In good times and in bad Immigrants, Self-employment and Social insurances.

Persson, Mats

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Mats R. Persson

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This thesis shows that self-employment decision is influenced by local labour market conditions. Interestingly, the mechanism seems to be different in the process of entering and leaving self-employment. Our findings show that immigrants enter self-employment when local labour demand is improving and leave their business for non-employment in response to deteriorating local labour market conditions.

The results in this thesis are consistent with the notion and indications from previous research that the use of the social insurance system in Sweden has not only been related to health, but also influenced by contextual and non-medical factors at regional level, in terms of both local labour market conditions and institutional aspects (e.g. social norms). The results also show that exposure to worse health conditions during the first year of life is associated with the greater likelihood of experiencing sickness absence in adulthood.

Key words: Immigrants, Self-employment, Social Insurances, Regional labour market conditions, early-life conditions.

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Lund, September 2015

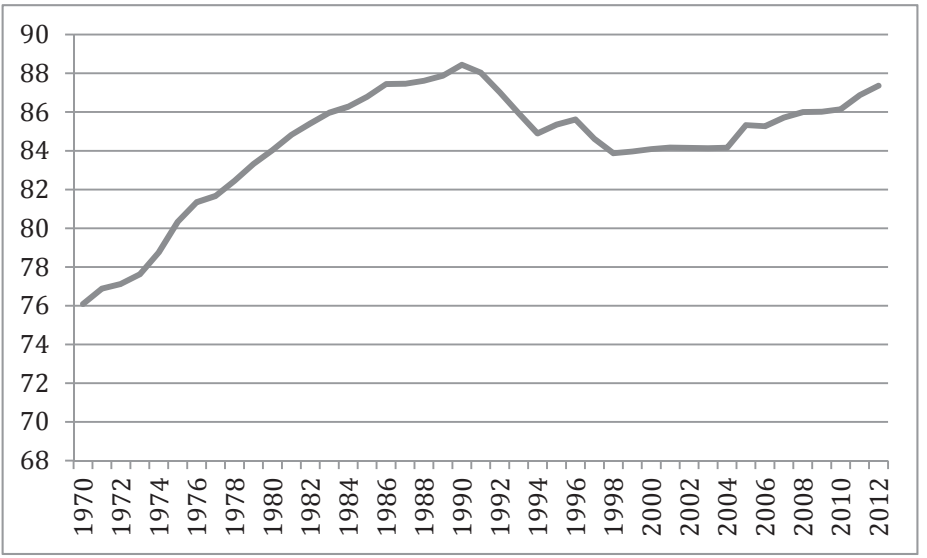
Introduction

1.1 Motivation for the thesis

The aim of this thesis is to improve our understanding and contribute to the literature of immigrants in the labour market and the use of the social insurance system. The empirical analysis examines a period characterized by a transformation from full employment and expansion of the welfare state, into a state with mass unemployment during an economic crisis, and subsequently a tightening labour market and increased use of the social insurance system, and covers the major immigrant waves to Sweden from the 1950s to the 1990s. At the beginning of the 1990s, Sweden experienced its most severe economic crisis since the 1930s. Between 1990 and 1993, the GDP growth rate was negative, dropping by a total of 6 percent, while the unemployment rate rose from 3 percent to 12 percent. The drastic fall in employment affected public finances and the public-sector deficit increased to reach its highest level of 13 percent of GDP in 1993 (Bäckström, 1997).

The economic crises highly affected the labour force participation rate, i.e. the proportion of working-age individuals economically active in terms of working or searching for work. Figure 1 presents the labour force participation rates for Sweden during the period 1970-2012. The labour force participation rate re ached its highest level at the end of the 1980s during a period of high employment and expansion of the welfare state, i.e. the number of those employed in the public sector increased. The economic downturn in the beginning of the 1990s generated a substantial drop in labour force participation rate as individuals withdraw from the labour force into early retirement pension. At the peak of the crises, there was a dramatic increase the number of those taking early retirement pension, in the case of older workers in particular, and almost 35 percent of the 60-64 age-group received an early retirement pension (Johansson et al, 2014). As a consequence of the downturn in the economy and the public-sector deficit, the social insurance system was tightened. In response to these changes and a tightening labour market, sickness absence decreased at the peak of the economic crisis.

Figure 1. Labour force participation rate (per cent), Sweden, age 25-64, 1970-2012.



Source: OECD

Although the economy improved at the end of the 1990s, the labour force participation rate stabilized and did not increase until 2004. This pattern was strongly related to an increase in the use of the social insurance system. When the economy recovered in the latter part of the 1990s and early 2000s, long-term sickness absence and early retirement pension increased drastically. The early retirement pension increased from 325,000 persons in 1985 to 425,000 persons in 1999 and 556,000 persons in 2005.

Notably, the increase in the utilization of social insurance benefits was accompanied by increasing regional differences in employment and social insurance outcome during the 1990s and 2000s, and the proportion of early retirement pensions and sickness absence benefits was high in regions with high unemployment rates (Lundberg, 2007).

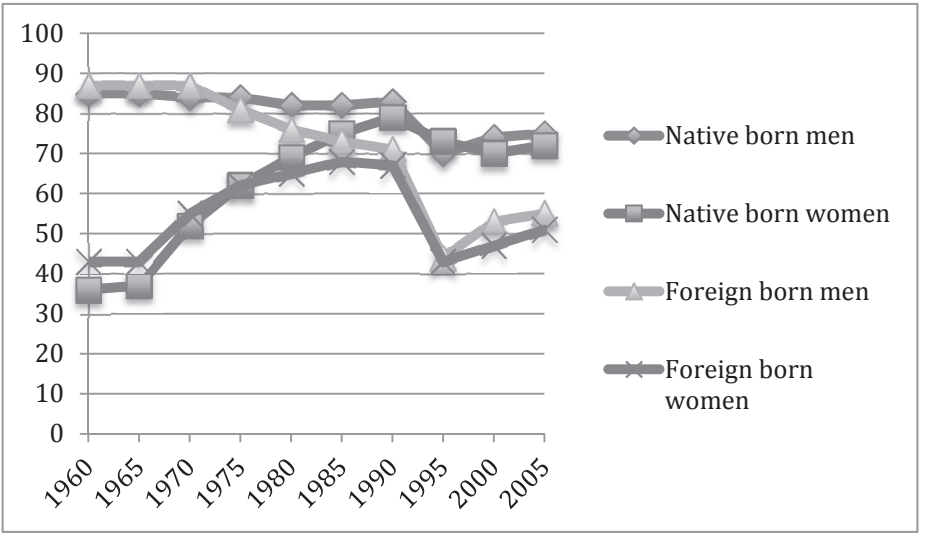
The drastic increase in the cases of sickness absence and those taking early retirement pension in the end of the 1990s and the beginning of the 2000s also had a strong impact on public finances. Between 1998 and 2002, work-absence, and therefore the costs of the sickness insurance system as well, increased by almost 75 per cent. In 2002, expenditure on sickness insurance and disability insurance amounted to approximately 3% of GDP.

The economic crisis severely affected the individuals. Being unemployed or sickness absent has a significant impact on an individual's' living conditions, satisfaction and well -being. Oswald (1997) points to unemployment as being a primary source of unhappiness. Work itself associates with several rewards, such as pay and status, while being unemployed or sickness absent can relate to economic stress since it has a negative effect on an individuals' earnings. Unemployment and work absence may also have long-term consequences on future career prospects, earnings and health (Mroz & Savage, 2006; Vahtera et al, 2004).

Employment, sickness absence and early retirement pensions have developed differently across gender, socio-economic groups and ethnic background resulting in increasing health inequalities during the 1990s (see Fritzell & Lundberg, 2007 for an overview). Whereas the labour force participation rate for men dropped dramatically during the 1990s, the drop in the participation rate for women was less so (OECD, 2012). The fall in employment rates clearly related to socioeconomic status being significantly greater among manual workers than among salaried employees (Palme et al, 2002) and almost a third of all low-skilled workers left the labour market between 1987 and 1993 (Lundgren, 1996).

The labour market gap is particularly evident when comparing different ethnic groups. Figure 2 shows the employment rate for native and foreign-born, respectively during the period 1960-2005. While immigrants performed better than native born in the 1960s and 1970s, they have experienced increasing difficulties in establishing in the Swedish labour market since the 1980s. The employment rate of foreign-born decreased during the economic crises and relative position of immigrants deteriorated also in terms of employment and income (Palme et al, 2002; Grand & Szulkin, 2002). When the economy recovered by the end of the 1990s and early 2000s, the employment gap between natives and immigrants narrowed, but the employment level of immigrants was still lower than in the late 1980s.

Figure 2. Age-standardized Employment rate (percent) among native and foreign born men and women, age 16-64, 1960-2005.



Source: (Bevelander, 2009)

Several indicators illustrate the weaker labour market attachment of immigrants. Unemployment is in general higher among immigrants than among natives (Lundh et al, 2002), while immigrants are over-represented in both self-employment (Andersson/Joona & Wadensjö, 2008) and temporary agency work (Andersson/Joona & Wadensjö, 2008; Wallette, 2004) and they have lower earnings than Swedish-born (Edin & Åslund 2001, Scott 1999). Importantly, immigrants face problems not only entering, but also remaining in the labour market and the labour force having higher levels of long-term sickness absence and early retirement (Andrén, 2001).

The aim of this thesis is to improve our understanding and contribute to the literature on immigrants in the labour market and the use of the social insurance system. This thesis goes beyond previous research, generally examining immigrants in traditional labour market outcomes such as employment, earnings, and careers, by exploring immigrants' labour market situation focusing on more indirect indicators of economic integration, such as sickness absence and early retirement. Moreover, this thesis analyses self-employment among immigrants, a subject often neglected in previous research. In contrast to earlier studies, the thesis uses a regional approach, thereby not treating

Sweden as a single labour market. The reason for taking this approach is the large and increasing regional variation in labour market outcomes and the social insurance system in Sweden in the 1990s and 2000s. The increasing regional differences presumably reflect a combination of low labour mobility and differences in regional labour market characteristics.

Analysing the period 1981-2003, characterized by a transformation from full employment and expansion of the welfare state during the 1980s, into the prospect of mass unemployment during the economic crises at the beginning of the 1990s, and subsequently a tightening labour market and increased use of the social insurance system at the end of the 1990s and onwards, allows us to capture the effects of different states of the economy. Specifically, the thesis explores the importance of regional characteristics in terms of local labour demand (business cycle), economic structure and institutional factors on self-employment, sickness absence and early retirement pension. Besides being a function of economic and institutional characteristics at the regional level, the labour market and social insurance outcome is presumably related to the individuals' health capital, being created during the whole life-cycle. In chapter four, we use data over a long time-span allowing us to adopt a life-course perspective following individuals from childhood into adulthood and exploring the significance of early life conditions on sickness absence.

The empirical analyses cover the major waves of immigration to Sweden from the 1950s to the 1990s; the labour migrants from European countries during the 1950s and 1960s; the refugees and subsequent tied movers from outside Europe during the 1970s and 1980 and to some extent the refugees during the 1990s. This approach allows us to take into account the heterogeneous characteristics of the foreign-born population.

A better understanding of the mechanisms behind early exit and self-employment are important, because policies intended to promote higher labour force participation and employment among immigrants depend on more solid evidence and knowledge.

First, a better understanding of the effects of the economic crisis in Sweden in the 1990s and the underlying mechanisms for withdrawal from the labour market and the labour force may give guidance today to those countries being highly affected by the financial crisis in 2008/2009 so that these can design policies that support higher participation and employment rates.

Second, a better understanding of the mechanisms underlying the withdrawal process of immigrants from the labour market (via long-term sickness absence) and the labour force (via early retirement) is important, in the light of the

development in many OECD- countries with an increasing flow of immigration and an increasing share of foreign-born during the 1980s and 1990s (Zimmermann, 2005) and the past decade (OECD, 2014). Specifically, a better understanding of the mechanisms underlying sickness absence among immigrants is needed because the effects of sickness absence can be more severe for immigrants than for natives, given the generally weaker labour market attachment of immigrants.

Third, more efficient policies for promoting higher labour force participation are important in enhancing individual well- being, in both the short and long term, because there may be long-lasting effects from labour market exclusion. Fourth, better strategies for promoting higher labour force participation are important given that many OECD-countries are experiencing an ageing population. In the European Union, the ratio of people aged 65 or above in relation to the working-age population aged 15-64, is expected to more than double in the coming decades (Economic Policy Committee and European Commission, 2009). In the Swedish context, given the Scandinavian welfare model with mainly tax-financed welfare programs, a better understanding of the mechanism underlying an early exit from the labour market and labour force is crucial, because early retirement and sickness absence imply a withdrawal of resources from production, a lowered tax base and an increased burden on pension and fiscal systems. Increasing labour supply, in terms of higher employment rates and labour force participation rates, offers a potential solution to these challenges. Storesletten (2000; 2003) shows that immigration has the potential of mitigating the fiscal burden relating to the ageing population in OECD-countries. These prospects are, however, highly dependent on immigrants establishing themselves in the labour market. Fifth, the lower employment rate of immigrants means that there is a need for a better understanding of the labour market entrance for immigrants in terms of the impact of self-employment. A better understanding of the mechanisms underlying self-employment entries and exits is highly relevant, given the increase in self-employment since the beginning of the 1990s and onwards. A better understanding of these mechanisms gives guidance whether self-employment should be encouraged or circumvented in public policy.

1.2 Immigration in Sweden

In the past three decades there has been an increasing flow of immigration in many OECD-countries and as a result there has been an increasing share of foreign-born (OECD, 2014). Sweden is no exception in this respect. Today Sweden has a large share of foreign born, higher than the OECD-average. In 2012, approximately 15 per cent of the total population in Sweden had been in another country, a figure is higher than that in the United States and similar to those levels in Belgium, Germany and Austria (OECD, 2014).

While Sweden today is characterized by net-immigration, the situation before the Second World War was different. In the 19th century and up to the 1930s, emigration exceeded immigration, mostly as a result of large-scale emigration to the United States. Since the Second World War Sweden is a net-migration country. The institutional framework regarding immigration and the pattern of immigration have undergone significant changes during this period and immigration in Sweden from 1945 to the present day can be divided into two phases; the first one being from 1945 and 1970 and the second one from 1970s onwards.

During the period 1945 to 1970, immigration into Sweden was dominated by refugees and labour migrants from Europe. As early as the period of the Second World War, refugees were coming to Sweden from its neighbouring countries; Denmark, Norway, Finland and the Baltic states. During the 1950s, political refugees from central and Eastern Europe arrived to Sweden, in particular from Yugoslavia, Poland, Hungary and Czechoslovakia. The labour migrants originated mainly from the Nordic countries. The Swedish economy expanded rapidly in the post war period, and the active recruitment of labour migrants was necessary in order to deal with the shortage of labour and allowing companies to expand by recruiting low–skilled or unskilled workers from other countries. By the time the Common Nordic Labour Market was established in 1954, the immigration policy had been liberalised to such an extent that the migration between the Nordic countries had become free. In principle, immigration was free for labour migrants from other countries as well, since the rules allowed individuals to enter Sweden as tourists and to change status and become residents if they found a job or received a job offer while still a tourist. Although the great majority of labour migrants came from the Nordic countries, labour migrants also came from Germany, Italy and Austria during the 1950s and from Greece, Turkey and Yugoslavia in the 1960s. Between 1960 and 1967 a total of 531 000 persons migrated to Sweden (Lundh &

Ohlsson, 1994). On their arrival, these foreign-born found employment in the manufacturing sector.

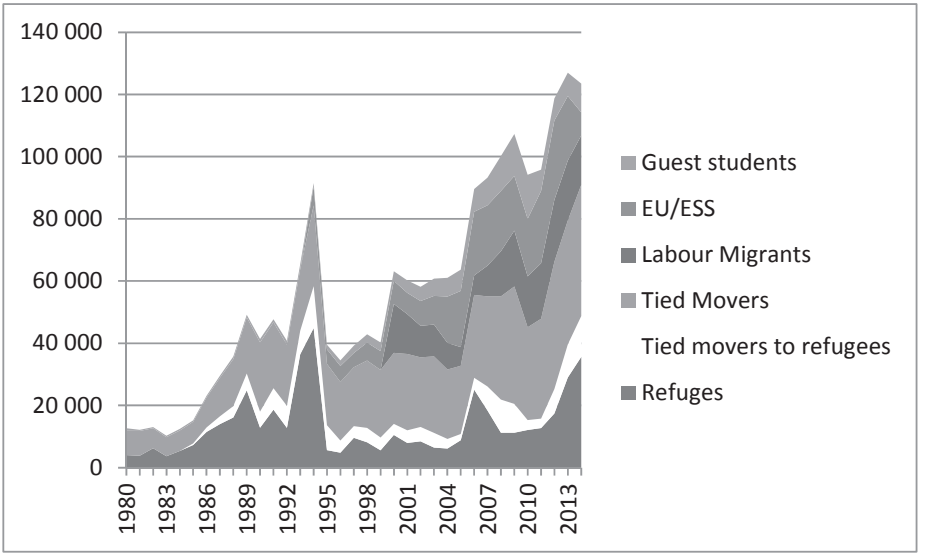
The immigration legislation in Sweden changed by the end of the 1960s. The trade unions saw immigration as a threat to the wage solidarity policy and argued that the supply of labour from other countries depressed the wage increases in the industry. From the trade unions perspective, immigrants were preserving the industrial sector, when it would otherwise have been forced to undergo substantial changes. As a consequence, the government changed the regulations in 1968 and established barriers against free labour immigration from non-Nordic countries. The new legislation stated that employment, work permits and housing should be arranged before the immigrant entered Sweden. In addition, it allowed trade unions to judge whether an individual's work permits were motivated and from 1970s the Swedish Trade Union Confederations recommend the rejection of all applications from non-Nordic citizens (Bengtsson, Lundh & Scott: 2005). As a result, labour migration from non-Nordic countries more or less vanished.

From the 1970s onwards, immigration was dominated by refugee migration and tied movers from non-European countries. The new legislation governing labour migration in the late 1960s was restrictive regarding the labour migration of non-Nordic citizens, but it allowed the immigration of refugees and tied movers, i.e. the immediate family of existing residents. In addition, the narrowing gap in living standards meant a gradual decline in the immigration from Nordic countries, from Finland to Sweden in particular. At the same time, the political events that took place in Greece in 1967 and Czechoslovakia in 1968, meant an increase in the number of refugees seeking asylum. The increase in refugees continued during the 1970s and 1980s as a result of political events in Chile and Iran/Iraq. The consequence of this was a significant increase in the proportion of non-European immigrants. Immigration during the 1990s was dominated by refugees from the former Yugoslavia as a result of the civil war. Approximately 100, 000 individuals migrated from former Yugoslavia during the period 1992-1995. In the latter part of the 1990s and early 2000s there were significant migration flows from Iraq and Afghanistan (OECD, 2013).

Figure 3 shows the distribution of residence permits during the period 1980-2014, based on migration status. The number of tied movers has increased over time. While the number varied between 5,000 and 10,000 individuals during the late 1970s and the 1980s (Lundh & Ohlsson, 1999), the corresponding number in the 1990s was approximately 20,000. Importantly, these numbers

do not represent the net-migration into Sweden. The statistics shows a significant level of return migration (Klinthäll, 2003).

Figure 3. The distribution of residence permits in Sweden based on migration status, 1980-2014.



Source: Swedish Migration Board

During the period of study in this thesis, 1981-2003, immigration to Sweden was dominated by the refuges and tied movers. However, as a result of Sweden joining the European Union in 1995 and the enlargement of the European Union in 2004, and given the fact that the European Union permits free movement within its borders, there has been an increase in the number of migrants from the EU/ESS. In addition, labour migration has increased, since a new legislation regarding labour migration was introduced in 2009, which abolished the previous law from the late 1960s, and now meant that employers were entitled to recruit non-EU workers without a permit via the unions.

Table 1 presents the proportion of foreign born during the period 1950-2012, stratified by country of birth region. The institutional framework and the pattern of immigration in Sweden have changed during the post-war period. While immigration in the 1950s and 1960s was dominated by refugees and labour migrants from other Nordic countries and Europe the immigration from

1970s and onwards has mainly consisted of refugees and tied movers from Non-European countries. As a result, the composition of immigrants has changed over time. While in 1980 the proportion of foreign born from the Nordic countries was about 55 per cent and the proportion born outside Europe around 10 percent, the corresponding numbers in 2000 were approximately 30 and 40 per cent, respectively.

Table 1. The proportion of foreign born, based on country of birth region, 1950-2012

Country of birth region	1950	1960	1970	1980	1990	2000	2012
Nordic countries	50,1	58,1	59,7	54,4	40,3	27,9	17,4
Other European countries	43,2	37	34,9	33,8	32,1	32,9	34,2
Outside Europé	6,7	4,9	5,4	11,8	27,6	39,2	48,4
Total	100	100	100	100	100	100	100

Source: Aldén & Hammarstedt (2014)

1.3 The Swedish Economy and Welfare State Expansion

1.3.1. The Swedish economy

The period following the Second World War was characterized by rapid GDP growth and high employment rates in Sweden. The expansion of the Swedish economy was related to war-related experiences in other European countries, e.g. high demand from reconstruction work in Europe. As a result, industrial production in Sweden doubled during the period 1950-1965 and the employment in the manufacturing industry increased substantially (Lundh & Ohlsson, 1994). The home-market became less important and the export-oriented sectors expanded.

The Swedish economy was highly influenced by the international economic downturn during the 1970s. The oil crises of 1973 and 1979 were the starting point for a period with lower growth rates and resulted in several countries in stagflation, i.e. both high inflation and unemployment. In Sweden, unemployment was still at a low level, due to devaluation of the currency, subsidies granted for specific industries and an increase in employment in the

public sector. However, the international competition was strengthened, specifically from newly industrialized countries, such as Japan and South Corea. This resulted in structural problems in large sectors of Swedish industry – shipyards, steel industry and textile and clothing (Schön, 2007).

The structural transformation of the economy in the 1970s and 1980s brought with it increased investments in knowledge-intensive and high-technology production in order to remain competitive in the international market. This therefore marked a stronger trend towards more highly-refined products and a gradual decline in the demand for unskilled labour. Many companies and industries improved their efficiency by increasing investments in machinery, squeezing costs and cutting down on the workforce.

The 1980s was a period of rationalization of industrial ownership which saw the concentration of industrial organizations and the absorption of previously small companies into larger companies. However, relative importance of the industrial sector to the economy has diminished over time, and the 1980s were no exception in this respect. By the end of the 1960s, the manufacturing industry accounted for 46 per cent of GDP and in 1990 the corresponding number was 27 per cent (Lundh & Ohlsson, 1994). The Swedish government adopted an expansionary monetary policy during the 1980s. In order to mantain revenues from the export sector the Swedish Goverment implemented a devaluation of the currency during the late 1970s and in 1982. The expansionary policy allowed unemployment rates that were lower than other European countries and at the end of the 1980s the rate was historically low.

At the beginning of the 1990s, the Swedish Economy experienced its largest and most severe crisis since the Great Depression of the 1930s. Between 1990 and 1993, GDP dropped by a total of 6 percent and the public-sector deficit increased to as much as 12 percent of GDP (Bäckström, 1997). The unemployment rate increased from 3 percent to 12 percent and almost a third of all low-skilled workers left the labour market between 1987 and 1993 (Lundgren, 1996). In response to the crises, the Swedish government introduced an inflation-target of around 2 per-cent and established a low inflation rate as the objective of Swedish monetary policy. In addition, Sweden joined the European Union in 1995. The depreciation of the Swedish currency promoted the export-sector and the Swedish economy recovered at the end of the 1990s. The catch-up period was, however, characterized by jobless growth, i.e. high growth rates but weak increases in the employment rate.

