment	.08	.03	.02	.21	.07	-.01
Crime	9.14	.32	7.15	10.05	9.16	.21*
Population	9.86	.90	7.79	13.69	9.67	.38*
Gini	.26	.03	.19	.36	.26	.09
Industry employment	.29	.05	.14	.42	.29	-.24*
GDP	5.50	.16	5.17	6.11	5.50	.07

Each variable is summarized at the level of observation.* indicates a correlation significant at the 5% level.

2011 for the municipality of Sorsele in the sparsely populated northeast of Sweden, with a population of just 2,729. Sorsele increased its foreign-born share by 6.5 percentage points during the period 2007–2011, mainly due to the opening of a new refugee reception center. Besides large increases of non-Europeans following the wars in Iraq, Afghanistan and, later, Syria, the largest immigration flows consists of increases in non-Nordic Europeans following the Yugoslavian wars in the 1990s (Swedish Migration Agency, n.d.). The increase of the non-Nordic share is at times larger than the overall increase of immigration as it is negatively correlated to Nordic immigration: Nordic immigrants appear to leave municipalities as the share of non-Nordic immigrants increase. This was the case in the municipality of Södertälje outside of Stockholm which increased its non-Nordic share of the population by over seven percentage points in the five years leading up to 2011, while at the same time decreasing its share of Nordic-born immigrants by one percentage point. This loss was due to both an increase in the population and a decrease in the absolute number of Nordic immigrants in the municipality. All the diversity variables are negatively correlated with trust, but none of the correlations are significant at the 5% level.

Looking at historical levels of diversity, the data show great differences in the number of immigrants living in different regions of Sweden also in the past.

Table 2. Historical shares of foreign born population

	1900	1930	1960	1990
Low	.002	.005	.021	.054
	(.001)	(.001)	(.005)	(.012)
High	.010	.013	.048	.102
	(.003)	(.004)	(.016)	(.026)

Cross sectional averages of historical shares of foreign born population, (SCB, n.d. b, c, 1960). Standard deviations in parentheses.

Table 2 presents the historical average share of the population born abroad at different times. For each period, the table shows the cross-sectional average share in two samples: the group of counties with shares of foreign-born population below the average at the time and the group with shares above average. For each of the four splits, the shares are markedly different: Counties in the *high* group have more than twice as high a share of foreigners as those in the *low* group in three out of four periods.

All the individual-level controls are significantly correlated with *Trust.* As expected from the literature (Rothstein & Stolle, 2003; Putnam, 2007; Gustavsson & Jordahl, 2008) older, employed, more educated and more wealthy people have greater trust. Among the contextual controls, neither housing segregation, the unemployment rate, inequality, nor GDP is significantly correlated with social trust. However, both crime levels and population are significantly positively correlated with *Trust.* This could be explained by larger municipalities tending to have more educated, richer, employed and, therefore, trusting populations, but also high levels of crime (as seen in Table A2). Respondents in municipalities with high shares of employment in industry are, in general, less trusting than others. This could partly be explained by these municipalities being poorer, smaller and more rural than other municipalities as seen in Table A2.

4.2 Main results

Table 3 presents the results from regressions with the full sample and with the sample split according to the share of population born abroad at different times in the past. For the full sample, the effect of immigration is negative, but insignificant. However, this result hides a stark contrast between regions with high and low shares of historical diversity. Social trust is more negatively affected by new diversity in those regions with historically high shares of foreigners for all splits. In contrast, in the regions with low levels of historical immigration the effects are insignificant. Respondents in regions with a history of immigration react more strongly to new immigration, the opposite of what is suggested by H1. Instead, these results give support for H2, the hypothesis that past experience of diversity leads to present-day diversity having a stronger negative effect on trust. The size of the coefficients in the *high* samples is economically significant. The largest effect, found in the sample split by diversity in 1990, demonstrates a decrease in *Trust* of 0.55 points should the foreign share increase by 6.5%, the maximum observed in the sample. For comparison, the difference between the highest and lowest average social trust among the 27 countries in the ESS survey 2010 is only 3.1 points,[27] making a change of 0.55 economically significant.

[27] The country with the highest average trust was Denmark (average trust 7.0), and the country with the lowest (3.9) was Bulgaria.

To test the third hypothesis concerning the effect of immigration across different origins, Table 4 presents results from the same samples but with the diversity measure now split between Nordic and non-Nordic immigrants. The hypothesis gets support in the regression using the full sample where non-Nordic immigration is significantly negatively correlated with trust while Nordic immigration is insignificantly positive. Nordic immigration is also positive in all the split samples and some of the coefficients are large, indicating that increasing levels of Nordic-born population increases trust. This could be due to Nordic immigrants being close enough culturally to Swedes that an increase in the share of Nordic population in effect is seen as a decrease of diversity. However, all the coefficients for Nordic immigration are insignificant, so this effect seems to be of less importance. The results for non-Nordic immigration, instead, show a consistent difference between the *high* and the *low* samples. In the *low* samples, the results follow the same pattern as in Table 3 with all results being insignificantly different from zero. In contrast, the effect of non-Nordic immigration is negatively significant in all the *high* samples. The most negative coefficient, -9.77, indicates a decrease of *Trust* of 0.7 points should the share of non-Nordic foreigners in a municipality increase by 7.2%, the maximum in the full sample. Cultural distance, thus, has an important role to play in the effects of diversity on trust and these results provide support for H3 as well as further support for H2.

As a robustness check, the sample is further split between non-Nordic European immigrants and non-European immigrants. The results are presented in the robustness section. These results point in the same direction as those of the main specification, with both non-Nordic Europeans and non-Europeans lowering trust in the *high* groups while Nordic immigrants still have no significant effect on trust.

To further test the three hypotheses, Table 5 presents the differences in coefficient size between samples and indicates whether these differences are significantly different from each other based on Wald tests. For the regressions using the change in total foreign share, the coefficients are significantly different at the 10% level for all splits except for the split based on immigration in 1960.

For the results from the regressions splitting immigration into Nordic and non-Nordic, the coefficients for Nordic immigration are never significantly different across the splits, even if the difference is often large. The coefficients for non-Nordic immigration however, are significantly different at the 10% level for the splits based on diversity in 1900 and 1960 and at the 5% level for the splits based on diversity in 1930 and 1990.

Table 3. Diversity and trust, all immigration

Year split is based on:			1900		1930		1960		1990	
Sample:		Full	Low	High	Low	High	Low	High	Low	High
Diversity	Foreign change	-4.12	2.13	-7.29**	2.05	-7.81**	2.66	-6.77**	5.85	-8.40***
		(2.62)	(4.79)	(3.04)	(4.55)	(3.16)	(5.20)	(2.95)	(4.35)	(3.01)
Individual controls	Woman	.17***	.09**	.21***	.11***	.21***	.10**	.20***	.09**	.22***
		(.03)	(.04)	(.04)	(.03)	(.04)	(.04)	(.03)	(.03)	(.04)
	Age	.03***	.03***	.03***	.03***	.03***	.03***	.03***	.03***	.03***
		(.00)	(.01)	(.00)	(.01)	(.00)	(.01)	(.00)	(.01)	(.00)
	Rural	-.08***	-.08*	-.08**	-.08**	-.08*	-.05	-.10***	-.04	-.12***
		(.03)	(.04)	(.04)	(.04)	(.04)	(.04)	(.04)	(.04)	(.04)
	Retired	-.30***	-.24***	-.32***	-.23***	-.34***	-.17**	-.36***	-.20***	-.36***
		(.04)	(.07)	(.05)	(.06)	(.05)	(.07)	(.05)	(.07)	(.05)
	Unemployed	-.39***	-.34***	-.42***	-.32***	-.44***	-.39***	-.40***	-.35***	-.42***
		(.05)	(.10)	(.07)	(.09)	(.07)	(.10)	(.07)	(.09)	(.07)
	Student	.13***	.08	.17**	.05	.19***	.06	.17***	.09	.16**
		(.05)	(.08)	(.06)	(.07)	(.07)	(.08)	(.06)	(.07)	(.07)
	Low income	-.70***	-.76***	-.68***	-.74***	-.68***	-.73***	-.69***	-.72***	-.69***
		(.03)	(.06)	(.04)	(.05)	(.04)	(.06)	(.03)	(.05)	(.04)
	Medium income	-.29***	-.35***	-.26***	-.33***	-.26***	-.32***	-.27***	-.29***	-.29***
		(.02)	(.04)	(.03)	(.04)	(.03)	(.04)	(.03)	(.04)	(.03)
	University	.62***	.63***	.62***	.64***	.62***	.62***	.63***	.64***	.62***
		(.02)	(.04)	(.03)	(.04)	(.03)	(.04)	(.03)	(.04)	(.03)

Contextual controls	Segregation	.16	-.46	.62	.09	.07	.35	-.21	-.14	-.09
		(.70)	(1.10)	(.87)	(1.02)	(1.02)	(1.02)	(.94)	(.97)	(1.09)
	Unemployment	-1.71	1.93	-3.24*	2.44	-3.70*	1.07	-2.84	2.71	-6.02***
		(1.59)	(2.32)	(1.88)	(2.20)	(1.88)	(2.59)	(1.74)	(2.19)	(1.85)
	Crime	-.11	-.17	-.11	-.22	.00	-.35**	.12	-.19	.01
		(.11)	(.17)	(.14)	(.15)	(.15)	(.16)	(.14)	(.15)	(.15)
	Population	.19	.01	.12	.12	.08	-.06	.32	-.14	.18
		(.33)	(.62)	(.41)	(.62)	(.44)	(.79)	(.38)	(.69)	(.52)
	Gini	-.32	-.14	-.94	.27	-1.51	.69	-1.40	.77	-1.89
		(.90)	(1.33)	(1.18)	(1.26)	(1.29)	(1.06)	(1.27)	(1.03)	(1.34)
	Industry	-1.93	-1.87	-3.05*	-1.73	-2.42	-3.26*	-.25	-4.03**	1.54
		(1.22)	(1.71)	(1.72)	(1.66)	(1.77)	(1.76)	(1.72)	(1.63)	(2.08)
	GDP	.45	.81	.45	.89	.15	1.16**	-.30	.99**	.67
		(.40)	(.72)	(.49)	(.61)	(.60)	(.57)	(.58)	(.46)	(.90)
	Constant	2.71	3.26	3.77	1.87	4.94	3.80	3.17	4.34	.30
		(4.38)	(7.91)	(5.38)	(7.57)	(6.33)	(9.60)	(5.56)	(8.15)	(8.26)
R^2		.06	.06	.06	.06	.06	.05	.06	.05	.06
Observations		42,072	14,315	27,757	16,365	25,707	13,648	28,424	16,128	25,944
Number of municipalities		264	109	155	120	144	88	176	118	146

Dependent variable: *Trust*. Standard errors clustered at the municipal level in parentheses. All regressions include municipal, year, and cohort fixed effects. The regressions only include municipalities that have not changed county since 1900. * indicates 10% significance, ** 5% and *** 1%.

Table 4. Diversity and trust, Nordic and non-Nordic immigration

Year split is based on:			1900		1930		1960		1990	
Sample:		Full	Low	High	Low	High	Low	High	Low	High
Diversity	Nordic change	8.85	27.15	2.86	2.13	3.20	19.74	5.26	14.57	1.80
		(5.92)	(19.47)	(6.46)	(13.77)	(6.87)	(15.82)	(6.57)	(8.96)	(7.46)
	Non-Nordic change	-5.36**	1.91	-8.95***	2.01	-9.77***	2.47	-8.47***	4.77	-9.31***
		(2.70)	(4.76)	(3.18)	(4.54)	(3.29)	(5.17)	(3.06)	(4.53)	(3.07)
Individual controls	Woman	.17***	.09**	.21***	.10***	.21***	.10**	.20***	.09**	.22***
		(.03)	(.04)	(.04)	(.03)	(.04)	(.04)	(.03)	(.03)	(.04)
	Age	.03***	.03***	.03***	.03***	.03***	.03***	.03***	.03***	.03***
		(.00)	(.01)	(.00)	(.01)	(.00)	(.01)	(.00)	(.01)	(.00)
	Rural	-.08***	-.08*	-.08**	-.08**	-.08*	-.05	-.10***	-.04	-.12***
		(.03)	(.04)	(.04)	(.04)	(.04)	(.04)	(.04)	(.04)	(.04)
	Retired	-.30***	-.24***	-.32***	-.23***	-.34***	-.17**	-.36***	-.20***	-.36***
		(.04)	(.07)	(.05)	(.06)	(.05)	(.07)	(.05)	(.07)	(.05)
	Unemployed	-.39***	-.34***	-.42***	-.32***	-.44***	-.39***	-.40***	-.35***	-.42***
		(.05)	(.10)	(.07)	(.09)	(.07)	(.10)	(.07)	(.09)	(.07)
	Student	.13***	.08	.17**	.05	.19***	.06	.17***	.09	.16**
		(.05)	(.08)	(.06)	(.07)	(.07)	(.08)	(.06)	(.07)	(.07)
	Low income	-.70***	-.76***	-.68***	-.74***	-.68***	-.73***	-.69***	-.72***	-.69***
		(.03)	(.06)	(.04)	(.05)	(.04)	(.06)	(.03)	(.05)	(.04)
	Medium income	-.29***	-.35***	-.26***	-.33***	-.26***	-.32***	-.27***	-.29***	-.29***
		(.02)	(.04)	(.03)	(.04)	(.03)	(.04)	(.03)	(.04)	(.03)
	University	.62***	.63***	.62***	.64***	.62***	.62***	.63***	.64***	.62***
		(.02)	(.04)	(.03)	(.04)	(.03)	(.04)	(.03)	(.04)	(.03)

Contextual controls	Segregation	.35	-.31	.78	.18	.23	.35	.08	-.07	.16
		(.68)	(1.10)	(.86)	(1.02)	(1.02)	(1.02)	(.95)	(.97)	(1.08)
	Unemployment	-1.32	1.76	-2.68	2.22	-2.98*	.95	-2.28	2.62	-5.51***
		(1.47)	(2.34)	(1.76)	(2.21)	(1.79)	(2.60)	(1.62)	(2.18)	(1.79)
	Crime	-.12	-.16	-.12	-.23	-.00	-.38**	.11	-.19	-.01
		(.11)	(.17)	(.14)	(.15)	(.16)	(.17)	(.14)	(.15)	(.15)
	Population	.11	.05	.07	.14	-.01	-.04	.20	-.18	.11
		(.32)	(.62)	(.40)	(.62)	(.44)	(.79)	(.38)	(.69)	(.52)
	Gini	-.31	-.08	-.84	.35	-1.47	.73	-1.45	.82	-1.94
		(.89)	(1.35)	(1.16)	(1.27)	(1.26)	(1.08)	(1.24)	(1.03)	(1.32)
	Industry	-1.75	-1.80	-2.63	-1.81	-1.87	-3.23*	.08	-3.99**	1.74
		(1.21)	(1.68)	(1.74)	(1.64)	(1.79)	(1.76)	(1.71)	(1.63)	(2.07)
	GDP	.47	.87	.44	.94	.09	1.17**	-.33	.99**	.62
		(.40)	(.72)	(.50)	(.61)	(.60)	(.57)	(.58)	(.46)	(.89)
	Constant	3.46	2.57	4.36	1.60	6.04	3.76	4.59	4.82	1.35
		(4.35)	(7.95)	(5.37)	(7.54)	(6.34)	(9.52)	(5.61)	(8.15)	(8.28)
R^2		.06	.06	.06	.06	.06	.05	.06	.05	.06
Observations		42,072	14,315	27,757	16,365	25,707	13,648	28,424	16,128	25,944
Number of municipalities		264	109	155	120	144	88	176	118	146

Dependent variable: *Trust*. Standard errors clustered at the municipal level in parentheses. All regressions include municipal, year, and cohort fixed effects. The regressions only include municipalities that have not changed county since 1900. * indicates 10% significance, ** 5% and *** 1%.

Table 5. Wald tests of difference between coefficients

Year split is based on:	1900	1930	1960	1990
Foreign change	9.42*	9.86*	9.43	14.25*
Nordic change	24.29	-1.07	14.48	12.77
Non-Nordic change	10.86*	11.78**	10.94*	14.08**

The table presents the difference between the coefficients in the *low* and *high* samples (coefficient in the *low* sample – the coefficient in the *high* sample) and whether this difference is significantly different from zero. Significance is based on a Wald test. * indicates 10% significance and ** 5%.

Although there are clear differences between the *high* and the *low* groups for all splits, the splits based on data from 1930 and 1990 produce marginally stronger differences between the two samples than those based on data from 1900 and 1960. The fact that the split based on the level of diversity in 1900 is of somewhat lesser importance can be explained in two not mutually exclusive ways. First, the results might indicate that the level of immigration in 1900 might simply have been too low to have any great impact on people's perceptions of immigrants. Especially the number of non-Nordic immigrants was very low at this point; in the country as a whole, only 0.3% of the population was born outside of the Nordic countries in 1900 (Statistics Sweden, 2015a). Second, the results could show that the effect of past immigration, although consistent for decades, does eventually fade away. The comparably weak results for 1960 could instead be explained by the composition of immigration as many of the immigrants at that time were labor migrants. While it is not unlikely that labor immigration could lead to conflict if foreigners are seen to compete with natives for scarce jobs (Blumer, 1958), the economic boom and the relative abundance of jobs in Sweden following the War presumably lessened any such conflict. Instead, working alongside foreigners could have dampened the saliency of group dividers somewhat. However, since the effect is still clearly there for all splits, the effects of this contact seem to be minor.

Based on these results, it seems that the group divider Swede/non-Swede (or rather, Nordic/non-Nordic) is more important in those counties that have more past experiences with immigration. Thus, counter to what is expected by H1, people do not get used to diversity over time. Group borders do not erode away with interaction; rather, diversity makes people increasingly turn toward their own group. This within-country heterogeneity could explain why studies on

diversity and trust in Sweden yield conflicting results (Gustavsson & Jordahl, 2008; Wallman Lundåsen & Wollebeak, 2013; Lundstedt & Nissling, 2016); diversity does have a negative effect on trust in some regions of Sweden, but not all.

One reason for why previous experiences with diversity do not decrease the negative effect of diversity on trust could be a lack of actual contact across groups. If diversity in a society only leads to segregation and few actual interactions across groups, then trust is likely to decrease as people will not overcome stereotypes about other groups (Uslaner, 2012). While "Chinatowns" or similar, where a single immigrant group dominates an area, are uncommon in Sweden, segregation between native Swedes and non-Nordic emigrant groups is widespread (Bråmå, 2003). But this segregation is a fairly recent phenomenon, with the levels of segregation being much lower in the 1960s and even in the 1980s and early 1990s than during the sample period (Murdie & Borgegård, 1998; Nordström Skans & Åslund, 2010). But even if housing were less segregated in the past and interactions did occur, not all types of interactions are equally conducive to improving intergroup relations (Pettigrew & Tropp, 2006). Allport (1954) listed four optimal conditions required for contact to have the greatest positive effect: equal status between groups, common goals, intergroup cooperation and the support of laws and custom. While the chances of these conditions occurring are likely to decrease if segregation is high, there is no guarantee that they are met even in desegregated societies.

Among the control variables, the results for the individual variables are consistent throughout all specifications. The results show that women trust more than men, as found by Putnam (2007), and that older people trust more than younger ones, also in line with the literature (Putnam, 2000; Rothstein & Stolle, 2003). Retired and unemployed people trust less than students and those who are employed, as found by Gustavsson and Jordahl (2008). People living in rural areas are less trusting than those living in cities, which is the opposite of what is found by Putnam (2000) but in line with previous research in Sweden (Gustavsson & Jordahl, 2008). As expected from earlier studies (Rothstein & Stolle, 2003; Gustavsson & Jordahl, 2008), richer and more educated people tend to trust more. Lastly, none of the different cohorts are consistently significantly different from the others. Neither of the contextual variables has a consistent effect on *Trust.* This could, in part, be explained by the simultaneous use of both municipal and year fixed effects: The former picks up all of the time-invariant intermunicipal differences and the latter all common changes over time, leaving only the within-municipality change over time not explained by

national trends. This change over time is likely to be low for several of the variables—e.g., *Gini.*

4.3 Robustness checks

This section presents the results from five sets of regressions performed to study the robustness of the main results. Table B1 in Appendix B presents results using a further split of the region of origin, splitting immigrants into three groups: Nordic immigrants, non-Nordic European immigrants and non-European immigrants. In summary, both non-Nordic European and non-European immigrants lower trust among native Swedes in the samples with a high share of foreigners in the past, although the former group seems to have a greater effect. Nordic immigration never has a significant effect in either sample. As such, the important split is that between Nordic and non-Nordic immigrants and not between non-Nordic European and non-European immigrants.

Table B2 presents the results from regressions where the splits between regions with a historically low and historically high share of immigrants are based on the median level instead of the mean. In these regressions the eleven counties with a historical share of immigrants below or equal to the median in the different four periods make up the *low* groups and the remaining 10 the *high* groups. The results for Nordic immigrants show some very large coefficients in the *low* samples. The effect is strongest in those regions with low levels of immigration in 1900 and 1930, where the coefficients are even significant, albeit only at the 10% level. This could be due to Nordic immigrants historically being considered more exotic than they are today, leading to early exposure increasing the saliency of the group divider between native Swedes and Nordic immigrants. The results for non-Nordic immigration are in general consistent with those in the main specification, but weaker. This shows that the counties with the highest shares of historical immigration drive the negative effect in the main specification.