1.3.2. The labour market

The 20th century was characterized by major institutional changes in the labour market. Lundh (2004) identifies four labour market regimes from 1850 and onwards. At the beginning of the 20th century, the establishment of unions and employer organizations and the introduction of collective bargaining formed the foundation of the system of collective agreement. During the 1930s and onwards, wage-setting was gradually centralized after the introduction of centralized wage negotiations and the "solidaristic wage policy". The aim of the "solidaristic wage policy" was "equal pay for equal work" a system which, in combination with the centralized wage formation, did not allow for regional wage-differences or for low-profit firms to lower wages in order to keep employees. The purpose of this system was to increase the structural transformation of the economy. From the 1980s onwards the labour market regime was characterized by a combination of wage negotiations at local and industry level and was thus more flexible and allowed for individual wage-setting. Despite the rise of this labour market regime, the Swedish labour market is still today characterized to a large extent by a high degree of unionization, a compressed wage-system and corporatism, whereby the latter means that labour market organizations are responsible for wage-setting and minimum wages are stipulated by collective agreements instead of legislation.

The labour market has been characterized by significant changes during the 1980s onwards. As mentioned above, the manufacturing industry has been in decline since the 1960s. The 1980s and 1990s were a period of rapid technological and organizational changes in Swedish firms. Increased international competition and the breakthrough of IT ushered in new production patterns and organizational structures (Lundh, 2004). The organizations were decentralized and flexible working-times were introduced. The industrial and service production moved away from mass-production to skill-intensive production.

Gradually, this process has decreased the demand for low-skilled employees. Importantly, this trend is not specific to Sweden but is found in most OECD-countries and is consistent with the hypothesis of "skill biased technological change", a shift in the production technology which increases the demand for more educated workers (see Katz & Autor, 1999 for an overview). By analyzing seven OECD - countries, including Sweden, during the period 1973-1989, Machin & Van Reenen (1998) find empirical support for skilled-biased technological change increasing the relative demand of skilled labour. In line

with this, Roed & Nordberg (2004) points to the deteriorating employment prospects facing individuals in the lower tail of the wage distribution in Norway during the 1990s. In addition, Autor et al (2003) argue that the changes in demand is strongly related to computerization, resulting in reduced labour input of routine manual and cognitive tasks and increased labour input of non-routine cognitive tasks. By exploring the employment characteristics across 16 European countries over the period 1993-2010, Goos et al (2014), shows that this development have resulted in the recent phenomenon of job polarization, i.e. decreasing the demand for medium-skilled occupations in relation to high-skilled and low-skilled occupations, due to "task biased technological change". In their analyses of net job creation in Sweden between 1975 and 2005, Adermon & Gustavsson (2015) reveal a pattern of job polarization, the effect of which is more visible during the period 1990-2005 compared to 1975-1990.

Another substantial change in the labour market is the fact that female labour force participation has increased significantly since the 1960s. From the mid-1800s up to the 1930s, the proportion of the female population in the labour force was stable at around 30 per cent (Jonung & Persson, 1994). In 1960, labour force participation among women in Sweden reached 50 per cent, while the corresponding number for France was 47 per cent, for UK 49 per cent and for Denmark 44 per cent (Pott-Butler, 1993). The expansion of the public sector during the 1960s and 1970s resulted in the increased employment intensity of women. The greater labour force participation of women was thus a prerequisite for the expansion of the welfare state. Specifically, there has been a steadily rising demand for the female workforce, in terms of expansion of jobs in education, health care and social care. As a result, female labour force participation in Sweden increased dramatically from 50 per cent in 1960 to over 80 per cent in 1990 (Stanfors, 2003). At the same time, male labour force participation has decreased (Österholm, 2010) and the gender gap in participation rates has narrowed (Stanfors, 2003). In 2010, labour force participation among women was 77 per-cent and among men 82 per-cent (OECD, 2012). However, there is still a significant and obvious gender division of labour in the labour market as well as in the household meaning that women undertake a far higher proportion of non-market work (Stanfors, 2003).

1.3.3. The expansion of the universalistic welfare state

In the seminal work, *The three worlds of welfare capitalism*, Esping-Andersen (1990) presents a typology of OECD welfare states, categorized into three ideal regime types; The Liberal, Conservative and Social Democratic welfare state. This division is based upon three principles: decommodification (the extent to which an individual's welfare is reliant upon the market) social stratification (the role of welfare states in maintaining or breaking down social stratification) and the private–public mix (the relative roles of the family, the voluntary sector, the market and the state in welfare provision). Although this division has been subjected to extensive criticism, and although there are a number of competing welfare state typologies in comparative social policy literature (see e.g. Bambra 2006; 2007) it gives some guidance on the features of the welfare model in Sweden and other Scandinavian countries in relation to other OECD-countries. Within this framework, the Scandinavian countries are considered to be typically Social Democratic (universalistic) welfare states.

The universalistic welfare state is characterized by a high level of decommodification, and the principle of stratification is directed at achieving a welfare system of universal and distributive benefits not dependent on individual contributions. "This model crowds out the market in favour of the welfare state" (Esping/Andersen, 1990, p.28). Since the model is based on tax-fund, countries belonging to this type of welfare state regime are in general aiming for full employment. Hence, women are encouraged to participate in the labour market, regardless of whether they have children or not.

The social insurance system is an important feature of the Scandinavian universalistic welfare state. Social insurances are motivated in order to protect against risk by sharing the risk to the whole population and can be seen as a response to information failure, since asymmetric information, in terms of and moral hazard[1] and adverse selection[2] may result in the failure of market solutions. Arrow (1963, p. 967) argues that: "The failure of the market to insure

1 Moral Hazard refers to the situation when the risk-taking party, due to the presence of assymmetric information, knows more about its intentions than the party paying the consequences of the risk.

2 The term adverse selection refers to selection process taking place in the presence of asymmetric information about the individuals' actual risk.

against uncertainties has created many social institutions in which the usual assumption of the market are to some extent contradicted".[3]

Another important characteristic of the Scandinavian welfare model is that income and living standards are redistributed not only between individuals, but also through intra-individual redistribution, i.e. across the life cycle, in order to equalize living conditions over the life course (Korpi & Palme, 1998; Fritzell & Lundberg, 2007). The transfers of resources between individuals and over an individuals' life cycle should take place in the form of cash payments and also through the consumption of public goods. The majority of these public goods are being produced by the responsibility of local authorities. Hence, the expansion of the public sector had significant regional effects through the implementation of administration in the municipalities and counties (Bengtsson & Johansson, 1994).

Edebalk (2000) emphasizes that the rise of the welfare state in Sweden had its origin in the reforms passed at the beginning of the 20th century which introduced social insurances. In 1901, the employers were given a mandatory responsibility regarding work-related injuries, and in 1916 a social insurance scheme for work-related injuries was introduced. In 1913, the public pension system covering all citizens, including an invalidity pension, was introduced. An important feature of the social insurances was the principle of protection against loss of income, and the benefits were therefore related to previous income.

Initially, the development of the welfare state was not faster in Sweden than in other West European countries. Public expenditure as a share of GDP in Sweden was approximately 30 per-cent in 1960, which was lower than the corresponding figure for France, Germany and Great Britain. By 1970, the share in Sweden was 43 per cent and the proportion increased during the 1980s and reached its highest level at 72 per cent in 1993 (Bergh & Henrekson, 2012). In 2013, public expenditure as a share of GDP was 49 per cent, which was among the highest in the world (IMF, 2012).

Given that full employment is an important component of the universalistic welfare model, the economic crisis of the 1990s had a substantial impact on the welfare state. The dramatic drop in employment affected public finances and the public sector-deficit accelerated and reached its highest level of 13

3 Hayek (1945), on the other hand, argues that asymmetric information is a motivation for market solutions, since the fact that individuals know different things allows the market to make beneficial use of these differences.

percent of GDP in 1993 (Palme et al, 2002). The downturn gave raise to changes in social policy since resources available for social policy program were affected. Specifically, qualification requirements for the unemployment insurance and compensation levels in the social insurance system were tightened and made less generous. The Swedish Welfare Commission, on evaluating the consequences of the crisis of the 1990s, concluded: "When it comes to social policy, the large number of changes that made provisions less generous is perhaps the most characteristics feature of the 1990s. Yet it would be misleading to conclude that the model has been abandoned" (Palme et al, 2002, p. 344).

1.3.3.1 The sickness insurance system

The publicly financed and organized sickness insurance system was first introduced in 1955. The sickness insurance system is compulsory and financed mainly via proportional payroll taxes. The state system provides compensation for earnings forgone as a result of temporary health problems, affecting working capacity. All individuals of working-age are eligible for sickness benefits. In principle, medical grounds should be provided by a doctor, which verify the health status of the individual in order for the social security administration to determine sickness absence. Sickness benefits can be granted for a short or a long period and is related to previous income of the individual.

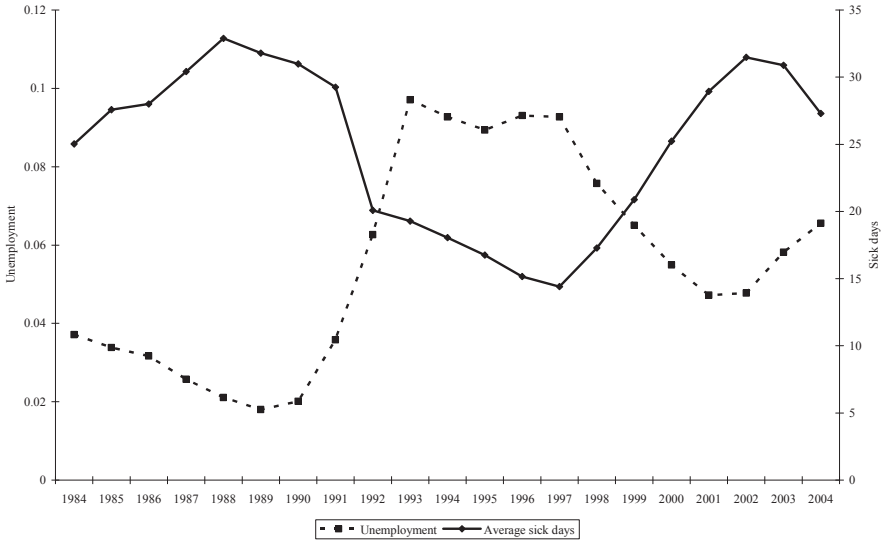
Notably, the institutional setting regarding compensation level for the forgone earnings has changed over time. For example, in 1991 the level was reduced from 90 per-cent to 65 per-cent of forgone earnings below the social security ceiling during the first three days of absence, and to 80 per cent between day 4 and day 90. As well as being eligible to claim public sickness insurance, the majority of employees are eligible to benefits from negotiated sickness insurance programmes established as a result of agreements made between trade unions and employer organisations. These programmes generally replace approximately 10 per cent of forgone earnings (Johansson & Palme, 2005).

In order to deal with moral hazard, the sickness insurance system has consisted of "qualifying days of sickness", i.e. the number of days of sickness which entitled the individual to receive benefits. In 1992, an "employer responsibility period" was introduced, meaning that the employer was financially responsible for the first fourteen days of every period the employee was off sick. Although the compensation levels and rules are set at national level, the Swedish Insurance Agency was organized into autonomous

authorities at county level in the form of local social insurance offices. This system changed in 2005 when the Swedish Insurance Agency was organized at the national level.

Sickness absence is related to the general economic climate. Figure 4 presents the national unemployment rate and the levels of sickness absence.

Figure 4. Unemployment rate and average number of sick days.



Source: Swedish National Insurance Board. Average number of days calculated as total sick days / labor force.

Clearly, there is an inverse relationship between unemployment and sickness absence at national level. This relationship is presumably the result of two underlying mechanisms: a disciplining effect and a composition effect. The disciplining effect means that during periods of high unemployment the tendency to report sick decreases in view of higher cost of losing the job, since it is more difficult to find a new one (Shapiro & Stiglitz, 1984). The composition effect means that individuals with poor health are more likely to leave the labour market during periods of high unemployment and, as a result, those remaining in the labour market constitute a relatively more healthy workforce (being absent from work less often). There has been a wide variation in the use of sickness benefits over time. While the first part of the 1990s (up to 1997) was characterized by a decline in sickness absence in

Sweden, there was a rapid increase from the latter part of 1990s onwards. In 2002, expenditure amounted to approximately 2% of GDP, and between 1998 and 2002, work-absence, and therefore the costs of the sickness insurance system increased by almost 75 per cent.

1.3.3.2. The disability pension system

All Swedish citizens and individuals residing in Sweden who are aged between 16 and 64 years are eligible for an early retirement pension (disability pension) if their working capacity is reduced due to poor health (be it physical and/or psychological, or both reasons). The disability insurance system is intended to replace forgone earnings for individuals with a permanent reduction in work ability due to health reasons.

During the period under study, an early retirement pension could be granted for either a certain period or an unspecified time, at a full or partial rate. Early retirement pension benefits were provided by the basic national retirement scheme (folkpension) as well as the national supplementary pension scheme (ATP), the latter being made available to individuals who had worked at least thirty years while of working age. Early retirement pension benefits replaced 60 percent of the assumed income of an individual based on previous income. This amount was further reduced if the period of residence in Sweden had been less than 40 years.

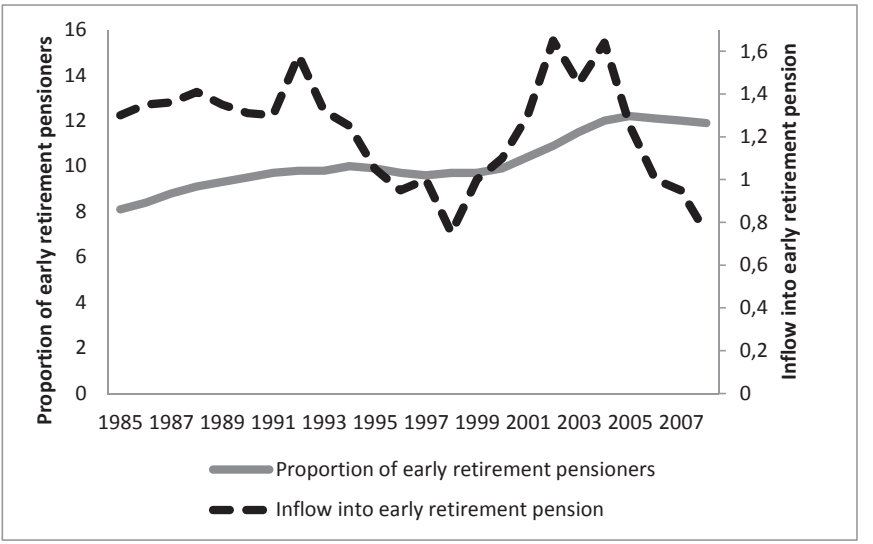
The regulatory framework for the early retirement pension system is stipulated at national level, but as already mentioned, until 2005, it was the he local social insurance offices organised at county level in the form of autonomous authorities which had full responsibility for the disability pension system. Disability pension benefits were awarded by these local social insurance offices, and there should in principle be a medical basis for the decision of reduced capacity to work. An application for early retirement pension was often the result of an interaction between the insured worker, the employer and the officials at the local social insurance offices.

The eligibility rules for the early retirement pension have changed over time. New rules have been introduced in order to give greater consideration to other factors than health, particularly in the case of older individuals (Jönsson et al, 2012). While the determining factors for early retirement pensions in Sweden in the early 1960s were solely medical, from the 1970s up to 1991, labour market opportunities were also considered in determining early retirement pensions, particularly in the case of individuals aged 60-64 years (Palme & Svensson, 2004). Those aged over 60 years of age who had more or less

exhausted their entitlement to unemployment compensation were eligible for early retirement pension though no illness was involved. The share of newly granted early retirement pensions explicitly given for labour market reasons increased markedly during the 1970s and 1980s. As expected, the number of early retirement pensions given for labour market reasons were related to the unemployment rate (Wadensjö, 1996). In 1991 the law no longer allowed the use of the labour market considerations for receiving early retirement pensions.

Figure 5 shows the proportion of early retirement pension and the proportion of newly granted early retirement pension benefits during the period 1985-2008. The proportion of the population aged 30-64 years who had disability pension increased from 8 to 12 percent between 1985 and 2008.

Figure 5. Proportion of early retirement pensioners and the proportion of newly granted early retirement pension, age 30-64, 1985-2008.



Source: Johansson et al (2014)

In addition, this figure shows a wide variation in inflow into early retirement pension over time. The drastic increase during 1992 and 1993 was a product of changes in the institutional setup. In 1992, a time when more ambitious proposals for rehabilitation were being made, the number of those taking early retirement pension increased rapidly, leading to a rapid decrease in the number of persons on long-term sick leave. This one-off increase led to a decreasing

inflow into disability pension in the following years up to 1998. As the economy improved in the latter part of the 1990s and the early 2000s, there was a substantial increase in inflow into early retirement pension between 1998 and 2004.

As inflow has exceeded outflow, there has been a large and continuous increase in the number of disability pensions from 1985 onwards. The number was around 325, 000 in 1985, and around 425, 000 in 1999, and it peaked at 556, 000 individuals in 2005. In 2013, 365, 000 individuals were receiving disability pension benefits.

1.4 Immigrants, the Labour market and the Social insurance system

As mentioned above, the Swedish economy expanded rapidly in the post-war period and active recruitment of labour migrants was necessary in order to allow for this expansion to occur and to address the shortage of labour. As the concept of labour force migration imply, the labour migrants who came during the 1950s and 1960s had no problem finding employment. Similarly, the refugees from European countries also established themselves at the labour market. Hence, the employment level among foreign-born was high during the 1960s and at the beginning of the 1970s. While employment rates and incomes levels among the men were the same as for their native counterparts, the employment levels among foreign- born women were higher than those among native women (Scott, 1999; Bevelander, 2000; 2005).

At the end of the 1960s and the beginning of the 1970s, the migration pattern changed in response to a new immigration policy, and refugees and tied movers dominated immigration to Sweden from the 1970s onwards. There have also been significant changes in the institutional framework of establishing foreign born in the Swedish society, in terms of education and settlement policies. In the 1950s and 1960s Sweden had adopted an assimilation policy, however, although foreign-born were assumed to adapt to Swedish culture and learn the language, many immigrants in the 1960s lacked the language skills necessary and knowledge about Swedish society. In order to increase skills among immigrants, both the Swedish Employers' Confederation (SAF) and the Swedish Trade Union Confederation (LO) argued that there was an increasing need for a policy to help foreign-born improve language skills and knowledge

about the Swedish society. A new policy was introduced in the middle of the 1970s, which established immigration offices giving foreign-born access to language training. The principles of the universalistic welfare state principle were also incorporated in this immigrations policy, which meant a rejection of a guest worker system and a recognition instead that foreign-born was considered to have the same social and economic rights as natives. Foreign-born were thus entitled to labour market programmes and social insurance benefits on the same grounds as natives.

During the 1980s the picture of immigrants in the labour market changed, and during both the 1980s and 1990s the relative earnings and employment rates declined (Aguilar & Gustafsson, 1994; Ekberg, 1999; Scott, 1999; Bevelander, 2000). Notably, the weakening labour market attachment of immigrants has not solely been a matter of change in the composition of the immigration population, the cohorts arriving during the 1960s and 1970s also experienced deteriorating relative earnings during the and falling employment intensity during the 1980s and 1990s, being highly affected by the economic crises in the 1990s (Scott, 1999; Bevelander, 2000).

Foreign-born women had higher employment rates than natives up to the mid-1970s. Although the employment rate among foreign-born women has increased since the 1970s, this increase was not in parity with the employment rate of native women, and as a result the gap in employment between native and foreign-born women increased over time (Bevelander, 2005).

The economic crisis of the 1990s increased the unemployment rate dramatically and the labour market attachment of immigrants weakened. As the economy recovered in the late 1990s the economy was characterized by jobless growth, high growth rates and weak increases in the employment rate. Although the employment situation improved for immigrants, this was not enough to bring employment levels back to those of the late 1980s.

Foreign-born have higher unemployment rates (Lundh et al, 2002), are more likely to be in temporary agency work (Andersson/Joona & Wadensjö, 2008; Wallette, 2004) and have lower earnings than Swedish born workers with similar qualifications (Edin & Åslund, 2001; Scott, 1999). In addition, immigrants are over-represented in self-employment (Andersson/Joona & Wadensjö, 2008) and they experience higher levels of sickness absence and early retirement (Andrén, 2001; Österberg & Gustafsson, 2006).

Importantly, previous research in the case of Sweden, points to differences within the immigrant population in terms of labour market outcome based on country of origin. While immigrants from Western Europe and non-European

English speaking countries have labour market performance roughly equivalent to natives, non-European immigrants experienced lower incomes, higher unemployment levels and lower labour force participation rates, when compared to their Swedish born counterparts (Edin & Åslund, 2001; Scott, 1999; Rooth, 1999).

The native-immigrant gap in labour market attachment has been observed in several countries (see Zimmerman, 2005 for an overview) and has several potential explanations, regarding both the supply and demand of labour and institutional factors.

Human capital theory explains differences in earnings and employment outcome between natives and immigrants by differences in individual characteristics, relating to education, ability and labour market experience. This framework explains the individual labour market outcome in terms of job skills acquired at school and during on-the-job training.[4]

In the seminal article *The Effect of Americanization on the Earnings of Foreign-born,* Chiswick (1978) tracks the earnings profiles of foreign-born in the U.S. using data from the 1970 census. The study shows that immigrants initially have lower earnings than native-born, but after 10 to 15 years they have earnings equal to or exceeding the earnings of natives.[5] Based on the findings and in line with a human capital approach, Chiswick emphasize the assimilation hypothesis. According to this, immigrants are expected to have a lower income and lower rate of employment than native-born, because their human capital from their home country is not fully transferable (Chiswick & Miller, 2009). As the amount of human capital increases we expect a catch-up effect, narrowing the earnings gap between natives and immigrants and after some years the immigrant may reach the same income level as the native born. Eventually, the earnings of immigrants' may overtake the earnings of natives (Chiswick, 1978).

In order to explain the differences in labour market outcome between natives and immigrants, the human capital approach has been broaded to distinguish between the skills acquired in the country of origin and those in the country of destination. The concept of country-specific human capital is based on the idea

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[4] Formal education and labour market experience not only reflect actual productivity, but also operates as a signaling factor to the employer as there is uncertainty regarding the actual productivity of the employee (see Mincer, 1962; Spence, 1973).

[5] The results in Chiswick (1978) have been criticized for using cross-sectional data and for not capturing cohort effects, that the human capital of more recent immigrant cohorts in the U.S. differs from that of previous immigrants (See Borjas, 1985; 1989).

that knowledge about the source countrys values and language skills is an important factor in assessing the probability to be employed (Chiswick & Miller, 1995; 2003, Dustmann & Fabbri, 2003). This approach assumes that immigrants gradually acquire country-specific knowledge, while accumulating labour market experience, social networks and language skills over time. For example, country-specific human capital gives access to networks, being an increasingly important channel in the job-search process (Behtoui (2008). The ability to learn new skills is generally based on age at migration, i.e. younger individuals are relatively more efficient compared to older migrants to accumulate country-specific human capital (Chiswick & Miller, 1995).

As pointed out by Borjas (1985; 1989), the characteristics of different immigrant cohorts explain differences in earnings and employment outcome between natives and immigrants. In this framework, the presence of cohort effect, i.e. different waves of immigrants' origins from different regions and have different "quality of labour", explains why different cohorts perform differently at the labour market. These differences in "quality" between immigrant cohorts are related to different selection of immigrants taking place over time.

There are also potential differences in the selection of immigrants between different destination countries. Roy (1951) presents a migration model arguing that there is self-selection such that regions/countries paying higher returns to skills attract more skilled workers than regions paying lower returns to education. In this framework, countries with an egalitarian wage-structure might be a more attractive destination for low-skilled immigrants than for high-skilled immigrants (Borjas, 1987). Analyzing immigration to OECD-countries in 2000/2001, Belot & Hatton (2012) point to the importance of cultural similarities, colonial legacy, and physical distance rather than to wage-structure as determinants of immigrant selection. Pedersen et al (2008) investigate the immigration flows into the OECD during the period 1990 to 2000 and finds support for strong networks effects, particularly in terms of the number of co-nationals living in the destination country. Interestingly, these network effects vary between source countries and are weaker in countries which are universalistic welfare state, attracting immigrants from the lowest income level source countries.

According to the human capital theory, the native-immigrant labour market gap is explained by differences in educational level and country-specific human capital. Thus, the labour market gap for a given immigrant cohort is

reduced by the number of years since migration, and the observed differences between natives and immigrants are related to self-selection and cohort effects.

The native-immigrant labour market gap may also be explained, however, by labour demand. In several OECD-countries (including the Scandinavian countries) there has been a weakening labour market attachment among immigrants since the 1980s and this has not only been a matter of changing composition of the immigration population, because cohorts who arrived during the 1960s and 1970s also experienced falling employment intensity (Zimmermann, 2005). A potential explanation is that both the newly arrived immigrants and those with longer residence time find difficulties adopting their skills in order to match the demands of the labour market. This notion is consistent with the aforementioned hypothesis of skilled-biased technological change, increasing the relative demand for high skilled labour. Autor et al (2003) argue that the changes in demand is strongly related to computerization, leading to reduced labour input of routine manual and cognitive tasks and increased labour input of non-routine cognitive tasks. As aforementioned, this development points to increasing demand for highly skilled workers and deteriorating effects on low-skilled or individuals in the middle of the wage distribution (job polarization).

In the case of Sweden, Scott (1999) and Bevelander (2000), argue that the country-specific human capital becomes increasingly important over time, due to changes in labour demand. Rosholm, Scott & Husted (2006) point to organizational changes towards a more flexible work organisation increasing the importance of country-specific human capital in terms of language proficiency and thereby reducing the attractiveness of immigrants in the labour market.

Previous studies also points to the importance of macro-economic conditions and business cycle-effects on the labour market outcome of immigrants. In the case of the U.S., Chiswick et al (1997) show that the employment of male immigrants is more adversely affected by macroeconomic downturns than is that of native males. Specifically, Orrenius & Zavodny (2010) find that the employment and unemployment rates of Mexican immigrants are more cyclically sensitive than those of immigrants from other countries of origin. In the case of Canada, McDonald & Worswick (1997) show that unemployment incidence of immigrant men increases more during an economic downturn compared to that of natives. Dustmann et al (2010) investigate the business cycle-effect among immigrants in Germany and the UK and finds that the unemployment probability of immigrants is more cyclically sensitive. In the

case of Norway, Hardoy & Schone (2013) investigate the effect of plant closures over the business cycle and finds that the effect is more severe in a recession, particularly for immigrants. Barth et al (2004) and Bratsberg et al (2006) analyse the effect of local unemployment on earnings in the case of Norway and the U.S. respectively and find that immigrants' wages are more affected by local labour market conditions than natives.

The pattern of immigrants' employment and earnings being more sensitive to changes in macro-economic conditions may have several explanations. The composition effect refers to the situation where immigrants work in more cyclically dependent industries and occupations or have lower educational level (see Orrenius & Zavodny, 2009 for an overview). Presumably, the labour market attachment of newly arrived immigrants is more vulnerable to the effects of an economic downturn. Recent migrants have relatively less country-specific human capital and a slowdown in the economy means that the employers will potentially keep their most productive workers first and foremost, i.e. higher competition of jobs may result in less skilled employees being displaced by more skilled employees as they move down the skill chain during a recession (Deveraux, 2004). Moreover, in the Swedish context, the labour market legislation ("first in – last out-rule") stipulates that high seniority workers are to be protected during an economic downturn. This legislation therefore states that those who have been employed more recently employed (e.g. immigrants) are to be the first to leave the workplace during a downturn.

While the human capital approach assumes that immigrants and natives with similar formal qualifications are treated the same way in the labour market, the presence of discrimination may put constraints to immigrants' establishment at the labour market as a result of unequal treatment of employees (Becker, 1957; Reimers, 1983). The mechanism behind discrimination can be divided into two parts. The first refers to a "taste for discrimination", i.e. employers, customers or co-workers acting on their dislike of ethnic or racial groups (Becker, 1957). The second mechanism is based on "statistical discrimination", i.e. differences between ethnic groups potentially arising even in the absence of prejudice, since an employer´s decision on whom to employ and reward is based on imperfect information regarding an individuals' productivity and ability. In the absence of perfect information regarding the individual, the employer uses information on the average performance of the group. As a result, the employer may take decisions generating inequality based on if an individual belongs to a group which is generally low-productive or high-productive (Arrow, 1972; Phelps, 1972).

The discrimination hypothesis has been investigated in several studies in Europe and the US in recent decades, and a clear majority of these find support for the notion of discrimination against minorities (see Riach & Rich, 2002 for an overview). Using experimental data, Carlsson & Rooth (2007) find evidence of ethnic discrimination in the Swedish labour market. However, although changing attitudes toward certain minorities are observed over time, these changing attitudes seem not to result in increased labour market discrimination (Åslund & Rooth, 2005).

One strand of the literature emphasizes the significance of the institutional context of the Swedish labour market in explaining the native-immigrant gap. Lindbeck & Snower (1988) presents the insider-outsider theory as a potential explanation for the weak labour market attachment among immigrants. In this framework, the labour force is divided between workers inside the labour market (insiders) and those outside the labour market (outsiders). Increasing labour turnover costs, e.g. the costs of hiring, firing and providing firm-specific training, means decreasing the bargaining power of outsiders and reinforcing the position of insiders. Presumably, the institutional framework in Sweden, i.e. minimum wages is stipulated by collective agreements and underbidding is not allowed, induces this insider/outsider situation. Skedinger (2010) documents that the collectively agreed minimum wages are high by international standards and Lundborg & Skedinger (2014) points to collectively agreed minimum wages increasing the unemployment among male refugees. This institutional setup may explain the pattern whereby immigrants in Sweden do not end up in lower paid jobs than natives, but are instead overrepresented as being non-employed (Bengtsson et al, 2005).

Besides the importance of labour market institutions, earlier studies also point to the importance of institutional reforms regarding settlement policy and integration policy. As is the case in many OECD-countries, Sweden is characterized by regional variation in its distribution of immigrants across municipalities. A majority of refuge immigrants arrived to the three major cities; Stockholm, Gothenburg and Malmoe (Scott, 1999). In order to reduce the concentration of immigrants in big city areas, in 1985, the Swedish government introduced a settlement policy, imposing restrictions on the settlement of newly arrived immigrants. The policy of settlement was in place between 1985 and 1994, and implied that all asylum seekers was placed in a refugee centre distributed all over Sweden and after receiving a resident permit the Immigration Board assigned foreign born to a municipality. At the same time, there was a shift in the approach of integration policy. Before 1985, the

Labour Market Board had been responsible of handling refugee issues and thus there was a direct link between labour market policy and integration of refugee immigrants. In 1985, the Immigration Board was made responsible for refugees and the connection to labour market policy weakened.[6] Edin et al (2004) evaluate these reforms and finds that the shift in focus of integration policy negatively influencing the earnings in the long run. Åslund & Rooth (2007) use the settlement policy reform as a source of exogenous variation in the local labour market conditions in order to explore the causal effect of labour market conditions at the time of immigration on future earnings and employment. Evidence is found for that early earnings assimilation is dependent on a favorable national labour market situation. Moreover, they find that initial exposure to a high rate of local unemployment has long-term negative effects on earnings and employment, suggesting that individuals are unable to escape this effect at local level despite improvement in macro-economic conditions.

Previous research shows that there exist differences in health between natives and immigrants, and in several health outcomes such as adulthood mortality (Sundqvist & Johansson, 1997), and in self-reported health (Lindström, Sundquist & Östergren, 2001). This health-gap is potentially related to differences in human capital, influencing labour market attachment. Grossman (1972) advances the human capital approach by linking human capital to the production of health (and consumption of health care). Within this framework, human capital is not only affecting labour market outcomes in terms of knowledge but also in terms of health. Therefore, if natives and immigrants differ in terms of their human capital we would expect this pattern to also give raise to differences in health status between these groups. In addition, the native-immigrant gap in health status may also origin from post-migration factors. Earlier studies show that the incidence of sickness may increase after migration, examples of this being sickness as a result of cardiovascular disease and being overweight and obesity (Salmond, Prior & Wessen, 1989; Marmot & Syme, 1976; Sundquist & Johansson, 1998; Lindström & Sundquist 2002; Dotevall et al, 2000).

As described above, previous literature shows that there is a labour market gap between natives and immigrants in traditional labour market outcomes such as employment, earnings, and careers. Earlier studies show that the

[6] For example, after the reform immigrants were, by default, placed on welfare benefits for an introductory period of about 18 months.

development of deteriorating employment situation among immigrants is accompanied by an increasing inflow into self-employment and the over-represented of immigrants in self-employment (Andersson-Joona & Wadensjö, 2008). This process may, in the Swedish context, be explained by the rules of the labour market. Given that underbidding is not allowed in the labour market, there are incentives for immigrants to become self-employed because self-employment that offers a low hourly income may be an alternative in order to escape unemployment. This notion of using self-employment in a response to disadvantage at the labour market is confirmed in empirical studies, showing that self-employed from non-European countries have lower incomes than do their native peers and self-employed immigrants from European countries, and they have lower income than do immigrants in paid employment (Andersson, 2006; Hammarstedt, 2006). In addition, previous studies show that there are differences in self-employment propensity within the foreign-born population based on country of origin – differences presumably related to those traditions of entrepreneurship (Hammarstedt & Shukur, 2009).

In Sweden, immigrants are also over-represented in the social insurance system in terms of their having higher rates of early retirement (Andrén, 2001; Österberg & Gustafsson, 2006) and sickness absence (Andrén, 2001; Bengtsson & Scott, 2006; 2008). There is therefore a native-immigrant gap in the social insurance outcome.

Analysing sickness absence in Sweden during the period 1986-1991, Andrén (2001) shows that naturalized immigrants are more likely to be on long-term sick leave than are native-born and foreign citizens. In the case of Norway, previous studies indicate that sickness absence are higher among immigrants from non-western countries than for natives (Dahl et al, 2010; Brekke & Schøne, 2013), this being explained in part by poorer levels of self-reported health (Brekke & Schøne, 2013). In Sweden's case, Bengtsson & Scott (2006; 2008) show in two studies for the periods 1981-1991 and 1993-2001, respectively, that there exist differences in sickness absence by country at birth, even after accounting for differences in socioeconomic factors, education and in the case of the latter period, also workplace conditions and macroeconomic factors. These results point to a high level of sickness absence among immigrant cohorts from labour migrant countries arriving during the 1960s and 1970s. Thus, the immigrant groups being best integrated in the 1960s are displaying the highest levels of sickness absence and early retirement today. These immigrant groups may also have been overrepresented in physically demanding jobs with poor working conditions. Klinthäll (2003) argues that

many labour immigrants planned initially only to stay for a short time in Sweden, in order to work and accumulate savings that could be taken back to the destination country. Their labour supply was therefore high and since they frequently had heavy or monotonous jobs, many now suffer from injury related to repetitive and heavy work. However, although there are indications of differences in the work environment between native and foreign born, the high levels of sickness absence among immigrants can not be explained by work-related injury (Wadensjö, 1996; Bengtsson & Scott, 2006; Hansen et al, 2014).

Earlier studies on Sweden shows that foreign born have higher rates of early retirement than natives and are more likely be on early retirement pension (Andrén, 2001; Stattin, 1998; Österberg & Gustafsson, 2006). Andrén (2001) shows that during the second part of the 1980s both naturalized immigrants and foreign citizens were more likely than native-born had a to take early retirement pension. Hammarstedt (2000) finds that foreign born who immigrated before 1968 at the end of the 1980s had approximately three times as high frequency of early retirement than the Swedish-born population, although there are also indications that immigrants arriving after 1968 had a higher proportion of those taking early retirement pension (Ekberg 1996, Lundh et al 2002). In a cross-sectional study for 1999, Österberg & Gustafsson (2006) find differences between immigrant groups based on country of origin and time of residence, controlling for socioeconomic status. While those immigrants who arrived from the Nordic countries and Southern Europe during the 1960s and 70s were more likely to be on early retirement pension, the opposite is found for newly arrived immigrants. In addition, Österberg & Gustafsson (2006) find differences in gender in early retirement, such that foreign-born women with high employment rates in the 1960s and 1970s were the most likely ones to have early retirement pension in the 1990s.

1.5 Conceptual Framework

In the previous section we summarized previous research, showing that there is a native-immigrant gap in employment, sickness absence and early retirement pension. The potential explanations for this gap refers top both labour supply (human capital and health) and labour demand factors (business cycle, structural change, discrimination) as well as institutional factors (labour market rules and social norms).

As aforementioned, although sickness absence should only be related to health and early retirement pension should be mainly for reasons of health, there is potentially an indirect effect from the labour market situation of the individual. Hence, the factors affecting the labour market outcome have a direct or indirect influence on the social insurance outcome.

This thesis adopts a regional approach towards self-employment, sickness absence and early retirement pension among immigrants. In addition, we take a life-course perspective by analysing the impact of early-life conditions on sickness absence in adulthood.

The reason for taking this regional approach is the increase in regional differences, both in the labour market and the social insurance system since the 1990s (Lundberg, 2007; National Insurance Board, 2003), which may reflect a combination of low labour mobility and differences in regional labour market characteristics. This pattern of increasing regional differences is also found when analysing the employment among immigrants. While there was small regional variation in this regard during the latter part of the 1970s (Ekberg, 1983), studies focusing on the latter part of the 1990s and onwards shows considerable regional variation in the employment rate for immigrants and significant regional differences in the native-immigrant employment gap (see Lundh et al, 2002; Lundh & Bevelander, 2004; Bevelander & Lundh, 2007 for detailed analyses).

The pattern of increasing regional differences in employment and the social insurance system during the period of investigation indicates that characteristics at the regional level may explain the weaker labour market attachment of immigrants and the native-immigrant gap. The analysis in this thesis focuses on the following characteristics at regional level:

i) local labour market conditions in terms of the local/regional business cycle, i.e. the number of jobs available.

ii) structural change in the labour market in terms of the economic structure of the region, i.e. the kind of jobs available.

iii) informal institutions in terms of social norms, affecting both the application process and the decision to approve social insurance benefits.

First, the development of the regional business cycle reflects the *number of jobs available*, presumably affecting the individual employment opportunities and the social insurance outcome. During periods of greater regional/local unemployment there are also greater job losses, fewer jobs available, and fiercer competition for jobs. In line with job search theory (see Lippman & McCall, 1976 for an overview), higher job search costs have a limiting effect on the individual's' job search activities. In times of economic hardship, the individual may become discouraged in the job search (the discouraged worker effect) and withdraw from the labour force by entering early retirement pension rather than continue the search for a new job. Another potential response to economic hardship in times of low economic activity and high unemployment is to entering self-employment in order to avoid future unemployment. If immigrants are over-represented in educational groups and sectors as well as in those occupations experiencing the largest job losses during an economic downturn, we can expect immigrants to be more affected by a worsen regional labour demand, presumably affecting both their self-employment propensity and early retirement pension probabilities. In addition, given their weaker labour market, poorer local labour market conditions may increase the transition into and out of self-employment among immigrants.

Second, the structural transformation of the labour market affects which *kinds of jobs available* at regional level, which presumably influences the labour market outcome of the individual. We hypothesize that there is an excluding process for the individuals that do not have the possibility to adapt to the new demands in periods of tightening labour market, due to mismatch between local labour demand and the individuals' human capital. This notion is consistent with the hypothesis of "skill biased technological change" (Katz & Autor, 1999) and "task biased technological change" (Goos et al, 2014), whereby the demand for more educated workers increases as a result of new production technology (e.g. computerization). Thus, we assume that the

economic structure in the region, in terms of industrial and production structure, influence the employment prospects of the individual, the ability to work at full capacity in the labour market (sickness absence) and the ability to remain in the labour force (early retirement pension). For example, regions with an economic structure based on a high reliance on modern technological industries such as biochemistry, IT and telecommunications, are expected to affect the individual in different ways, unlike those regions with a higher reliance on "traditional" manufacturing industry.[7]

Third, social insurance and labour market outcome may be influenced by institutional characteristics at regional level. North (1990) develops an analytical framework distinguishing between formal institutions (laws and regulations) and informal institutions (norms and practices). Lindbeck et al (1999; 2003) presents theoretical models of how the interaction between social norms and economic incentives affects the labour supply decision. An underlying assumption in the models is that social norms regarding attitudes towards work and leisure are related to the proportion of individuals in work, whereby an increase in the number of people receiving welfare benefits weakens the social norm of receiving an income from work. Within this framework, "cultures of unemployment" are created in areas of high unemployment (regions, municipalities and neighborhoods), which give rise to social norms placing greater value on leisure and on accepting the welfare benefits provided by the social insurance system. Potentially, social norms regarding attitudes towards work affects the individual's decision to apply for and make us of sickness benefits and an early retirement pension, and also the way in which the social insurance offices interpret these cases and give their approval.

Since the regulatory framework for the social insurance system in Sweden during the period of investigation was set at national level, the key mechanism behind the differences in institutions at regional level arises from the differences in practice and interpretation on the part of the autonomous

7 In order to capture differences in economic structure this thesis use a classification developed by The Swedish Business Development Agency (Nutek). Statistics Sweden uses a division into local labour markets, based on the quantitative patterns of commuting between municipalities. Nutek has introduced a division, with the different labour market regions grouped into six region-families, reflecting regional economic structure in terms of industrial and population structure (Nutek, 2002). The region-families are larger cities, university-regions, regional centres, secondary centres, small regions dominated by private sector employment and small regions dominated by public sector employment.

authorities at county-level. Palme & Svensson (2004) emphasize that, despite that the regulatory framework for disability pensions in Sweden being the same throughout the country, the wide variation in grants provided by the local social insurance offices indicates that the implementation and the interpretation of the rules varies. Similarly, analyses of the regional pattern in Sweden indicate that unemployment is high in regions with high levels of sickness benefits and early retirement pensions (National Insurance Board, 2003; 2004). This pattern indicates that sickness absence and disability retirement are related to non-medical factors, and points to an interaction between labour market conditions and social norms at regional level.

The thesis focuses on the significance of business cycle-effect, economic structure and informal institutions at regional level. Importantly, the regional approach allows for taking differences regarding economic and institutional factors in the regions into account. We attempt to distinguish between these explanations, in order to disentangle whether regional characteristics are important and whether such regional effects operate through the regional business -cycle, the economic structure and/or informal institutions.

Besides a regional approach, the thesis adopts a life-course perspective by analysing the impact of early-life conditions on sickness absence in adulthood. As mentioned in Section 4, health is considered a human capital factor that affects both labour market position and social insurance outcome. In the framework proposed by Heckman (2007) and Cunha & Heckman (2007), health is considered to be capability affecting the production of several future capabilities, suggesting a link between early environmental conditions on the development of adolescent and adult cognitive and non-cognitive skills. Health in childhood is therefore likely to affect future health, thus influencing in turn labour supply and productivity (see Currie, 2009, for an overview). The results of several studies show that the conditions experienced in early life have long-term effects on health throughout the life-course (Galobardes et al, 2004; 2008). In this framework, health differences between native and foreign born origins from pre-migration circumstances and health condition early in life. Presumably, differences in health conditions in early life between cohorts born in different countries during different time-periods give rise to differences in socio-economic status and health later in life. The link between early life conditions and labour market attachment later in life has been explored in several studies, and points to children who suffered poor health in childhood having poorer socioeconomic status in adulthood (Case, et al, 2005 for the U.S.; Kristensen et al, 2004 for Norway). In the case of Sweden, Helgertz

(2010) analyses biological siblings and shows that adverse early life conditions during infancy have a negative effect on income attainment in adulthood. In addition, previous literature finds a strong association between socioeconomic status in childhood and adult health and mortality (Currie, 2009; Preston et al, 1998).

The conceptual framework that goes with assuming a regional and an early-life approach in order to explain the weaker labour market attachment of immigrants and the native-immigrant gap adds to the explanations presented in Section 4. Paper 1 analyses the importance of local labour demand on self-employment entries and exits, while taking the economic structure into account. Paper 2 explores the link between the regional unemployment rate and early retirement pension, while taking informal institutions into account. Paper 3 attempts to distinguish between informal institutions (social norms and practices) and the economic structure, taking the local unemployment rate into consideration, as determinants of sickness absence. Finally, Paper 4 investigates the significance of early-life factors on sickness absence and thereby provides a new perspective on the impact of health status on sickness absence propensity.

1.6 Data

This thesis uses Swedish register data. Data comes from two different databases; the Swedish Longitudinal Immigrant Database (SLI) and the Longitudinal Individual Data for Sweden (LINDA). The register data is linked to macroeconomic data of regional and national characteristics. Information on the unemployment rate at national, county, and local level is provided by Statistics Sweden (SCB) and the Swedish Labour Market Board (AMS). The data on infant mortality rate comes from several sources: Mitchell, 2007a; 2007b; World Bank, 1993; Abouharb & Kimball, 2007).

SLI is a register-based panel, including socioeconomic and demographic information on a sample of native and foreign-born individuals from 1968 onwards. SLI is representative of both the native and foreign-born populations in Sweden. The information comes from several administrative registers such as the censuses, the taxation registers, and the educational registers. The taxation registers consist of yearly observations from 1968 to 2001 (and onwards) and the censuses were taken every five years between 1970 and 1990.

Initially, in 1997, the database was constructed by drawing a random sample of foreign-born from the 1970s census, stratified by sex and immigration year. The sample consisted of European a nd non-European immigrants from the sixteen largest immigrant groups in Sweden. An additional random sample for the same countries was extracted from the 1980 census. This sample was enlarged by approximately 7,000 citizens from each country immigrating to Sweden during 1968 and 1993. In order to establish a control group, the database also included a random sample of native Swedes, drawn from the 1970 and 1980 censuses. In 1997, the SLI consisted of 110,000 unique individuals.

In 2005, the SLI was updated in such a way that the number of individuals it included increased substantially, among both natives and immigrants. A sample of natives, born between 1971 and 1987, were added to the data and the SLI was extended by a sample of immigrants who were from the country of origin already included in the database, and who entered Sweden between 1994 and 2001. However, the extension of the SLI in 2005, consisted mostly of linking individuals to their children, parents and spouses, on the basis that these individuals had resided in Sweden at some point in time between 1968 and 2001. This expansion of the data implies that the SLI consists of 550,000 unique individuals from around 150 countries, albeit that this is in some cases a very small number.

The database consists of labour migrants, refugees and tied movers arriving during different periods of time and the data represents the entire spectrum from labour migrants of the 1950s and 1960s to the refugees and tied movers of the 1970s onwards. These individuals were randomly selected and thus spread throughout Sweden, enabling analysis focusing on local labour market conditions.

LINDA is a rich administrative register-based longitudinal data set on Sweden, containing yearly information from 1968 to 2003. It consists of a large panel of individuals and their household members. The core registers are the Income Registers and Population Censuses. LINDA consists of two separate samples: a primary sample of approximately 3 per-cent of the total Swedish population (roughly 300,000 individuals) and a non-overlapping immigrant sample of 20 per-cent of the foreign-born population.[8] The panel is representative of the Swedish population during the whole period and consists of demographic and socio-economic information. The data is rich in

[8] For more information about LINDA, see Edin & Fredriksson (2000).

information on income from different income sources, allowing us to perfectly observe social insurance benefits.

The primary difference between the sources is that the SLI contains a great deal of information on the period prior to immigration, while LINDA has detailed economic information regarding the time in Sweden.

The databases contain information taken from the taxation registers for different income types, such as income from work, income from business activity and benefits provided by the social insurance system. Therefore, in defining the dependent variable, we avoid the common problems associated with using survey data, i.e. information origin from personal assessment.

The taxation registers and income registers used in this thesis consist of yearly observations**.** Using annual data implies that labour market status in not explicitly given in the data and in order to define labour market status we need to take the whole income-profile into consideration. The yearly data is not considered to be a significant problem since the process into self-employment, long-term sickness absence and early retirement pension is presumably a gradual one.