Table B3 shows the result from regressions with splits based on the historical share of non-Nordic immigrants in the regions[28] (Statistics Sweden, n.d.a, b, e,

[28] The data concerning non-Nordic immigrants in the year 1900 is an approximation created by aggregating the annual flows of non-Nordic immigrants during the years 1875–1900. During these years immigrants coming from Russia were not separated from those coming from Finland on the county level and the latter are therefore counted as Nordic for this year (Statistics Sweden, n.d.e).

1936, 1960). Just as in the regressions in Table B2, Nordic immigration has a large effect in the *low* samples for 1900 and 1930, this time even being significant once at the 5%. For non-Nordic immigration, these results are in line with the main results except for the split based on the share of non-Nordic immigrants in 1990. While the coefficient in the *high* sample is still the most negative, it is only significant at the 10% level and the difference in coefficient size across the two samples is very small. However, this can, in part, be explained by the large influx of immigrants from the Balkan wars that arrived to Sweden a few years into the decade. Some 80,000 asylum seekers arrived in Sweden during a short period, likely overshadowing the effects of the levels of non-Nordic immigration in the year 1990. As such, the level of non-Nordic immigration in the year 1990 is not representative of the levels of the 1990s as a whole. Splitting the sample based on the level of non-Nordic immigrants in 1995 produces results that are more in line with previous results.[29]

Table B4 presents the results from regression using the five-year change in a fractionalization index as the measure of diversity. The index is one minus a Herfindahl index of the three groups used in Table 4: natives, Nordic immigrants and non-Nordic immigrants.[30] For these regressions the historical split is based on historical fractionalization instead of the share of nonnative born population (Statistics Sweden, n.d.a, b, e, 1936, 1960).[31] These results are in line with the main specifications.

Lastly, to make sure that using OLS regressions with a limited dependent variable does not distort the results, Table B5 presents results from ordered-logit regressions (Gustavsson & Jordahl, 2008). The scale used to measure trust in the SOM survey is arbitrary: one cannot for certain say that a response of 8 on the trust scale indicates "twice as much trust" as a response of 4, even if the former is clearly indicative of higher trust than the latter. Ordered-logit regressions address the issues of such ordinal, but noncardinal, scales by assuming an underlying latent variable with different cut-off points for each of the values of the dependent variable (McCullagh, 1980). Since the coefficients in ordered-logit regressions should be interpreted as changes in log odds of being at a higher level of trust and not direct changes in trust, their size is not directly comparable to the previous results. However, as seen in Table B5, the direction and significance is very much in line with the main results.

[29] Results available upon request.

[30] The index is explained further in Table A1.

[31] The results using splits based on the share of immigrants are very similar.

5. Discussion

The positive effects of social trust on societies are numerous. Trust improves not only the level of economic well-being in a society (Knack & Keefer, 1997), but it is also positively correlated with low levels of corruption and crime (Uslaner, 2012). Considering these positive effects, it is not surprising that the causes of trust and distrust are the focus of such a large literature, both theoretical and empirical. A negative correlation between contemporary diversity, especially in terms of immigration or ethnic diversity, and social trust has been found in both across and within-country studies (e.g., Knack & Keefer, 1997; Zak & Knack, 2001; Putnam, 2007; Gustavsson & Jordahl, 2008). However, while present-day diversity is well covered, the effects of historical diversity remain underresearched. Diversity could have effects reaching across decades as norms and preferences are transferred across generations (Bisin & Verdier, 2001; Bisin et al., 2004; Guiso et al., 2008), and studying the historical context could bring new insights to the literature on diversity and generalized trust.

By studying the correlation between diversity and trust across Swedish regions with varying degrees of historical diversity, this study sheds light on how the effect of diversity today depends on the population's earlier experiences. The results presented here reveal that history does have an effect: The population in regions with relatively higher levels of historical diversity reacts more negatively to new immigration. This result gives strong support to Hypothesis 2 and it seems that early exposure to diversity leads to group identifiers becoming more salient over time, giving support to conflict theory in the long run. This is the opposite of what is hypothesized by Putnam (2007), who instead suggested that group borders erode away after generations of interaction across groups. The result is driven by immigration coming from non-Nordic countries. This gives support for Hypothesis 3, that immigration from culturally distant countries has a more negative effect than immigration from countries sharing a similar culture as the destination country. However, the effect of cultural distance seems to be important only between the neighboring Nordic countries and other countries, further divisions having only small effects.

These results have some lessons to offer policymakers, not the least concerning the relocation of refugees. First, as rapid changes in diversity are more detrimental to trust than high levels of diversity it is more important to create an even increase of diversity than an even level of diversity across regions. Furthermore, regions without a long history of diversity seem more capable of incorporating citizens from distant countries. At the present, these factors appear

not to be taken into consideration: Following the large influx of refugees to Sweden in 2015, more refugees per capita were allocated to counties with historically high levels of immigration[32] (Swedish Migration Agency, 2016). According to the results presented here, this is the opposite of the optimal way of allocating immigrants to preserve generalized trust.

The results of this paper also point to an interesting new avenue of research, further studying historical diversity's effect on trust. Future research could gain further knowledge by studying more fine-grained data on immigrants' origin in the past and present as well as their reasons for immigrating. These aspects differ across countries as different countries have different experiences of immigration from the past: Immigration could be common or uncommon, from nearby countries or from far-away ones, consist of refugees or laborers, and so on. It is therefore not clear that these results are applicable in regions with a different history of immigration from that in Sweden. Further research is needed and the effect of history needs to be tested in different countries and contexts to further tease out the relationship between past diversity and the relationship between modern diversity and social trust.

References

Akerlof, G.A., & Kranton, R.E. (2000). Economics and Identity. *The Quarterly Journal of Economics,* vol. 65, no. 3, pp. 715–753.

Alesina, A., & La Ferrara, E. (2000). Participation in Heterogeneous Communities. *Quarterly Journal of Economics,* vol. 115, no. 3, pp. 847–904.

Alesina, A., & La Ferrara, E. (2002). Who Trusts Other? *Journal of Public Economics,* vol. 85, pp. 207–234.

Algan, Y., & Cahuc, P. (2010). Inherited Trust and Growth. *American Economic Review,* vol. 100, pp. 2060–2092.

Allport, G.W. (1954). *The Nature of Prejudice.* Reading, MA: Addison-Wesley.

Almqvist, A. (2016). *Regional Inkomstojämlikhet i Sverige.* Stockholm, Sweden: Bantorget Grafiska AB.

Anderson, C.J., & Paskeviciute, A. (2006). How Ethnic and Linguistic Heterogeneity Influence the Prospects for Civil Society: A Comparative Study of Citizenship Behavior. *Journal of Politics,* vol. 68, no. 4, pp. 783–802.

[32] This holds true for all the sample splits made in the main specification.

Andersson, P. (1993). Sveriges Kommunindelning 1863–1993. Mjölby, Sweden: Bokförlaget Draking.

Ariely, G. (2014). Does Diversity Erode Social Capital? Conceptual and Methodological Issues. *Political Studies,* vol. 62, pp. 573–595.

Balliet, D., Wu, J., & De Dreu, C.K.W. (2014). Ingroup Favoritism in Cooperation: A Meta-Analysis. *Psychological Bulletin,* vol. 140, no. 6, pp. 1556–1581.

Bisin, A., Topa, G., & Verdier, T. (2004). Cooperation as a Transmitted Cultural Trait. *Rationality and Society,* vol. 16, no. 4, pp. 477–507.

Bisin, A., & Verdier, T. (2001). The Economics of Cultural Transmission and the Dynamics of Preferences. *Journal of Economic Theory,* vol. 97, pp. 298–319.

Bjørnskov, C. (2006). Determinants of Generalized Trust: A Cross-Country Comparison. *Public Choice,* vol. 130, pp. 1–21.

Blumer, H. (1958). Race Prejudice as a Sense of Group Position. *Pacific Sociological Review,* vol. 1, no. 1, pp. 3–7.

Bråmå, Å. (2003). Utvecklingen av Boendesegregationen i Mellanstora Städer under 1990-Talet. *Rapport Integration 2003.*

Canadian Families Project. (2002). *National Sample of the 1901 Census of Canada.* Victoria, Canada: University of Victoria.

Chen, Y., & Li, S.X. (2009). Group Identity and Social Preferences. *American Economic Review,* vol. 99, no. 1, pp. 431–457.

Costa, D.L., & Kahn, M.E. (2003). Civic Engagement and Community Heterogeneity: An Economist's Perspective. *Perspectives on Politics,* vol. 1, no. 1, pp. 103–111.

Delhey, J., & Newton, K. (2005). Predicting Cross-National Levels of Social Trust: Global Pattern or Nordic Exceptionalism? *European Sociological Review,* vol. 21, no. 4, pp. 311–327.

The Digital Archive, Norwegian Historical Data Center (University of Tromsø) & the Minnesota Population center. (2008). *National Sample of the 1900 Census of Norway.* Version 2.0. Tromsø, Norway: University of Tromsø.

Dinesen, P.T. (2012). Does Generalized (Dis)Trust Travel? Examining the Impact of Cultural Heritage and Destination-Country Environment on Trust of Immigrants. *Political Psychology,* vol. 33, no. 4, pp. 495–511.

Dinesen, P.T., & Sønderskov, K.M. (2015). Ethnic Diversity and Social Trust: Evidence from the Micro-Context. *American Sociological Review,* vol. 80, no. 3, pp. 550–573.

Dohmen, T., Falk, A., Huffman, D., & Sunde, U. (2012). The Intergenerational Transmission of Risk and Trust Attitudes. *Review of Economic Studies,* vol. 79, pp. 645–677.

Duffy, B. (2004). *Life Satisfaction and Trust in Other People.* London, UK: MORI Social Research Institute.

Edin, P-A., Fredriksson, P., & Åslund, O. (2003). Ethnic Enclaves and the Economic Success of Immigrants—Evidence from a Natural Experiment. *Quarterly Journal of Economics,* vol. 118, no. 1, pp. 329–357.

European Social Survey. (2010). European Social Survey Round 5 Data. Data file edition 3.2. NSD—Norwegian Centre for Research Data, Norway—Data Archive and distributor of ESS data for ESS ERIC.

Fehr, E., Fischbacher, U., von Rosenbladt, B., Schupp, J., & Wagner, G.G. (2002). A Nation-Wide Laboratory—Examining Trust and Trustworthiness by Integrating Behavioral Experiments into Representative Surveys. Institute for Empirical Research in Economics, University of Zurich Working paper series No. 141.

Gardarsdóttir, Ó. (n.d.). *1901 Census of Iceland.* Version 2.0. Reykjavík, Iceland: National Archives of Iceland.

Gesthuizen, M. van der Meer, T., & Scheepers, P. (2008). Ethnic Diversity and Social Capital in Europe: Tests of Putnam's Thesis in European Countries. *Scandinavian Political Studies,* vol. 32, no. 2, pp. 121–142.

Glaeser, E.L., Laibson, D.I., Scheinkman, J.A., & Soutter, C.I. (2000). Measuring Trust. *Quarterly Journal of Economics,* vol. 115, no. 3, pp. 811–846.

Goette, L., Huffman, D., & Meier, S. (2006). The Impact of Group Membership on Cooperation and Norm Enforcement: Evidence Using Random Assignment to Real Social Groups. *American Economic Review,* vol. 96, no. 2, pp. 212–216.

Goldin, C., & Katz, L.F. (1999). Human Capital and Social Capital: The Rise of Secondary Schooling in America, 1910–1940. *Journal of Interdisciplinary History,* vol. 29, no. 4, pp. 683–723.

Gothenburg University, SOM Institute. (2015). Super-Riks-SOM 1986–2013. Version v2014.1. Svensk Nationell Datatjänst. doi:10.5878/002635.

Guiso, L., Sapienza, P., & Zingales, L. (2008). Alfred Marshall Lecture: Social Capital as Good Culture. *Journal of the European Economic Association,* vol. 6, no. 2–3, pp. 295–320.

Gustavsson, M., & Jordahl, H. (2008). Inequality and Trust in Sweden: Some Inequalities Are More Harmful Than Others. *Journal of Public Economics,* vol. 92, pp. 348–365.

Harrison, D. (2009, 21 August). Invandringen till Sverige. *Populär Historia,* vol. 10, pp. 20–30.

Hero, R.E. (2003). Social Capital and Racial Inequality in America. *Perspectives on Politics,* vol. 1, no. 1 pp. 113–122.

Hooghe, M., Reeskens, T., Stolle, D., & Trappers, A. (2009). Ethnic Diversity and Generalized Trust in Europe—A Cross-National Multilevel Study. *Comparative Political Studies,* vol. 42, no. 2, pp. 198–223.

Institute for Social Sciences, Stockholm University. (1941). *Population Movements and Industrialization, vol. II.* Stockholm Economic Studies 10. Stockholm, Sweden: P.A. Norstedt and Söner.

Ivarsflaten, E., & Strømsnes, K. (2013). Inequality, Diversity and Social Trust in Norwegian Communities. *Journal of Elections, Public Opinion and Parties,* vol. 23, no. 3, pp. 322–342.

Kazemipur, A. (2006). A Canadian Exceptionalism? *Journal of International Migration and Integration,* vol. 7, no. 2, pp. 219–240.

Kesler, C., & Bloemraad, I. (2010). Does Immigration Erode Social Capital? The Conditional Effects of Immigration-Generated Diversity on Trust, Membership, and Participation across 19 Countries, 1981–2000. *Canadian Journal of Political Science,* vol. 43, no. 2, pp. 319–347.

Knack, S., & Keefer, P. (1997). Does Social Capital Have an Economic Payoff? A Cross-Country Investigation. *Quarterly Journal of Economics,* vol. 112, no. 4, pp. 1251–1288.

Kollock, P. (1998). Transforming Social Dilemmas: Group Identity and Cooperation. In P.A. Danielson (ed.) *Modeling Rationality, Morality and Evolution.* Oxford, UK: Oxford University Press.

La Porta, R., Lopes-de-Silanez, F., Shleifer, A., & Vishny, R.W. (1997). Trust in Large Organizations. *American Economic Review Papers and Proceedings,* vol. 87, no. 2, pp. 333–338.

Leigh, A. (2006). Trust, Inequality and Ethnic Heterogeneity. *Economic Record,* vol. 82, no. 258, pp. 268–280.

Letki, N. (2008). Does Diversity Erode Social Cohesion? Social Capital and Race in British Neighbourhoods. *Political Studies,* vol. 56, pp. 99–126.

Lewis, J.D., & Weigert, A. (1985). Trust as a Social Reality. *Social Forces,* vol. 63, no. 4, pp. 967–985.

Li, Y., Pickles, A., & Savage, M. (2005). Social Capital and Social Trust in Britain. *European Sociological Review,* vol. 21, no. 2, 109–123.

Ljunge, M. (2014). Trust Issues: Evidence on the Intergenerational Trust Transmission among Children of Immigrants. *Journal of Economic Behavior and Organization,* vol. 106, pp. 175–196.

Lundstedt, J., & Nissling, S. (2016). Lägre tillit med ökad etnisk mångfald? *Ekonomisk Debatt,* vol. 44, no. 8, pp. 31–41.

Markstedt, E. (2014). *Representativitet och Viktning: Riks-SOM som Spegel av Det Svenska Samhället 1986–2013.* SOM-rapport 2014:20. Göteborg, Sweden: SOM-institutet.

Marschall, M.J., & Stolle, D. (2004). Race and the City: Neighborhood Context and the Development of Generalized Trust. *Political Behavior,* vol. 26, no. 2, pp. 125–153.

McCullagh, P. (1980). Regression Models for Ordinal Data, *Journal of the Royal Statistical Society Series B (Methodological),* vol. 42, no. 2, pp. 109–142.

Minnesota Population Center. (2016). *North Atlantic Population Project: Complete Count Microdata.* Version 2.3. Minneapolis, MN: Minnesota Population Center.

Murdie, R.A., & Borgegård, L-E. (1998). Immigration, Spatial Segregation and Housing Segmentation of Immigrants in Metropolitan Stockholm, 1960–95. *Urban Studies,* vol. 35, no. 10, pp. 1869–1888.

Nordström Skans, O., & Åslund, O. (2010). Etnisk segregation i storstäderna—bostadsområden, arbetsplatser skolor och familjebildning 1985–2006. IFAU Reports, 2010:4.

Nunn, N., & Wantchekon, L. (2011). The Slave Trade and the Origins of Mistrust in Africa. *American Economic Review,* vol. 101, pp. 3221–3252.

Özden, C., Parsons, C.R., Schiff, M., & Walmsley, T.L. (2011). Where on Earth Is Everybody? The Evolution of Global Bilateral Migration 1960–2000. *World Bank Economic Review,* vol. 25, no. 1, pp. 12–56.

Paxton, P. (2002). Social Capital and Democracy: An Interdependent Relationship. *American Sociological Review,* vol. 67, pp. 254–277.

Pennant, R. (2005). Diversity, Trust and Community Participation in England. *Home Office Findings,* no. 253, pp. 1–6.

Pettigrew, T.F., & Tropp, L.R. (2006). A Meta-analytic Test of Intergroup Contact Theory. *Journal of Personality and Social Psychology,* vol. 90, no. 5, pp. 751–783.

Putnam, R.D. (2000). *Bowling Alone. The Collapse and Revival of American Community.* New York, NY: Simon and Schuster.

Putnam, R.D. (2007). *E Pluribus Unum:* Diversity and Community in the Twenty-First Century—The 2006 Johan Skytte Prize Lecture. *Nordic Political Science Association,* vol. 30, no. 2, pp. 137–174.

Reeskens, T., & Hooghe, M. (2008). Cross-Cultural Measurement Equivalence of Generalized Trust. Evidence from the European Social Survey (2002 and 2008). *Social Indicators Research,* vol. 85, no. 3, pp. 515–532.

Rothstein, B., & Stolle, D. (2003). The State and Social Capital: An institutional Theory of Generalized Trust. *Comparative Politics,* vol. 40, no. 4, pp. 441–459.

Ruggles, S., Genadek, K., Goeken, R., Grover, J., & Sobek, M. 2015. *Integrated Public Use Microdata Series.* Version 6.0. Minneapolis, MN: University of Minnesota.

Soroka, S.N., Helliwell, J.F., & Johnston, R. (2007). Measuring and Modelling Interpersonal Trust. In F. Kay & R. Johnston (eds.) *Diversity, Social Capital and the Welfare State,* pp. 95–132. Vancouver, Canada: UBC Press.

Statistics Sweden. (n.d. a). *Population.* Available online: http://www.scb.se/en/finding-statistics/statistics-by-subject-area/population/population-composition/population-statistics/. [Accessed 12 February 2016].

Statistics Sweden. (n.d.b). *Tables on the Population of Sweden.* Available online: http://www.scb.se/en/finding-statistics/statistics-by-subject-area/population/population-composition/population-statistics/. [Accessed 12 February 2016].

Statistics Sweden. (n.d.c). *Statistical Yearbook.* Available online: http://www.scb.se/hitta-statistik/statistik-efter-amne/ovrigt/ovrigt/statistisk-arsbok/. [Accessed 20 March 2016].

Statistics Sweden. (n.d.d). *Regional Accounts.* Available online: http://www.scb.se/en/finding-statistics/statistics-by-subject-area/national-accounts/national-accounts/regional-accounts/. [Accessed 10 February 2016].

Statistics Sweden. (n.d.e). *Bidrag till Sveriges Officiella Statistik—Befolkningsstatistik.* Available online: http://www.scb.se/sv_/Hitta-statistik/Historisk-statistik/Digitaliserat—Statistik-efter-serie/Bidrag-till-Sveriges-officiella-statistik-BiSOS-1851-1917/Befolkning-1851-1910-BiSOS-A/. [Accessed 15 March 2016].

Statistics Sweden. (1936). Folkräkningen 1930 IV—Tabell A. Available online: http://www.scb.se/Grupp/Hitta_statistik/Historisk_statistik/_Dokument/SOS/Folkrakningen_1930_4.pdf. [Accessed 26 July 2016].

Statistics Sweden. (1960). Folk—och Bostadsräkningen 1960—tabell A 33.

Statistics Sweden. (2013). *Integration-A Description of the Situation in Sweden.* Integration: Report 6. Örebro, Sweden: SCB-Tryck.

Statistics Sweden. (2014). *Databasen STATIV.* Available online: http://www.scb.se/stativ. [Accessed 15 February 2016].

Statistics Sweden. (2015a). *Population by Country of Birth 1900–2015.* Available online: http://www.scb.se/en_/Finding-statistics/Statistics-by-subject-area/Population/Population-composition/Population-statistics/Aktuell-Pong/25795/. [Accessed 25 June 2016].

Statistics Sweden. (2015b). *Statistical Database.* Available online: http://www.statistikdatabasen.scb.se/. [Accessed 26 July 2016].