The data has several shortcomings and there are potential measurement problems. Although the data in SLI contains information regarding workplace factors, such as sector of employment, growth rate of the work place and workplace size, the data lacks information of detailed work place factors in terms of work environment and stress at work, being preferable analysing sickness absence and early retirement pension. In addition, although the SLI does contain some information on the health status, the databases lack data on direct information on health status, such as self-reported health.

The information regarding the educational level of the individual comes from the educational registers. This register contains information on the highest education level attained by the individual, based on educational degrees, received either in Sweden or in the country of origin, where a foreign education is translated to Swedish circumstances. In cases where there is a lack of data on immigrants' education, the educational data is based on self-reported information. The quality of the data improves over time. Because the educational register is used in the vast majority of Swedish register data, this study shares the potential problem associated with self-reported information with other data sources in Sweden. Besides this potential problem, Antelius & Björklund (2000) points to measurement problems of the educational registers, since the data does not pick up some partial studies at high school and college but not leading to a formal degree.

In addition, the tax registers only contain direct information on the income of self-employed for those with unincorporated business. Individuals with incorporated business declare wage-income from their own business and are observed in the tax registers as wage-employed. In analysing self-employment it would be preferable to be able to distinguish between and measure both unincorporated and incorporated businesses. As pointed out in paper 1, however, this lack of data is not considered to be a substantial problem.

These limitations notwithstanding, using these databases offers several strengths and advantages. The individuals are randomly selected and thus spread throughout Sweden, enabling both an analysis focusing on local labour market conditions and a regional analysis to be made. In addition, basing measurement of the dependent variables on register data and using the rich information on different income sources allows us to distinguish labour market status and identify social insurance benefits. Furthermore, the data allows for a life-course approach, tracking individuals from birth into adulthood.

1.7 Summary of Chapters

1.7.1. Paper I – Is self-employment a response to local labour market conditions? The case of immigrants in Sweden, 1985-2001.

This study examines whether immigrants are pushed into and out of self-employment in periods of worsened local economic conditions. The research question is motivated from the development in several OECD-countries, including Sweden, characterized by immigrants having lower employment rates than natives (Zimmermann et al, 2005) accompanied by an increasing inflow of immigrants into self-employment (Andersson/Joona & Wadensjö, 2008). Previous literature indicates that self-employment among immigrants is the result of disadvantage in the labour market (Blume et al, 2008; Evans & Leighton, 1989; Moore & Muller, 2002). This notion is supported by empirical studies on the case in Sweden, showing that self-employed from non-European countries have low incomes (Andersson, 2006; Hammarstedt, 2006) and are over-represented among those in both self-employment and temporary agency work (Andersson-Joona & Wadensjö, 2008).

The study goes beyond previous literature on self-employment among immigrants in several ways. First, in contrast to most previous studies on the

case in Sweden, we use longitudinal data allowing us to explore the conditions determining whether an individual enter and exit self-employment. Second, analysing both the entry and exit processes of self-employment, allows us to investigate whether the determinants for entering and leaving self-employment are different. Third, in contrast to previous longitudinal studies, which used labour market indicators at national level, this study adopts a regional approach capturing the response to changes in labour demand at local level using municipal unemployment rates. Local labour demand is preferable to national indicators since it reflects more accurately the individual employment opportunities. Moreover, this regional approach also allows us to take into account the different economic structures in each region, in terms of the composition of industries and educational level.

We use longitudinal data from SLI for the period 1985-2001 in order to follow the labour market trajectories of individuals and identify their labour market status over time. In addition, the panel data structure makes it possible to take into account previous labor market experience and thus deal with state dependence and the initial condition problem.

This study examines the complete set of transitions between non-employment, wage-employment and self-employment, by estimating a multinomial logit model for both male and female immigrants**.** Analysing transitions to self-employment separately for non-employed and wage-employed individuals is motivated since the mechanism behind the entries into self-employment might be different for individuals coming from non-employment compared to wage-employment.

The results show that the self-employment decision is influenced by local labour market conditions. Interestingly, the mechanism seems to be different in the process of entering and leaving self-employment. For both natives and immigrants, a negative relationship is found between the local unemployment rate and the probability of entering self-employment. In addition, a higher educational level has a positive influence on the self-employment propensity. In sum, the results of the estimates in the entry -process indicate that self-employment is not used as a last resort. Turning to the exit process from self-employment, we find that immigrants are pushed out of self-employment in response to worsened local economic conditions. Altogether, the findings show that immigrants enter self-employment when local labour demand is improving and leave their business for non-employment in response to deteriorating local labour market conditions.

In addition, we find that the impact of deteriorating local labour demand operates differently for immigrants and natives in the exit-process, in that natives are more likely to leave their business for wage-employment when the local economic conditions deteriorate. These results indicate that self-employed natives enjoy a stronger position as employees and/or that self-employment experience of natives is valued more highly among employers. This study shows the importance of analysing both the entry and exit processes of self-employment, since our results show that the impact of deteriorating local labour demand differ between entering and leaving self-employment.

1.7.2. Paper II – Early retirement pension and regional economic conditions: The case of immigrants in Sweden, 1982-2003.

This paper analyses early retirement pensions among immigrants during a period when the labour market has tightened and when there has been an increase in disability retirement, in particular for immigrants. The main focus is the relationship between the county-level unemployment and disability pension transitions. There has been a drastic increase in the proportion of early retirement pensions in Sweden since the 1980s. In addition, earlier studies on Sweden show that foreign-born have higher rates of early retirement than do natives and are more likely to be receiving early retirement pension (Hammarstedt, 2000; Österberg & Gustafsson, 2006). Previous research points to the significance of health status (Karlsson et al, 2008), socio-economic status (Månsson et al, 1998) and labour market attachment (Gustafsson et al, 2015) as determinants of early retirement pension in Sweden. Another strand of the literature focuses on the importance of economic incentives on early retirement, e.g. the manners in which people respond to changes in the disability pension system (see Johansson et al, 2014, Jönsson et al, 2012; Karlström et al, 2008; Palme & Svensson, 2004). The overall conclusion from these studies are that although economic incentives, in terms of eligibility rules and income taxes, affects retirement and the timing of an exit from the labour market, they alone cannot explain the significant changes in the usage of early retirement pension.

This study goes beyond earlier studies in several respects. First, while previous studies on early retirement among immigrants in Sweden have been performed within a cross-sectional framework, using longitudinal data allows us to explore whether early retirement pension is affected by regional labour market conditions. Second, in contrast to previous studies on the relationship

between the unemployment rate and early retirement, we distinguish between foreign-born and native-born. Third, by adopting a regional approach, using county-level data on unemployment allows us not treating Sweden as a single labour market and we use the variation in local economic conditions across the counties in order to identify the impact of regional labour market conditions on early retirement pension. Moreover, this regional approach allows us to take into account differences in practices between the social insurances at the county level due to social norms.

By using data from LINDA, over two different periods, 1982-1991 and 1992-2003, respectively, we are able to analyse early retirement pension during different labour market contexts and states of the economy.

We estimate a linear probability model on the link between the county-level unemployment rate local labour demand and disability pension transitions, controlling for individual characteristics and socioeconomic status. Regional and time specific effects are included in the model in order to take potential bias into account.

The empirical analysis shows that early retirement pension transitions are cyclically sensitive. The results show that county-level unemployment increases the likelihood of leaving the labour force for early retirement during the 1990s. The estimates for the 1980s, however, shows another relationship, which probably reflects that the mechanism underlying early retirement pension is different in a period of increasing employment and higher labour demand from that in a period of increasing unemployment rates and a tightening labour market. Thus, these results show that early retirement transitions are not only health-induced, but also related to non-medical factors. The findings are consistent with the notion that the use of the social insurance system in Sweden over time has to a larger extent been a product of mismatch at the labour market and that harder competition for jobs excludes individuals with lack in working capacity.

This study also shows that early retirement pension probability is different between different countries of birth-regions. We find the largest impact of worsened labour market conditions on the early retirement probability among immigrants from Southern Europe and Eastern Europe, whereas the lowest association is found for immigrants from Western Europe.

1.7.3. Paper III - Regional and Ethnic Patterns in sickness benefit utilization in Sweden, 1993-2001. (co-authored with Kirk Scott)

This study focuses on regional differences in long-term sickness absence among immigrants. We examine the influence of the economic structure on sickness absence for immigrants and natives. Our hypothesis is that the economic structure in the labour market region where the individual lives, in terms of industry-structure, the level of know-how in production and access to skilled labour, is a significant factor affecting the propensity of experience sickness absence, and that this effect is more noticeable among immigrants than among natives. This research question is motivated by the pattern of sickness absence in Sweden being characterized by large regional variation and differences between natives and immigrants, which indicate that sickness absence during this period was in part a symptom of weak labour market attachment and was not purely health-related.

Previous research shows that immigrants face barriers on entering the labour market, and having entered it they experience higher levels of sickness absence (Andrén, 2001; Bengtsson & Scott, 2006; 2008). In addition, the regional pattern of sickness absence in Sweden during the 1990s was characterized by high levels of sickness benefits in regions of high unemployment (National Insurance Board, 2003). Our paper adds to previous literature by combining these perspectives.

Using longitudinal data from SLI during the period 1993-2001, we estimate separate logit models for individuals in each administrative region and region family, accounting for individual characteristics and socioeconomic status, work place factors and also the business cycle effect on long-term sickness absence. Using a regional division of Sweden, which links labour market regions into "region families" as the basis of this study, allows us to distinguish between explanations pointing to the importance of regional economic conditions and the institutional framework of the sickness insurance system.

The results show that there are unexplained differences in sickness absence in the regions that exist even after taking into account different population structures, workplace conditions and industries in the regions. We find weak effects from the economic structure in the region where the individual live on sickness absence propensity, suggesting that the regional differences in sickness absence are more a function of institutional factors related to the sickness insurance system, such as differences in the application of the rules and/or different social norms. In addition, our findings suggest that differences

in sickness absence between immigrants and natives are to a large extent a matter of immigrants and natives having different demographic and socioeconomic characteristics.

1.7.4. Paper IV - Early Life Conditions and Long-Term Sickness Absence During Adulthood – A Longitudinal Study of 9,000 Siblings in Sweden (co-authored with Jonas Helgertz)

This article examines the influence of health conditions experienced during the individual's first year of life on the incidence of sickness absence during adulthood. Previous research shows that there is a link between early-life conditions and health later in life (Galobardes et al, 2004; 2008) as well as the individual's socioeconomic status (Bengtsson & Mineau, 2009; Heckman, 2007; Kuh & Wadsworth, 1993). However, few studies investigate the relationship between early-life conditions and sickness absence later in life, which is the topic of this study. Furthermore, this study explores the importance of socioeconomic resources during childhood, i.e. whether the magnitude of the effect of early-life conditions is affected by the individual's socioeconomic resources early on in life. Previous literature documents a strong association between socioeconomic status in childhood and health in adulthood and mortality (Currie, 2009; Preston et al, 1998). Presumably, the presence of an intergenerational transmission of socioeconomic status and differences in terms of knowledge and resources between parents and children implies that the influence of early-life conditions on sickness absence might be mitigated or exacerbated by the individual's socioeconomic status in childhood.

We advance earlier studies on the link between early life factors and sickness absence in several ways. First, using longitudinal data from SLI, covering a sufficient long time period in order to follow individuals from birth and into adulthood, allows us to adopt a life-course approach. Second, using a macro-level indicator – the infant mortality rate- as an instrument of early-life conditions, allows us to overcome problems relating to the early life condition not being exogenous to the individual. Potentially, unobserved characteristics (e.g. genetic endowments) may influence both childhood health and adult circumstances. For instance, the educational attainment of the parents is partially the result of unobservable factors that also influence the health of the individual later in life. Third, this study analyses a sample of siblings, allowing us to deal with unobserved and time-constant characteristics at family level,

such as common genetic factors, traditions, norms and household practices, potentially yielding bias if not taken into account.

We estimate sibling fixed effect models on a sample of approximately 9,000 biological siblings from 17 countries of origin living in Sweden during the period 1981-1991. The link between early life conditions and later life outcomes is examined both with and without intermediary characteristics observed during the individual's childhood and adulthood, aiming for a better understanding regarding to what extent the effect of exposure to an early life insult can be mediated.

The results show that exposure to worse health conditions during the first year of life is associated with the greater likelihood of experiencing sickness absence in adulthood. An increase in the infant mortality rate by ten per thousand is associated with a four percentage point higher probability of experiencing sickness absence. Despite the importance of socioeconomic status in adulthood on sickness absence propensity, these factors do not mediate the influence of the health conditions experienced during the first year of life, suggesting that the association from early life conditions on sickness absence in adulthood operates as a direct mechanism. The link between early life conditions and sickness absence is only present in the case of children to parents with primary schooling and not so in the case of individuals with more educated parents. These findings suggest that families with more abundant resources have the ability to either protect their child from exposure to adverse health conditions during early life, or to cancel out the influence from an early-life insult.

1.8 Conclusions

This thesis analyses self-employment, sickness absence and early retirement pension among immigrants in Sweden. The empirical analysis investigate a period, 1981-2003, characterized by a transformation from high employment and expansion of the welfare state in the 1980s into a state with high unemployment and tightening social insurance systems during the economic crises in the beginning of the 1990s, and subsequently a tightening labour market and increased use of the social insurance system. In the 1990s, the employment and social insurance outcome was also characterized increasing regional differences, potentially reflecting a combination of low labour

mobility and differences in regional labour market characteristics. The employment situation developed differently for different socio-economic and ethnic groups. In particular, the relative labour market position of immigrants deteriorated during the economic crises. Immigrants have lower earnings than Swedish-born (Edin & Åslund 2001, Scott 1999), are more likely to be unemployed (Lundh et al, 2002), and are over-represented in both self-employment (Andersson/Joona & Wadensjö, 2008) and temporary agency work (Andersson/Joona & Wadensjö, 2008; Wallette, 2004). Notably, immigrants face difficulties not only entering, but also remaining in the labour market and the labour force, having higher levels of long-term sickness absence (Andrén, 2001, Bengtsson & Scott, 2006) and early retirement (Österberg & Gustavsson, 2006).

While there is a flourishing body of literature on the labour market situation facing immigrants in terms of earnings, employment and careers, research on self-employment and outcome in the social insurance system in the case of immigrants is scarce. Previous studies on the labour market attachment and social insurance outcome of immigrants in Sweden have mostly treated Sweden as a single region. This is problematic given the different regional economic and social structures, and implies that important features of the regional labour market and the immigrants' situation are excluded from these analyses. This thesis goes beyond most previous studies in adopting a regional approach, thereby allowing for an analysis of the importance of local and regional labour market conditions. Specifically, we explore the influence of local labour market conditions on self-employment dynamics, long-term sickness absence and early retirement pension, during a period of significant changes in the economy. Importantly, while studies exploring the effect from indicators at the macro-economic level capture the business cycle effect, an analysis at the municipality or county-level to a higher extent identifies the labour market conditions facing the individual. The regional approach also allows for taking into account differences in economic structure and institutional factors (e.g. social norms) in the regions.

The labour market and social insurance outcome is, however, presumably not only a function of economic and institutional characteristics at the regional level but also related to the individuals' health capital, being created during the whole life-cycle. Using data over a long time-span allows us to embrace a life-course perspective following individuals from childhood into adulthood and exploring the importance of early life conditions on sickness absence.

The results in this thesis are consistent with the notion and indications from previous research (e.g. Johansson et al, 2014; Jönsson et al, 2012) that the use of the social insurance system in Sweden has not only been related to health, but also influenced by contextual and non-medical factors at regional level, in terms of both local labour market conditions and institutional aspects (e.g. social norms). Paper 3 shows that sickness absence during the 1990s was related to institutional factors, such as differences in the application of the rules and/or different social norms, rather than the economic structure in the labour market region where the individual lives. Although the results points to the importance of institutional factors related to the sickness insurance system, there is potentially an interaction between local labour market conditions and social insurance schemes such that sickness absence is facilitated by the local social insurance offices in regions with higher unemployment rates.

At the individual level, early retirement pension is highly related to sickness absence, since a typical pathway into early retirement pension often comprises of periods of long-term sickness absence (see Palme & Svensson, 2004). Paper 2 shows that there is a link between the county-level unemployment and early retirement, and that this relationship operates differently in different states of the economy. While a higher county-level unemployment increased the likelihood of leaving the labour force into early retirement during the 1990s, such an effect was not found for the 1980s. The finding is in line with the result in Eliason & Storrie (2006), who show that the effect of job loss from plant closure on early exit is strengthened by poor macroeconomic conditions. Our results are consistent with the hypothesis that individuals become discouraged in the job search and withdraw from the labour force rather than continue their job-search in periods of higher competition for jobs. Another potential explanation is that there is an excluding process for individuals with lack in working capacity not being able to adapt to the new demands in periods of tightening labour market. Presumably, this mismatch between local labour demand and the individuals' human capital was strengthened by "skill biased technological change" during and after the economic crisis of the 1990s.

While Papers 2 and 3 illustrate the importance of the economic and institutional environment at regional level on the outcome in the social insurance system, Paper 1 shows that local labour market conditions are also an important factor in the dynamics of self-employment. The results show that immigrants enter self-employment when local labour demand increases and leave their business for non-employment in response to worsened local labour market conditions. While the empirical analysis finds no support for the

hypothesis that immigrants are pushed into self-employment, the findings shows that immigrants are being pushed out from self-employment in response to worsened local labour market conditions.

Besides showing that sickness absence is a function of economic and institutional characteristics at the regional level, this thesis also shows the importance of health conditions in childhood on long-term sickness absence. In Paper 4, we adopt a life-course approach and track individuals from childhood to adulthood, allowing us to take into account childhood factors occurring before 1968. By using early life conditions across countries we are able to identify the effects from temporary changes in the disease environment on later life health. The thesis shows that exposure to adverse health conditions during the first year of life increases the likelihood of being sickness absent later in life. Interestingly, despite the importance of socioeconomic status in adulthood on sickness absence propensity, these factors do not mediate the influence from the health conditions experienced during the first year of life, suggesting that the relationship between early life conditions and sickness absence operates as a direct mechanism. The link between early life conditions and sickness absence is only present for children to parents with primary schooling and not for individuals with more educated parents. These findings suggest that the mediating factors operates early in life and that families with more abundant resources have the ability to protect their child from exposure to adverse health conditions during early life, or to cancel out the influence from an early life insult. For instance, better educated parents presumable have more knowledge regarding health care practices, care and nutrition.

This thesis shows that the mechanisms of entering and exiting self-employment are different for immigrants and natives. While the underlying mechanism is rather similar for natives and immigrants in the self-employment entry process, the effect from worsened local labour market conditions, however, operates differently for natives and immigrants in the self-employment exit process. While immigrants are pushed out of self-employment into non-employment in worsened economic times, natives are more likely to leave their business for wage-employment under such circumstances, probably reflecting that natives in general have stronger labour market attachment and thus more labour market alternatives than immigrants.

The thesis examines gender differences in self-employment and social insurance outcome. A gender-analysis is interesting, given the Swedish context of the universalistic welfare state model. From an international perspective, Sweden is characterized by high labour force participation rates among

women. An important component of the rise of the welfare state was the expansion of the public sector during the 1960s and 1970s, increasing the demand of the female workforce. There is an obvious gender division of labour in the labour market where women dominate the public sector employment. The gender division was also obvious in the household, i.e. family responsibilities within families such that women undertake a much higher proportion of household work (Stanfors, 2003). As the public sector deficit increased drastically as a result of the recession in the 1990s, the social insurance system and public sector employment was tightened. Analysing foreign-born women is particularly interesting, given the drastic change in relative labour market position of immigrant women during the period under study in this thesis. As aforementioned, the employment gap in employment between native and foreign-born women has increased since the 1980s and being reinforced during the 1990s (Bevelander, 2005).

The thesis shows that there are gender-differences in self-employment, early retirement pension and sickness absence. Consistent with earlier studies (Lohmann, 2001), Paper 1 find that women having lower self-employment propensity. The finding of lower self-employment probability for women is presumably explained by the gender division in the labour market and in the household as well as reflecting that women are less likely to be involved in risk-taking activities (Verheul et al, 2012). Paper 2 and Paper 4 show that women have a higher early retirement pension and sickness absence probability, presumably related to the aforementioned gender division of labour, but also to factors in the working environment. In addition, we find that foreign-born women are more likely than native women to enter early retirement pension. In particular, women arriving from southern Europe in the 1960s and 1970s have the highest early retirement pension risk. This pattern is potentially explained by the high employment rate among many foreign born women, working long hours and full-time to a greater extent than native women. Among labour migrants, the high labour supply may be related to individuals expecting to stay in Sweden for only a short period and organized their lives to accomplish as great savings as possible. Given the strong family tradition in many of these countries, it is reasonable to assume that foreign born women undertake even greater household responsibility than Swedish women. In the short run this might encourage a high degree of overloading, by working full time yet still having the main responsibility for the family. Thus, immigrant women were caught between the expectations from their country of

origin where the rate of female employment is comparative low and the Swedish system with a high female rate (Eden, 1998).

The thesis also shows that the gender differences are not related to differences between men and women in response to local and regional economic conditions or health environment early in life. The findings show that men and women have a similar behavioral pattern in terms of how local and labour demand affects self-employment and early retirement pension propensity. In Paper 4, we show that there are differences in sickness absence risk, the effect from adverse early life conditions are similar for men and women. Altogether, the thesis shows that although there are gender-differences, the findings indicate that these differences does not relate to differences in behaviour between men and women, but rather being a result of that men and women have other characteristics.

Consistent with previous research, the findings show that there are differences on the basis of country of origin in both the early retirement pension and self-employment process. Paper 1 show, in line with previous research (see Yungert, 1995) that country of origin in itself is an important determinant of the self-employment propensity. Notably, non-European immigrants, generally having a weak labour market attachment, have higher self-employment probability. However, non-European immigrants do not use self-employment in response to worsened local labour demand, indicating that traditions of entrepreneurship among immigrants from specific countries also matter in the self-employment decision.

In Paper 2, the empirical analysis of early retirement pension shows that labour migrants arriving from southern Europe in the 1950s and 1960s and refugees from non-European countries (arriving during the same period) have the highest early retirement pension risk. Analysing the significance of regional labour demand across countries of origin-groups, we find the largest association of worsened labour market conditions among immigrants from Southern Europe and Eastern Europe, whereas the lowest association is found for immigrants from Western Europe. A particularly strong impact is found for labour migrants from southern Europe. The labour migrants from Southern Europe, initially having high employment rates, were to a high extent working in the manufacturing industries and potentially being highly affected by the structural change in the 1990s. In line with the hypothesis of skill biased technological change workers were excluded since there was increasing mismatch between labour demand and the individuals' human capital.

The thesis contributes and provides further knowledge to the existing body of literature in several respects. First, we advance previous research in the case of Sweden by analysing separately the effect from local labour demand on early retirement pension of natives and immigrants. The study adds to previous findings of the significance of changes in eligibility rules (Jönsson et al, 2012) and relative pension income (Palme & Svensson, 2004) on early retirement inflow, by showing that the early retirement pension probability is also affected by regional labour market conditions. While earlier studies (Hallberg (2011) identify a link between industry employment rates and occupational pension in Sweden, our findings shows that worsened labour market conditions are also a significant factor in the publicly financed early retirement pension. In addition, our finding that the effect of count-level unemployment rate on early operates differently in the different states of the economy provides further knowledge to the finding in Eliason & Storrie (2006), of long-term effects from plant closure being reinforced by poor macroeconomic conditions. In addition, we go beyond earlier studies on early retirement pension among immigrants in Sweden (Hammarstedt, 2000; Österberg/Gustavsson, 2006) by showing that early retirement pension probability of immigrants are affected by regional labour market conditions.

Second, while previous studies on self-employment among immigrants in Sweden pointing to self-employment as being a function of individual characteristics rather than the economic environment, this thesis shows that the self-employment propensity of immigrants is cyclically sensitive. Our findings suggest that immigrants enter self-employment when local labour demand is good and leave their business to non-employment in response to worsened local labour market conditions. While previous cross-sectional studies contribute to the understanding on why an individual is self-employed at a certain point in time, these studies do not capture whether the processes of entering and exiting self-employment are different. By using longitudinal data and analysing entries and exits of self-employment, we show that worsened local economic conditions, in contrast to natives, push immigrants out of self-employment and into non-employment. Thus, we show that the effect from local economic conditions is different for natives and immigrants in the self-employment process. This finding is consistent with earlier studies (Bratsberg et al, 2006; Chiswick et al, 1997; Dustmann et al, 2010), pointing to immigrants' earnings, unemployment and employment being relatively more affected by changing macroeconomic conditions. The increased movement to non-employment among self-employed immigrants in response to worsened

local labour demand is potentially the result of immigrants being self-employed in cyclically sensitive industries or self-employed immigrants facing barriers in the labour market and lacking opportunities to leave their business for wage-employment. The latter explanation is supported and indicated by previous research, which shows that self-employed from non-European countries have low incomes (see Andersson, 2006; Hammarstedt, 2006).

Third, while the existing literature shows that there is a relationship between early-life factors and later-life health (Galobardes et al, 2004; 2008) as well as socioeconomic status (Bengtsson & Mineau, 2009; Heckman, 2007; Kuh & Wadsworth, 1993), we go beyond earlier studies by showing that there is also a link between early-life conditions and sickness absence during adulthood. The thesis also contributes to the literature by showing that the positive effect from adverse health conditions during the first year of life on sickness absence operating as a direct mechanism. This finding is in line with Helgertz (2010), who shows that adverse early-life conditions have a negative effect on income attainment in adulthood. In addition, our finding that this link is present only among children to parents with primary schooling adds knowledge to the existing literature pointing to a strong association between socioeconomic status in childhood and adult health and mortality (Currie, 2009; Preston et al, 1998).

This thesis has several methodological advantages in comparison to previous research, which thereby allows us to deal with a number of methodological issues. The analysis of longitudinal data means that this thesis, in contrast to cross-sectional studies, explores the conditions determining transitions into the social insurance system and the entries and exits of self-employment. Using macro-economic indicators, such as the infant mortality rate and the unemployment rate, allows us to deal with the problems of early life and economic conditions not being exogenous to the individual. Exploring the regional variation in the unemployment rate, at both municipal and county-level, allows us to take advantage of wider variation in labour market conditions than we could do using an indicator at national level, since the unemployment rates at local level do not follow the national business cycle alone. We are thus able to capture more precisely the actual labour market conditions facing the individual. The regional approach also allows us to take social norms into account, potentially affecting both the individual application/use of sickness benefits and early retirement pension and the interpretation and approval decisions of the social insurance offices. In Paper four, by analysing siblings, we are also able to deal with shared and time

constant unobserved characteristics at family level such as traditions, norms and genetic factors, which could potentially yield biased results if these not taken into account.

Although this thesis deals with several methodological concerns, the results of the estimates of local economic conditions cannot be interpreted in terms of causal effects. Since the county or municipality of residence is probably not a result of a completely random process, we can not rule out the fact that our results are affected at least in part by selection, for instance individuals move away from areas with low labour market prospects to areas with better labour market conditions. In order to deal with this problem of selection we are required to make use of quasi-experimental situations, such as the aforementioned settlement policy in Sweden during the period 1985 to 1994 as a source of exogenous variation of labour market conditions (see Edin et al, 2004; Åslund & Rooth, 2007). This reform is not, however, well suited in order to explore the research questions in this thesis. First, the reform was restricted to refuges and thereby not allowing for the analysis of less recent immigrant cohorts, such as the labour migrants of the 1950s and 1960s. Second, the policy of settlement was not in force over a sufficiently long time to enable us to capture the development of a tightening labour market and the increasing number of individuals being long-term sickness absent, early retirement pension and the inflow into self-employment.

Another methodological issue relates to the regional approach adopted in the thesis whereby regions are operationalized at municipal and regional level by using unemployment rates and a classification for economic structure. Potentially, both the regions and the municipalities are too large in order to capture employment prospects and the creation of social norms, and thereby neighborhood offers a more appropriate unit of analysis. Edin et al (2013) find positive neighbourhood effects on employment in the case of immigrants, partly as a result of self-selection through internal migration. However, given the construction of the social insurance system with independent authorities at the regional level, analysing neighbourhood effects is not adequate if we are to take institutional factors into account.

Another methodological concern is that the results may be influenced by endogeneity bias in terms of the health of immigrants affecting their ability and human capital influencing their position in the labour market, which in turn increases their sickness absence and early retirement pension risk. Potentially, poor health and weak labour market attachment operates as mutual reinforcing mechanisms. Therefore, if immigrants systematically have worse health than

natives, than this will affect their labour market position, in turn influencing the sickness absence and early retirement pension probability.

The findings obtained in this work also set scope for future research. This thesis shows the need for a regional approach, which captures the different economic and social characteristics of the regions and enables more accurate identification of the actual labour market conditions facing the individual. Besides emphasizing the importance of a regional approach, this thesis shows the advantages of using a life-course approach that focuses on early-life conditions.

Future research will also require access to more detailed data. Analyzing the outcome in the social insurance system it would be appealing with direct access to information regarding health status (e.g. self-reported health) and on the medical diagnosis being the basis for the medical decision of both sickness absence benefits and disability pension. In addition, as pointed out in Paper 3, there is a demand for data sources which enables a regional analysis at municipal level on immigrants from different country of origin in order to analyse their potentially different behaviours at local and regional level. This is particular important, given the existence of differences in sickness absence by country at birth (Bengtsson & Scott, 2006; 2008)

Future studies on the relationship between early-life conditions and later-life health and socioeconomic outcomes would also benefit from access of regional data, which make it possible to capture more accurately the actual early-life conditions facing the individual. In studies analysing self-employment exits it is crucial not only having access to regional data but also being able to identify the industry sector.

The results in this thesis have several policy implications. One of the contributions of this thesis is that it shows that the use of the social insurance system in the 1990s, in terms of early retirement pension and sickness absence, was related to labour conditions and institutional factors at regional level. Although the social insurance system should mainly be related to health status, the findings shows that individuals withdraw from the labour force in periods of high unemployment related to poor labour market prospects. These results highlight the significance of formulating government policies that prevent individuals from being pushed into the social insurance system in times of economic hardship.

The findings of a link between adverse early-life conditions and sickness absence later in life points to the importance of implementing interventions (e.g. childhood health care) in order to reduce and counteract these effect.

Importantly, the link between early life conditions and sickness absence is only present for children to parents with primary schooling and not for individuals with more educated parents. These findings suggest that families with more abundant resources have the ability to cancel out the influence from an early life insult or to protect their child from exposure to adverse health conditions during early life. Since the effect from adverse early life conditions is not mediated by adulthood socio-economic factors, and thereby operates as a direct mechanism, indicating that the mediating factors are present early in life. These results highlight that investments should be addressed to families with low socioeconomic status and, as proposed by Heckman (2007), the timing of these interventions is important and should be implemented in early childhood.

Altogether, this thesis presents new findings and contributes to our understanding of immigrants' labour market situation and outcome in the social insurance system. These issues are relevant and important, given the demographic development taking place in many OECD-countries.

References

Abouharb, M.R., & Kimball A.L. (2007). A New Dataset on Infant Mortality Rates, 1816-2002. *Journal of Peace Research*, 44(6), 743-754.

Adermon, A., & Gustavsson, M. (2015). Job Polarization and Task-Biased Technological Change: Evidence from Sweden, 1975–2005. *Scandinavian Journal of Economics* (forthcoming).

Aguilar, R., & Gustafsson, B. (1994). Immigrants in Sweden's Labour Market during the 1980s. *Scandinavian Journal of Social Welfare*, *3*(3), 139-147.

Aldén, L. & Hammarstedt,M. (2014). *Utrikes födda på den svenska arbetsmarknaden– en översikt och en internationell jämförelse.* Linnaeus University Centre for Labour Market and Discrimination Studies, Working papers 2014:5.

Andersson, P. (2006). *Four Essays on Self-employment*. Doctoral thesis in Economics. Stockholm University.

Andersson/Joona, P., & Wadensjö, E. (2008). A note on Immigrant Representation in Temporary Agency Work and Self-employment in Sweden. *Labour*, 22(3), 495-507.

Andrén, D. (2001). Work, Sickness, Earnings and Early Exits from the Labour Market. An Empirical analysis using Swedish longitudinal data. Doctoral Thesis. Gothenburg University.

Antelius, J., & Björklund, A. (2000). How Reliable are Register Data for Studies of the Return on Schooling? An examination of Swedish data. *Scandinavian Journal of Educational Research* 44(4).

Arrow, K. J. (1963). Uncertainty and the welfare economics of medical care.*The American economic review*, 941-973.

Arrow, K.J. (1972). Models of job discrimination. *Racial discrimination in economic life*, 83.

Autor, D.H., Levy, F., & Murname, R.J. (2003), The Skill Content of recent Technological change: An empirical exploration. *Quaterly Journal of Economics*, 118(4), 1279-1333.

Bambra, C. (2006). Research Note: Decommodification and the worlds of welfare revisited. *Journal of European Social Policy*, *16*(1), 73-80.

Bambra, C. (2007). Going beyond The three worlds of welfare capitalism: regime theory and public health research. *Journal of epidemiology and community health*, *61*(12), 1098-1102.

Barth, E., Bratsberg, B., & Raaum, O. (2004). Identifying earnings assimilation of immigrants under changing macroeconomic conditions. *Scandinavian Journal of Economics*, 106(1), 1-22.

Becker, G. (1957). *The Economics of Discrimination*. University of Chicago Press.

Belot, M.V., & Hatton, T.J. (2012). Immigrant Selection in the OECD*. *The Scandinavian Journal of Economics*, *114*(4), 1105-1128.

Behtoui, A. (2008). Informal recruitment methods and disadvantages of immigrants in the Swedish labour market. *Journal of ethnic and migration studies*, *34*(3), 411-430.

Bengtsson T., Lundh C., & Scott K. (2005): From Boom to Bust: The Economic Integration of Immigrants in Postwar Sweden. In K. Zimmermann (Ed.), *European Migration: What Do We Know?* New York: Oxford University Press.

Bengtsson, T., & Johansson, M. (1994). Internal Migration", in T. Bengtsson (Ed.), *Population, Economy and Welfare in Sweden*. Springer-Verlag.

Bengtsson, T., & Mineau, G.P. (2009). Early-life effects on socio-economic performance and mortality in later life: A full life-course approach using contemporary and historical sources. *Social science & medicine*, *68*(9), 1561-1564.

Bengtsson, T., & Scott, K. (2006). Immigrant consumption of sickness benefits in Sweden, 1982–1991. *The Journal of Socioeconomics*, 35(3), 440-457.

Bengtsson, T., & Scott, K. (2008). Workplace, human capital and ethnic determinants of sickness absence in Sweden, 1993-2001. IZA Discussion Paper No 3672.

Bergh, A., & Henrekson, M. (2012). Varför går det bra för Sverige. Om sambanden mellan offentlig sektor, ekonomisk frihet och ekonomisk utveckling. FORES+ IVRIG, Stockholm.

Bevelander, P. (2000). Immigrant Employment integration and structural change in Sweden, 1970-1995. Doctoral Thesis. Lund University.

Bevelander, P. (2005). The Employment Status of Immigrant Women: The Case of Sweden. *International Migration Review*, 39(1), 173–202.

Bevelander, P., & Lundh, C. (2007). Employment integration of refugees: The influence of local factors on refugee job opportunities in Sweden.

Bevelander, P. (2009), in Segal, U.A, Elliott, D, Mayadas N.S (Ed.), *Immigration Worldwide: Policies, Practices, and Trends*. New York. Oxford University Press.

Blume, K., Ejrnæs, M., Nielsen, H. S., & Würtz, A. (2009). Labor market transitions of immigrants with emphasis on marginalization and self-employment. *Journal of Population Economics*, *22*(4), 881-908.

Borjas, G.J. (1985). Assimilation, Changes in Cohort Quality, and the Earnings of Immigrants. *Journal of Labor Economics*, 3(4), 463-489.

Borjas, G. J. (1989). Economic theory and international migration. *International migration review*, 457-485.

Borjas, G. J. (1987). Self-selection and the earnings of immigrants. *American Economic Review*, 77, 531-53.

Borjas, G.J. (1990). Friends or Strangers: The Impact of Immigration on the US Economy. New York: Basic Books.

Bratsberg, B., Barth, E., & Raaum, O. (2006). Local Unemployment and Relative Wages of Immigrants: Evidence form the Current Popuation Surveys. *The Review of Economics and Statistics,* 88(2), 243-263.

Brekke, I., & Schøne, P. (2013). Long Sickness Absence Differences Between Natives and Immigrant Workers: The Role of Differences in Self-reported Health. *Journal of International Migration and Integration*,1-19.

Bäckström, U. (1997). What Lessons Can Be Learned from Recent Financial Crises? The Swedish Experience. Proceedings of a Symposium.

Carlsson, M., & Rooth, D. O. (2007). Evidence of ethnic discrimination in the Swedish labor market using experimental data. *Labour Economics*, *14*(4), 716-729.

Case, A., Fertig, A., & Paxson, C. (2005). The lasting impact of childhood health and circumstance. *Journal of health economics*, *24*(2), 365-389.

Chiswick, B.R. (1978). The Effect of Americanization on the Earnings of Foreign-born men. *Journal of Political Economy*, 86(5), 879-922.

Chiswick, B.R., & Miller P.W. (1995). The endogeneity between language and earnings: International analyses. *Journal of Labor Economics*, 13(2), 246-288.

Chiswick, B.R., Cohen, Y., & Zack, T. (1997). Labour market status of immigrants: effects of the unemployment rate at arrival and duration of residence. *Industrial Labour Relations Review*, 52, 289-303.
Chiswick, B.R., & Miller P.W. (2002). Immigrant earnings: Language skills, linguistic concentrations and the business cycle. *Journal of Population Economics*, 15(1), 31-57.
Chiswick, B.R., & Miller P.W. (2003). The complementarity of language and other human capital: immigrant earnings in Canada. *Economics of Education Review*, 22(5), 469-480.
Chiswick, B.R., & Miller P.W. (2009). The international transferability of immigrants‟ human capital. *Economics of Education Review*, 28(2), 162-169.
Cunha, F., & Heckman, J. (2007). The Technology of Skill Formation. *American Economic Review*, 97(2), 31-47.

Currie, J. (2009). Healthy, Wealthy, and Wise: Socioeconomic Status, Poor Health in Childhood, and Human Capital Development. *Journal of Economic Literature*, 47(1), 87-122.

Dahl, SÅ., Hansen H.T., & Olsen, KM. (2010). Sickness Absence among Immigrants in Norway, 1992-2003. *Acta Sociologica*, 53(1), 35-52.

Deveraux, P.J. (2004). Cyclical Quality Adjustment in the Labor Market. *Southern Economic Journal*, 70(3), 600-615.

Dustmann, C., & Fabbri F. (2003). Language proficiency and labour market performance of immigrants in the UK. *The Economic Journal*, 113(489), 695-717.

Dustmann, C., Glitz, A., & Vogel, T. (2010). Employment, wages, and the economic cycle: Differences between immigrants and natives. *European Economic Review*, *54*(1), 1-17.

Dotevall, A., Rosengren, A., Lappas, G., & Wilhelmsen, L. (2000). Does immigration contribute to decreasing CHD incidence? Coronary risk factors among immigrants in Göteborg, Sweden. *Journal of internal medicine,* 247(3), 331-339.

Economic Policy Committee and European Commission. (2009). The 2009 ageing report. Economic and budgetary restrictions for the EU-27 member states (2008-2060). European Economy, number 2.

Edebalk, P.G. (2000). Emergence of a welfare state–Social insurance in Sweden in the 1910s. *Journal of Social Policy*, *29*(04), 537-551.

Edin, P.A., & Fredriksson, P. (2000). *LINDA Longitudinal Individual Data for Sweden*. Working paper 19, Department of Economics, Uppsala University.

Edin, P.A., & O. Åslund. (2001). *Invandrare på 1990-talets arbetsmarknad*. Stockholm: IFAU.

Edin, P.A., Fredriksson, P., & Åslund, O. (2003). Ethnic enclaves and the economic success of immigrants-evidence from a natural experiment. *The Quarterly Journal of Economics*, 118(1), 329-357.

Edin, P.A., Fredriksson, P., & Åslund, O. (2004). Settlement policies and the economic success of immigrants. *Journal of Population Economics*, 17, 133-155.

Ekberg, J. (1983). *Inkomsteffekter av invandring*. Doktorsavhandling, Nationalekonomiska institutionen, Lunds universitet.

Ekberg, J. (1996) "Labour Market Career among Young Finnish Immigrants in Sweden," International Migration Quarterly Review 34: 371-384.

Ekberg, J. (1999). Immigration and the public sector: Income effects for the native population in Sweden. *Journal of Population Economics*, *12*(3), 411-430.

Eliason, M., & Storrie, D. (2006). Lasting or latent scars? Swedish evidence on the long-term effects of job displacement. *Journal of Labor Economics*, *24*(4), 831-856.

Esping-Andersen, G. (1990). *The three worlds of welfare capitalism*. Princeton University Press.
Evans, D. S., & Leighton, L. S. (1989). Some empirical aspects of entrepreneurship. *The American Economic Review*, 519-535.

Fritzell, J., & Lundberg, O. (2007). Health Inequalities and Welfare Resources: Continuity and Change in Sweden. Policy Press.

Galobardes, B., Lynch, J. W., & Smith, G. D. (2004). Childhood socioeconomic circumstances and cause-specific mortality in adulthood: systematic review and interpretation. Epidemiologic reviews, 26(1), 7-21.

Galobardes, B., Lynch, J. W., & Smith, G. D. (2008). Is the association between childhood socioeconomic circumstances and cause-specific mortality established? Update of a systematic review. *Journal of epidemiology and community health*, *62*(5), 387-390.

Goos, M., Manning, A., & Salomons, A. (2014). Explaining job polarization: Routine-biased technological change and offshoring. *The American Economic Review*, *104*(8), 2509-2526.

Grand, C. L., & Szulkin, R. (2002). Permanent disadvantage or gradual integration: explaining the immigrant–native earnings gap in Sweden. *Labour*,*16*(1), 37-64.

Grossman, M. (1972). On the concept of health capital and the demand for health. *The Journal of Political Economy*, 223-255.

Gustafsson, K., Aronsson, G., Marklund, S., Wikman, A., & Floderus, B. (2014). Peripheral labour market position and risk of disability pension: a prospective population-based study. *BMJ open*, *4*(8),

Hallberg, D. (2011). Economic fluctuations and retirement of older employees.*Labour*, *25*(3), 287-307.

Hammarstedt, M. (2000). The Receipt of Transfer Payments by Immigrants in Sweden. *International Migration Quarterly Review*, 2, 239-268.

Hammarstedt, M. (2006). The predicted earnings differential and immigrant self-employment in Sweden. *Applied Economics*, *38*(6), 619-630.

Hammarstedt, M., & Shukur, G. (2009). Testing the home-country self-employment hypothesis on immigrants in Sweden. Applied Economics Letters,16(7), 745-748.
Hansen HT, Holmås TH, Islam MK, Naz G (2014), "Sickness Absence Among Immigrants in Norway: Does Occupational Disparity Matter?" European Sociological Review: 30 (1): 1-12

Hardoy, I., & Schøne, P. (2012). Does the impact of plant closure on labour market attachment differ between immigrants and native workers across the business cycle? *Empirical Economics*, 1-24.

Hayek, F. A. (1945). The use of knowledge in society.

Heckman, J.J. (2007). The Economics, Technology, and Neuroscience of Human capability formation. *Proceedings of the National Academy of Sciences*, 104(33), 13250-13255.

Helgertz, J. (2010). Immigrant careers: Why country of origin matters. Lund University.

International Monetary Fund (2012), World Economic Database.

Johansson, P., & Palme, M. (2005). Moral hazard and sickness insurance.*Journal of Public Economics*, 89(9), 1879-1890.

Johansson, P., Laun, L., & Laun, T. (2014a). Screening stringency in the disability insurance program. The BE Journal of Economic Analysis & Policy, 14(3), 873-891.
Johansson, P., Laun, L., & Palme, M. (2014b). Pathways to retirement and the role of financial incentives in Sweden. In Wise, D.A. (Ed.), *Social Security Programs and Retirement Around the World: Disability Insurance Programs and Retirement*. Chicago. University Press: Chicago.

Jonung, C., & Persson, I. (2004). Combining Market Work and Family", in Bengtsson T, (Ed.), *Population, Economy and Welfare in Sweden.* Springer-Verlag.

Jönsson, L., Palme, M., & Svensson, I. (2012). Disability insurance, population health and employment in Sweden. In Wise, D.A. (Ed.), *Social Security and Retirement Around the World: Historical Trends in Mortality and Health, Employment, and Disability Insurance Participation and Reforms,* pp.79-126. University of Chicago Press.
Karlsson, N. E., Carstensen, J. M., Gjesdal, S., & Alexanderson, K. A. (2008). Risk factors for disability pension in a population-based cohort of men and women on long-term sick leave in Sweden. *The European journal of public health*, 18(3), 224-231.
Karlström, A., Palme, M., & Svensson, I. (2008). The employment effect of stricter rules for eligibility for DI: Evidence from a natural experiment in Sweden. *Journal of Public Economics*, *92*(10), 2071-2082.
Katz, Lawrence F., and David H. Autor. (1999). Changes in the Wage Structure and Earnings Inequality. In O. Ashenfelter & Card, D.E. (Ed.), *Handbook of Labor Economics. Vol. 3A*, pp. 1463–1555. Amsterdam: Elsevier B.V.

Klinthäll, M. (2003). *Return Migration from Sweden, 1968-1996.* Stockholm: Almqvist & Wiksell International.

Korpi, W., & Palme, J. (1998). The paradox of redistribution and strategies of equality: Welfare state institutions, inequality, and poverty in the Western countries. *American sociological review*, 661-687.

Kristensen, P., Bjerkedal, T., & Irgens, L. M. (2004). Birthweight and work participation in adulthood. *International journal of epidemiology*, *33*(4), 849-856.

Kuh, D. J., & Wadsworth, M. E. (1993). Physical health status at 36 years in a British national birth cohort. *Social science & medicine*, *37*(7), 905-916.

Lindbeck, A., & Snower, D. (1988). The insider-outsider theory of employment and unemployment. Cambridge (Mass.).

Lindbeck, A., Nyberg, S., & Weibull, J.W. (1999). Social Norms and Economic Incentives in the Welfare State. *Journal of Economics*, 114, 1-35.

Lindbeck, A., Nyberg, S., & Weibull, J.W. (2003). Social Norms and Welfare State Dynamics. *Journal of the European Economic Association,* 1(2-3), 533-542.

Lindström, M., Sundquist, J., & Östergren, P.O. (2001). Ethnic differences in self reported health in Malmö in southern Sweden. *Journal of Epidemiology and Community Health*, *55*(2), 97-103.

Lindström, M., & Sundquist, J. (2002). Ethnic differences in daily smoking in Malmö, Sweden: Varying influence of psychosocial & economic factors". *European Journal in Public Health,*12(4), 287-94.

Lippman, S. A., & McCall, J. (1976). The economics of job search: A survey.*Economic inquiry*, *14*(2), 155-189.

Lohmann, H. (2001). *Self-employed or employee, full-time or part-time?: gender differences in the determinants and conditions for self-employment in Europe and the US* (No. 38). Mannheim: MZES.

Lundberg, K. (2007). Sjukförsäkringens Geografi. In E. Palmer (Ed.), *Sjukförsäkring. Kulturer och Attityder*. Social Insurance Board.

Lundborg, P., & Skedinger, P. (2014), *Minimum Wages and the Integration of Refugee Immigrants.* IFN Working Paper No. 1017.

Lundgren, N-G. (1996). De nordiska regionerna och 1990-talskrisen. Perspektiv på kort och lång sikt. Luleå.

Lundh, C. (2004). Institutional Change in the Swedish Labour Market 1830-1990", in Lundh et al (2004) *Wage Formation, Labour Market Institutions and Economic Transformation in Sweden 1860-2000.* Almqvist & Wiksell International.