Stolle, D., Soroka, S., & Johnston, R. (2008). When Does Diversity Erode Trust? Neighborhood Diversity, Interpersonal Trust and the Mediating Effect of Social Interactions. *Political Studies,* vol. 56, pp. 57–75.

Sturgis, P., Brunton-Smith, I., Read, S., & Allum, N. (2011). Does Ethnic Diversity Erode Trust? Putnam's "Hunkering Down" Thesis reconsidered. *British Journal of Political Science,* vol. 41, no. 1, pp. 57–82.

Swedish Migration Agency. (n.d.). History. Available online: http://www.migrationsverket.se/English/About-the-Migration-Agency/Facts-and-statistics-/Facts-on-migration/History.html. [Accessed 18 July 2016].

Swedish Migration Agency. (2016). *Kommuner—Mottagna och Anvisade 2016-11-01.* Available online: http://www.migrationsverket.se/Om-Migrationsverket/Statistik/Aktuell-statistik.html. [Accessed 20 December 2016].

Swedish National Council for Crime Prevention. (n.d.). Reported crimes. Available online: http://statistik.bra.se/solwebb/action/index, [Accessed 5 August 2016].

Tabellini, G. (2010). Culture and Institutions: Economic Development in the Regions of Europe. *Journal of the European Economic Association,* vol. 8, no. 4, pp. 677–716.

Tajfel, H., & Turner, J. (1979). An Integrative Theory of Intergroup Conflict. In W.G. Austin & S. Worchel (eds.), *The Social Psychology of Intergroup Relations,* pp. 33–47. Monterey, CA: Brooks/Cole.

Tolsma, J., van der Meer, T., & Gesthuizen, M. (2009). The Impact of Neighborhood and Municipality Characteristics on Social Cohesion in the Netherlands. *Acta Politica,* vol. 44, no. 3, pp. 286–313.

United Nations. (2015). Trends in International Migrant Stock: 2015 Revision. Available online: http://www.un.org/en/development/desa/population/migration/data/estimates2/estimates15.shtml. [Accessed 15 February 2016].

Uslaner, E.M. (2002). *The Moral Foundations of Trust.* New York, NY: Cambridge University Press.

Uslaner, E.M. (2012). *Segregation and Mistrust—Diversity, Isolation, and Social Cohesion.* New York, NY: Cambridge University Press.

Van der Meer, T., & Tolsma, J. (2014). Ethnic Diversity and Its Effects on Social Cohesion. *Annual Review of Sociology,* vol. 40, pp. 459–78.

Vernersdotter, F. (2014). Den nationella SOM-undersökningen 2013. In A. Bergström & H. Oscarsson (eds.) *Mittfåra and Marginal,* pp. 531–559. Göteborg, Sweden: SOM-institutet.

Wallman Lundåsen, S., & Wollebeak, D. (2013). Diversity and Community Trust in Swedish Local Communities. *Journal of Elections, Public Opinion and Parties,* vol. 23, no. 3, pp. 299–321.

Whitt, S., & Wilson, R.K. (2007). The Dictator Game, Fairness and Ethnicity in Postwar Bosnia. *American Journal of Political Science,* vol. 51, no. 3, pp. 655–668.

You, J. (2012). Social Trust: Fairness Matters More Than Homogeneity. *Political Psychology,* vol. 33, no. 5, pp. 701–721.

Zak, P.J., & Knack, S. (2001). Trust and Growth. *The Economic Journal,* vol. 111, pp. 295–32.

Appendix A Variable descriptions and correlations

Table A1. Summary of variables

Variable	Definition	Source
Trust	Answer to the question "In your opinion, to what extent is it generally possible to trust people?" Answers range from 0 ("People cannot generally be trusted") to 10 ("People can generally be trusted").	Gothenburg university (2015)
Foreign change	Change in the share of municipal population born abroad in the past five years, lagged one year.	SCB (n.d.a, b)
Nordic change	Change in the share of municipal population born in the Nordic countries outside of Sweden the past five years, lagged one year.	SCB (n.d.a, b)
Non-Nordic change	Change in the share of municipal population born outside of the Nordic countries in the past five years, lagged one year.	SCB (n.d.a, b)
Non-Nordic European change	Change in the share of municipal population born in Europe outside of the Nordic countries the past five years, lagged one year.	SCB (n.d.a, b)
Non-European change	Change in the share of municipal population born outside of Europe in the past five years, lagged one year.	SCB (n.d.a, b)
Fractional-ization change	Change in fractionalization index in the past five years. Calculated as $1 - \sum_{i=1}^{N} s_i^2$. s_i^2 is the share of the population who are natives, Nordic born immigrants and non-Nordic born immigrants, lagged one year.	SCB (n.d.a, b)

Continued on next page

Table A1. Summary of variables, continued

Woman	Dummy coded 1 if the respondent is a woman.	Gothenburg university (2015)
Age	Age of respondent	Gothenburg university (2015)
Rural	Dummy coded 1 if the respondent lives in a rural area.	Gothenburg university (2015)
Employment dummies	Employment situation of respondent. Consists of dummies for the categories *Retired, Unemployed*, *Student*, and *Employed* (reference).	Gothenburg university (2015)
Income dummies	Self-assessed relative gross income of the respondent. Consists of dummies for the categories *Low income, Medium income,* and *High income* (reference).	Gothenburg university (2015)
University	Dummy coded 1 if the respondent has any post-secondary education	Gothenburg university (2015)
Segregation	Within-municipality segregation housing index between native and non-native born, lagged one year. The index is calculated as $s_x = \frac{\sum\lvert p_i^1 - p_i\rvert}{2(1-p^1)}$, where p_i^1 is share of population category 1 in area i, p_i the total share of the population in area i and p^1 the municipal	SCB (2014)
Unemployment	The unemployment level among the Swedish born citizens in the municipality, lagged one year.	SCB (2014)
Crime	Logged number of reported crime per 100,000 inhabitants in the municipality, lagged one year.	Swedish National Council for Crime Prevention (n.d.)
Population	Logged population in the municipality, lagged one	SCB (n.d.a, b)
Gini	Gini at the county level, lagged one year.	Almqvist (2016)
Industry	Share of the all employed people in each county working in the market production of goods, including raw materials and farming, lagged one year.	SCB (n.d. c)
GDP	Logged GDP per capita in the county measured in thousands of SEK in 2000 prices, lagged one year.	SCB (n.d.d)

Table A2. Correlations

	1	2	3	4	5	6	7	8	9	10
1. Trust	1									
2. Foreign change	-.05	1								
3. Nordic change	-.07	**.15**	1							
4.Non-Nordic change	-.02	**.93**	**-.23**	1						
5. Non-Nordic Europe change	-.03	**.68**	**-.07**	**.70**	1					
6.Non-Europe change	-.01	**.75**	**-.27**	**.84**	**.21**	1				
7. Fractionalization change	-.04	**.97**	**.19**	**.89**	**.68**	**.70**	1			
8. Woman	**.04**	-.04	-.07	-.01	-.01	-.01	-.03	1		
9. Age	**.06**	**.11**	.04	**.09**	.03	**.11**	**.11**	**-.03**	1	
10. Rural	**-.05**	-.03	**.07**	-.06	.01	**-.10**	.00	**-.02**	**.03**	1
11. Retired	**-.02**	.05	.05	.03	.04	.01	.05	.00	**.69**	.00
12. Unemployed	**-.07**	.02	-.02	.03	.00	.04	.02	.01	**-.12**	**.02**
13. Student	**-.05**	-.03	-.01	-.02	.01	-.04	-.03	**.04**	**-.46**	**-.04**
14. Low income	**-.13**	.06	.04	.05	.06	.02	.06	**.08**	**.16**	**.01**
15. Medium income	**-.01**	-.02	.04	-.04	-.03	-.03	-.02	**-.02**	**.03**	**.05**
16. University	**.16**	-.03	-.04	-.02	-.03	.00	-.03	**.09**	**-.15**	**-.18**
17. Segregation	-.02	**.29**	**-.20**	**.37**	**.18**	**.37**	**.23**	-.01	.01	**-.26**
18. Unemployment	-.01	**-.22**	**.16**	**-.27**	**-.17**	**-.25**	**-.21**	-.04	.04	.05
19. Crime	.01	**.33**	**-.13**	**.37**	**.15**	**.40**	**.27**	**.07**	-.01	**-.22**
20. Population	.01	**.15**	**-.26**	**.25**	**.06**	**.29**	**.07**	.01	-.03	**-.43**
21. Gini	.09	**.29**	**-.12**	**.32**	**.15**	**.32**	.27	.03	**.29**	-.27
22. Industry	**-.24**	-.04	-.07	-.06	**.13**	**-.16**	-.02	.03	-.08	**.23**
23. GDP	.07	**.42**	**-.13**	**.45**	**.15**	**.49**	.39	**-.01**	**.30**	**-.39**

Correlations in bold are significant at 5%. Each correlation is made at the highest level of municipality-year level is correlated with municipality-year averages of the individual variables.

11	12	13	14	15	16	17	18	19	20	21	22
1											
-.14	1										
-.18	**-.07**	1									
.31	**.08**	**.10**	1								
.04	.01	**-.04**	**-.43**	1							
-.19	**-.06**	**.06**	**-.15**	**-.09**	1						
.01	.01	.05	-.04	.00	**-.09**	1					
.06	.01	.03	.03	.03	-.06	**-.03**	1				
-.01	-.02	.00	-.05	-.04	.01	**.43**	**-.07**	1			
-.05	.03	.03	**-.10**	.00	.03	**.64**	**-.12**	**.56**	1		
.11	**-.24**	**-.30**	**-.12**	**-.29**	**.47**	-.01	**-.53**	**.27**	**.22**	1	
-.02	**.11**	**.12**	**.20**	**.13**	**-.38**	**.19**	.05	**-.13**	-.07	**-.47**	1
.18	**-.32**	**-.30**	**-.19**	**-.28**	**.57**	-.01	**.49**	**.12**	.05	**.63**	**-.53**

aggregation of the two variables (as in You, 2012). For instance, a variable that is fixed at the

Appendix B Robustness checks

Table B1. Further splits of region of birth

Year split is based on:			1900		1930		1960		1990	
Sample:		Full	Low	High	Low	High	Low	High	Low	High
Diversity	Nordic change	8.81	27.27	2.81	22.39	3.13	20.49	4.57	14.78	1.07
		(5.89)	(19.55)	(6.46)	(14.28)	(6.98)	(16.38)	(6.55)	(8.99)	(7.40)
	Non-Nordic European change	-6.50*	-.73	-10.03**	-.96	-10.05*	1.68	-11.69**	4.15	-12.26**
		(3.86)	(6.50)	(5.07)	(6.38)	(5.11)	(6.90)	(4.99)	(6.59)	(4.96)
	Non-European change	-4.42	4.44	-8.10**	4.59	-9.51***	3.29	-6.02*	5.16	-6.67*
		(3.18)	(5.55)	(3.72)	(5.28)	(3.57)	(6.02)	(3.33)	(5.08)	(3.53)
Individual controls	Woman	.17***	.09**	.21***	.10***	.21***	.10**	.20***	.09**	.22***
		(.03)	(.04)	(.04)	(.03)	(.04)	(.04)	(.03)	(.03)	(.04)
	Age	.03***	.03***	.03***	.03***	.03***	.03***	.03***	.03***	.03***
		(.00)	(.01)	(.00)	(.01)	(.00)	(.01)	(.00)	(.01)	(.00)
	Rural	-.08***	-.08*	-.08**	-.08**	-.08*	-.05	-.10***	-.04	-.12***
		(.03)	(.04)	(.04)	(.04)	(.04)	(.04)	(.04)	(.04)	(.04)
	Retired	-.30***	-.24***	-.33***	-.23***	-.34***	-.17**	-.37***	-.20***	-.37***
		(.04)	(.07)	(.05)	(.06)	(.05)	(.07)	(.05)	(.07)	(.05)
	Unemployed	-.39***	-.34***	-.42***	-.32***	-.44***	-.39***	-.40***	-.35***	-.42***
		(.05)	(.10)	(.07)	(.09)	(.07)	(.10)	(.07)	(.09)	(.07)
	Student	.13***	.08	.17**	.05	.19***	.06	.17***	.09	.16**
		(.05)	(.08)	(.06)	(.07)	(.07)	(.08)	(.06)	(.07)	(.07)
	Low income	-.70***	-.76***	-.68***	-.74***	-.68***	-.73***	-.69***	-.72***	-.69***
		(.03)	(.06)	(.04)	(.05)	(.04)	(.06)	(.03)	(.05)	(.04)

	Medium income	-.29***	-.35***	-.26***	-.33***	-.26***	-.32***	-.27***	-.29***	-.29***
		(.02)	(.04)	(.03)	(.04)	(.03)	(.04)	(.03)	(.04)	(.03)
	University	.62***	.63***	.62***	.64***	.62***	.62***	.63***	.64***	.62***
		(.02)	(.04)	(.03)	(.04)	(.03)	(.04)	(.03)	(.04)	(.03)
Context controls	Segregation	.29	-.52	.75	-.02	.23	.28	-.04	-.11	.11
		(.70)	(1.16)	(.86)	(1.06)	(1.02)	(1.09)	(.95)	(1.00)	(1.07)
	Unemployment	-1.24	1.72	-2.55	2.23	-2.96	.94	-1.95	2.63	-5.36***
		(1.46)	(2.34)	(1.75)	(2.22)	(1.80)	(2.60)	(1.61)	(2.19)	(1.77)
	Crime	-.12	-.17	-.12	-.23	-.00	-.38**	.11	-.19	-.02
		(.11)	(.17)	(.14)	(.15)	(.16)	(.17)	(.15)	(.16)	(.15)
	Population	.13	-.06	.10	.03	-.00	-.06	.30	-.20	.18
		(.33)	(.63)	(.43)	(.61)	(.45)	(.79)	(.39)	(.71)	(.52)
	Gini	-.33	-.11	-.86	.29	-1.48	.72	-1.49	.81	-2.02
		(.90)	(1.34)	(1.16)	(1.27)	(1.27)	(1.09)	(1.26)	(1.04)	(1.37)
	Industry	-1.62	-1.73	-2.47	-1.60	-1.82	-3.16*	.55	-3.96**	2.52
		(1.26)	(1.63)	(1.88)	(1.65)	(1.91)	(1.79)	(1.84)	(1.67)	(2.36)
	GDP	.48	.93	.44	1.00*	.09	1.19**	-.33	.99**	.66
		(.40)	(.71)	(.49)	(.59)	(.61)	(.54)	(.59)	(.46)	(.90)
	Constant	3.12	3.49	3.98	2.53	5.97	3.94	3.40	5.01	.32
		(4.42)	(7.98)	(5.60)	(7.48)	(6.43)	(9.60)	(5.68)	(8.44)	(8.16)
R^2		.06	.06	.06	.06	.06	.05	.06	.05	.06
Observations		42,072	14,315	27,757	16,365	25,707	13,648	28,424	16,128	25,944
Number of municipalities		264	109	155	120	144	88	176	118	146

Dependent variable: *Trust*. Standard errors clustered at the municipal level in parentheses. All regressions include municipal, year, and cohort fixed effects. The regressions only include municipalities that have not changed county since 1900. * indicates 10% significance, ** 5% and *** 1%.

Table B2. Samples split by median share

Year split is based on:		1900		1930		1960		1990	
Sample:		Low	High	Low	High	Low	High	Low	High
Diversity	Nordic change	36.22*	3.06	37.28*	3.21	15.41	7.02	15.34	6.10
		(20.68)	(6.55)	(20.70)	(6.53)	(16.67)	(6.50)	(10.91)	(7.06)
	Non-Nordic change	-1.00	-6.41**	-.66	-6.52**	1.77	-8.45***	-3.83	-5.09*
		(5.35)	(3.15)	(5.42)	(3.14)	(5.37)	(3.03)	(6.58)	(2.92)
Individual controls	Woman	.09**	.20***	.10**	.20***	.10**	.20***	.12***	.19***
		(.04)	(.03)	(.04)	(.03)	(.04)	(.03)	(.04)	(.04)
	Age	.03***	.03***	.03***	.03***	.02***	.03***	.02***	.03***
		(.01)	(.00)	(.01)	(.00)	(.01)	(.00)	(.01)	(.00)
	Rural	-.08*	-.08**	-.08*	-.08**	-.08*	-.08**	-.06	-.09**
		(.04)	(.04)	(.05)	(.04)	(.05)	(.04)	(.05)	(.04)
	Retired	-.24***	-.32***	-.24***	-.32***	-.16**	-.36***	-.12	-.37***
		(.07)	(.05)	(.07)	(.05)	(.07)	(.05)	(.08)	(.04)
	Unemployed	-.31***	-.43***	-.29***	-.44***	-.38***	-.40***	-.34***	-.42***
		(.10)	(.07)	(.10)	(.07)	(.11)	(.06)	(.09)	(.07)
	Student	.08	.16**	.07	.16***	.09	.15**	.05	.17***
		(.08)	(.06)	(.08)	(.06)	(.08)	(.06)	(.08)	(.06)
	Low income	-.74***	-.69***	-.74***	-.69***	-.78***	-.67***	-.67***	-.71***
		(.06)	(.03)	(.06)	(.03)	(.06)	(.03)	(.06)	(.03)
	Medium income	-.34***	-.27***	-.34***	-.27***	-.35***	-.26***	-.25***	-.30***
		(.04)	(.03)	(.04)	(.03)	(.04)	(.03)	(.05)	(.03)
	University	.61***	.63***	.61***	.63***	.59***	.64***	.63***	.62***
		(.04)	(.03)	(.04)	(.03)	(.04)	(.03)	(.05)	(.03)

Contextual controls	Segregation	.21	.47	.22	.45	.39	-.03	.37	.58
		(1.18)	(.84)	(1.19)	(.84)	(.98)	(.94)	(1.16)	(.89)
	Unemployment	.13	-1.98	.20	-2.05	1.60	-2.36	.25	-2.59
		(2.38)	(1.77)	(2.39)	(1.76)	(2.71)	(1.63)	(2.59)	(1.67)
	Crime	-.25	-.08	-.27	-.08	-.37**	.10	-.22	-.09
		(.18)	(.14)	(.18)	(.14)	(.18)	(.14)	(.18)	(.14)
	Population	-.16	-.03	-.15	-.07	.43	.06	-.66	.10
		(.64)	(.41)	(.65)	(.40)	(.73)	(.39)	(.89)	(.44)
	Gini	.96	-.99	1.57	-1.12	.97	-1.62	1.14	-1.62
		(1.60)	(1.11)	(1.71)	(1.08)	(1.12)	(1.16)	(1.11)	(1.18)
	Industry	-2.20	-2.51	-2.12	-2.47	-2.79	.14	-2.45	-.61
		(1.73)	(1.70)	(1.80)	(1.62)	(1.82)	(1.65)	(2.20)	(1.64)
	GDP	.97	.45	1.04	.46	1.20**	-.36	.91	.02
		(.75)	(.49)	(.78)	(.48)	(.58)	(.55)	(.67)	(.65)
	Constant	4.99	5.05	4.53	5.35	-1.27	6.25	10.37	5.65
		(8.14)	(5.41)	(8.22)	(5.35)	(9.00)	(5.66)	(10.13)	(7.01)
R^2		.06	.06	.06	.06	.06	.06	.05	.06
Observations		13,570	28,502	13,241	28,831	12,372	29,700	11,867	30,205
Number of municipalities		103	161	102	162	82	182	87	177

Dependent variable: *Trust*. Standard errors clustered at the municipal level in parentheses. All regressions include municipal, year, and cohort fixed effects. The regressions only include municipalities that have not changed county since 1900. * indicates 10% significance, ** 5% and *** 1%.