Lundh, C., & Ohlsson,R. (1994). Immigration and Economic Change. In T. Bengtsson (Ed.), *Population, Economy and Welfare in Sweden*. Springer-Verlag.

Lundh, C., Bennich-Björkman, L., Ohlsson, R., Pedersen. P., & Rooth, D-O. (2002). *Arbete? Var god dröj! Invandrare i välfärdssamhället.* Stockholm: SNS Förlag.

Lundh, C., & Bevelander, P. (2004). Regionala variationer i sysselsättning för invandrade män år 2000, [Regional variation in Employment for immigrant men the year 2000] In: Ekberg, J. (Ed.), Egenförsörjning eller bidragsförsörjning, SOU 2004:21 Stockholm.

Machin, S., & Van Reenen, J. (1998). Technology and changes in skill structure: evidence from seven OECD countries. *Quarterly journal of economics*, 1215-1244.

McDonald, J.T., & Worswick, C. (1997). Unemployment incidence of immigrant men in Canada. *Canadian Public Policy/Analyse de Politiques*, 353-373.

Marmot, M.G., & Syme, S.L. (1976). Acculturation and Coronary Heart Disease in Japanese-Americans. *American Journal of Epidemiology*, 104(3), 225-47.

Mincer, J. (1962). On-the-job training: Costs, returns, and some implications.*The Journal of Political Economy*, 50-79.

Mitchell, B.R., (2007a). *International Historical Statistics Europe 1750-2005.* New York: Palgrave MacMillan.

Mitchell, B.R., (2007b). International Historical Statistics The Americas 1750-2005. New York: Palgrave MacMillan.

Moore, C. S., & Mueller, R. E. (2002). The transition from paid to self-employment in Canada: the importance of push factors. *Applied Economics*,*34*(6), 791-801.

Mroz, T.A., & Savage, T.H. (2006). The long-term effects of youth unemployment. *Journal of Human Resources*, 41(2), 259-293.

Månsson, N. O., Råstam, L., Eriksson, K. F., & Israelsson, B. (1998). Socioeconomic inequalities and disability pension in middle-aged men. *International journal of epidemiology*, *27*(6), 1019-1025.

National Insurance Board. (2003). *Regionala Skillnader i Sjukskrivningar - hur ser de ut och vad beror de på?* Riksförsäkringsverket analyserar 2003:12. Stockholm

National Insurance Board. (2004). Regionala skillnader i utgifter för sjukpenning och förtidspension - En studie av utbetalade belopp i rikets kommuner 1993 – 2000. Riksförsäkringsverket analyserar 2004:12. Stockholm.

North, D. C. (1990). Institutions, institutional change and economic performance. Cambridge University Press.

Nutek (2002) [The Swedish Agency for Economic and Regional Growth]. Regionernas tillstånd 2002; en rapport om tillväxtens förutsättningar i svenska regioner [The conditions in the Regions 2002: a report on the prerequisites for Growth in Swedish Regions]. Stockholm.
OECD, (2012). OECD Statistics. OECD 2012.

OECDa, (2013), Factbook 2013: Economic, Environmental and Social Statistics. OECD 2013.

OECD, (2014), International Migration Outlook. OECD 2014.

Orrenius, P.M., & Zavodny, M. (2009). *Tied to the business cycle: how immigrants fare in good and bad economic times.* Washington, DC: Migration Policy Institute.

Orrenius, P.M., & Zavodny, M. (2010). Mexican Immigrant Employment Outcomes over the business cycle. *American Economic Review: Papers & Proceedings*, 100, 316-320.

Oswald, A.J. (1997). Happiness and economic performance. *The Economic Journal*, 107(445), 1815-1831.

Palme, J., Bergmark, A., Backman, O., Estrada, F., Fritzell, J., Lundberg, O., ... & Szebehely, M. (2002). Welfare trends in Sweden: balancing the books for the 1990s. *Journal of European Social Policy*, *12*(4), 329-346.

Palme, M., & Svensson, I. (2004). Income Security Programs and Retirement in Sweden. In Gruber, J & Wise, D (Ed.), *Social Security and Retirement Around the World: Microestimates*, pp.579-641. University of Chicago Press.

Pedersen, P.J., Pytlikova, M., & Smith, N. (2008). Selection and network effects—Migration flows into OECD countries 1990–2000. *European Economic Review*, *52*(7), 1160-1186.

Phelps, E. S. (1972). The statistical theory of racism and sexism. *The American Economic Review*, 659-661.

Pott-Butler, H.A. (1993). *Facts and Fairy Tales about Female Labor, Family and Fertility*. Amsterdam University Press, Amsterdam.

Preston, S.H., Hill, M.E., & Drevenstedt, G.L. (1998). Childhood conditions that predict survival to advanced ages among African–Americans. *Social science & medicine*, *47*(9), 1231-1246.

Reimers, C.W. (1983). Labor market discrimination against Hispanic and black men. *The Review of Economics and Statistics*, 570-579.

Riach, P. A., & Rich, J. (2002). Field Experiments of Discrimination in the Market Place*. *The Economic Journal*, *112*(483), F480-F518.

Røed, K., & Nordberg, M. (2004). Have the relative employment prospects for the low-skilled deteriorated after all?. *Journal of Population Economics*, *17*(1), 67-82.

Rooth, D.O. (1999). Refugee Immigrants in Sweden-educational investments and labour market integration. Doctoral dissertation. Lund University.
Rosholm, M., Scott, K., & Husted L. (2006). The Times They Are A-Changin‟: Declining Immigrant Employment Opportunities in Scandinavia. *International Migration Review*, 40(2), 318-347.

Roy, A.D. (1951). Some thoughts on the distribution of earnings. *Oxford Economic Papers*, *3*(2), 135-146.

Salmond, C.E., Prior, I.A.M., & Wessen, A.F. (1989). Blood pressure patterns and migration: A 14-year cohort study of adult Tokelauans". *American Journal of Epidemiology*,130, 37-52.

Scott, K. (1999). The Immigrant Experience: Changing Employment and Income Patterns in Sweden, 1970-1993. Lund. Lund University Press.

Schön, L. (2007). En modern svensk ekonomisk historia: tillväxt och omvandling under två sekel. Stockholm: SNS förlag.

Shapiro, C., & Stiglitz, J.E. (1984). Equilibrium unemployment as a worker discipline device. *The American Economic Review*, 433-444.

Skedinger, P. (2010). Effekterna av Anställningsskydd – vad säger forskningen? SNS Förlag.

Spence, M. (1973). Job market signaling. *The quarterly journal of Economics*, 355-374.

Stanfors, M. (2003). Education, labor force participation and changing fertility patterns: a study of women and socioeconomic change in twentieth century Sweden. Doctoral Thesis. Lund University. Almqvist & Wiksell International.

Stattin, M. (1998). Yrke, yrkesförändring och utslagning på arbetsmarknaden-en studie av relationen mellan förtidspensionering och arbetsmarknadsförändring. Umeå. Umeå universitet akademisk avhandling vid sociologiska institutionen, Umeå.

Storesletten, K. (2000). Sustaining fiscal policy through immigration. *Journal of Political Economy*, 108(2), 300-323.

Storesletten, K. (2003). Fiscal implications of immigration: A net present value calculation. The *Scandinavian Journal of Economics*, 105(3), 487-506.

Sundqvist, J., & Johansson, S-E. (1997). Long term illness among indigenous and foreign born people in Sweden. *Social Science & Medicine*, 44, 189-198.

Sundquist, J., & Johansson, S-E. (1998). The influence of socioeconomic status, ethnicity and lifestyle on body mass index in a longitudinal study. *International Journal of Epidemiology*, 27, 57-63.

Vahtera, J., Pentti, J., & Kivimäki, M. (2004). Sickness absence as a predictor of mortality among male and female employees. *Journal of Epidemiology and Community Health*, 58(4), 321-326.

Verheul, I., Thurik, R., Grilo, I., & van der Zwan, P. (2012). Explaining preferences and actual involvement in self-employment: Gender and the entrepreneurial personality. *Journal of Economic Psychology*, *33*(2), 325-341.

Wadensjö, E. (1996). Early Exit from the Swedish Labour Market. In E. Wadensjö (Ed.), *The Nordic Labour Markets in the 1990s*. Amsterdam.North-Holland.

Wallette, M. (2004). *Temporary Jobs in Sweden: Incidence, Exit, and On-the-Job Training.* Lund Economic Studies, no. 120. Doctoral Thesis. Department of Economics, Lund University.

World Bank (1993), International Economics Dept. (1997): World Tables of Economic and Social Indicators 1950-1992 [Computer File]. Washington, D.C.: World Bank, International Economics Dept. [producer], 1993. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 1997.

Yuengert, A. (1995). Testing hypothesis of Immigrant Self-employment. *Journal of Human Resources*, 30, 194-204.

Zimmermann, K. (2005). *European Migration. What do we know?* Oxford: Oxford University Press.

Åslund, O., & Rooth, D.O. (2005). Shifts in attitudes and labor market discrimination: Swedish experiences after 9-11. *Journal of Population Economics*, *18*(4), 603-629.

Åslund, O., & Rooth, D-O. (2007). Do when and where matter? Initial labour market conditions and immigrant earnings. *The Economic Journal*, 117 (518), 422–448.

Österberg, T., & Gustafsson, B. (2006). Disability Pensions among Immigrants in Sweden", *Social Science & Medicine*, 63, 805-816.

Österholm, P. (2010). Unemployment and labour-force participation in Sweden. *Economics Letters*, 106(3), 205-208.

Paper I

Is self-employment a response to local labour market conditions? The case of immigrants in Sweden 1985-2001

Mats R. Persson

Centre for Economic Demography, Lund University
Department of Economic History, Lund University

Abstract

This study examines whether immigrants are pushed into and out of self-employment in periods of worsened local economic conditions. We use longitudinal data from Swedish Longitudinal Database (SLI) for the period 1985-2001 and analyse both the entry and exit processes of self-employment. The results show that the self-employment decision is influenced by local labour market conditions. Interestingly, the mechanism seems to be different in the process of entering and leaving self-employment. The results of the estimates in the entry -process indicate that self-employment is not used as a last resort. Turning to the exit process from self-employment, we find that immigrants are pushed out of self-employment in response to worsened local economic conditions.

Key words: self-employment, immigrants, local economic conditions,

JEL Classification: J23, J61, C23, M13

1. Introduction

As in many other European countries, the employment rates among immigrants in Sweden today are lower than those among natives (Zimmermann et al, 2005). At the same time, immigrants in Sweden are generally overrepresented in the self-employment sector (Andersson-Joona & Wadensjö, 2008).[1] The increased inflow into self-employment of immigrants in Sweden during the 1990s and onwards gave rise to a view where self-employment among immigrants is a last resort, a view theoretically reinforced in the Swedish context, because the institutional framework can create an insider/outsider effect.[2] This feature may explain why immigrants in Sweden do not end up in lower paid jobs than natives, but are instead overrepresented as being non-employed (Bengtsson et al, 2005). Because underbidding is not allowed in the labour market, there are incentives for immigrants to become self-employed since self-employment with a low hourly income may be an alternative escaping unemployment. In addition, given the weak labour market attachment for immigrants, self-employment potentially works as a stepping- stone into wage-employment.

While there is a flourishing literature on self-employment, studies on self-employment among immigrants are scarce (Dustmann & Fabri, 2005). Moreover, previous studies on self-employment among immigrants mainly analyse a cross-sectional context and thereby neglect the conditions for determining whether an individual enter and exit self-employment. Consequently, we lack knowledge of the mechanisms behind the self-employment dynamics among immigrants. Knowledge in this area has important policy implications, since it gives guidance on whether self-employment among immigrants should be promoted or discouraged.

The aim of this paper is to examine if immigrants use self-employment as a response to worsened local economic conditions and if immigrants are pushed out of self-employment under such conditions. The underlying

[1] In addition, the number of foreign born self-employed increased with 65 percent from around 34 000 in 1990 to 56 000 in the year 2000. The increase for natives was 47 percent, from 182 000 self-employed in 1990 to 266 000 in 2000 (Statistics Sweden).

[2] Minimum wages stipulated by collective agreements may be too high achieving equilibrium between supply and demand in the case of individuals with a low educational level and low skills.

question is if the self-employment dynamics is different between immigrants and natives. The *a priori* expectation is that immigrants' self-employment decision is more affected by changes in local labour demand compared to natives. First, immigrants are more likely, in view of their weaker labour market attachment, to resort self-employment in order to avoid being jobless during periods of higher unemployment, a shortage of available jobs and harder local labour market conditions. Second, self-employed immigrants are, given this weaker labour market attachment, more cyclically sensitive and therefore more likely than natives in times of economic hardship to leave their business for non-employment rather than wage-employment.

This study contributes to the literature on self-employment among immigrants in several respects. First, in contrast to previous studies on the case of Sweden which mostly analysed the subject in terms of a cross-sectional framework, we use longitudinal data allowing us to explore the conditions determining whether an individual enter and exit self-employment. Second, by analysing both the entry and exit processes of self-employment, allows us to investigate whether the determinants for entering and leaving self-employment are different. Third, in contrast to previous (longitudinal) studies which used labour market indicators at the national level, this study adopts a regional approach capturing the response to changes in labour demand at the local level using municipal unemployment rates. Local labour demand is preferable to national indicators since it reflects more accurately the local labour market conditions faced by the individual and varies over time and across municipalities. This regional approach also allows us to take into account the different economic structures in each region, in terms of the composition of industries and educational level.

We estimate the transitions to and from self-employment within a competing risk framework using rich longitudinal register data from the Swedish Longitudinal Immigrant Database (SLI) for the period 1985 to 2001. The panel data structure makes it possible to take into account an individual's previous labor market experience and thus deal with state dependence and the initial conditions problem.

In line with Carrasco (1999) and Blume et al (2009), the analysis of transitions to self-employment (entries) is performed separately for non-employed and wage-employed individuals. The approach is motivated since the mechanism behind the entries into self-employment might be different for individuals coming from non-employment compared to wage-employment. In addition, analysing the exit-process from self-employment increases our

understanding of whether self-employment serve as a stepping-stone into paid employment or whether individuals are pushed out of self-employment into non-employment. Consequently, the full transition pattern between non-employment, wage-employment and self-employment is investigated. The analysis controls for individual and socioeconomic factors, as well as the economic structure of the local labour market.

Using longitudinal data for a 17-year period allows us to follow the labour market trajectories of individuals and identify their labour market status over time. The period of study, 1985 to 2001, covers a period with varying macroeconomic conditions in Sweden. In the later part of the 1980s up to 1990, the Swedish economy experienced a business cycle peak with low unemployment rates. In 1990 the economy turned into a deep economic downturn, resulting in a drastic increase in unemployment. This recession was followed by a catch-up period characterized by jobless growth, i.e. high growth rates but weak increases in the employment rate.

The remainder of this paper is organized as follows. Section 3 presents theory and previous research. Section 4 addresses questions related to the methodology and a description of data and variables are then presented in Section 5. Summary statistics are provided in part 6. The results are presented in Section 7 and Section 8 forms the conclusion to this paper.

2. The Immigrant Population in Sweden

Sweden and many other OECD countries have experienced an increased share of foreign-born individuals during recent decades. In 2012, approximately 14 per cent of the total population in Sweden were born in another country. The composition of foreign-born individuals has changed over time. During the period 1945 to 1970 immigration to Sweden was dominated by refugees and labour migrants from Europe, mainly the Nordic countries. Due to more strict regulations governing labour migrants, immigration was then dominated by refugee migration from non-European countries during the 1970s and onwards. In 1980, around 55 per cent of the foreign-born population in Sweden were born in other Nordic countries and 10 per cent were born outside Europe. In 2000, 30 per cent were born in other Nordic countries and 40 per cent outside Europe.

In Sweden, the immigration population is heterogeneous and subject to large variations in self-employment rates based on country of origin. In 2005,

the self-employment rate among immigrants from the Middle East and Turkey was approximately 25 per cent, compared to 9 per cent among natives. The composition of self-employed immigrants changed in the 1980s. While immigrants from the Nordic countries and Western Europe formed the predominant group among the foreign-born self-employed in 1980, almost 25 per cent of the foreign-born self-employed in 1990 were born in non-European countries. The highest proportion of self-employed is found for immigrants from outside Europe, and from Turkey and Iran in particular, while the proportion of self-employed immigrants from the Nordic countries, Finland in particular, was lower (Scott, 1999; Andersson, 2006).

3. Theory and Previous Research

Several studies analyse the relative labour market performance (earnings) of self-employed immigrants, in relation to either native self-employed or wage-employed immigrants. While most studies show that self-employed immigrants have lower incomes than employees with similiar characteristics (Hamilton, 2000; Frenette, 2004), Lofstrom (2002) finds that self-employed immigrants in the U.S. have higher earnings than wage-employed immigrants. In the case of Sweden, self-employed individuals from non-European countries have lower incomes than their native peers and self-employed immigrants from European countries, and have lower income than immigrants in paid employment (Andersson, 2006; Hammarstedt, 2006).

The literature on self-employment can be categorized into two groups. First, the *"entrepreneurial pull-school"* emphasizes that entrepreneurs engage in risk-taking activities on the basis of particular abilities (Lucas, 1978; Kihlstrom and Laffont, 1979; Fairlie and Meyer, 1996; Lofstrom, 2002). Within this framework, the least risk-adverse individuals become entrepreneurs, since their expected relative earnings are higher when they are self-employed. This pull hypothesis emphasizes a positive selection with innovative individuals choosing self-employment as a means of enhancing their labor market career. There should therefore be no relation between the unemployment rate and the self-employment decision. Within this framework, higher self-employment rates among immigrants are explained in terms of higher levels of unobservable motivation and/or immigrants displaying more risk-taking behaviour (Stark, 1991).

The second strand of literature, the *disadvantage theory,* emphasizes that self-employment is a product of disadvantages such as unemployment, poor language skills and discrimination. Within this framework, the self-employment decision correlates positively with deteriorating macroeconomic conditions and individuals choosing self-employment in order to avoid unemployment. This hypothesis receives support from Evans and Leighton (1989) arguing that individuals switching from wage-employment to self-employment tend to receive relatively low wages, change jobs frequently and experiencing relatively long spells of unemployment as wage workers. Using data on plant closure in Sweden 1987/1988, von Greiff (2009) shows that displacement increases the probability of entering self-employment and the effect is strongest among individuals with a potentially less favourable position on the labour market. Another indication in line with the disadvantage theory is that unemployed are more likely to enter self-employment than wage-employment (Carrasco, 1999; Moore & Mueller, 2002; Andersson-Joona & Wadensjö, 2007). Andersson-Joona (2010) follows self-employed in Sweden during a three-year period after start-up, 1999-2002, and finds that non-western immigrants face a higher risk of exiting to unemployment and lower risk of exiting to wage-employment. In the case of Denmark, Blume et al (2008) investigate transition patterns across labour market states and conclude that a high proportion of immigrants from non-European countries use self-employment as a last resort. In a cross-sectional study on Sweden Andersson-Joona & Wadensjö (2008) show that immigrants are over-represented in both self-employment and temporary agency work, which is interpreted in terms of disadvantage at the labour market.

Self-employment entries and exit presumably relates to macro-economic conditions pushing or pulling individuals into or out of self-employment. *A priori*, a high (local) unemployment rate has both a positive and a negative effect on the self-employment decision. The positive effect relates to the lower opportunity costs of entering self-employment, as a result of poorer opportunities in wage-employment, implying that self-employment is used as a strategy to avoid future non-employment. The negative effect is the fact that individuals can expect decreasing returns from self-employment during times of economic hardship and/or the fact that they do not want to risk starting a business when faced with fewer options in the labour market if they fail.

In the self-employment exit process, a high (local) unemployment rate may push individuals out of their business due to a decreasing demand for their products/services. On the other hand, a high unemployment rate reduces the probability of finding alternative employment and may thus forces individuals to stay in self-employment. The net effect in both the entry and exit processes is determined by which of these has the dominant effects.

Previous research on the influence of macroeconomic conditions on the self-employment decision is ambiguous. While Evans & Leighton (1989) and Alba-Ramirez (1994) find a positive relationship between the national unemployment rate and self-employment entries, Lin et al (2000) find when using provincial unemployment rates for Canada no evidence that the "push theory" dominates the "pull theory". Carrasco (1999) shows that the probability of leaving self-employment increases in response to a higher national unemployment rate in Spain. In addition, this study emphasize that the effect of macroeconomic conditions operates different depending on the individuals' educational level and labour market situation, and while self-employment becomes a less attractive alternative for the unemployed when labour market conditions are worsened, the opposite is found in the case of wage-employed individuals. Constant & Zimmermann (2004) investigate the business cycle-effect on self-employment dynamics for immigrants and natives in Germany, using GNP growth rates as a proxy for macro-economic conditions. Their results suggest that the self-employment probability of immigrants relates to non-cyclical factors, albeit that the process moving from self-employment into wage-employment is reinforced by economic growth. Using cross-sectional data for Sweden, Ohlsson et al (2012) finds that self-employment propensity of immigrants is function of individual characteristics, rather than the economic environment. However, while cross-sectional studies contribute to our understanding on why an individual is self-employed at a certain point in time, the cross-sectional framework does not allow for the possibility that the entry - and exit processes may be different. For example, a high unemployment rate may push individuals into self-employment, but it may also drive them out of business.

Previous research also emphasizes the significance of regional characteristics to the self-employment process (e.g. Gianetti & Simonov, 2004). Entrepreneurial activities are not exogenous given, but are affected by factors in the local environment such as entrepreneurial culture, local attitudes to self-employment, and the presence of networks of self-employed individuals in the region. In addition, heterogeneous economic structures

across the regions affect relative earnings and thus the propensity to enter and exit self-employment. Differences in economic structure between the regions might have several components. The composition of industries is presumably important in this respect. If a region is dominated by industrial sectors with low entry barriers, such as the service sector, it is likely to experience a higher number of start-up businesses. The opposite is expected if a region is characterized by large-scale capital intensive industries, such as manufacturing industrial areas, due to high entry barriers (the capital-intensive sector) and lower knowledge intensity. Another area of difference is educational level. For example, there might be knowledge spill-over across individuals (Glaeser et al, 1992). Urban areas are assumed to have higher self-employment entry rates, thanks to positive knowledge externalities from universities, a large potential market and a high density of entrepreneurs.

4. Method

This study focuses on the dynamics of self-employment by exploring the full transition pattern between non-employment, wage-employment and self-employment. The analyses of entries into self-employment are performed separately for non-employed and wage-employed individuals, because the mechanism behind the entries into self-employment can be different for individuals switching from non-employment and wage-employment, respectively.[3] Analysing the determinants of self-employment exits improves our understanding of whether individuals are pushed into or pulled out of self-employment.

Individual i in state k in time period t is assumed to choose between three unordered outcomes; wage-employment, self-employment and non-employment, in time $t+1$. Within this competing risk framework the

[3] The term non-employment includes both unemployed and individuals outside the labour market. The reason for the inclusion of inactive individuals is the trend for immigrants in Sweden to experience greater dependence on the social welfare system and therefore view self-employment as an alternative to being unemployed and receiving ongoing support from social welfare. Non-employment may have a negative effect on the individuals' prospects in the labour market, in terms of both the accumulation of human capital and/or a potential employer interpreting the status of the non-employment as a proxy for low ability. Similar approaches are found in Carrasco (1999) and Blume et al (2008).

individual will be observed in self-employment at time t+1 if the utility derived from self-employment exceeds the utility obtained as wage-employed or non-employed, such as:

$$U^{S}_{i,t+1} - \max U^{W}_{i,t+1}, U^{N}_{i,t+1} > 0 \qquad (1)$$

Where $U^{S}_{i,t+1}$, $U^{W}_{i,t+1}$ and $U^{N}_{i,t+1}$ are the utility obtained by the individual from self-employment, wage- employment and non-employment, respectively, at time *t+1*.

Given the assumption of unordered outcomes and the structure of the data, we estimate a multinomial logit model.[4] First, we estimate a multinomial logit model on the probability to enter wage-employment or self-employment in time period *t+1* given that the individual is non-employed in time *t*. Second, we estimate the probability to enter self-employment or non-employment in time period *t+1*, given that the individual is wage-employed in time *t*. Third, we estimate the probability to enter wage-employment or non-employment in time period *t+1*, given that the individual is self-employed in time *t*.

The models estimate transitions from state *k* separately for each state, where the transition intensity from state *k* to state *m* for individual *i* is assumed to have the following specification:

$$\Pr(y_i = m|\boldsymbol{x}_i) = \frac{\exp(\boldsymbol{x}_i \beta_m)}{\sum_{j=1}^{j} \exp(\mathbf{x}_i \beta_j)} \qquad (1)$$

[4] The multinomial logit model assumes that the alternatives are independent of irrelevant alternatives, i.e. the odds ratios of any two alternatives should be affected by neither the presence nor absence of another alternative. Long & Freese (2006) argues that the available tests for this assumption is not reliable and conclude that it is important to specify the model to ensure that the alternative outcomes are distinct from each other. Because entering self-employment often requires access to capital, this can be seen as different from entry into wage-employment. In addition, the models are estimated in a dichotomous framework as logit models, where similar results are obtained. The results appear therefore to be robust to the exclusion of one of the choice outcomes. The results from the dichotomous models are available upon request.

,where we let Pr (y=m|**x**) be the probability of observing outcome *m* given **x**. To identify the model, we need to impose constraints on the β's, such that $\beta_1 = 0$, written as:

$$\Pr(y_i = m|\boldsymbol{x}_i) = \frac{\text{Exp}(\boldsymbol{x}_i \beta_m)}{1+\sum_{j=2}^{j} \exp(\mathbf{x_i}\beta_j)} \quad \text{for m>1} \qquad (2)$$

Multinomial logit models focus on the effect of the explanatory variables on the probability of each outcome category compared to a reference category. The status of the individual *i* in period *t* (the origin state) is used as the reference category in the estimations, i.e. the reference category refers to the situation where no transition occurs in period *t+1* from the origin state in period *t*. Separate regressions are performed for immigrants and natives.

When combining aggregated data with data on individual characteristics as explanatory variables there is often an assumption that the errors are uncorrelated within groups. However, since it is reasonable to expect that units such as location, which share an observable characteristic, also share unobservable characteristics, this assumption is problematic and can lead to downward biased standard errors (Moulton, 1990). Standard errors are therefore cluster-corrected at the municipality level.

A potential problem when estimating transitions is the occurrence of state dependency, i.e. the possibility that the transition probabilities depend on the origin and destination states, thus yielding biased estimates if not taking into account the occupational choices made before the present choice **(**Hsiao, 1986).[5] In order to address this concern the individuals' labour market status in time period t-1, i.e. the period prior to being in the origin state is taken into consideration.[6]

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[5] It is often assumed that the probability of moving into a state is independent of the experience or non-experience of the event in the past. However, in studies considering labour force participation and unemployment it is noted that individuals who have experienced a certain event in the past are more likely to experience the same event in the future. Therefore, the probability of an individual experiencing a certain event is a function of past experience.

[6] It is assumed that the probability of the future state depends only of the most recent state (a first-order Markov chain).

Another concern is that it is not possible to observe whether the initial labour market status is the result of state dependence or unobserved heterogeneity in the case of individuals having the same labour market status in time *t-1* as in time *t* when first observed. This initial conditions problem (stock sample bias), i.e. the absence of the starting value in the data, needs to be addressed (Heckman, 1981).

5. Data and Variables

This study uses data from the Swedish Longitudinal Immigrant Database (SLI), a register-based panel, including socioeconomic and demographic information for a sample of native and foreign-born individuals from 16 countries during the period 1968-2001. SLI is representative for both the native and foreign-born population in Sweden. The nationalities in the database cover labour migrants, refuges and tied movers from different cohorts. The individuals are randomly selected and thus spread throughout Sweden, allowing for analysis focusing on local labour market conditions. The database contains information from the tax registers for different income types, including income from work, income from business activity and benefits from the social insurance system. We thereby avoid the common problems associated with analysing self-employment using survey data, i.e. the information comes from personal assessment.[7] Because the information on self-employment in Sweden before 1985 was based on personal judgment, 1985 is used as a starting point for the analysis.

The sample includes individuals aged 24 to 60. The lower boundary is chosen on the assumption that individuals older than 24 have completed their studies and are active in the labour market. The higher boundary is chosen on the assumption that individuals older than 60 may leave the labour market for early retirement.[8]

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[7] There are several problems associated with defining an individuals' main activity when it is determined on the basis of personal assessment. For example, individuals who are simultaneously both wage- and self-employed might report themselves as being self-employed, even if they obtain their main income from wage-employment.

[8] An explicit analysis of the self-employment transitions of older individuals is found in Zissimopoulos & Karoly (2007).

The analysis is conducted on an unbalanced panel, allowing for individuals to enter and exit the sample throughout the period of investigation, 1985-2001. Since the estimation considers transitions, we exclude those individuals who only are observed in the data during one year and thereby have no risk to experience a transition. Individuals are excluded from the estimation when a transition into new status has occurred. The final sample consist of 98, 143 foreign-born and 165, 489 native-born individuals. The sample of self-employed includes 17, 245 of which 6, 930 is foreign-born.

Using annual data implies that it is not possible to perfectly observe the timing of the transition during the year. However, one advantage of adopting this approach is that it takes into account the fact that the process into self-employment can be a gradual process. For example, in a given year an individual may have several activities, e.g. being both self-employed and employed/non-employed. In order to distinguish labour market status and identify transitions in the data, we use the full annual income-profile of each individual. The definition of labour market status is based on the individual's main activity in a given year.[9] Appendix A presents a detailed description of the labour market definitions.

There are several limitations to the data. It does not, unfortunately, allow for separate analyses of self-employment in different industries. It would have been preferable to be able to take the industry into account when exploring the significance of local unemployment on self-employment exits. In addition, the data does not allow us to capture both self-employed running incorporated business and self-employed running unincorporated business. The latter declare "income from business activity", while those with incorporated business declare wage-income from their own business. SLI contains information on income from business activity, and therefore self-employed with incorporated business are not included among the self-employed, but are instead observed as wage-employed in the data.[10]

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[9] The focus on main activity might be a reasonable approach for studies comparing immigrants and natives, since it is differences within the group of individuals whose main activity is self-employment that can lead to persistent differences between natives and immigrants in the labour market.

[10] There are several differences between these two corporate forms. While starting an incorporated business requires a business capital of 100,000 SEK, there is no such requirement for starting an unincorporated business. In addition, while individuals starting an

Andersson (2006) shows that the self-employed running unincorporated business is in the vast majority, not least among immigrants. In 1998, 67 percent of the native self-employed, 75 percent of the self-employed from Western Europe and 90 percent of the self-employed from non-European countries were self-employed with unincorporated business. Given this pattern and the focus of this study, the lack of data on incorporated business is not considered to be a significant problem.[11]

Table 1 presents the explanatory variables. Differences based on sex are captured through a dummy variable. Previous research in the case of several OECD-countries shows that men have a higher propensity to become self-employed than women (Lohmann, 2001). This pattern can be explained by men and women having different incentive structures (see Cowling & Taylor, 2001) e.g. working in different sectors and occupations and/or having different household and family responsibilities within families and/or women generally having lower preference for self-employment, such as being more risk-averse (see Verheul et al, 2012).

An individual presumably needs the time and skills to acquire resources for establishing a business and investigating the size of the market and customer preferences. Consequently, we include age as a control variable, to reflect know-how of the labour market and experience. The model also controls for civil status. Being married presumably have a positive effect on the probability of becoming self-employed, since arranging finance to start a business is a simplified process in which two individuals are involved. The assumed positive effect of access to liquidity on self-employment propensity is captured using a dummy variable indicating home-ownership.[12]

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unincorporated business have personal responsibility for the firm's finances, the owner of an incorporated business has limited liability.

[11] The lack of data on incorporated business affects the interpretation of the results. If we find a positive (negative) relationship between local unemployment and self-employment entrance, this effect presumably will be over-estimated (under-estimated), since individuals entering self-employed with incorporated business presumably have a stronger labour market position. Similarly, if we find a negative (positive) effect from local unemployment rate on self-employment exit to non-employment this effect is probably over-estimated (under-estimated).

[12] Previous research points to the importance of wealth and liquidity constraints (Evans & Jovanovic, 1989; Lindh & Ohlsson, 1996; Johansson, 2000). Longitudinal studies find a

In order to capture the importance of human capital an education variable is included in the model, which is divided into three categories; primary, secondary and higher (university) education.[13]

Table 1. Explanatory Variables

Variable name	Description
Female	dummy; 1 if woman
Age	
Married	dummy; 1 if married
Years since migration (ysm)	year-immigration year
Education	(3 categories)
Primary	Elementary School
Secondary	Secondary School (or corresponding education in other country)
University	University (or corresponding education in other country)
Country of birth	dummies based on country of birth (14 countries)
Duration	number of year in the origin state
Labour Market Program	dummy; 1 if individual are in labour market program in time t
Unemployment	dummy; 1 if individual are unemployed in time t
State dependence	dummy; 1 if individual had experience of the status before being in origin state (previous WE/NE/SE-experience)
Homeownership	dummy; 1 if individual pays property tax
Local unemployment rate	the share of the labour force in ages 20-64 in the municipality that are unemployed or in labour market programs
Regional classification	1) Larger cities 2) university regions 3) regional centre 4) secondary centre 5) small regions, dominated with private employment 6) small regions, dominated with public employment.

positive relationship between access to assets and the probability of entering self-employment (Fairlie & Meyer, 1996).

[13] The educational categories are based on the Swedish SUN code, consisting of 5 levels. The information comes from the Swedish Education Register and contains data on the individuals' highest educational attainment, achieved either in Sweden or in the country of origin; overseas qualifications have been expressed here in terms of Swedish equivalent.

Because cultural endowment such as traditions of entrepreneurship among immigrants from specific countries may explain why these immigrant groups are self-employed to a larger extent (Clark & Drinkwater, 2009; Hammarstedt & Shukur, 2009; Yuengert, 1995), the model includes controls for an immigrant's country of birth. There are potential differences between immigrants based on their time of residence in Sweden and therefore the models include a variable reflecting the number of year since their migration. The non-employment status applies to both unemployed and inactive individuals. A dummy variable, equal to one where an individual is unemployed, is included in the model where non-employment is the origin state. The reason for this is that the unemployed are expected to have a higher transition out of non-employment, due to their higher search intensity for jobs.[14] This model also includes a dummy variable to reflect whether an individual is in a labour market programme.

Previous studies analyse the business cycle effect on self-employment by focusing on the relationship between the national unemployment rate and the self-employment decision. We use the *local* unemployment rate, because this reflects the local labour market conditions facing the individual and since it varies over time and across regions.[15] Local labour demand can be seen as exogenous to the choice of being self-employed. The local unemployment rate captures whether individuals are pushed out of or pulled into self-employment in times of recession. Since there is not always an immediate link between local economic conditions and the individual decision of labour market status, we therefore lag the unemployment rate by one year.

As mentioned above, local economic conditions relates not only to the local unemployment rate but also to the local economic structure, in terms of composition of industries and educational level. In order to control for local differences in economic structure, we divide the regions into six types of

[14] The institutional framework in Sweden stipulates that unemployed individuals must be seeking work in order to receive benefits. Where an individual is non-employed, he or she is defined as unemployed if the income received from the unemployment insurance benefits exceeds that from the Social Insurance system.

[15] The local unemployment rate is the proportion of those in the labour force in the ages 20-64 in a given municipality who are unemployed or in a labour market programme. The register-based local unemployment statistics are supplied by The Swedish Labour Market Board (AMS).

regional families.[16] These regional families reflect demographic factors, production conditions and economic structure.[17]

6. Sample Characteristics

Table 2 presents the mean values for a selected set of variables. More men than women are self-employed. Women constitute around 30 percent of the self-employed in the case of both natives and immigrants. In the case of native and foreign-born self-employed individuals, about 10 percent have a university degree. The proportion of self-employed immigrants who have only primary education is higher than that of their native counterparts.

Table 3 shows the raw transition probabilities for the three labour market states for natives and immigrants. The transition pattern observed points to state dependence in all states. Almost 90 percent of the immigrants and 94 percent of the natives who are wage-employed in time *t* are also wage-employed in time *t+1*. The corresponding figure for the self-employed is 80 percent. As expected, immigrants are less likely than natives to experience a transition from non-employment. Interestingly, it is more common for self-employed immigrants to exit to non-employment (13,3 percent) than to wage-employment (7,2 percent), suggesting that self-employment does not serve as a stepping-stone into wage-employment. Natives, by contrast, are more likely to leave self- employment for wage-employment (9,8 percent) than for non-employment (8,6 percent).

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[16] This classification is proposed by "the Swedish Agency for Economic and Regional Growth", which regroups the labour market regions into six types of regional-families; 1) Larger cities, 2) university regions, 3) regional centre, 4) secondary centre, 5) small regions with predominantly private-sector employment, 6) small regions with predominantly public-sector employment.

[17] This division is based on several factors; i) population size (the number of those of working age 20-64 years), ii) the proportion of self-employed among the inhabitants, iii) the proportion of the population with a higher education, iv) population density (proportion of the population less than 10 minutes away from a local centre), v) the proportion of the population less than 30 minutes away from a university.

Table 2. Summary Statistics by labour market status, selected mean characteristics.

	Wage-employment		**Non-employment**		**Self-employment**	
Variable	Natives	Immigrants	Natives	Immigrants	Natives	Immigrants
Women	0,46	0,45	0,58	0,55	0,33	0,29
Age	38,65	40,18	35,98	40,45	41,4	39,51
Married	0,64	0,75	0,55	0,73	0,68	0,79
Ysm	-	14,68	-	10,88	-	15,3
Education						
Secondary	0,27	0,25	0,24	0,19	0,27	0,23
University	0,14	0,15	0,06	0,06	0,1	0,09
Local_UE	6,16	5,78	6,61	6,47	7,91	6,28
Homeownership	0,48	0,25	0,24	0,08	0,57	0,26
Country of birth						
Nordic	-	0,2	-	0,13	-	0,12
Chile	-	0,09	-	0,07	-	0,03
f.Cze	-	0,07	-	0,04	-	0,04
Etiophia	-	0,04	-	0,05	-	0,02
Germany	-	0,08	-	0,05	-	0,07
Greece	-	0,04	-	0,07	-	0,07
Iran	-	0,04	-	0,07	-	0,07
Iraq	-	0,04	-	0,07	-	0,05
Italy	-	0,04	-	0,03	-	0,04
Poland	-	0,11	-	0,09	-	0,09
Turkey	-	0,08	-	0,14	-	0,24
U.S	-	0,04	-	0,04	-	0,03
f.Yugoslavia	-	0,09	-	0,09	-	0,09
Vietnam	-	0,05	-	0,05	-	0,03
No of individuals	95,046	41,852	60,128	49,361	10,315	6,93

Table 3. Raw Transition Probilities, immigrants and natives, distribution (percent)

A. Immigrants			
	Destination State		
Origin state	NE(t+1)	WE(t+1)	SE(t+1)
Non-employment NE(t)	88,3	10,5	1,2
Wage-employment WE(t)	10,9	88,3	0,8
Self-employment SE(t)	13,3	7,2	79,6
B. Natives			
Non-employment NE(t)	78,5	20,1	1,4
Wage-employment WE(t)	5,3	94,1	0,6
Self-employment SE(t)	8,6	9,8	81,6

Source: Swedish Longitudinal Immigrant Database (SLI)

7. Results

Tables 4 to 9 present coefficients and marginal effects from the multinomial logit regressions.[18] The reference state is that no transition occurs from the

[18] If we are interested in the quantitative interpretation it would be natural to express results as odds ratios. However, in the multinomial logit model the odds ratio does not give a full picture of the variable effect in terms of economic significance, since the change in the value of a variable affects the probability for every outcome such that it could be that the probability of another category will increase even more. Instead, we calculate marginal effects, showing the change in the probability of the outcome for a unit change in the explanatory variable. For dummy variables this represents the change from 0 to 1. In order to be able to interpret the

origin state. First, focus is put on the self-employment entry process, analysing the transitions for wage- and non-employed individuals separately. Second, the self-employment exit process is examined. Finally, transition probabilities are calculated separately for natives and immigrants. These predicted probabilities give guidance on the issue of whether one group to a higher extent is pushed or pulled into and out of self-employment.

The analysis clearly shows evidence of state dependence, i.e. the propensity to enter a certain status is higher if the individual experiences the same event before being in the origin state. The state dependence effect is strongest in the case of the self-employed, indicating that previous self-employment experience reflects risk taking behaviour and preferences for self-employment. The results are consistent with the findings in Evans & Leighton (1989), and points to the importance of taking state dependence into consideration when analysing the mechanisms behind the self-employment decision.

7.1 The Self-Employment Entry Process

Table 4 and 5 presents the results for the self-employment entry process for wage-employed and non-employed immigrants, respectively. When analysing the influence of local labour market conditions, we find a negative relationship between the local unemployment rate and self-employment probability, in the case of both wage-employed and non-employed.

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percentage point change in the probability of the outcome for a unit change in the covariate, the calculated marginal effects in the tables is multiplied by 100.

Table 4. Results from Multinomial Logit model for immigrants. Non-employment as origin state and reference outcome category. Coefficients and standard deviation (in parenthesis).

	Pr (Wage- employment)		**Pr (Self-employment)**	
Variable	**Coefficient**	**Marg.effect**	**Coefficient**	**Marg.effect**
Local Unemployment rate	-0.080***	-0.0058	-0.022***	-0.0001
	(0.005)		(0.006)	
Women	- 0.170***	-0.012	-1.021***	-0.0078
	(0.018)		(0.042)	
Ysm	-0.042***	-0.0031	0.030***	0.0002
	(0.003)		(0.006)	
Property tax	0.384***	0.0312	0.776***	0.0073
	(0.034)		(0.075)	
Previous WE-Experience	0.194***	0.0147	-0.061*	-0.0005
	(0.018)		(0.044)	
Previous SE-Experience	-0.036	-0.0047	1.676***	0.0283
	(0.04)		(0.076)	
Education				
Primary	ref.		ref.	
Secondary	0.326***	0.0257	0.184***	0.0011
	(0.026)		(0.05)	
University	0.646***	0.0592	0.357***	0.0023
	(0.047)		(0.083)	
Country of birth				
Nordic countries	ref.		ref.	
Chile	-0.204***	0.0163	-0.761***	-0.0041
	(0.036)		(0.142)	
form.Cze	-0.248***	-0.0164	-0.153	-0.0009
	(0.079)		(0.142)	
Etiopien	-0.073	-0.0048	-1.271***	-0.0054
	(0.064)		(0.195)	
Germany	-0.174***	-0.0119	0.267***	0.0022
	(0.039)		(0.099)	
Greece	-0.525***	-0.0316	-0.145	-0.0008
	(0.046)		(0.106)	
Iran	-0.377***	-0.0241	0.219**	0.0019
	(0.022)		(0.087)	

---- Continuation of table 4

Iraq	-0.544***	-0.0326	0.293***	0.0027
	(0.032)		(0.096)	
Italy	-0.242***	-0.0161	0.146	0.0012
	(0.068)		(0.106)	
Poland	-0.149***	-0.0102	-0.139*	-0.0009
	(0.031)		(0.084)	
Turkey	-0.418***	-0.0269	0.482***	0.0043
	(0.038)		(0.088)	
U.S.A	-0.436***	-0.0267	-0.151	-0.0008
	(0.039)		(0.112)	
form Yugoslavia	-0.153***	-0.012	-0.171*	-0.0011
	(0.02)		(0.102)	
Vietnam	-0.076*	-0.0053	-0.193	-0.0012
	(0.044)		(0.163)	
constant	-1.543***		-5.334***	
Number of individuals (n)	25657		2862	
N= 49361				

Note: * significant at 10%, ** significant at 5%, *** significant at 1%,

Standard errors are robust and clustered at the municipality level.

The model controls for age, age^2, ysm^2, civil status and the economic structure in the region.

This negative relationship most likely reflects the fact that individuals expect decreasing returns as self-employed during times of economic recession and/or do not want to risk starting a business at a time when there are fewer available opportunities as wage-employed in case of failure. Another explanation is that it is more difficult to find capital in poor economic times. These findings differ from several previous studies, but are consistent with Lin et al (2000), also examining the effect of the regional variation in labour market conditions.

A higher educational level generally decreases the probability of a transition into non-employment and increases the likelihood of a transition into wage-employment. In the case of both non-employed and wage-employed immigrants, the likelihood of transitioning to self-employment increases with educational level. However, holding a university degree has a very small additional effect on the self-employment propensity of immigrants. Importantly, the positive relationship between the educational level and self-employment probability for both non-employed and wage-employed also applies when controlling for access to capital. Since we control for the economic structure in the region, the effect is not driven by

"knowledge spillover" in urban regions. This positive effect stands in contrast to previous findings from longitudinal studies, which generally find an insignificant relationship when controlling for access to capital.

Table 5. Results from Multinomial Logit model for immigrants. Wage-employment as origin state and reference outcome category. Coefficients and standard deviation (in parenthesis).

	Pr (Non- employment)		**Pr (Self-employment)**	
Variable	**Coefficient**	**Marg.effect**	**Coefficient**	**Marg.effect**
Local Unemployment rate	0.021***	0.0017	-0.039***	-0.0002
	(0.003)		(0.007)	
Women	0.156***	0.0124	-0.688**	-0.0035
	(0.019)		(0.046)	
Ysm	-0.019***	-0.0015	0.019*	0.0001
	(0.002)		(0.01)	
Property tax	-0.421***	-0.03	0.188***	0.0011
	(0.026)		(0.071)	
Previous NE-Experience	0.434***	0.0339	0.133***	0.0004
	(-0.015)		(-0.045)	
Previous SE-Experience	0.244***	0.0185	1.739***	0.0211
	(-0.036)		(-0.081)	
Education				
Primary	ref.		ref.	
Secondary	-0.201***	-0.0149	0.117**	0.0007
	(0.015)		(0.06)	
University	-0.584***	-0.0383	0.174**	0.0012
	(0.031)		(0.077)	
Country of birth				
Nordic countries	ref.		ref.	
Chile	0.024	0.0021	-0.714***	-0.0027
	(0.029)		(0.199)	
form.Cze	-0.159***	-0.0116	0.012	0.0001
	(0.035)		(0.113)	
Etiophia	0.041	0.0034	-0.273	-0.0012
	(0.04)		(0.177)	
Germany	-0.185***	-0.0134	0.101	0.0006
	(0.039)		(0.09)	
Greece	0.426***	0.0383	0.474***	0.0026
	(0.037)		(0.135)	
Iran	0.246***	0.0207	0.229*	0.0011
	(0.044)		(0.124)	

--- Continuation of table 5

Iraq	0,301***	0,026	0,209	0,0009
	(0,048)		(0,148)	
Italy	0,022	0,0016	0,179	0,0009
	(0,055)		(0,159)	
Poland	-0,027	-0,0021	-0,018	0,0001
	(0,032)		(0,159)	
Turkey	0,369***	0,0319	0,759***	0,005
	(0,036)		(0,093)	
U.S.A	0,267***	0,0226	0,284**	0,0015
	(0,055)		(0,128)	
form Yugoslavia	0,128***	0,0104	0,065	0,0003
	(0,035)		(0,108)	
Vietnam	-0,162***	-0,0116	-0,419***	-0,0017
	(0,057)		(0,141)	
constant	-0,252		-4,622***	
Number of individuals	24 705		1782	
N=41 852				

Note: * significant at 10%, ** significant at 5%, *** significant at 1%.

Standard errors are robust and clustered at the municipality level.

The model controls for age, age^2, ysm^2, civil status and the economic structure in the region.

In line with previous research, we find that the propensity to become self-employed increases with the amount of time spent in Sweden. This relationship is to be expected in that the number of years since migration reflects know-how of the labour market and that the individual needs time to acquire resources to start a business.