Table B3. Samples split by historical non-Nordic share

Year split is based on:		1900		1930		1960		1990	
Sample:		Low	High	Low	High	Low	High	Low	High
Diversity	Nordic change	33.15**	2.30	18.50*	1.64	12.62	6.10	14.39	4.45
		(16.43)	(6.79)	(9.39)	(7.63)	(9.19)	(7.52)	(9.44)	(7.40)
	Non-Nordic change	3.04	-7.96**	3.15	-11.36***	1.33	-7.53**	-3.02	-5.55*
		(4.96)	(3.08)	(4.04)	(3.34)	(4.98)	(3.03)	(5.68)	(2.89)
Individual controls	Woman	.11***	.20***	.10***	.22***	.12***	.19***	.12***	.19***
		(.04)	(.04)	(.03)	(.04)	(.04)	(.04)	(.04)	(.04)
	Age	.03***	.03***	.03***	.03***	.02***	.03***	.02***	.03***
		(.01)	(.00)	(.01)	(.00)	(.01)	(.00)	(.01)	(.00)
	Rural	-.05	-.09***	-.07*	-.09**	-.10**	-.06*	-.07	-.08**
		(.05)	(.04)	(.04)	(.04)	(.04)	(.04)	(.04)	(.04)
	Retired	-.27***	-.31***	-.29***	-.30***	-.18**	-.36***	-.16**	-.37***
		(.07)	(.04)	(.06)	(.05)	(.07)	(.05)	(.08)	(.04)
	Unemployed	-.36***	-.41***	-.39***	-.39***	-.35***	-.41***	-.35***	-.41***
		(.09)	(.07)	(.09)	(.07)	(.09)	(.07)	(.09)	(.07)
	Student	.03	.18***	.09	.16**	.16**	.12*	.11	.14**
		(.08)	(.06)	(.07)	(.07)	(.07)	(.06)	(.07)	(.06)
	Low income	-.72***	-.69***	-.73***	-.68***	-.76***	-.67***	-.73***	-.68***
		(.05)	(.04)	(.05)	(.04)	(.05)	(.04)	(.05)	(.04)
	Medium income	-.30***	-.29***	-.31***	-.28***	-.31***	-.28***	-.29***	-.29***
		(.04)	(.03)	(.04)	(.03)	(.04)	(.03)	(.05)	(.03)
	University	.66***	.61***	.64***	.61***	.61***	.63***	.64***	.62***
		(.04)	(.03)	(.04)	(.03)	(.05)	(.03)	(.04)	(.03)

Contextual controls	Segregation	-.24	.23	-.32	.69	.07	.41	.58	.12
		(1.20)	(.93)	(.99)	(.98)	(1.01)	(1.00)	(1.07)	(.96)
	Unemployment	1.82	-4.43**	1.29	-3.92*	.58	-3.80*	.54	-4.94**
		(2.09)	(1.99)	(1.94)	(2.14)	(2.25)	(1.94)	(2.19)	(1.95)
	Crime	-.19	-.10	-.05	-.19	-.12	-.11	-.13	-.15
		(.17)	(.14)	(.15)	(.16)	(.15)	(.15)	(.16)	(.15)
	Population	-.21	-.08	.14	.18	.40	-.48	-.32	-.59
		(.59)	(.49)	(.54)	(.55)	(.65)	(.53)	(.67)	(.57)
	Gini	3.10***	-2.56**	1.17	-2.36**	.78	-1.88	1.84*	-3.14***
		(1.12)	(1.02)	(1.10)	(1.19)	(1.16)	(1.22)	(1.04)	(1.17)
	Industry	-2.61	-.22	-2.26	-1.54	-2.22	1.09	-1.91	.79
		(1.69)	(1.76)	(1.62)	(2.17)	(2.28)	(1.88)	(1.76)	(1.76)
	GDP	.65	.95	.63	.85	.72	.68	.46	.90
		(.59)	(.65)	(.52)	(.69)	(.56)	(.80)	(.51)	(.79)
	Constant	6.15	3.07	1.87	1.69	-0.52	8.35	8.13	9.27
		(7.20)	(6.47)	(6.82)	(7.11)	(7.71)	(8.06)	(7.66)	(8.40)
R^2		0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.06
Observations		13,800	28,272	17,748	24,324	14,340	27,732	13,596	28,476
Number of municipalities		108	156	140	124	114	150	109	155

Dependent variable: *Trust*. Standard errors clustered at the municipal level in parentheses. All regressions include municipal, year, and cohort fixed effects. The regressions only include municipalities that have not changed county since 1900. * indicates 10% significance, ** 5% and *** 1%.

Table B4. Fractionalization index

Year split is based on:			1900		1930		1960		1990	
Sample:		Full	Low	High	Low	High	Low	High	Low	High
Diversity	Fractionalization change	-2.85*	2.40	-4.62**	.65	-5.41**	.90	-4.59**	2.74	-5.34***
		(1.67)	(3.18)	(1.93)	(2.81)	(2.14)	(3.14)	(1.96)	(2.70)	(2.00)
Individual controls	Woman	.17***	.11***	.20***	.10***	.21***	.09**	.20***	.09**	.22***
		(.03)	(.04)	(.04)	(.03)	(.04)	(.04)	(.03)	(.03)	(.04)
	Age	.03***	.03***	.03***	.03***	.03***	.03***	.03***	.03***	.03***
		(.00)	(.01)	(.00)	(.01)	(.00)	(.01)	(.00)	(.01)	(.00)
	Rural	-.08***	-.06	-.10***	-.08**	-.08*	-.05	-.10***	-.04	-.12***
		(.03)	(.05)	(.04)	(.04)	(.04)	(.04)	(.04)	(.04)	(.04)
	Retired	-.30***	-.27***	-.31***	-.23***	-.34***	-.17**	-.36***	-.20***	-.36***
		(.04)	(.07)	(.04)	(.06)	(.05)	(.07)	(.05)	(.07)	(.05)
	Unemployed	-.39***	-.36***	-.41***	-.32***	-.44***	-.39***	-.40***	-.35***	-.42***
		(.05)	(.09)	(.07)	(.09)	(.07)	(.10)	(.07)	(.09)	(.07)
	Student	.13***	.03	.18***	.05	.19***	.06	.17***	.09	.16**
		(.05)	(.08)	(.06)	(.07)	(.07)	(.08)	(.06)	(.07)	(.07)
	Low income	-.70***	-.72***	-.69***	-.74***	-.68***	-.73***	-.69***	-.72***	-.69***
		(.03)	(.05)	(.04)	(.05)	(.04)	(.06)	(.03)	(.05)	(.04)
	Medium income	-.29***	-.30***	-.29***	-.33***	-.26***	-.32***	-.27***	-.29***	-.29***
		(.02)	(.04)	(.03)	(.04)	(.03)	(.04)	(.03)	(.04)	(.03)
	University	.62***	.66***	.61***	.64***	.62***	.62***	.63***	.64***	.62***
		(.02)	(.04)	(.03)	(.04)	(.03)	(.04)	(.03)	(.04)	(.03)

Contextual controls	Segregation	.20	-.34	.09	.18	.02	.44	-.23	-.04	-.15
		(.69)	(1.22)	(.93)	(1.04)	(1.00)	(1.04)	(.92)	(.98)	(1.07)
	Unemployment	-1.71	1.96	-4.85**	2.35	-3.55*	.98	-2.75	2.69	-5.85***
		(1.57)	(2.13)	(2.04)	(2.20)	(1.83)	(2.60)	(1.70)	(2.19)	(1.81)
	Crime	-.11	-.19	-.08	-.21	.01	-.35**	.12	-.18	.01
		(.11)	(.17)	(.14)	(.15)	(.15)	(.16)	(.14)	(.15)	(.15)
	Population	.08	-.12	-.21	.11	-.12	-.07	.15	-.13	.01
		(.35)	(.64)	(.50)	(.65)	(.45)	(.83)	(.40)	(.72)	(.53)
	Gini	-.32	2.84**	-2.57**	.33	-1.47	.71	-1.38	.79	-1.85
		(.90)	(1.10)	(1.02)	(1.25)	(1.29)	(1.05)	(1.27)	(1.02)	(1.35)
	Industry	-1.87	-2.60	-.44	-1.73	-2.39	-3.24*	-.19	-4.11**	1.43
		(1.21)	(1.76)	(1.74)	(1.67)	(1.76)	(1.76)	(1.72)	(1.63)	(2.09)
	GDP	.45	.56	.97	.90	.17	1.15**	-.30	.97**	.68
		(.40)	(.59)	(.65)	(.61)	(.60)	(.57)	(.58)	(.46)	(.90)
	Constant	3.84	5.71	4.36	1.90	7.01	3.94	5.06	4.36	2.20
		(4.59)	(7.65)	(6.50)	(7.84)	(6.44)	(9.94)	(5.74)	(8.52)	(8.23)
R^2		.06	.06	.06	.06	.06	.05	.06	.05	.06
Observations		42,072	13,800	28,272	16,365	25,707	13,648	28,424	16,128	25,944
Number of municipalities		264	108	156	120	144	88	176	118	146

Dependent variable: *Trust*. Standard errors clustered at the municipal level in parentheses. All regressions include municipal, year, and cohort fixed effects. The regressions only include municipalities that have not changed county since 1900. * indicates 10% significance, ** 5% and *** 1%.

Table B5. Ordered logit regressions

Year split is based on:			1900		1930		1960		1990	
Sample:		Full	Low	High	Low	High	Low	High	Low	High
Diversity	Nordic change	7.29	18.00	3.19	13.07	3.90	14.09	5.08	11.73	1.60
		(4.92)	(16.36)	(5.42)	(11.61)	(5.78)	(13.15)	(5.56)	(7.46)	(6.26)
	Non-Nordic change	-4.12*	1.01	-6.40**	1.14	-7.18***	1.80	-6.66***	4.97	-7.70***
		(2.19)	(3.84)	(2.53)	(3.65)	(2.59)	(4.16)	(2.43)	(3.38)	(2.49)
Individual controls	Woman	.13***	.07**	.17***	.08***	.17***	.07**	.16***	.07**	.17***
		(.02)	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)
	Age	.02***	.03***	.02***	.02***	.02***	.02***	.02***	.02***	.02***
		(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)
	Rural	-.04*	-.05	-.04	-.05	-.04	-.03	-.06*	-.01	-.07**
		(.02)	(.04)	(.03)	(.03)	(.04)	(.04)	(.03)	(.04)	(.03)
	Retired	-.23***	-.18***	-.26***	-.17***	-.27***	-.13**	-.29***	-.15**	-.30***
		(.03)	(.06)	(.04)	(.05)	(.04)	(.06)	(.04)	(.06)	(.04)
	Unemployed	-.31***	-.28***	-.33***	-.28***	-.34***	-.31***	-.32***	-.29***	-.32***
		(.04)	(.08)	(.05)	(.07)	(.05)	(.08)	(.05)	(.07)	(.05)
	Student	.07**	.06	.08*	.04	.10*	.05	.08*	.06	.08*
		(.04)	(.06)	(.05)	(.06)	(.05)	(.06)	(.05)	(.06)	(.05)
	Low income	-.57***	-.61***	-.55***	-.60***	-.54***	-.60***	-.55***	-.58***	-.55***
		(.02)	(.05)	(.03)	(.04)	(.03)	(.05)	(.03)	(.04)	(.03)
	Medium income	-.25***	-.29***	-.23***	-.27***	-.23***	-.26***	-.24***	-.23***	-.26***
		(.02)	(.04)	(.02)	(.03)	(.02)	(.03)	(.02)	(.03)	(.03)
	University	.53***	.54***	.53***	.55***	.53***	.53***	.53***	.55***	.53***
		(.02)	(.03)	(.02)	(.03)	(.03)	(.04)	(.02)	(.03)	(.03)

Contextual controls	Segregation	.20	-.37	.66	-.01	.38	.01	.19	-.36	.35
		(.56)	(.89)	(.69)	(.82)	(.82)	(.81)	(.79)	(.77)	(.86)
	Unemployment	-.78	1.81	-2.00	2.04	-2.19	.78	-1.37	2.87	-4.37***
		(1.18)	(1.95)	(1.41)	(1.82)	(1.47)	(2.10)	(1.32)	(1.81)	(1.45)
	Crime	-.10	-.13	-.11	-.19	-.00	-.31**	.09	-.15	-.01
		(.09)	(.13)	(.12)	(.12)	(.13)	(.13)	(.12)	(.13)	(.13)
	Population	.15	-.03	.12	.02	.05	-.13	.26	-.17	.27
		(.27)	(.47)	(.35)	(.47)	(.37)	(.58)	(.32)	(.51)	(.44)
	Gini	-.45	-.36	-.83	.18	-1.44	.39	-1.22	.72	-2.00**
		(.68)	(1.02)	(.88)	(.98)	(.96)	(.85)	(.96)	(.80)	(1.01)
	Industry	-1.53	-1.69	-2.27	-1.50	-1.63	-2.22	-.36	-3.15**	1.09
		(1.03)	(1.34)	(1.50)	(1.37)	(1.58)	(1.42)	(1.50)	(1.32)	(1.79)
	GDP	.37	.92	.28	.88*	-.06	1.03**	-.34	.81**	.35
		(.33)	(.59)	(.41)	(.50)	(.51)	(.47)	(.47)	(.38)	(.75)
Observations		42,072	13,570	28,502	13,241	28,831	12,372	29,700	11,867	30,205
Number of municipalities		264	103	161	102	162	82	182	87	177

Dependent variable: *Trust*. Standard errors clustered at the municipal level in parentheses. All regressions include municipal, year, and cohort fixed effects. The regressions only include municipalities that have not changed county since 1900. * indicates 10% significance, ** 5% and *** 1%.

Chapter 3

Chapter 3
The Effect of Business Incubators on Firm Size and Performance: The Case of ICT Firms in Southern Sweden.

1. Introduction

Business incubators (BIs) have become standard tools of national and regional industrial policy, aiming to help start-up firms develop and grow. Specifically, BIs are thought to help new firms alleviate what Stinchcombe (1965) called the "liability of newness" (Organization for Economic Co-operation and Development, 1997): the higher risk of failure during the initial years of business operation. Start-up entrepreneurs typically lack experience and reliable networks of suppliers, customers, investors and creditors. In addition, new firms often have little organizational legitimacy. BIs aim to help firms overcome these problems through a mix of services covering subsidized office space, shared amenities, business coaching, and access to a network of local firms and other important actors in the industry (Aernoudt, 2004; Bøllingtoft & Ulhøi, 2005; Tötterman & Sten, 2005; McAdam & McAdam, 2008; Patton, Warren & Bream, 2009; Westhead & Storey, 1994). The goal of a BI is to use these services to help incumbents not only survive, but also grow and develop faster than they would have outside the BI (International Business Innovation Association, 2015).

BIs are today located all over the world (Hansen, Chesbrough, Nohria & Sull, 2000). Their industry concentration can vary, but they frequently focus on technology-based start-ups: Some consider the services offered by BIs to be

especially helpful to firms in these industries as investors and creditors often lack the technical knowledge to assess the market value of technological products and services (Colombo & Delmastro, 2002; Ferguson & Olofsson, 2004). Therefore, technology firms have become the most common type of firms studied in the BI literature (cf. Macdonald, 1987; Westhead & Storey, 1994; Phan, Siegel & Wright, 2005; Tamásy, 2007).

Although BIs differ in size and profit orientation (Amezcua, Grimes, Bradley & Wiklund, 2013), modern BIs offer essentially the same set of services across all nations (Hansen et al., 2000). Yet, entrepreneurs are also incentivized and constrained by local institutions (North, 1990), including formal institutions (Simón-Moya, Revuelto-Taboada & Fernández Guerrero, 2014; Stephen, Urbano & van Hemmen, 2005) and local culture (Davidsson, 1995; Steensma, Marino, Weaver & Dickson, 2000; Hayton, George & Zahra, 2002; Hofstede, Noorderhaven, Thurik, Uhlaner, Wennekers & Wildeman, 2004; M. Andersson, 2015). These institutions determine the allocation of entrepreneurial talent (Baumol, 1990) and the ensuing success of new business ventures. Thus, reasons exist to expect the success of modern incubators to be context dependent. Empirical research highlights that the effect of incubation indeed differs across countries, with results varying across time and space (Allen & Bazan, 1990; Westhead & Storey, 1994; Colombo & Delmastro, 2002; Chen, 2009; Amezcua, 2010; Lasrado, Sivo, Ford, O'Neal & Garibay, 2015). Further research made in novel environments could therefore provide additional insights into the effects of incubation. This paper contributes to the BI literature by studying BIs in a new context: the Malmö–Lund region of southern Sweden.

In Sweden, the share of the population running a start-up has gradually increased since the year 2000, not least in information and communications technology (ICT; Global Entrepreneurship Monitor, 2015, 2016). However, most firms remain small; the vast majority of ICT firms in Sweden do not grow beyond five salaried employees, even if active for several years (Statistics Sweden, 2010). Sweden started to establish BIs to assist the country's start-ups around the turn of the millennium. Today, the national organization of Swedish Incubators and Science Parks has more than two dozen member BIs. However, the effects of these BIs on their incumbent firms remain largely uninvestigated, thereby supporting a more careful account.

In Malmö–Lund, each of the two cities has one major BI and together the region houses a promising cluster of ICT start-ups. In 2005, 600 limited ICT firms operated in the two municipalities. By 2013, this number had more than doubled, leading to a rate of about 2.9 limited ICT firms per 1,000 inhabitants.

This is more than triple the rate of New York City, which has 0.8 high-technology firms per 1,000 inhabitants (DiNapoli & Bleiwas, 2014). However, in employment, these New York-based firms are, on average, twice the size of the firms in Malmö and Lund. As in the rest of Sweden, ICT firms in Malmö–Lund have problems growing past their first few employees; of the 1,223 ICT firms that were active in the region in 2013, 875 had fewer than five employees and of these, 375 did not report any employees at all. Unsurprisingly, these firms are also small in terms of assets and sales.

This paper studies how incubation affects four measures of firm size and performance to capture different dimensions of firm success. In addition to employment, these are assets, turnover, and returns. These measures cover several dimensions of scale as well as the stated developmental goals of policymakers and entrepreneurs. This research relies on two types of information. First, a series of interviews with entrepreneurs, politicians, and BI managers provides information on the local ICT industry and the public entrepreneur-support system available in the region, which has informed the design of the quantitative analysis. Appendix A lists these interviews. The interviews took place in the summer and fall of 2014. Second, firm data come from a dataset that covers the universe of limited ICT firms started in the two municipalities between 2005 and 2013. Furthermore, the dataset identifies all incubated firms and the time spent in a BI, making it possible to discern the effects of incubation both before and after graduation. In total, the final dataset covers a panel of 429 ICT firms, 5.8% of which have incubator experience.

The results show that incubation has no positive impact on their incumbents in the period and region studied here. If anything, incubated firms underperform compared to their unincubated peers in sales and profits while located in the incubator. This outcome aligns with responses from interviews, in which several of the entrepreneurs expressed skepticism toward the local BIs and the entire public innovation-support system.

The remainder of the paper continues as follows. The following section provides a brief overview of BIs and their assistance to start-ups. Section 3 gives a short synopsis of the local ICT industry and BIs in the Malmö–Lund region. Section 4 introduces the data and discusses the method. Section 5 presents the results, after which section 6 concludes.

2. Business incubators

BIs are real estate-based organizations focused on assisting start-ups to develop and grow.[33] The first BI opened in Batavia, New York in 1959 (Lewis, 2002; Hansen et al., 2000). The first BIs were mainly large offices or co-working spaces where small firms could set up shop. Over time, they developed and started to provide more and more services. Modern BIs, started from around the year 2000, belong to the so-called "third-generation incubators" (Bruneel, Ratinho, Clarysse & Groen, 2012). These BIs attempt to help firms by providing four types of benefits to their incumbents: First, they offer affordable business facilities and shared office amenities (Patton et al., 2009; Soetanto & Jack, 2013). Sharing could free up resources in the firm, allowing incumbents to focus their resources on getting their products to the market (Chan & Lau, 2005; McAdam & McAdam, 2008). Second, incubators offer advice and coaching on subjects concerning the management of start-ups (Aernoudt, 2004). Such topics could include legal matters, business planning, and hiring practices (Rice, 2002). Third, being located in a BI could lend legitimacy to a firm by associating it with a prestigious address, university, or research park (Westhead & Storey, 1994; Hannon & Chaplin, 2003; Aernoudt, 2004; Rothschild & Darr, 2005). Having a BI address could further help incumbents signal legitimacy simply by allowing firms to plan meetings in proper facilities (McAdam & McAdam, 2008).

Last, BIs also offer incumbents access to their network of investors, local firms, and other key industry actors (Hansen et al., 2000; Bøllingtoft & Ulhøi, 2005; Sá & Lee, 2012). The importance of such networks for economic actors in general and firms in particular is well-established (Granovetter, 1973, 1985; Powell, 1990; Saxenian, 1991, 1996). New entrepreneurs, often without

[33] The literature on BIs relates closely to that on Science Parks. Science Parks usually differ from BIs in the latter's focus on start-ups and more active help of incumbents (Swedish Incubators and Science Parks, n.d.). However, this is not universally true, as some ventures that consider themselves Science Parks also actively help their incumbents (Ferguson & Olofsson, 2004). The literature often makes no clear distinction between Science Parks and BIs; the two concepts are sometimes even used interchangeably (Phan, Siegel & Wright, 2005). Much of the theory and empirical research on the effects of Science Parks is therefore relevant for BIs as well. In Sweden, research has focused on Swedish Science Parks (Lindelöf & Löfsten, 2002; Ferguson & Olofsson, 2004). These papers come to conflicting results with Lindelöf and Löfsten (2002) finding positive effects for employment and turnover while Ferguson and Olofsson (2004) did not find any such effects. In Malmö–Lund, the region studied here, the assistance offered, together with the focus on start-ups, will be sufficient to distinguish BIs, as defined here, from Science Parks.

substantive resources on their own, have to rely on their networks of investors, suppliers, and other firms to attain critical resources and advice (Aernoudt, 2004; Lin, Li & Chen, 2006). For this reason, the expansion and management of networks has emerged as the most important service offered by BIs and the defining feature of third-generation BIs (Bruneel et al., 2012).

A BI could expand an incumbent's business network in two ways. First, incubation lowers the cost of interaction between incumbent entrepreneurs by clustering many firms close to each other, thereby increasing the chances of collaboration and mutual learning (Bøllingtoft & Ulhøi, 2005). Second, incubators can also increase a start-up's network of important actors in the local economy by arranging networking events or by directly setting up meetings between incumbent entrepreneurs and venture capitalists (Rice, 2002; McAdam & McAdam, 2008), entrepreneurs from alumni firms (Aernoudt, 2004), important business leaders (Tötterman & Sten, 2005), and academics (Colombo & Delmastro, 2002).

Although start-up firms from most industries could potentially benefit from incubation, BIs often gear themselves toward technology-based firms because policymakers often perceive such firms as especially capable of generating economies of agglomeration in their geographic regions (Mian, 1997; Colombo & Delmastro, 2002). Technology firms are furthermore likely to suffer from restrictive capital constraints, as technologically advanced products and services are especially hard to assess by investors lacking the necessary technological expertise (Colombo & Delmastro, 2002; Ferguson & Olofsson, 2004). These firms could therefore potentially benefit more from the assistance offered by BIs and as a result, the literature on BIs mainly focuses on technology-based firms (cf. Macdonald, 1987; Westhead & Storey, 1994; Mian, 1997; Westhead, 1997; Colombo & Delmastro, 2002; Phan et al., 2005; Tamásy, 2007).

As there are various ways to define growth and success, empirical work has used various measures to gauge the results of incubation.[34] Results from the UK and Italy indicate that incubation increases employment and turnover (Westhead & Storey, 1994; Colombo & Delmastro, 2002), whereas one early study did not find either of these effects in the United States (Allen & Bazan, 1990). Later work on U.S. BIs found that incubated firms do grow faster than unincubated ones during and after incubation (Amezcua, 2010; Lasrado et al., 2015).

[34] The research reviewed here covers only studies that compared the outcomes of incubated firms to a control group of similar but unincubated firms. Without such a control group, it is hard to at all discern the effects of incubation (Bearse, 1998).

However, despite increased sales and employment, incubation does not necessarily increase a firm's profitability (Westhead & Storey, 1994) or assets (Allen & Bazan, 1990). Results from Taiwan showed no effect of incubation on an aggregate measure of sales and profits (Chen, 2009). Given the importance of context when it comes to the study of small firms (Stinchcombe, 1965; Hofstede et al., 2004; Bowen & De Clercq, 2008), these results are not easily comparable, as they use data from different countries and times.

3. Research site

The research site consists of the two neighboring cities of Malmö and Lund (see locational information in Figure 1). The two cities are located in the very south of Sweden, about 10 minutes away from each other by train. Malmö is located just a 20-minute train ride across the Öresund Bridge from Copenhagen, Denmark. From Copenhagen Airport, Paris, Berlin, and London are all within a two-hour flight, linking the region to the European market. The joint population of Malmö and Lund is approximately 430,000, or 5% of Sweden's total population (Statistics Sweden, 2015a).

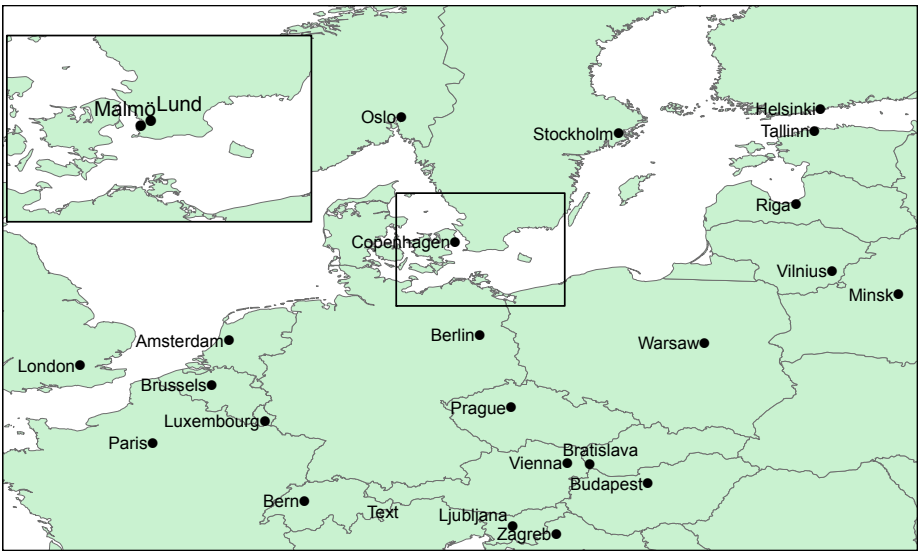

Figure 1. Malmö and Lund in Europe.

3.1 The ICT industry in Malmö-Lund

Even in the ICT-intensive Swedish economy, where 13% of all new entrepreneurs establish themselves in the sector (Global Entrepreneurship Monitor, 2016),[35] the Malmö–Lund region stands out. In 2011 alone, 147 limited ICT firms started in the two cities. This concentration of firms, together with the BI literature's focus on technology-based firms, makes the ICT industry the natural focus in a study of the effects of BIs in this region. In 2013, ICT firms employed more than one of every 20 employed persons in the region, a share 50% above the average in the rest of the country (Statistics Sweden, 2015b). Although high in a national comparison, paired with the high rate of ICT start-ups, this employment share is indicative of the small size of the firms in the sector.

In Lund, the ICT industry has played a vital part in the local economy for decades. In the 1960s, the national government started a technical college, which later merged as part of Lund University. The technical college worked together with the university, the local government, and Ericsson Mobile to start up the first Science Park in Sweden, Ideon, in 1983 (Karlsson, Wigren-Kristoferson & Landström, 2015). Initially, Ericsson Mobile kept much of their research activities in the city and dominated the local industry,[36] but over time, the relative importance of Ericsson diminished, and the importance of small technology-based start-ups increased. In the 2000s, the city witnessed a renewed ICT boom, with the number of active firms per 1,000 inhabitants increasing from 1.8 to 3.3 in the years 2005 to 2013.

In contrast, Malmö has historically been a base for heavy industry. However, at the beginning of the 1990s, increased international competition led to widespread lay-offs in many of these industries (Billing, 2000). As a response, the local government rebranded Malmö as a city focused on knowledge-intensive industries. This effort included lobbying the national government to create a local university in 1998. In 2003, the city started its first and still largest BI, Minc. The ICT sector became a key industry in this industrial restructuring and the sector has grown continuously since, with the total number of active limited firms increasing from 1.5 in to 2.6 per 1.000 inhabitants between 2005 and 2013.

[35] The highest rate among the countries covered by the GEM.

[36] Ericsson developed Bluetooth from research conducted partly in Lund.

It is common for ICT entrepreneurs to move between the two cities; half of the entrepreneurs interviewed had based their operations in both cities and several had moved their offices between the cities. It is therefore natural to study the two cities together. Although successful in the number of firms started, ICT firms in the region tend to remain small and rarely grow past their first four employees; of the 1,223 ICT firms active in the two municipalities in 2013, only 328 had more than five employees. Only 14 of the firms had more than 100 employees, and most of these started before the 2000s, some already in the 1980s. Turnover is likewise usually low, with less than 200 of the firms active in 2012 having a net turnover over USD 1 million.

3.2 The local BIs

Each of the cities has one major incubator: the Minc Incubator in Malmö, and Ideon Innovation in Lund.[37] The aim of the two BIs is "building value into [the incumbent] company so that it develops faster than it would outside the incubator" (Ideon Innovation, 2016), and to help their incumbents "scale faster and smarter" (Minc Incubator, 2016). To achieve their aims they offer services similar to those of most international BIs; Minc Incubator's manager stated that Brooklyn-based BIs inspired the incubator. The BIs provide office space and shared amenities. They have in-house business coaches and business developers providing assistance concerning firm management. Furthermore, the BIs assist in increasing the firm's network in the region.

The two incubators are similar in age, size, location in their respective city, services offered, and target group, although they differ somewhat in ownership, with private actors owning a share of Ideon Innovation, whereas public bodies completely own Minc Incubator. Table 1 summarizes the characteristics of the two BIs. Minc Incubator started in 2003 and Ideon Innovation in 2000. Both incubators had an annual budget of 10.5 million SEK (about USD 1.3 million) in 2013, of which half a million (Ideon Innovation) and 4.5 million SEK (Minc Incubator, 2016) came from private sources, mostly local partner firms (Region Skåne, 2014).

Minc Incubator is located just across the street from Malmö University while Ideon Innovation is located two minutes away from Lund's Technical College

[37] Other, smaller, incubators in the region were also contacted. However, none of the firms in the sample had been located there. Minc today also includes workspaces and events for local firms outside of the BI, but this study focuses only on the firms that have been in the incubator.

Table 1. The two incubators

	Minc Incubator	Ideon Innovation
City	Malmö	Lund
Start year	2003	2000
Turnover (2013)	1.3 million USD	1.3 million USD
Total incumbents up until 2013, all industries	125	104
Owners	Municipal government	Municipal government, Lund university, private real estate company
Fee	180-300 USD/person and month	210-300 USD/person and month
Official term limit	2 years	2 years

and right across the road from the School of Economics and Management. The location matches well with who enters the incubator: people who were, or had previously been, employed at the local universities started 16% of the incubated ICT firms between 2005 and 2013.[38] This share was only 4% among unincubated firms started during the same period. Although both incubators take in firms from a large number of industries, they focus on knowledge-intensive firms, ranging from robotics to software development. Until the end of 2013, Minc Incubator had accepted, in total, 125 firms and Ideon Innovation had accepted 104.

Malmö municipality is the sole owner of Minc Incubator whereas a private real estate company, Lund University, and the municipal government jointly own Ideon Innovation. Although private owners could have different goals than public ones, this is unlikely to have a major effect, considering that half of the nonrent share of Ideon Innovation's budget comes from public sources[39] (Region Skåne, 2014). The BIs are located closely to, and well connected with, a number of other innovation-support organizations located in the region. The most prominent ones are the Swedish Agency for Innovation Systems (VINNOVA), Connect and Almi (Karlsson et al., 2015). These national

[38] These numbers are based on employment data provided by the two local universities. The data are discussed further in the data and method section.

[39] Furthermore, the privately funded part of the budget is provided from several "supporting companies" and not just from the real estate company.

organizations work to provide finance to local firms, either directly or through their networks of investors. The county-based organization Teknopol[40] provides business support and attempts to increase the size of the entrepreneurs' local networks. Support from organizations such as these can be of considerable assistance to start-ups; one of the entrepreneurs interviewed received USD 10 million in investment from state-owned organizations over the lifetime of his first firm. Although support from these organizations is not contingent on a BI affiliation, incubation programs often include contact with some or all of these organizations. As an example, one of the incubated entrepreneurs interviewed secured funding from VINNOVA, Almi and other public sources on at least six separate occasions.

Incumbents of the incubators pay a monthly fee. The initial fees are 1,500 SEK (USD 180) per month and person at Minc and 1,750 SEK (USD 210) at Ideon. The fee then increases over time spent in the incubator up to 2,500 SEK (USD 300) per person and month for both BIs. Neither incubator takes any stake in their firms. The incubators both have an official two-year limit of residence, but this is not a strict deadline and several firms have stayed for longer. The average time spent in the two incubators is 1.5 years.

4. Data and method

4.1 Sample

The sample consists of annual observations of limited ICT firms started in the municipalities of Malmö and Lund between 2005 and 2013.[41] Appendix B lists the industry codes (based on five-digit-level Swedish industry codes,[42] SNI) defined as the ICT industry in this sample. Statistics Sweden provided a list identifying all firms in this category. The sample excludes subsidiaries.

[40] Now part of Innovation Skåne.

[41] In the case of companies being started as shelf companies (which customarily do not register industry or proper location), data from the first observation as a nonshelf company was used to identify starting location and industry.

[42] The SNI codes are coordinated with European NACE industry codes. The firms use three different sets of SNI codes (SNI1992, SNI2002, and SNI2007), depending on when the firms started.

Company-performance data come from Retriever Business (n.d.) and cover the years 2005–2013. Business Retriever collects data from the firms' official annual reports to the Tax Authority and other public authorities. The data are inflation adjusted to 2005 SEK using the Consumer Price Index (Statistics Sweden, 2015c). The final sample covers an unbalanced panel of 2,030 observations from 429 firms.[43]

Both incubators provided a full list of previous and present occupants. This list identifies all firms in the sample that have experience from incubation, 5.8% of the firms in the final sample. Of the incubated firms, thirteen had experience from MINC Incubator, eleven from Ideon Innovation, and one firm had experience from both incubators.

The sample consists of quite similar firms, as they all started in the same industry, time-span, and region. Further reductions of the sample could decrease the external validity of the results. However, to ensure comparability between the incubated and unincubated groups, the robustness section presents results using a matched sample, based on coarsened exact matching (CEM; Iacus, King & Porro, 2012). Regressions with this sample leads to results similar to the full sample.

4.2 Variables

Dependent variable: Firm size and performance

Given the multidimensionality of the goals of BIs, it is important to use several different measures of firm size and performance to capture the effects of incubation on incumbents (Davidsson & Wiklund, 2006). This paper therefore uses four types of measures to study the effects of incubation: returns, employment, turnover, and assets. These measures cover the goals of policymakers and entrepreneurs and the possible trade-offs between the number of employees and the amount of assets in a firm[44] (Bearse, 1998; Hackett & Dilts, 2004; Davidsson & Wiklund, 2006).

[43] Three observations from one firm are excluded due to missing data on board composition. One additional observation is missing due to a misfiled financial report.

[44] These are all variables in levels (as in Allen & Bazan, 1990; Colombo & Delmastro, 2002) because the use of change variables reduces the sample by one observation per firm. Due to the dynamic method used (discussed further in section 4.3) the sample is already restricted to those firms with at least three observations and further reductions greatly lower the sample size. The

Table 2 lists the variables studied.[45] Return on assets, *ROA,* captures the effects on the firms' financial results (Yermack, 1996; Lindelöf & Löfsten, 2002). *Turnover* is one of the most common variables in the BI literature, as it captures an important aspect of firm size: to what extent firms manage to sell their goods and services (Colombo & Delmastro, 2002; Schwartz, 2011). It is measured net VAT and discounts. The variable *Employees* is a headcount of employees in a given year (Colombo & Delmastro, 2002; Lasrado et al., 2015). Last, to test the effect on firms' assets, this paper uses the level of fixed assets[46], *Assets,* in a firm (Allen & Bazan, 1990).

Table 2. Firm size and performance measures. All data comes from Business Retriever.

Variables	Description	Unit
ROA	Return on assets	Percent
Turnover	Net turnover	Thousands of SEK (logs)
Employees	Number of employees	Number of employees
Assets	Fixed assets	Thousands of SEK (logs)

Explanatory variables

The main variables of interest are a pair of dummies that capture the effect of incubation (Amezcua, 2010). The first variable, *DURING,* measures the period a firm spent inside an incubator and the second, *AFTER,* captures the period after graduation. *DURING* is coded 1 for the year after a firm entered an incubator and the years up until and including the year it leaves, and 0 otherwise. *AFTER* is coded 1 all years following the year the firm leaves the incubator and 0 otherwise. As the two incubators in this sample are similar, the variables do not differentiate between the two.

Control variables

To rule out confounding factors, a number of controls are included in the regressions. The number of employees control for the companies' size (Colombo & Delmastro, 2002; Amezcua, 2010), as size affects future growth (Davidsson

robustness-check section presents results using change variables in this reduced sample. These results show no significant effects of incubation on any of the variables.

[45] To avoid loss of data when logging variables, zero replaces ln(0). This is controlled for using a dummy variable as one of the control and is further discussed in the control-variable section.

[46] The results using total assets are similar.

& Wiklund, 2006) and is likely to affect a firm's need for incubation.[47] Two dependent variables, *Turnover* and *Assets,* use logged values. To avoid losing observations, zero replaces log(0). To make sure this replacement does not skew the results, the regressions using logged dependent variables include a dummy variable to control for these observations (Pakes & Griliches, 1984; Payne & Siow, 2003).[48]

Dummies for the location of the firm control for potential geographical and policy differences: *Lund* (the reference category), *Malmö* and *Other. Other* identifies those firms that leave the region during the sample period and those that register elsewhere while listed as shelf companies.[49] The *Other* category covers less than 8% of the observations and more than half of these are located in nearby municipalities in the same county. To control for the differences in the number of academic connections among incubated and unincubated firms (Löfsten & Lindelöf, 2002), the regressions include a variable that lists the number of people on the current board and the CEO who has held a qualified position at either Malmö University or Lund University.[50] The average age of board members correlates with performance, possibly due to an increase of experience or risk aversion with age (Bonn, Yoshikawa & Phan, 2004; Yermack, 2004; Faleye, 2006). Furthermore, young entrepreneurs could benefit disproportionately from BI services such as business coaching and network building and the regressions include the average age of board members and CEO (Colombo & Delmastro, 2002). The regressions also include a control for the firm's age (Colombo & Delmastro, 2002; Amezcua, 2010), as BIs specifically target young firms.

[47] Having *Employees* as a dependent variable in some regressions and an independent in others introduces endogeneity into the regressions. The main specification, therefore, measures this variable using internal instruments, Regressions with *Employees* as the dependent variable do not include it as an independent variable. Removing the variable from the other regressions does not change the results. Results are available upon request.

[48] Removing this variable does not change the results. Results are available upon request.

[49] 15 observations are of firms started as shelf companies. Removing these firms does not change the results. Results are available upon request.

[50] This matching used given and family names, birth year, and birth month. Uncertain cases were double-checked by hand. The respective university directly provided the employment data. For Lund University, the data go back to 2000 and for Malmö University to its start in 1998.

4.3 Method

To capture the effects of incubation on their incumbents' size and performance, this paper uses the following econometric model:

$$y_{it} = \alpha + \beta_1 y_{it-1} + \beta_2 DURING_{it} + \beta_3 AFTER_{\text{it}} + \beta_4 x_{it} + YEAR_t + \mu_i + v_{it} \quad (3)$$

Here i and t denote firm and year, respectively, y_{it} is one of the size or performance measures, α is a constant, and x_{it} is a vector of control variables. $YEAR_t$ and μ_i are the year and firm-fixed effects, respectively. The firm-fixed effects capture any time invariant heterogeneity among firms and the year fixed effects control for common shocks to the firms in the region. Last, v_{it} indicates individual errors clustered at the firm level, and the β's are parameters to be estimated. The specification is dynamic, as a firm's performance and size are likely to show persistence over time. The regressions are estimated using the system GMM estimator[51] (Blundell & Bond, 1998) to avoid dynamic panel bias, which is otherwise present in dynamic models with fixed effects (Nickell, 1981). The sample excludes all firms with less than three observations because the estimator requires a second lag of the dependent variable to instrument the lagged dependent variable.[52] The regressions exclude the first observation for each firm as the specification includes a lagged dependent variable, but all available observations are included as instruments.

One concern is that the results could suffer from selection bias, as the choice to join an incubator is not random. To join an incubator, a firm must first apply to do so, and the BI must accept the application in turn. Such selection could create an upward bias of the results if entrepreneurs who are more motivated are more likely to apply to a BI (Storey, 1999). From the administrative side, BIs usually pick firms they believe have high chances of succeeding (Bergek & Norrman, 2008) and administrative selection is therefore likely to put further upward pressure on the results. Ideon Innovation specifically aims to enroll

[51] The regression models the BI variables and *Employees* as endogenous, and the lagged dependent variable as predetermined following Roodman's (2009) specification of the respective type of variable. All instruments are internal. To avoid instrument proliferation, the regressions collapse all GMM-style instruments into one. The results are robust to instead restrict the lag lengths to 3, 4, or 5. The system GMM estimator outperforms the alternative first-differences GMM estimator, especially when the coefficient for the lagged dependent variable is close to one (Blundell & Bond, 1998)

[52] The results do not change when firms with only two observations are included, bringing the number of incubated firms up to 35. Using an additional lag of the BI variables (thereby reducing the sample to those firms with at least four observations to properly instrument them) yields no significant results.

firms with international ambitions (Ideon Innovation, 2016) and Minc Incubator targets "businesses with high growth potential" (Minc Incubator, 2016). In contrast, if entrepreneurs seek the organizational support of an incubator because they are more risk averse, this could bias the results downwards (Colombo & Delmastro, 2002). Which way, if any, the results are biased is an empirical question, but previous work on non-BI entrepreneurial support policy in Sweden has demonstrated a significant positive bias due to selection (Norrman & Bager-Sjögren, 2010). Any effect found in this setting is therefore likely to be, if anything, biased upwards and a null result would be a strong indicator that BIs do not provide any benefit to their incumbents.

To see whether the two groups of firms do indeed differ from each other before incubation takes place, one can compare the incubated and unincubated firms in their first year of business operation. Such a difference would indicate that some selection could be at work. Table 3 shows *t* tests between the comparison and incubated group using only observations from the firms' first year, excluding firms with extreme values. For two of the measures (*Turnover* and *Employees*) the difference is significant at the 5% level. Incubated firms have a smaller turnover, but more employees in their first year of operation. Although this test does not include any controls, it does indicate that some selection is at work, which could affect the results. However, in absolute numbers, the differences are rather small: the average number of employees in the first year in the incubated firms is 1.9, whereas for unincubated firms, the number is 1.2. In unlogged numbers, BI firms, on average, start with 897,000 SEK (USD 108,000) in sales, whereas the unincubated ones start with 319,000 SEK (USD 38,000). Thus, even if some differences emerge between the two groups, they both consist of small firms.

Table 3. *T*-tests for first year, two-sided tests

Variables	Difference (non-incubated - incubated)	Observations
ROA	25.5	397
Turnover	1.65**	422
Employees	-0.7*	422
Assets	-0.84	421

* Significant at 5% **significant at 1%.

The system GMM estimator could suffer from weak instruments, which could bias the results (Bun & Windmeijer, 2010). The robustness section therefore presents results using a standard OLS. To avoid dynamic panel bias, these

regressions do not include a lagged dependent variable. The overall results are robust to this specification.

5. Empirical results

5.1 Summary of variables and correlations

Table 4 shows summary statistics for the variables used in the regression. The log-average of fixed assets is only 19,000 SEK (approximately USD 2,200) and of annual turnover just 200,000 SEK (USD 24,000). Such a small turnover, if kept over several years, suggests that entrepreneurs in the sample are part-time entrepreneurs, as they are likely to require other sources of income. On average, the firms have fewer than two employees. Returns are negative, on average, but with a high standard deviation. Although a high variation in returns among start-up firms is natural due to their low levels of assets, the size of the standard deviations suggests the presence of extreme values. The regressions therefore exclude firms with extreme values to avoid these values skewing the results. The regressions using *ROA* exclude firms with annual returns at the top- and

Table 4. Summary of variables and correlations with BI

Variables	Mean	Std. dev.	Median	Correlations:	
				DURING	*AFTER*
ROA	-15.76	417.35	5.85	-0.19*	0.03
Turnover	5.30	2.96	6.43	-0.03	0.02
Employees	1.90	3.52	1.00	0.04	0.14*
Assets	2.92	2.70	3.02	0.04	0.22*
Company age	3.17	1.84	3.00	-0.03	0.15*
University employee	0.13	8.70	41.00	0.17*	0.22*
Board age	41.91	7.66	35.00	-0.05*	0.05*
DURING	0.02	0.14	0.00	1.00	-0.02
AFTER	0.02	0.14	0.00		1.00

Observations: 2,030, * indicates a correlation significant at 5%.

bottommost percentiles to exclude positive and negative outliers.[53] The other three regressions exclude only the top percentile, as these variables cannot take on values below zero. As the extreme values of the dependent variable in each regression determine the sample, the sample size differs between regressions. The robustness check presents results with the full sample for all regressions and these are in line with the main specification, except for *ROA,* which seems to suffer from outliers.

Table 4 also shows the correlations between the dependent variables and the two incubator variables. The correlations between the control variables are located in Appendix C. In general, *AFTER* correlates positively with all four dependent variables, even though the correlation is only significant for *Employees* and *Assets*. The correlations with the *DURING* variable is less consistent, with some correlations being positive and others negative. The only dependent variable that is significantly correlated with *DURING* is *ROA,* which is negatively correlated with the BI variable. At this stage of the analysis, incubation thus seems to have a positive effect on firms only for some measures, and only after the firms have left the incubator. During the time spent in the BI, incumbents instead appear to underperform compared to non-incubated firms.

5.2 Regression results

Table 5 shows the results for the main specification.[54] These results show that, in general, incubation does not improve performance or help firms to scale. Turnover is even significantly negative for the period a firm spends in the incubator. The result is economically significant: firms located in incubators sell less than half as much as comparable firms outside of the incubator. Furthermore, incubated firms do not sell more after graduating, although this

[53] Alternative cut-off points of 0.5% and 1.5% yield similar results; results are available upon request.

[54] The Hansen's *J*-test statistic is insignificant throughout, indicating that the instruments are valid for all regressions. The tables also present the Arellano–Bond test for autocorrelation. As the Arellano–Bond test uses the residuals in first differences, first-order autocorrelation is to be expected and the significant results for this test are not a cause for concern (Roodman, 2009). However, it could be worrisome that some of the regressions also show second-order autocorrelation, as this could invalidate the second lag of the dependent variable as an instrument. However, the main results are robust to running the regressions using only the third lag and above of the dependent variable as an instrument (and thus only firms with at least four observations). Results are available upon request.

Table 5. Results, system GMM

	ROA	Employees[a]	Assets	Turnover
DURING	-56.67*	0.733	0.635	-1.878**
	(22.06)	(0.949)	(0.459)	(0.601)
AFTER	-12.18	0.372	-0.273	-0.523
	(9.550)	(0.611)	(0.476)	(0.274)
Lagged dependent variable	0.211*	0.998***	0.465***	0.219***
	(0.086)	(0.062)	(0.065)	(0.042)
Employees	0.423		0.037***	0.253***
	(0.217)		(0.010)	(0.031)
Company age	0.786	-0.053*	-0.104***	-0.002
	(0.962)	(0.023)	(0.030)	(0.027)
University	-3.809	0.062	0.143	0.033
employee	(4.805)	(0.094)	(0.137)	(0.127)
Board age	-0.218	0.001	0.008	0.003
	(0.201)	(0.004)	(0.005)	(0.005)
Malmö	-8.586*	-0.093	0.094	-0.095
	(3.562)	(0.077)	(0.093)	(0.098)
Other	-4.898	-0.044	-0.058	-0.092
	(4.739)	(0.106)	(0.126)	(0.130)
Constant	13.85	0.271	2.581***	4.449***
	(9.629)	(0.185)	(0.429)	(0.354)
Year FEs	Y	Y	Y	Y
Firm FEs	Y	Y	Y	Y
Log dummy			Y	Y
Observations	1,497	1,559	1,563	1,568
Firms	397	422	421	422
Hansen's *J*-test	0.491	0.756	0.303	0.318
AR1	0.001	0.001	0.000	0.000
AR2	0.640	0.888	0.033	0.085
Wald test	0.000	0.000	0.000	0.000

Robust standard errors in parentheses. The log dummy is a dummy coded 1 for those observations where the underlying dependent variable is zero, and 0 otherwise. The tables present *p*-values for the overall Hansen's *J*-test, Arellano-Bond tests for autocorrelation, and Wald test.

[a]The parameter close to one for the lagged *Employees* variable indicates that the variable is non-stationary. * indicates 5% significance, ** 1% and *** 0.1%.

difference is insignificant. Likewise, a firm makes smaller returns than comparable firms do while incubated. Once again, this negative effect is not significant after the firm has left the BI, but the coefficient for *AFTER* is still negative, showing no indication that graduated firms overtake unincubated firms once they leave. For the regressions using *Employees* as the dependent variable, neither *DURING* nor *AFTER* is statistically significant. Similarly, the BI coefficients are positive but insignificant for the assets regressions. The insignificant result for employees is thus not the result of incubated firms investing their money in assets instead of employees, which could otherwise have explained the insignificant results for employment (Davidsson & Wiklund, 2006).

The negative results found here for returns and sales are in line with the results from a local report on Swedish incubators in Västra Götaland County (2011) 1997–2008 in the west of Sweden. The report also found that incubated firms in this county sold less and made smaller returns than comparable unincubated firms. However, the report found a significant negative result both during and after incubation. Furthermore, the report also found that the incumbent's assets increased after incubation, as did their number of employees in some specifications. As further argued in the discussion and implication section, the differences between the results from the two regions could be due to differences in entrepreneurial culture between the regions. It is also possible that the differences were caused by the longer time span available in the Västra Götaland study. If the latter is correct, BIs do have a positive effect on the level of assets and perhaps employment, but only after several years after graduation.

Concerning the controls, the lagged dependent variables are highly significant and positive in all regressions. The coefficient is largest in the employment regression, close to one,[55] and the smallest for the return variable. This shows the persistence of employment levels across time and emphasizes the slow rate of employment growth among firms. In the regressions with *Assets* and *Turnover* as the dependent variable, the number of employees is positive and significant, showing that firms increase their assets, sales, and staff at the same time. Returns are unrelated to firm size, as the number of employees has no significant impact on *ROA.* The rest of the control variables are largely insignificant. The two regional dummies are significant only once, a negative result for the *Malmö* dummy in the regression with *ROA* as the dependent variable. This result

[55] This indicates nonstationarity, which could create problems with spurious results. However, as neither of the BI variables are significant, this is not a big concern. Furthermore, as seen in the robustness-check section, incubation has no effect on *Employees* in first differences.

indicates that, holding all other variables constant, the location of the firms largely has no effect on the performance of the firm. Given how close Malmö and Lund are to each other, and the prevalence of nearby municipalities in the *Other* category, this result was expected. The age of the company has a significant effect on assets and employees, but the coefficients are very small.

5.3 Robustness checks

Appendix D presents results from four robustness checks. First, Table D1 presents the results from fixed-effects regressions. Although these regressions do not use a lagged dependent variable to avoid dynamic panel bias, they do not have any problems with weak instruments from which the main specification could potentially suffer.[56] Second, Table D2 presents the results from regressions including extreme values to see whether these potential outliers have any effect on the results. Table D3 presents results from a matched sample and Table D4 presents results from regressions with the annual change of the variables in the main regressions as the dependent variables.

The results without the use of lags and instruments in Table D1 are, with few exceptions, in line with those from the main specification. The differences that do occur do not change the overall conclusion; incubation neither improves a firm's performance nor helps it grow. The results for *Employees* and *Assets* are still insignificant. The effect of incubation on *ROA* is still negative and significant for the period spent in the BI, but insignificant once the firm leaves, even though the coefficients are slightly smaller than before. However, the *p*-value of the *F*-test for the *ROA* regression is no longer significant, which indicates a poor fit for this regression and casts some doubts on the significant result. The regression using *Turnover* as the dependent variable now shows no significant relationship between incubation and *Turnover*: the effect, while located in the BI, is now one tenth its size in the main specification and the effect after leaving is even positive, although insignificant.

The results using the sample including extreme values in Table D2 show no qualitative changes from the main specification for the three nonreturns regressions. However, the results for *ROA* changes from the main specifications. First, all coefficients and the Wald test are now insignificant, indicating a much worse fit than in the original regression. The *DURING* coefficient in the *ROA*

[56] For comparability, the sample is the same as in the main specification.

regression is two orders of magnitude larger than before, but insignificant. Meanwhile, the *AFTER* coefficient switches signs to become positive, but is still insignificant. These differences, compared to the main specification, demonstrate that outliers indeed seem to skew the results for the returns variable, but not for the remaining variables. Considering the small average size of the firms, the presence of outliers in this variable is not surprising: even a modest profit in absolute value could be large in relation to a start-up's assets, inflating the results.

Table D3 presents the results from a matched sample. The matching is based on CEM which reduces bias further than the otherwise popular propensity score matching in Monte Carlo simulations (Iacus et al., 2011). CEM matches unincubated firms to incubated firms by creating coarsened versions of the matching variables (i.e., groups similar values) and then performs an exact match on these new versions. The match uses the start year, the initial municipality, the two-digit industry of the firm, and the number of its founders who had a university connection. After matching, the number of firms decreased to 290 but the number of incubated firms remained the same as all incubated firms find matches.[57] The results using this sample are similar to the main results, but with slightly smaller coefficients for BI variables in some regressions. The only coefficient to switch sign compared to the main regressions is the coefficient for *AFTER* in the *ROA* regressions. However, this coefficient is insignificant in both cases. Overall, this indicates that the original sample indeed does contain firms that are very similar to each other.

Last, Table D4 shows the result using the annual change of the outcome variables as the dependent variable.[58] As in the main regressions, at least three observations are required to instrument the lagged dependent variable properly. As two observations are required to measure change, this limits the sample to those firms with at least four observations. This leads to a significant reduction in sample size. In these regressions, none of the BI variables has a significant impact on either of these variables. Thus, BIs does not appear to benefit incumbents through quicker growth.

[57] Extreme values were removed before matching using the same method as before. Regressions use weights to balance the number of matched controls to each incubated firm.

[58] The change is measured as the difference from the previous year.

6. Discussion and implications

BIs are an important part of the innovation support system in Sweden and in Malmö–Lund. As firms struggle to scale, BIs try to provide their incumbent firms with the assistance required to help the firms develop more quickly than they could have done outside of the incubator. However, the results presented here show that the two incubators in southern Sweden studied here do not have this effect, at least not in the industry and period studied. The incubators in Malmö–Lund do not significantly increase returns, employment, assets, or sales. In fact, incubated firms even seem to sell less than unincubated ones, at least for the period spent inside the incubator. Likewise, incubated firms seem to make, if anything, smaller returns, at least while still located in the BI. These results are even more worrisome, considering that incubators selected their incumbents partly due to their perceived ability to scale. This means that the real effect of incubation could be even more negative than what the results show here.

These results are in line with what local entrepreneurs with experience from incubation expressed during the interviews. One entrepreneur expressed that the services provided did not generate any value to the firm and stated: "The choice [to enter the BI] was only due to us needing somewhere to sit, we needed an office." Another entrepreneur, although appreciative of the "buzz around the office" (i.e., being among several other start-ups instead of sitting isolated), also said that the BI had nothing decisive to offer them.

Modern BIs like Ideon Innovation and Minc Incubator are part of the "third generation" of incubators, focusing on increasing incumbent firms' networks by clustering start-ups close to each other and by connecting them with experienced actors and financiers in the region (Bruneel et al., 2012). However, clustering firms in a BI does not automatically lead to firms forming a network (Bøllingtoft & Ulhøi, 2005). Incumbent firms themselves often downplay the importance of clustering and networking in BIs, as the firms are too different to get any benefit from each other's presence (Chan & Lau, 2005). An additional problem of incubation is that the assistance offered to incumbents could act as "life-support," simply postponing the death of a firm that will never survive on its own (Phan et al., 2005).

The local context could also partly explain the lack of positive results found in the Malmö–Lund region compared to results in Italy, the UK, and the United States. For economic policy to be successful, it must take local informal institutions into consideration (Eggertsson, 1997). Not the least cross-country

cultural differences could be important. Culture affects the propensity to become entrepreneurs and how entrepreneurs act (Steensma et al., 2000; Hayton, George & Zahra, 2002; Hofstede et al., 2004; Stephan & Uhlaner, 2010; Hopp & Stephan, 2012), and thus, plausibly, which assistance they require. For instance, on the Hofstede cultural scale, Sweden stands out as an extremely feminine culture focused on quality of life, work–life balance, and caring for the weak (Hofstede, 2001). This has a clear effect on how Swedish entrepreneurs act; one of the interviewed entrepreneurs complained about the companies at Ideon Science Park (where Ideon Innovation is located): "There is no interaction between the firms; everyone goes home at five pm." In such a culture, it could be hard for incubators to forge new contacts between entrepreneurs; this and other culturally driven differences in entrepreneur behavior could be one explanation for the differences in results. Cultural differences exist also in countries (García-Cabrera & García-Soto, 2009), even in a small country like Sweden (Davidsson, 1995; M. Andersson, 2015). Regional cultural differences could be part of the explanation for the more positive results for assets and employment in Västra Götaland (Västra Götaland County, 2011) compared with results from Malmö–Lund.

An additional reason for the inefficiency of the incubators in Malmö–Lund could be the other public innovation-support organizations present in the region. The regional innovation-support system offers several other venues outside of the BI through which a start-up could contact investors and other more experienced firms (Karlsson et al., 2015), potentially making the BI's assistance superfluous. The lack of support among local entrepreneurs is also likely to have a negative impact on the effect of incubation. The improved legitimacy potentially offered to BI incumbents and access to the network of local actors are clearly contingent on the attitudes of local entrepreneurs toward BIs and the innovation-support system as a whole. If local entrepreneurs consider entrepreneurship support to be an integrated part of the entrepreneurial community, they are presumably more likely to co-operate with the BI and their incumbents than if they do not. The interviewed entrepreneurs in Malmö–Lund were generally unsupportive of the government-sponsored support system: "I find it horrible that it exists," said one Malmö-based entrepreneur about the entire innovation support system, "that it's allowed to function the way it does." Another entrepreneur was as skeptical of the entire innovation-support system stating, "They have no […] idea whatsoever." With such attitudes among local entrepreneurs, it will be hard for BIs and their firms to create beneficial networks. The relationship between BIs and surrounding firms requires further research; policymakers need to understand the attitudes of local entrepreneurs to

be able to create a closer match between the services offered to entrepreneurs and the services actually demanded.

Some limitations apply to these results. As discussed in this section, the regional context of start-ups and innovation-support systems are important and the results presented here are not necessarily representative of other regions, inside or outside of Sweden. Thus, further research should study the effects of BIs in more regions and more countries, to tease out how the regional context and culture affects the success of BIs. Furthermore, the long-term effects of incubation and the dynamics of the same require more research. The dataset here covers, on average, five observations per firm, and such a study would require an annual dataset covering a longer period. It would also be interesting to investigate the combined effect of the total public innovation-support system, including BIs, investor organizations, and the other business support offered.

Although returns, sales, assets, and employment are all important indicators of firm size and performance, an incubator could benefit local businesses in other ways. The lessons learned and contacts made while in an incubator could benefit entrepreneurs in future ventures, even if the current one is not successful. A BI could also act as a signal from the local and central government that entrepreneurs are welcome and appreciated, which could increase the number of people who decide to take the risk of starting a firm. Such long-run and dynamic effects require more research, as they could create benefits for the local economy without benefiting the incubated firms themselves.

References

Aernoudt, R. (2004). Incubators: Tool for Entrepreneurship? *Small Business Economics,* vol. 23, pp. 127–135.

Allen, D., & Bazan, E. (1990). Value Added Contributions of Pennsylvania's Business Incubators to Tenant Firms and Local Economies. Appalachian Regional Commission and Pennsylvania Department of Commerce.

Amezcua, A.S. (2010). *Boon or Boondoggle? Business Incubation as Entrepreneurship Policy.* Whitman School of Management, Syracuse University.

Amezcua, A.S., Grimes, M.G., Bradley, S.W., & Wiklund, J. (2013). Organizational Sponsorship and Founding Environments: A Contingency View on the Survival of Business-Incubated Firms, 1994–2007. *Academy of Management Journal,* vol. 56, no. 6, pp. 1626–1654.

Andersson, M. (2015). Start-Up Rates, Entrepreneurship Culture and the Business Cycle: Swedish Patterns from National and Regional Data. In C. Karlsson, U. Gråsjö, & S. Wixe (eds.) *Innovation and Entrepreneurship in the Global Economy Knowledge, Technology and Internationalization,* pp. 162–183. Cheltenham, UK: Edward Elgar.

Baumol, W.J. (1990). Entrepreneurship: Productive, Unproductive, and Destructive. *Journal of Political Economy,* vol. 95, no. 5, part 1, pp. 893–921.

Bearse, P. (1998). A Question of Evaluation: NBIA's Impact Assessment of Business Incubators. *Economic Development Quarterly,* vol. 12, no. 4, pp. 322–333.

Bergek, A., & Norrman, C. (2008). Incubator Best Practice: A Framework. *Technovation,* vol. 28, pp. 20–28.

Billing, P. (2000). Skilda Världar? Malmös 1990-tal i ett Kort Historiskt Perspektiv. Malmö: Malmö Stad.

Blundell, R., & Bond, S. (1998). Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics,* vol. 87, pp. 115–143.

Bøllingtoft, A., & Ulhøi, J.P. (2005). The Networked Business Incubator-Leveraging Entrepreneurial Agency? *Journal of Business Venturing,* vol. 20, no. 2, pp. 265–290.

Bonn, I., Yoshikawa, T., & Phan, P.H. (2004). Effects of Board Structure on Firm Performance: A Comparison Between Japan and Australia. *Asian Business and Management,* vol. 3, pp. 104–125.

Bowen, H.P., & De Clercq, D. (2008). Institutional Context and the Allocation of Entrepreneurial Effort. *Journal of International Business Studies,* vol. 39, no. 4, pp. 747–67.

Bruneel, J., Ratinho, T., Clarysse, B., & Groen, A. (2012). The Evolution of Business Incubators: Comparing Demand and Supply of Business Incubation Services Across Different Incubator Generations. *Technovation,* vol. 32, pp. 110–121.

Bun, M.J., & Windmeijer, F. (2010). The Weak Instrument Problem of the System GMM Estimator in Dynamic Panel Data Models. *The Econometrics Journal,* vol. 13, pp. 95–126.

Chan, K.F., & Lau, T. (2005). Assessing Technology Incubator Programs in the Science Park: The Good, the Bad and the Ugly. *Technovation,* vol. 25, no. 10, pp. 1245–1228.

Chen, C. (2009). Technology Commercialization, Incubator and Venture Capital, and New Venture Performance. *Journal of Business Research,* vol. 62, pp. 90–103.

Colombo, M.G., & Delmastro, M. (2002). How Effective Are Technology Incubators? Evidence from Italy. *Research Policy,* vol. 31, pp. 1103–1122.

Davidsson, P. (1995). Culture, Structure and Regional Levels of Entrepreneurship. *Entrepreneurship and Regional Development,* vol. 7, no. 1, pp. 41–62.

Davidsson, P., & Wiklund, J. (2006). Conceptual and Empirical Challenges in the Study of Firm Growth. In P. Davidsson, F. Delmar, & J. Wiklund (eds.), *Entrepreneurship and the Growth of Firms,* pp. 39–61. Cheltenham, UK: Elgar.

DiNapoli, T.P., & Bleiwas, K.B. (2014). New York City's Growing High-Tech Industry. Office of the State Comptroller Report. 2-2015.

Eggertsson, T. (1997). The Old Theory of Economic Policy and the New Institutionalism. *World Development,* vol. 25, no. 8, pp. 1187–1203.

Faleye, O. (2006). Classified Boards, Firm Value, and Managerial Entrenchment. *Journal of Financial Economics,* vol. 83, pp. 501–529.

Ferguson, R., & Olofsson, C. (2004). Science Parks and the Development of NTBFs—Location, Survival and Growth. *Journal of Technology Transfer,* vol. 29, pp. 5–17.

García-Cabrera, A.M., & García-Soto, M.G. (2009). Cultural Differences and Entrepreneurial Behavior: An Intra Country Cross-Cultural Analysis in Cape Verde. *Entrepreneurship and Regional Development,* vol. 20, no. 5, pp. 451–483.

Global Entrepreneurship Monitor. (2015). Entreprenörskap i Sverige, Nationell Rapport 2015.

Global Entrepreneurship Monitor. (2016). 2015/16 Global Report.

Granovetter, M.S. (1973). The Strength of Weak Ties. *American Journal of Sociology,* vol. 78, no. 6, pp. 1360–1380.

Granovetter, M. (1985). Economic Action and Social Structure: the Problem of Embeddedness. *American Journal of Sociology,* vol. 91, no. 3, pp. 481–510.

Hackett, S.M., & Dilts, D.M. (2004). A Systematic Review of Business Incubation Research. *Journal of Technology Transfer,* vol. 29, pp. 55–84.

Hansen, M.T., Chesbrough, H.W., Nohria, N., & Sull, D.N. (2000). Networked Incubators—Hothouses of the New Economy. *Harvard Business Review,* vol. 78, no. 5, pp. 74–84.

Hannon, P.D., & Chaplin, P. (2003). Are Incubators Good for Business? Understanding Incubation Practice—The Challenges for Policy. *Environment and Planning C: Government and Policy,* vol. 21, pp. 861–881.

Hayton, J.C, George, G., & Zahra, S.A. (2002). National Culture and Entrepreneurship: A Review of Behavioral Research. *Entrepreneurship Theory and Practice,* vol. 26, no. 4, pp. 33–52.

Hofstede, G. (2001). *Culture's Consequence: Comparing Values, Behaviors, Institutions, and Organizations across Nations.* 2nd edition. Thousand Oaks, California: Sage.

Hofstede, G., Noorderhaven, N.G., Thurik, A.R., Uhlaner, L.M., Wennekers, A.R.M., & Wildeman, R.E. (2004). Culture's Role in Entrepreneurship: Self-Employment Out of Dissatisfaction. In T. Brown and J. Ulijn (eds.) *Innovation, Entrepreneurship and Culture: The Interaction between Technology, Progress and Economic Growth,* pp. 162–203. Cheltenham, UK: Edward Elgar.

Hopp, C., & Stephan, U. (2012). The Influence of Socio-cultural Environments on the Performance of Nascent Entrepreneurs: Community Culture, Motivation, Self-Efficacy and Start-Up Success. *Entrepreneurship & Regional Development,* vol. 24, no. 9–10, pp. 917–945.

Iacus, S.M., King, G., & Porro, G. (2012). Causal Inference without Balance Checking: Coarsened Exact Matching. *Political Analysis,* vol. 20, pp. 1–24.

Ideon Innovation. (2016). Available online: http://www.ideoninnovation.se/sv/om-inkubatorn, [Accessed 11 July 2016].

International Business Innovation Association. (2015). What is Business Incubation? Available online: http://www2.nbia.org/resource_library/what_is/. [Accessed 5 August 2016].

Karlsson, T., Wigren-Kristoferson, C., & Landström, H. (2015). The Evolution of Lund University's Entrepreneurial Ecosystem from 1980 to 2012. In L. Foss & D.V. Gibson (eds.) *The Entrepreneurial University—Context and Institutional Change,* pp. 131–149. London, UK: Routledge.

Lasrado, V., Sivo, S., Ford, C., O'Neal, T., & Garibay, I. (2015). Do Graduated University Incubator Firms Benefit from Their Relationship with University Incubators? *Journal of Technology Transfer,* vol. 41, no. 2, pp. 205–219.

Lewis, D.A. (2002). *Does Technological Incubation Work? A Critical Review of the Evidence.* Athens, Ohio: National Business Incubator Association.

Lin, B., Li, P., & Chen, J. (2006). Social Capital, Capabilities, and Entrepreneurial Strategies: A Study of Taiwanese High-Tech New Ventures. *Technological Forecasting and Social Change,* vol. 73, pp. 168–181.

Lindelöf, P., & Löfsten, H. (2002). Growth, Management and Financing of New Technology-Based Firms—Assessing Value-Added Contributions of Firms Located on and off Science Parks. *Omega,* vol. 30, pp. 143–154.

Löfsten, H., & Lindelöf, P. (2002). Science Parks and the growth of new technology-based firms—academic-industry links, innovation and markets. *Research Policy.* 31, 859–876.

Macdonald, S. (1987). British Science Parks: Reflections on the Politics of High Technology. *R&D Management,* vol. 17, no. 1, pp. 25–37.

McAdam, M., & McAdam, R. (2008). High Tech Start-Ups in University Science Park Incubators: The Relationship between the Start-Up's Lifecycle Progression and Use of the Incubator's Resources. *Technovation,* vol. 28, pp. 277–290.

Mian, S.A. (1997). Assessing and Managing the University Technology Business Incubator: An Integrative Framework. *Journal of Business Venturing,* vol. 12, no. 4, pp. 251–285.

Minc Incubator. (2016). Available online: http://www.minc.se/incubator. [Accessed 11 July 2016].

Nickell, S. (1981). Biases in Dynamic Models with Fixed Effects. *Econometrica,* vol. 49, no. 6, pp. 1417–1426.

Norrman, C., & Bager-Sjögren, L. (2010). Entrepreneurship Policy to Support New Innovative Ventures: Is It Effective? *International Small Business Journal,* vol. 28, no. 6, pp. 602–619.

North, D.C. (1990). *Institutions, Institutional Change and Economic Performance.* Cambridge, UK: Cambridge University Press.

Organization for Economic Co-operation and Development. (1997). *Technology Incubators: Nurturing Small Firms.* Paris, France: OECD.

Pakes, A., & Griliches, Z. (1984). Patents and R&D at the Firm Level: A First Look. In Z. Griliches (ed.) *R&D, Patents and Productivity,* pp. 55–72. Chicago, IL: University of Chicago Press.

Patton, D., Warren, L., & Bream, D. (2009). Elements that Underpin High-Tech Business Incubation Processes. *Journal of Technology Transfer,* vol. 34, pp. 621–636.

Payne, A.A., & Siow, A. (2003). Does Federal Research Funding Increase University Research Output? *Advances in Economic Analysis and Policy,* vol. 3, no. 1, pp. 1–22.

Phan, P.H., Siegel, D.S., & Wright, M. (2005). Science Parks and Incubators: Observations, Synthesis and Future Research. *Journal of Business Venturing,* vol. 20, no. 2. pp. 165–182.

Powell, W.W. (1990). Neither Market nor Hierarchy: Network Forms of Organization. *Research in Organizational Behavior,* vol. 12, pp. 295–336.

Region Skåne. (2014). Strategi för utveckling av inkubatorernas roll i innovationsstödssytemet i Skåne. Version 1.0.

Retriever Business. (n.d.) Retriever Business Manual. Available online: http://web.retriever-info.com/static/pdf/businessinfo/businessinfo_manual.pdf. [Accessed 20 March 2014].

Rice, M.P. (2002). Co-production of Business Assistance in Business Incubators. An Exploratory Study. *Journal of Business Venturing,* vol. 17, no. 2, pp. 163–187.

Roodman, D. (2009). How to Do xtabond2: An Introduction to Difference and System GMM in Stata. *Stata Journal,* vol. 9, no. 1, pp. 86–136.

Rothschild, L., & Darr, A. (2005). Technological Incubators and the Social Construction of Innovation Networks: An Israeli Case Study. *Technovation,* vol. 25, pp. 59–67.

Sá, C., & Lee, H. (2012). Science, Business, and Innovation: Understanding Networks in Technology-Based Incubators. *R&D Management,* vol. 42, no. 3, pp. 243–253.

Saxenian, A. (1991). The Origins and Dynamics of Production Networks in Silicon Valley. *Research Policy,* vol. 20, pp. 423–437.

Saxenian, A. (1996). Inside-Out: Regional Networks and Industrial Adaption in Silicon Valley and Route 128. *Cityscape: A Journal of Policy Development and Research,* vol. 2, no. 2, pp. 41–60.

Schwartz, M. (2011). Incubating and Illusion? Long-Term Incubator Firm Performance after Graduation. *Growth and Change,* vol. 42, no. 4, pp. 491–516.

Simón-Moya, V., Revuelto-Taboada, L., & Fernández Guerrero, R. (2014). Institutional and Economic Drivers of Entrepreneurship: An International Perspective. *Journal of Business Research,* vol. 67, pp. 715–721.

Soetanto, D.P., & Jack, S.L. (2013). Business Incubators and the Networks of Technology-Based Firms. *Journal of Technology Transfer,* vol. 38, pp. 432–453.

Statistics Sweden. (2010). *De Små och Medelstora Företagens Ekonomi 2008.* Statistiska meddelanden. NV 19 SM 1004.

Statistics Sweden. (2015a). Population in the Country, Counties and Municipalities by Sex and Age. Available online: http://www.scb.se/en_/Finding-statistics/Statistics-by-subject-area/Population/Population-composition/Population-statistics/Aktuell-Pong/25795/Yearly-statistics--Municipalities-Counties-and-the-whole-country/159277/. [Accessed 17 September 2015].

Statistics Sweden. (2015b). Employed Population 16–64 Years by Region of Work (SSYK3). Available online: http://www.statistikdatabasen.scb.se/pxweb/en/ssd/?rxid=9fd6f336-40e7-411e-88e5-1382088bd530. [Accessed 7 March 2015].

Statistics Sweden. (2015c). CPI, Fixed Index Numbers. Available online: http://www.scb.se/en_/Finding-statistics/Statistics-by-subject-area/Prices-and-Consumption/Consumer-Price-Index/Consumer-Price-Index-CPI/Aktuell-Pong/33779/Consumer-Price-Index-CPI/272151/. [Accessed 7 August 2015].

Steensma, H.K., Marino, L., Weaver, K.M., & Dickson, P.H. (2000). The Influence of National Culture on the Formation of Technology Alliances by Entrepreneurial Firms. *The Academy of Management Journal,* vol. 43, no. 5, pp. 951–973.

Stephan, U., & Uhlaner, L.M. (2010). Performance Based vs. Socially Supportive Culture: A Cross-National Study of Descriptive Norms an Entrepreneurship. *Journal of International Business Studies,* vol. 83, pp. 717–38.

Stephen, F.H., Urbano, D., & van Hemmen, S. (2005). The Impact of Institutions on Entrepreneurial Activity. *Managerial and Decision Economics,* vol. 26, pp. 413–419.

Stinchcombe, A.L. (1965). Social Structure and Organizations. In J.G. March (ed.) *Handbook of Organizations,* pp. 142–194. Chicago, IL: Rand McNally.

Storey, D. (1999). Six Steps to Heaven: Evaluating the Impact of Public Policies to Support Small Businesses in Developed Economies. In D.L. Sexton & H. Landström (eds.) *The Blackwell Handbook of Entrepreneurship,* Oxford, UK: Blackwell. Available online: http://www.blackwellreference.com/subscriber/tocnode.html?id=g9780631215738_chunk_g978063121573812. [Accessed 13 October 2016].

Swedish Incubators and Science Parks. (n.d.). Swedish Incubators and Science Parks. Available online: http://sisp.se/om-sisp?language=sv. [Accessed 18 October 2014].

Tamásy, C. (2007). Rethinking Technology-Oriented Business Incubators: Developing a Robust Policy Instrument for Entrepreneurship, Innovation, and Regional Development? *Growth and Change,* vol. 38, no. 3, pp. 460–473.

Tötterman, H., & Sten, J. (2005). Business Incubation and Social Capital. *International Small Business Journal,* vol. 23, no. 5, pp. 487–511.

Västra Götaland County. (2011). Effektutvärdering av Stöd till Näringslivet Genom Såddfinansiering och Inkubatorer. Utvärderingsrapporter, Regional Utveckling Västra Götalandsregionen. 2011:01.

Westhead, P. (1997). R&D "Inputs" and "Outputs" of Technology-Based Firms Located on and off Science Parks. *R&D Management,* vol. 27, pp. 45–62.

Westhead, P., & Storey, D.J. (1994). *An Assessment of Firms Located on and off Science Parks in the UK.* London, UK: HMSO.

Yermack, D. (1996). Higher Market Valuation of Companies with a Small Board of Directors. *Journal of Financial Economics,* vol. 40, pp. 185–211.

Yermack, D. (2004). Remuneration, Retention, and Reputation Incentives for Outside Directors. *Journal of Finance,* vol. 59, no. 5, pp. 2281–2308.

Appendix A Interviews

Table A1. Interviews.

Interview number	Date	Location	Description at the time of interview
1	3 March 2014	Lund	Manager of Ideon Innovation.
2	27 March 2014	Malmö	Manager of Minc Incubator.
3	13 June 2014	Malmö	CEO, founder
4	16 June 2014	Malmö	CEO, founder, angel investor
5	16 June 2014	Malmö	CEO, co-founder
6	17 June 2014	Malmö	CEO, founder
7	8 September 2014	Malmö	Former chairman of the municipal board
8	7 October 2014	Lund	Lead scientist, co-founder
9	7 October 2014	Lund	Founder
10	14 October 2014	Malmö	CEO, co-founder
11	14 October 2014	Malmö	Vice president for sales, co-founder

Appendix B ICT industries.

Table B1. SNI industry codes included in the ICT industry.

SNI	Code	Description
1992	72201	Computer consultancy activities
	72202	Computer programming activities
2002	52617	Non-specialized retail sale via internet
	52618	Retail sale of books, media goods and computer equipment via internet
	52619	Other retail sale via internet
	64201	Network operation
	72210	Publishing software
	72220	Other software consultancy and supply
	72300	Data processing
	72400	Data base activities
	72600	Other computer related activities
2007	47911	Non-specialized retail sale via mail order houses or via Internet
	47912	Retail sale of clothing via mail order houses or via Internet
	47913	Retail sale of books and other media goods via mail order houses or via Internet
	47914	Retail sale of computers and other electronic equipment via mail order houses or via Internet
	47915	Retail sale of sports and leisure goods via mail order houses or via Internet
	47916	Retail sale of household goods via mail order houses or via Internet
	47917	Internet retail auctions
	47919	Other retail sale via mail order houses or via Internet
	58210	Publishing of computer games
	58290	Other software publishing
	61900	Other telecommunications activities
	62010	Computer programming activities
	62020	Computer consultancy activities
	62030	Computer facilities management activities
	62090	Other information technology and computer service activities
	63110	Data processing, hosting and related activities
	63120	Web portals
	63990	Other information service activities n.e.c.

Appendix C Further correlations

Table C1. Correlations between the dependent variable and controls.

	1	2	3	4	5	6	7
1. ROA	1						
2. Turnover	0.03	1					
3. Employees	0.02	0.57*	1				
4. Assets	0.00	0.06*	0.14*	1			
5. Company age	0.02	0.08*	0.14*	0.08*	1		
6. University employee	-0.08*	-0.03	0.01	0.05*	0.01	1	
7. Board age	-0.04	-0.03	-0.01	0.06*	0.18*	0.05*	1

* indicates significance at 5%

Appendix D Robustness checks

Table D1. Fixed effects regressions

	ROA	Employees	Assets	Turnover
DURING	-24.79*	-0.276	0.703	-0.180
	(11.76)	(0.437)	(0.387)	(0.470)
AFTER	-7.660	1.089	0.680	0.616
	(16.55)	(0.800)	(0.428)	(0.548)
Employees	0.196		0.031**	0.195***
	(0.405)		(0.012)	(0.037)
Company age	-1.325	0.136	-0.010	-0.022
	(1.895)	(0.114)	(0.043)	(0.038)
University employee	-12.09	0.156	0.204	-0.033
	(15.675)	(0.292)	(0.214)	(0.413)
Board age	0.755	0.019	-0.004	-0.007
	(0.644)	(0.025)	(0.021)	(0.015)
Malmö	-16.55*	0.564	-0.068	-0.227
	(6.606)	(0.296)	(0.233)	(0.211)
Other	-10.09	-0.019	-0.247	-0.318
	(6.587)	(0.263)	(0.207)	(0.215)
Constant	-12.94	-0.217	4.641***	6.347***
	(27.70)	(1.143)	(0.872)	(0.642)
Year FEs	Y	Y	Y	Y
Firm FEs	Y	Y	Y	Y
Log dummy			Y	Y
Observations	1,497	1,559	1,563	1,568
Firms	397	422	421	422
F	0.289	0.000	0.000	0.000

Standard errors clustered at firm level in parentheses. The log dummy is a dummy coded 1 for those observations where the underlying dependent variable is zero, and 0 otherwise. The tables present *p*-values for the overall *F*-test. * indicates 5% significance, ** 1% and *** 0.1%.

Table D2. Including extreme values

	ROA	Employees	Assets	Turnover
DURING	-1,319.8	1.095	0.651	-1.738**
	(1,061.3)	(0.963)	(0.447)	(0.562)
AFTER	-163.7	0.954	0.165	-0.312
	(257.2)	(0.656)	(0.515)	(0.275)
Lagged dependent variable	-0.095	0.765***	0.463***	0.249***
	(0.088)	(0.116)	(0.066)	(0.045)
Employees	4.146		0.040***	0.163***
	(4.583)		(0.010)	(0.039)
Company age	10.26	0.042	-0.092**	0.020
	(7.445)	(0.045)	(0.032)	(0.029)
University employee	-42.89	-0.012	0.128	0.040
	(65.73)	(0.124)	(0.130)	(0.127)
Board age	-6.374	0.001	0.008	0.001
	(7.108)	(0.006)	(0.005)	(0.005)
Malmö	-81.68	-0.044	0.121	-0.066
	(62.98)	(0.131)	(0.098)	(0.101)
Other	-48.83	-0.208	-0.009	-0.127
	(50.06)	(0.153)	(0.138)	(0.136)
Constant	306.6	0.230	2.645***	4.403***
	(336.0)	(0.283)	(0.422)	(0.367)
Year FEs	Y	Y	Y	Y
Firm FEs	Y	Y	Y	Y
Log dummies			Y	Y
Hansen's *J*-test	0.971	0.580	0.220	0.607
AR1	0.066	0.119	0.000	0.000
AR2	0.091	0.315	0.027	0.045
Wald	0.602	0.000	0.000	0.000

Firms: 429, observations 1,600. Robust standard errors in parentheses. The log dummy is a dummy coded 1 for those observations where the underlying dependent variable is zero, and 0 otherwise. The tables present *p*-values for the overall Hansen's *J*-test, Arellano-Bond tests for autocorrelation, and Wald tests. * indicates 5% significance, ** 1% and *** 0.1%.

Table D3. Matched sample

	ROA	Employees	Assets	Turnover
DURING	-34.17	0.152	0.753	-1.375**
	(30.52)	(0.619)	(0.498)	(0.502)
AFTER	1.135	0.401	-0.014	-0.482
	(12.10)	(0.717)	(0.687)	(0.303)
Lagged dependent variable	0.133	0.938***	0.288**	0.156**
	(0.124)	(0.087)	(0.094)	(0.048)
Employees	1.380		0.086*	0.298***
	(1.242)		(0.038)	(0.039)
Company age	-1.270	-0.009	-0.083	0.020
	(1.796)	(0.035)	(0.045)	(0.034)
University employee	-4.812	0.134	0.323	0.001
	(8.708)	(0.106)	(0.189)	(0.131)
Board age	-0.029	0.004	-0.010	0.007
	(0.513)	(0.007)	(0.008)	(0.008)
Malmö	-9.323	-0.267**	0.197	-0.239*
	(8.901)	(0.091)	(0.136)	(0.122)
Other	-9.071	0.034	0.058	-0.192
	(9.863)	(0.153)	(0.176)	(0.208)
Constant	12.542	0.011	3.690***	4.980***
	(25.747)	(0.335)	(0.462)	(0.364)
Year FEs	Y	Y	Y	Y
Firm FEs	Y	Y	Y	Y
Log dummies			Y	Y
Observations	946	804	966	967
Firms	274	241	284	284
Hansen's *J*-test	0.747	0.815	0.363	0.225
AR1	0.108	0.001	0.003	0.004
AR2	0.156	0.504	0.331	0.121
Wald	0.000	0.000	0.000	0.000

Robust standard errors in parentheses. The log dummy is a dummy coded 1 for those observations where the underlying dependent variable is zero, and 0 otherwise. The tables present *p*-values for the overall Hansen's *J*-test, Arellano-Bond tests for autocorrelation, and Wald tests. * indicates 5% significance, ** 1% and *** 0.1%.

Table D4. Change in variables

	ROA	Employees	Assets	Turnover
DURING	-1.157	-0.105	0.360	0.391
	(26.69)	(0.561)	(0.594)	(0.475)
AFTER	6.374	0.341	0.081	-0.259
	(11.12)	(0.597)	(0.155)	(0.542)
Lagged dependent variable	-0.216**	0.157*	0.039	-0.011
	(0.067)	(0.066)	(0.045)	(0.046)
Employees	0.031		0.044***	0.097***
	(0.226)		(0.007)	(0.018)
Company age	1.308	0.003	-0.043	-0.103*
	(0.982)	(0.024)	(0.036)	(0.049)
University employee	-0.244	0.041	0.180	0.151
	(3.290)	(0.084)	(0.125)	(0.124)
Board age	0.495*	0.002	-0.008	-0.006
	(0.220)	(0.003)	(0.006)	(0.009)
Malmö	0.804	-0.146	0.058	-0.118
	(3.276)	(0.096)	(0.111)	(0.161)
Other	5.459	-0.076	-0.166	0.227
	(5.303)	(0.120)	(0.199)	(0.275)
Constant	-36.149*	-0.010	-0.036	-0.224
	(15.650)	(0.200)	(0.351)	(0.772)
Year FEs	Y	Y	Y	Y
Firm FEs	Y	Y	Y	Y
Log dummies			Y	Y
Observations	976	986	974	989
Firms	272	275	271	275
Hansen's *J*-test	0.666	0.782	0.759	0.992
AR1	0.000	0.000	0.000	0.000
AR2	0.905	0.472	0.0180	0.890
Wald	0.190	0.005	0.000	0.000

Robust standard errors in parentheses. The log dummy is a dummy coded 1 for those observations where the underlying dependent variable is zero, and 0 otherwise. The tables present *p*-values for the overall Hansen's *J*-test, Arellano-Bond tests for autocorrelation, and Wald tests. *Significant at 5% ** significant at 1% *** significant at 0.1%.

Lund Economic Studies

1. Guy Arvidsson	Bidrag till teorin för verkningarna av räntevariationer, 1962
2. Björn Thalberg	A Trade Cycle Analysis. Extensions of the Goodwin Model, 1966
3. Bengt Höglund	Modell och observationer. En studie av empirisk anknytning och aggregation för en linjär produktionsmodell, 1968
4. Alf Carling	Industrins struktur och konkurrensförhållanden, 1968
5. Tony Hagström	Kreditmarknadens struktur och funktionssätt, 1968
6. Göran Skogh	Straffrätt och samhällsekonomi, 1973
7. Ulf Jakobsson och Göran Norman	Inkomstbeskattningen i den ekonomiska politiken. En kvantitativ analys av systemet för personlig inkomstbeskattning 1952-71, 1974
8. Eskil Wadensjö	Immigration och samhällsekonomi. Immigrationens ekonomiska orsaker och effekter, 1973
9. Rögnvaldur Hannesson	Economics of Fisheries. Some Problems of Efficiency, 1974
10. Charles Stuart	Search and the Organization of Marketplaces, 1975
11. S Enone Metuge	An Input-Output Study of the Structure and Resource Use in the Cameroon Economy, 1976
12. Bengt Jönsson	Cost-Benefit Analysis in Public Health and Medical Care, 1976
13. Agneta Kruse och Ann-Charlotte Ståhlberg	Effekter av ATP - en samhällsekonomisk studie, 1977
14. Krister Hjalte	Sjörestaureringens ekonomi, 1977
15. Lars-Gunnar Svensson	Social Justice and Fair Distributions, 1977
16. Curt Wells	Optimal Fiscal and Monetary Policy - Experiments with an Econometric Model of Sweden, 1978
17. Karl Lidgren	Dryckesförpackningar och miljöpolitik - En studie av styrmedel, 1978
18. Mats Lundahl	Peasants and Poverty. A Study of Haiti, London, 1979
19. Inga Persson-Tanimura	Studier kring arbetsmarknad och information, 1980
20. Bengt Turner	Hyressättning på bostadsmarknaden - Från hyresreglering till bruksvärdesprövning, Stockholm 1979
21. Ingemar Hansson	Market Adjustment and Investment Determination. A Theoretical Analysis of the Firm and the Industry, Stockholm 1981
22. Daniel Boda Ndlela	Dualism in the Rhodesian Colonial Economy, 1981

23. Tom Alberts	Agrarian Reform and Rural Poverty: A Case Study of Peru, 1981
24. Björn Lindgren	Costs of Illness in Sweden 1964-75, 1981
25. Göte Hansson	Social Clauses and International Trade. An Economic Analysis of Labour Standards in Trade Policy, 1981
26. Noman Kanafani	Oil and Development. A Case Study of Iraq, 1982
27. Jan Ekberg	Inkomsteffekter av invandring, 1983
28. Stefan Hedlund	Crisis in Soviet Agriculture?, 1983
29. Ann-Marie Pålsson	Hushållen och kreditpolitiken. En studie av kreditrestriktioners effekt på hushållens konsumtion, sparande och konsumtionsmönster, 1983
30. Lennart Petersson	Svensk utrikeshandel, 1871-1980. En studie i den intraindustriella handelns framväxt, 1984
31. Bengt Assarsson	Inflation and Relative Prices in an Open Economy, 1984
32. Claudio Vedovato	Politics, Foreign Trade and Economic Development in the Dominican Republic, 1985
33. Knut Ödegaard	Cash Crop versus Food Crop Production in Tanzania: An Assessment of the Major Post-Colonial Trends, 1985
34. Vassilios Vlachos	Temporära lönesubventioner. En studie av ett arbetsmarknadspolitiskt medel, 1985
35. Stig Tegle	Part-Time Employment. An Economic Analysis of Weekly Working Hours in Sweden 1963-1982, 1985
36. Peter Stenkula	Tre studier över resursanvändningen i högskolan, 1985
37. Carl Hampus Lyttkens	Swedish Work Environment Policy. An Economic Analysis, 1985
38. Per-Olof Bjuggren	A Transaction Cost Approach to Vertical Integration: The Case of Swedish Pulp and Paper Industry, 1985
39. Jan Petersson	Erik Lindahl och Stockholmsskolans dynamiska metod, 1987
40. Yves Bourdet	International Integration, Market Structure and Prices. A Case Study of the West-European Passenger Car Industry, 1987
41. Krister Andersson and Erik Norrman	Capital Taxation and Neutrality. A study of tax wedges with special reference to Sweden, 1987
42. Tohmas Karlsson	A Macroeconomic Disequilibrium Model. An Econometric Study of the Swedish Business Sector 1970-84, 1987
43. Rosemary Vargas-Lundius	Peasants in Distress. Poverty and Unemployment in the Dominican Republic, 1989

44. Lena Ekelund Axelson	Structural Changes in the Swedish Marketing of Vegetables, 1991
45. Elias Kazarian	Finance and Economic Development: Islamic Banking in Egypt, 1991
46. Anders Danielson	Public Sector Expansion and Economic Development. The Sources and Consequences of Development Finance in Jamaica 1962-84, 1991
47. Johan Torstensson	Factor Endowments, Product Differentiation, and International Trade, 1992
48. Tarmo Haavisto	Money and Economic Activity in Finland, 1866-1985, 1992
49. Ulf Grönkvist	Economic Methodology. Patterns of Reasoning and the Structure of Theories, 1992
50. Evelyne Hangali Maje	Monetization, Financial Development and the Demand for Money, 1992
51. Michael Bergman	Essays on Economic Fluctuations, 1992
52. Flora Mndeme Musonda	Development Strategy and Manufactured Exports in Tanzania, 1992
53. Håkan J. Holm	Complexity in Economic Theory. An Automata Theoretical Approach, 1993
54. Klas Fregert	Wage Contracts, Policy Regimes and Business Cycles. A Contractual History of Sweden 1908-90, 1994
55. Per Frennberg	Essays on Stock Price Behaviour in Sweden, 1994
56. Lisbeth Hellvin	Trade and Specialization in Asia, 1994
57. Sören Höjgård	Long-term Unemployment in a Full Employment Economy, 1994
58. Karolina Ekholm	Multinational Production and Trade in Technological Knowledge, 1995
59. Fredrik Andersson	Essays in the Economics of Asymmetric Information, 1995
60. Rikard Althin	Essays on the Measurement of Producer Performance, 1995
61. Lars Nordén	Empirical Studies of the Market Microstructure on the Swedish Stock Exchange, 1996
62. Kristian Bolin	An Economic Analysis of Marriage and Divorce, 1996
63. Fredrik Sjöholm	R&D, International Spillovers and Productivity Growth, 1997
64. Hossein Asgharian	Essays on Capital Structure, 1997
65. Hans Falck	Aid and Economic Performance - The Case of Tanzania, 1997
66. Bengt Liljas	The Demand for Health and the Contingent Valuation

	Method, 1997
67. Lars Pålsson Syll	Utility Theory and Structural Analysis, 1997
68. Richard Henricsson	Time Varying Parameters in Exchange Rate Models, 1997
69. Peter Hördahl	Financial Volatility and Time-Varying Risk Premia, 1997
70. Lars Nilsson	Essays on North-South Trade, 1997
71. Fredrik Berggren	Essays on the Demand for Alcohol in Sweden - Review and Applied Demand Studies, 1998
72. Henrik Braconier	Essays on R&D, Technology and Growth, 1998
73. Jerker Lundbäck	Essays on Trade, Growth and Exchange Rates, 1998
74. Dan Anderberg	Essays on Pensions and Information, 1998
75. P. Göran T. Hägg	An Institutional Analysis of Insurance Regulation – The Case of Sweden, 1998
76. Hans-Peter Bermin	Essays on Lookback and Barrier Options - A Malliavin Calculus Approach, 1998
77. Kristian Nilsson	Essays on Exchange Rates, Exports and Growth in Developing Countries, 1998
78. Peter Jochumzen	Essays on Econometric Theory, 1998
79. Lars Behrenz	Essays on the Employment Service and Employers' Recruitment Behaviour, 1998
80. Paul Nystedt	Economic Aspects of Ageing, 1998
81. Rasha M. Torstensson	Empirical Studies in Trade, Integration and Growth, 1999
82. Mattias Ganslandt	Games and Markets – Essays on Communication, Coordination and Multi-Market Competition, 1999
83. Carl-Johan Belfrage	Essays on Interest Groups and Trade Policy, 1999
84. Dan-Olof Rooth	Refugee Immigrants in Sweden - Educational Investments and Labour Market Integration, 1999
85. Karin Olofsdotter	Market Structure and Integration: Essays on Trade, Specialisation and Foreign Direct Investment, 1999
86. Katarina Steen Carlsson	Equality of Access in Health Care, 1999
87. Peter Martinsson	Stated preference methods and empirical analyses of equity in health, 2000
88. Klas Bergenheim	Essays on Pharmaceutical R&D, 2000
89. Hanna Norberg	Empirical Essays on Regional Specialization and Trade in Sweden, 2000
90. Åsa Hansson	Limits of Tax Policy, 2000
91. Hans Byström	Essays on Financial Markets, 2000

92. Henrik Amilon	Essays on Financial Models, 2000
93. Mattias Lundbäck	Asymmetric Information and The Production of Health, 2000
94. Jesper Hansson	Macroeconometric Studies of Private Consumption, Government Debt and Real Exchange Rates, 2001
95. Jonas Månsson	Essays on: Application of Cross Sectional Efficiency Analysis, 2001
96. Mattias Persson	Portfolio Selection and the Analysis of Risk and Time Diversification, 2001
97. Pontus Hansson	Economic Growth and Fiscal Policy, 2002
98. Joakim Gullstrand	Splitting and Measuring Intra-Industry Trade, 2002
99. Birger Nilsson	International Asset Pricing, Diversification and Links between National Stock Markets, 2002
100. Andreas Graflund	Financial Applications of Markov Chain Monte Carlo Methods, 2002
101. Therése Hindman Persson	Economic Analyses of Drinking Water and Sanitation in Developing Countries, 2002
102. Göran Hjelm	Macroeconomic Studies on Fiscal Policy and Real Exchange Rates, 2002
103. Klas Rikner	Sickness Insurance: Design and Behavior, 2002
104. Thomas Ericson	Essays on the Acquisition of Skills in Teams, 2002
105. Thomas Elger	Empirical Studies on the Demand for Monetary Services in the UK, 2002
106. Helena Johansson	International Competition, Productivity and Regional Spillovers, 2003
107. Fredrik Gallo	Explorations in the New Economic Geography, 2003
108. Susanna Thede	Essays on Endogenous Trade Policies, 2003
109. Fredrik CA Andersson	Interest Groups and Government Policy, A Political Economy Analysis, 2003
110. Petter Lundborg	Risky Health Behaviour among Adolescents, 2003
111. Martin W Johansson	Essays on Empirical Macroeconomics, 2003
112. Joakim Ekstrand	Currency Markets - Equilibrium and Expectations, 2003
113. Ingemar Bengtsson	Central bank power: a matter of coordination rather than money supply, 2003
114. Lars Pira	Staples, Institutions and Growth: Competitiveness of Guatemalan Exports 1524-1945, 2003
115. Andreas Bergh	Distributive Justice and the Welfare State, 2003

116. Staffan Waldo	Efficiency in Education - A Multilevel Analysis, 2003
117. Mikael Stenkula	Essays on Network Effects and Money, 2004
118. Catharina Hjortsberg	Health care utilisation in a developing country -The case of Zambia, 2004
119. Henrik Degrér	Empirical Essays on Financial Economics, 2004
120. Mårten Wallette	Temporary Jobs in Sweden: Incidence, Exit, and On-the-Job Training, 2004
121. Tommy Andersson	Essays on Nonlinear Pricing and Welfare, 2004
122. Kristian Sundström	Moral Hazard and Insurance: Optimality, Risk and Preferences, 2004
123. Pär Torstensson	Essays on Bargaining and Social Choice, 2004
124. Frederik Lundtofte	Essays on Incomplete Information in Financial Markets, 2005
125. Kristian Jönsson	Essays on Fiscal Policy, Private Consumption and Non-Stationary Panel Data, 2005
126. Henrik Andersson	Willingness to Pay for a Reduction in Road Mortality Risk: Evidence from Sweden, 2005
127. Björn Ekman	Essays on International Health Economics: The Role of Health Insurance in Health Care Financing in Low- and Middle-Income Countries, 2005
128. Ulf G Erlandsson	Markov Regime Switching in Economic Time Series, 2005
129. Joakim Westerlund	Essays on Panel Cointegration, 2005
130. Lena Hiselius	External costs of transports imposed on neighbours and fellow road users, 2005
131. Ludvig Söderling	Essays on African Growth, Productivity, and Trade, 2005
132. Åsa Eriksson	Testing and Applying Cointegration Analysis in Macroeconomics, 2005
133. Fredrik Hansen	Explorations in Behavioral Economics: Realism, Ontology and Experiments, 2006
134. Fadi Zaher	Evaluating Asset-Pricing Models in International Financial Markets, 2006
135. Christoffer Bengtsson	Applications of Bayesian Econometrics to Financial Economics, 2006
136. Alfredo Schclarek Curutchet	Essays on Fiscal Policy, Public Debt and Financial Development, 2006
137. Fredrik Wilhelmsson	Trade, Competition and Productivity, 2006
138. Ola Jönsson	Option Pricing and Bayesian Learning, 2007

139. Ola Larsson	Essays on Risk in International Financial Markets, 2007
140. Anna Meyer	Studies on the Swedish Parental Insurance, 2007
141. Martin Nordin	Studies in Human Capital, Ability and Migration, 2007
142. Bolor Naranhuu	Studies on Poverty in Mongolia, 2007
143. Margareta Ekbladh	Essays on Sickness Insurance, Absence Certification and Social Norms, 2007
144. Erik Wengström	Communication in Games and Decision Making under Risk, 2007
145. Robin Rander	Essays on Auctions, 2008
146. Ola Andersson	Bargaining and Communication in Games, 2008
147. Marcus Larson	Essays on Realized Volatility and Jumps, 2008
148. Per Hjertstrand	Testing for Rationality, Separability and Efficiency, 2008
149. Fredrik NG Andersson	Wavelet Analysis of Economic Time Series, 2008
150. Sonnie Karlsson	Empirical studies of financial asset returns, 2009
151. Maria Persson	From Trade Preferences to Trade Facilitation, 2009
152. Eric Rehn	Social Insurance, Organization and Hospital Care, 2009
153. Peter Karpestam	Economics of Migration, 2009
154. Marcus Nossman	Essays on Stochastic Volatility, 2009
155. Erik Jonasson	Labor Markets in Transformation: Case Studies of Latin America, 2009
156. Karl Larsson	Analytical Approximation of Contingent Claims, 2009
157. Therese Nilsson	Inequality, Globalization and Health, 2009
158. Rikard Green	Essays on Financial Risks and Derivatives with Applications to Electricity Markets and Credit Markets, 2009
159. Christian Jörgensen	Deepening Integration in the Food Industry – Prices, Productivity and Export, 2010
160. Wolfgang Hess	The Analysis of Duration and Panel Data in Economics, 2010
161. Pernilla Johansson	From debt crisis to debt relief: A study of debt determinants, aid composition and debt relief effectiveness, 2010
162. Nils Janlöv	Measuring Efficiency in the Swedish Health Care Sector, 2010

163. Ai Jun Hou	Essays on Financial Markets Volatility, 2011
164. Alexander Reffgen	Essays on Strategy-proof Social Choice, 2011
165. Johan Blomquist	Testing homogeneity and unit root restrictions in panels, 2012
166. Karin Bergman	The Organization of R&D - Sourcing Strategy, Financing and Relation to Trade, 2012
167. Lu Liu	Essays on Financial Market Interdependence, 2012
168. Bujar Huskaj	Essays on VIX Futures and Options, 2012
169. Åsa Ljungvall	Economic perspectives on the obesity epidemic, 2012
170. Emma Svensson	Experimenting with Focal Points and Monetary Policy, 2012
171. Jens Dietrichson	Designing Public Organizations and Institutions: Essays on Coordination and Incentives, 2013
172. Thomas Eriksson	Empirical Essays on Health and Human Capital, 2013
173. Lina Maria Ellegård	Political Conflicts over Public Policy in Local Governments, 2013
174. Andreas Hatzigeorgiou	Information, Network and Trust in the Global Economy – Essays on International Trade and Migration, 2013
175. Gustav Kjellsson	Inequality, Health, and Smoking, 2014
176. Richard Desjardins	Rewards to skill supply, skill demand and skill match-mismatch – Studies using the Adult Literacy and Lifeskills survey, 2014
177. Viroj Jienwatcharamongkhol	What Drives Exports? - An Empirical Evidence at the Firm Level, 2014
178. Anton Nilsson	Health, Skills and Labor Market Success, 2014
179. Albin Erlanson	Essays on Mechanism Design, 2014
180. Daniel Ekeblom	Essays in Empirical Expectations, 2014
181. Sofie Gustafsson	Essays on Human Capital Investments: Pharmaceuticals and Education, 2014
182. Katarzyna Burzynska	Essays on Finance, Networks and Institutions, 2015

183. Mingfa Ding	Corporate Ownership and Liquidity in China's Stock Markets, 2015
184. Anna Andersson	Vertical Trade, 2015
185. Cecilia Hammarlund	Fish and Trips in the Baltic Sea – Prices, Management and Labor Supply, 2015
186. Hilda Ralsmark	Family, Friend, or Foe? Essays in Empirical Microeconomics, 2015
187. Jens Gudmundsson	Making Pairs, 2015
188. Emanuel Alfranseder	Essays on Financial Risks and the Subprime Crisis, 2015
189. Ida Lovén	Education, Health, and Earnings – Type 1 Diabetes in Children and Young Adults, 2015
190. Caren Yinxia Nielsen	Essays on Credit Risk, 2015
191. Usman Khalid	Essays on Institutions and Institutional change, 2016
192. Ross Wilson	Essays in Empirical Institutional Analysis, 2016
193. Milda Norkute	A Factor Analytical Approach to Dynamic Panel Data Models, 2016
194. Valeriia Dzhamalova	Essays on Firms' Financing and Investment Decisions, 2016
195. Claes Ek	Behavioral Spillovers across Prosocial Alternatives, 2016
196. Graeme Cokayne	Networks, Information and Economic Volatility, 2016
197. Björn Thor Arnarson	Exports and Externalities, 2016
198. Veronika Lunina	Multivariate Modelling of Energy Markets, 2017
199. Patrik Karlsson	Essays in Quantitative Finance, 2017
200. Hassan Sabzevari	Essays on systemic risk in European banking, 2017
201. Margaret Samahita	Self-Image and Economic Behavior, 2017
202. Aron Berg	Essays on informational asymmetries in mergers and acquistions, 2017

203. Simon Reese	Estimation and Testing in Panel Data with Cross-Section Dependence, 2017
204. Karl McShane	Essays on Social Norms and Economic Change, 2017

Printed by Media-Tryck, Lund 2017 NORDIC ECOLABEL, 3041 0903

LUND UNIVERSITY
School of Economics and Management

Lund University
Department of Economics
ISBN 978-91-7753-208-8
ISSN 0460-0029