In sum, the negative relationship between the local unemployment rate and self-employment probability in combination with the identification of pull factors among individual characteristics indicates that self-employment is not used as a last resort among immigrants. In addition, the country of origin is an important factor for the self-employment probability. Immigrants from Turkey and Iran have a high propensity to become self-employed, from both wage- and non-employment, controlling for individual characteristics.

Tables 6 and 7 present the results for the self-employment entry process for wage-employed and non-employed natives. The findings show that there is a negative relationship between the local unemployment rate and self-

employment entries for both non-employed and wage-employed natives. In the case of both non-employed natives and non-employed immigrants, the likelihood of transitioning to self-employment increases with educational level. While a higher educational level has no effect on the transitions from wage-employment to self-employment in the case of natives, the self-employment probability increases with the educational level of wage-employed immigrants.

Furthermore, in the case of both immigrants and natives, paying property tax (homeownership) correlates positively with self-employment, pointing to the importance of access to capital in the self-employment process.

Table 6. Results from Multinomial Logit model for natives. Non-employment as origin state and reference outcome category. Coefficients and standard deviation (in parenthesis).

	Pr (Wage- employment)		**Pr (Self-employment)**	
Variable	**Coefficient**	**Marg.effect**	**Coefficient**	**Marg.effect**
Local Unemployment rate	-0.039***	-0.0052	-0.004	0.0001
	(0.003)		(0.004)	
Women	-0.018	-0.0011	-0.743***	-0.0078
	(0.014)		(0.05)	
Property tax	0.258***	0.0337	0.912***	0.0107
	(0.013)		(0.039)	
Previous WE-experience	0.323***	0.043	0.154***	0.0009
	(0.015)		(0.075)	
Previous SE-experience	0.001	-0.0076	1.869***	0.049
	(0.044)		(0.075)	
Education				
Primary	ref.		ref.	
Secondary	0.333***	0.0463	0.358***	0.0032
	(0.019)		(0.047)	
University	1.039***	0.1816	0.378***	0.0014
	(0.028)		(0.08)	
constant	-1.45		-4.913***	
Number of individuals	43201		2932	
N=60128				

Note: * significant at 10%, ** significant at 5%, *** significant at 1%,

Standard errors are robust and clustered at the municipality level.

The model controls for age, age2 civil status, inactive, labour market program, duration of labour market status and the economic structure in the region.

Table 7. Results from Multinomial Logit model for natives. Wage-employment as origin state and reference outcome category. Coefficients and standard deviation (in parenthesis).

	Pr (Non- employment)		Pr (Self-employment)	
Variable	**Coefficient**	**marg.effect**	**Coefficient**	**marg.effect**
Local Unemployment rate	0.022***	0.0008	-0.019***	-0.0001
	(0.002)		(0.006)	
Women	0.301***	0.0125	-0.759***	-0.0038
	(0.017)		(0.04)	
Property tax	-0.400***	-0.0162	0.400***	0.0022
	(0.011)		(0.054)	
Previous NE-experience	0.709***	0.0338	0.574***	0.0032
	(0.001)		(0.001)	
Previous SE-experience	0.032	0.0004	1.676***	0.0212
	(0.046)		(0.068)	
Education				
Primary	ref.		ref.	
Secondary	-0.316***	-0.0119	0.027	0.0002
	(0.016)		(0.047)	
University	-0.859***	-0.0266	-0.097	-0.0003
	(0.027)		(0.068)	
constant	0.333***		-5.186***	
Number of individuals	40 866		4805	
N= 95 046				

Note: * significant at 10%, ** significant at 5%, *** significant at 1%,

Standard errors are robust and clustered at the municipality level.

The model controls for age, age^2, ysm^2, civil status and the economic structure in the region.

7.2 The Self-Employment Exit Process

Table 8 and 9 presents the exit process results estimated coefficients and marginal effects produced by the multinomial logit models for self-employed immigrants and natives, respectively. While the effect of local labour market conditions on natives and immigrants in the self-employment entry process is fairly similar, the business cycle effect is different in the self-employment exit-process.

Table 8. Results from Multinomial Logit model for Immigrants. Self-employment as origin state and reference outcome category. Coefficients and standard deviation (in parenthesis).

	Pr (Wage- employment)		Pr (Non-employment)	
Variable	**Coefficient**	**Marg.effect**	**Coefficient**	**Marg.effect**
Local Unemployment rate	-0.032***	-0.0018	0.024***	0.0024
	(0.006)		(0.006)	
Women	0.212***	0.0111	0.048	0.0031
	(0.049)		(0.058)	
Ysm	0.029**	0.0015	-0.006	0.0004
	(0.013)		(0.008)	
Proptax	-0.042	0.0008	-0.605***	-0.0497
	(0.059)		(0.052)	
Previous WE-experience	0.366***	0.02	-0.141***	-0.0149
	(0.056)		(0.037)	
Previous NE-experience	-0.142***	-0.0111	0.558***	0.0508
	(0.049)		(0.048)	
Education				
Primary	ref.		ref.	
Secondary	0.150**	0.0085	-0.072	-0.0074
	(0.067)		(0.06)	
University	0.583***	0.0385	-0.109*	-0.0135
	(0.095)		(0.064)	
Country of birth				
Nordic countries	ref.		ref.	
Chile	0.179	0.0098	0.036	0.0022
	(0.196)		(0.11)	
form Cze	-0.228**	-0.0104	-0.069	-0.0051
	(0.116)		(0.086)	
Etiopien	-0.377*	-0.0155	-0.336**	-0.0257
	(0.207)		(0.161)	
Germany	-0.003	0.0004	-0.037	-0.0045
	(0.133)		(0.071)	
Greece	-0.369**	-0.0165	-0.039	-0.0018
	(0.193)		(0.088)	
Iran	-0.231***	-0.0109	-0.004	0.0008
	(0.093)		(0.08)	

--- Continuation of table 8

Iraq	-0.473**	0.0204	0.027	0.0047
	(0.122)		(0.101)	
Italy	-0.212*	-0.0092	-0.193	-0.0156
	(0.127)		(0.139)	
Poland	-0.229**	-0.0104	-0.12	-0.0095
	(0.113)		(0.082)	
Turkey	-0.593***	-0.0267	-0.073	-0.0038
	(0.081)		(0.083)	
U.S.A	0.174	0.0093	0.048	0.0034
	(0.172)		(0.089)	
form Yugoslavia	-0.278**	-0.0128	-0.046	-0.0028
	(0.118)		(0.098)	
Vietnam	-0.508*	-0.0206	-0.229*	-0.0174
	(0.277)		(0.134)	
constant	-2.941***		-1.759***	
Number of individuals	1852		3425	
N=6930				

Note: * significant at 10%, ** significant at 5%, *** significant at 1%,

Standard errors are robust and clustered at the municipality level.

The model controls for age, age^2, ysm^2, civil status and the economic structure in the region.

Table 8 shows that self-employed immigrants are more likely to leave their business for non-employment and less likely to exit for wage-employment in poorer local labour market conditions. The estimated coefficients are strongly statistically significant and the likelihood of exiting self-employment into non-employment increases by 0,24 percentage points or 2 percent of the baseline probability in response to a one percent increase in the local unemployment rate. A corresponding change in local labour market conditions decreases the probability of exiting for wage-employment by 10 percent. These results indicate that immigrants are pushed out of self-employment in response to poorer local labour market conditions. This effect might be a result of decreasing demand for their product/services, which might in turn be due to the fact that immigrants are self-employed in industries being more sensitive to the business cycle. Consistent with the notion that newly arrived immigrants face harder conditions at the labour market, we find that self-employed immigrants who have spent a longer time in Sweden are more likely to exit self-employment for wage -employment.

As mentioned above, immigrants from Turkey and Iran are more likely to enter self-employment. As self-employed, these immigrant groups experience

a reduced risk of exiting for wage -employment. These estimates indicate that although these immigrants groups are likely to enter self-employment, this move does not serve as a stepping-stone into wage-employment.

Table 9 presents the results for self-employed natives and shows a different pattern. Natives have a higher propensity to leave their business when the local economic conditions are worsened, both for wage-employment and non-employment.

Table 9. Results from Multinomial Logit model for natives. Self-employment as origin state and reference outcome category. Coefficients and standard deviation (in parenthesis).

	Pr (Wage- employment)		**Pr (Non-employment)**	
Variable	**Coefficient**	**Marg. Effect**	**Coefficient**	**Marg.Effect**
Local Unemployment rate	0,024***	0,0015	0,052***	0,003
	(0,007)		(0,005)	
Women	0,104**	0,0077	-0,023	-0,0019
	(0,023)		(0,042)	
Education				
Primary	ref.		ref.	
Secondary	0,268***	0,0212	-0,174***	-0,0113
	(0,04)		(0,048)	
University	0,752***	0,0711	-0,194***	-0,0149
	(0,057)		(0,076)	
Proptax	-0,083**	-0,0029	-0,581***	-0,0356
	(0,043)		(0,035)	
Previous WE-experience	0,410***	0,0283	-0,334***	-0,0236
	(0,056)		(0,051)	
Previous NE-experience	-0,224***	-0,0203	0,838***	0,0496
	(0,038)		(0,044)	
constant	1,215**		2,649***	
Number of individuals	3790		3347	
N=10 315				

Note: * significant at 10%, ** significant at 5%, *** significant at 1%,

Standard errors are robust and clustered at the municipality level.

The model controls for age, age^2, civil status and the economic structure in the region.

The results indicate that while self-employed natives have an alternative being wage-employed this is not the case for immigrants, suggesting that self-employment experience of natives is more highly valued by employers. Turning to the role of education to the exit process we see in the case of natives that a higher educational level reduces the risk of exiting self-employment for non-employment and increases the probability of exiting self-employment for wage-employment. However, as shown in table 9, in the case of immigrants only self-employed individuals with university education have a reduced risk of non-employment. We find a weak significant negative effect (at the 10 percent level) from having a university education, one which decreases the probability by 1,35 percentage points or 10 percent of the raw (baseline) transition probability (13,3 percent, see table 4) when compared to those who attained a primary educational level. The results suggest that while a higher educational level increases the likelihood of immigrants entering self-employment, it does not reduce the risk of non-employment.

7.3 Sensitivity analysis

Baseline findings on the role of local labour market conditions are robust to alternative specifications.[19] Adding control for year specific effects does not affect the estimates of the local unemployment rate. In addition, models are re-estimated using different thresholds for the definition of labour market status, generating similar results.[20]

As expected, the results show that men have a higher probability than women of experiencing a transition to self-employment, from both non-employment and from wage-employment. Both native and immigrant women are more likely than men to leave their business for wage-employment.

[19] Previous research, mostly in the case of the U.S. points to the importance of living in areas where relatively many co-nationals reside and that this explains differences within the immigrant population and differences between immigrants and natives in self-employment rates (Borjas 1986). In this context Aldrich et al (1985) emphasize that immigrants living in areas with high proportion of co-nationals have a comparative advantage in providing services/goods for an ethnic market due their knowledge of special tastes and preferences. Including controls for ethnic enclaves (i.e. the proportion of co-nationals at the municipality level) in the models does not change the results.

[20] As mentioned in Appendix A, two different thresholds are used; i) income greater than zero and ii) income greater than 3 basic amounts.

Estimating separate regressions for men and women in order to examine whether the self-employment dynamics is different, we find that the mechanisms behind the self-employment decision is similar.[21] Thus, women do not respond differently to changes in local economic conditions than men do. As self-employed, both native-born and immigrant women are more likely than men to leave their business for wage-employment, indicating that self-employed women constitute a positively selected group.

As mentioned above, the country of origin is in itself an important factor in the self-employment propensity.[22] In addition, the results are also robust when performing separate regressions for different immigrant group. Thus, non-European immigrants, in general having higher unemployment rates, do not enter self-employment in response to decreasing local labour demand.[23]

In the case of self-employed immigrants, a reduced local labour demand increases the propensity to exit for non-employment and has the opposite effect on the probability of entering wage-employment. However, the estimated coefficients give no guidance on the economic significance of the local unemployment rate, and the marginal effect only reflects the effect of a one percent increase from the mean value. Therefore, predicted probabilities are calculated at different levels of the local unemployment rate, while all other variables are kept at their sample mean.

Figure 1 shows a clear pattern. The probability of exiting self-employment for non-employment increases from 0.10 to 0.18 when we allow the local unemployment rate to vary from zero to the highest level in the sample. The corresponding probability of exiting self-employment for wage- employment decreases from 7.9 to 3.4.

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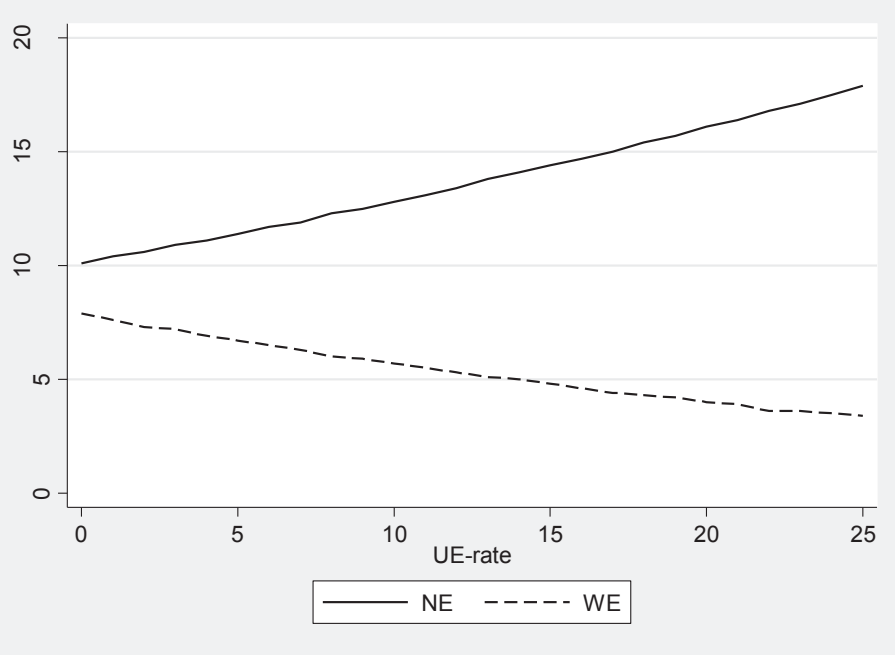
[21] The results are similar to those obtained in the pooled regressions. For men, the estimates for educational level have the same sign but are not statistical significant

[22] This is not due to that these groups are living together with co-ethnics (ethnic enclaves). The independent country of origin effect persists when controlling for the proportion of co-nationals living in a municipality.

[23] Separate regressions are performed for different country of origin categories ("Outside Europe", "Other Europe" and "Western Europe"). This gives a more detailed picture of the mechanism when considering the self-employment process for different immigrant groups. Qualitatively similar results are found. For immigrants from outside Europe a higher educational level has no positive effect on the self-employment probability where the individual is non-employed.

In order to investigate the magnitude of the aforementioned initial condition problem (see Section 4), the models are re-estimated using a sample where the individuals included is conditioned on not having the same status in time t-1 as in time t (origin state). Had the initial conditions problem been severe, the results from the estimations for this sample would have been different. However, the results do not change taking the initial conditions into account. The coefficient for some variables become insignificant, but since the direction of the effect does not change this is probably the result of the smaller sample size.[24]

Figure 1. Predicted probabilities for immigrants of leaving Self-employment into Wage-employment (WE) and Non-employment (NE) by local unemployment rate.



[24] A more detailed description of the different sample strategies and the results from the sensitivity analysis are presented in Persson (2008).

7.4 Transition Probabilities

In order to investigate the self-employment dynamics, predicted probabilities are calculated separately for natives and immigrants. These estimates gives guidance to the issue of whether immigrants are pushed or pulled into and out from self-employment to a higher extent. In order to obtain comparable probabilities we use the mean for natives, taking into account the different compositions of immigrants and natives have and put interest to the transition probabilities where immigrants and natives have the same individual characteristics.[25]

Table 10 shows a variation in estimated transitions probabilities. Taking the composition effect into consideration (using native means), we see that both natives and immigrants have a higher transition probability of exiting non-employment for wage -employment than for self-employment. As expected, immigrants are more likely than natives to become non-employed as wage-employed. Notably, taking the composition effect into account, immigrants do not have a higher predicted probability than natives to enter self-employed as non-employed.

Self-employed immigrants have a higher probability to exit self-employment for non-employment than wage- employment, whereas the opposite pattern is found for natives. The predicted probabilities points to immigrants being pushed out of self-employment. Importantly, since the predicted probabilities of self-employed immigrants are fairly similar independent of using native or immigrant mean, the exit-pattern among immigrants is mainly driven by behavioural differences, rather than observable characteristics.

[25] The predicted probabilities are obtained based on a standardized individual constructed with characteristics as the mean value for the sample.

Table 10. Estimated Transition Probabilities, native mean. Probabilities using Immigrant mean (in parenthesis). Percentage points.

A. Immigrants			
		Destination State	
Origin state	NE(t+1)	WE(t+1)	SE(t+1)
Non-employment NE(t)	73,7	25,1	1,2
	(84)	(13,9)	(2,1)
Wage-employment WE(t)	10,5	88,9	0,6
	(10,7)	(88,5)	(0,9)
Self-employment SE(t)	11,5	5,9	82,6
	(11,9)	(6,5)	(81,6)
B. Natives			
Non-employment NE(t)	77	21,4	1,6
Wage-employment WE(t)	5,9	93,4	0,7
Self-employment SE(t)	8,5	8,8	82,4

Source: Swedish Longitudinal Immigrant Database (SLI) All variables are kept at its sample mean.

8. Conclusions

In Sweden and in other developed countries, immigrants experience a high rate of self-employment simultaneously with a high non-employment rate. The increased inflow into self-employment among immigrants in Sweden during and after the recession at the beginning of the 1990s indicates that self-employment is used as a last resort. This notion is theoretically reinforced by the kind of institutional framework that exists in Sweden.

This paper explores whether immigrants use self-employment as a response to worsened local economic conditions and whether immigrants are pushed out of self-employment under such conditions. The study goes beyond previous research by analysing bo th the entries into and exits out of self-employment and by using longitudinal data. In addition, adopting a regional approach allows us to identify the employment opportunities facing

the individual, which varies across municipalities and take into account the different economic structures in each region, in terms of the composition of industries and educational level.

The results show that the self-employment decision is influenced by local labour market conditions. Thus, the self-employment dynamics is cyclically sensitive. Immigrants enter self-employment when local labour demand is improving and leave their business for non-employment in response to worsen local labour market conditions. While previous cross-sectional studies on the case on Sweden (Ohlsson et al, 2012) points to the importance of individual factors rather than the economic environment, we find that local labour market conditions is important for the self-employment decision. This presumably illustrates the importance of using longitudinal data allowing for an entry-exit analysis of self-employment.

Altogether, the negative relationship between the local unemployment rate and the self-employment probability when combined with the pull factors identified among individual characteristics indicates that self-employment is not used as a last resort. Thus, the findings in this study gives no support for the "disadvantage theory" in the self-employment entry process, in terms of immigrants being pushed into self-employment in response to decreasing local labour demand. The results are consistent with Lin et al (2000), also examining the effect of the labour market conditions at the regional level. There are several explanations as to why immigrants might not use self-employment as a response to worsen local economic conditions. Potentially, individuals expect decreasing return as self-employed in times of low economic activity. Another explanation is that the fewer opportunities as wage- employed obstruct the risk-taking behaviour in starting a business, since individuals are aware that the probability of finding other employment is low if the venture fails.

Both the estimated transition probabilities and the effect from local labour demand shows that immigrants are pushed out of self-employment, and therefore self-employment does not serve as a stepping- stone into wage-employment. The finding of local unemployment rate increasing the exit probability to non-employment is consistent with earlier studies (Blume et al (2009) in the case of Denmark and Taylor, 1999 in the case of U.K). While Andersson-Joona (2010) find that non-western immigrants are more likely to exit for unemployment, analysing self-employed during a three-year period after start-up in Sweden, our analysis, using data on a17-year period, show that this increased likelihood is influenced and strengthened by worsen local

labour demand. The increased movement to non-employment among self-employed immigrants in response to worsened local labour demand is potentially a result of immigrants being self-employed in cyclically sensitive industries. Another explanation is that self-employed immigrants face barriers in the labour market and do not have the opportunity to leave their business for wage- employment, which is indicated by previous research (Andersson, 2006; Hammarstedt, 2006), showing that self-employed from non-European countries have low incomes.

The empirical analysis shows that the self-employment propensity is different for immigrants from different countries and consistent with earlier studies (Yungert, 1995), we find that the country of origin is in itself an important determinant of self-employment transitions. Interestingly, non-European immigrants, generally having a weak position at the labour market, have higher self-employment probability. However, they do not resort to self-employment in response to worsened local labour demand, indicating that the high self-employment propensity is more a function of the presence of traditions of entrepreneurship among immigrants from specific countries. In addition, in line with previous studies we find that men are more likely to enter self-employment, although men and women respond similar to worsened local labour demand. Both native-born and immigrant women are more likely than men to leave their business for wage-employment, indicating that self-employed women constitute a positively selected group.

Is the response to local labour market conditions in terms of self-employment propensity different for immigrants and natives? The answer is "yes". While the mechanisms behind the self-employment entry process seem to be quite similar for natives and immigrants, local labour demand in the exit process impacts on these groups in a different way. While immigrants are more likely to leave self-employment for non-employment, natives, on the other hand, are more likely to leave their business for wage-employment when the local economic conditions are worsened. This finding is potentially explained by immigrants being self-employed in cyclically sensitive industries, but the result also indicate that while self-employed natives have an alternative in the form of wage- employment, immigrants face other barriers and are pushed out of self-employment. This pattern points to self-employment experience of natives being higher valued among employers.

Altogether, the empirical analysis suggests that both push and pull factors operates in the self-employment dynamics of immigrants. Immigrants do not enter self-employment to circumvent unemployment when local economic

conditions are worsened our findings show that immigrants are pushed out from self-employment under such circumstances.

This study gives some guidance for future research. The results show the importance of adopting a regional approach and using longitudinal data, and taking into account the fact that the unemployment rate varies over time and across regions and different economic structures in the regions. In addition, our findings point to the importance of analysing both self-employment entries and exits, since the underlying mechanism may be different for entering and leaving self-employment.

References

Alba-Ramirez, A. (1994). Self-employment in the midst of unemployment: the case of Spain and the United States. *Applied Economics*, *26*(3), 189-204.

Aldrich, H., Cater, J., Jones, T., Mc Evoy, D., & Velleman, P. (1985). Ethnic residential concentration and the protected market hypothesis. *Social forces*,*63*(4), 996-1009.

Andersson, P. (2006). *Four Essays on Self-employment*. Doctoral thesis in Economics. Stockholm.

Andersson-Joona, P., & Wadensjö, E. (2007). Do the unemployed become successful entrepreneurs?. *International Journal of Manpower*, *28*(7), 604-626.

Andersson-Joona, P., & Wadensjö, E. (2008). A Note on Immigrant Representation in Temporary Agency Work and Self-employment in Sweden. *Labour*, *22*(3), 495-507.

Andersson-Joona, P. (2010). Exits from Self-Employment: Is There a Native-Immigrant Difference in Sweden? 1. *International Migration Review*, *44*(3), 539-559.

Andersson-Joona, P., & Wadensjö, E. (2013). The best and the brightest or the least successful? Self-employment entry among male wage-earners in Sweden.*Small Business Economics*, *40*(1), 155-172.

Bengtsson T., Lundh C., & Scott K. (2005): From Boom to Bust: The Economic Integration of Immigrants in Postwar Sweden. In K. Zimmermann (Ed.), *European Migration: What Do We Know?* New York: Oxford University Press.

Blume, K., Ejrnæs, M., Nielsen, H. S., & Würtz, A. (2009). Labor market transitions of immigrants with emphasis on marginalization and self-employment. *Journal of Population Economics*, *22*(4), 881-908.

Borjas, G. J. (1986). The self-employment experience of immigrants. *Journal of Human Resources,* 22(4), 485-506.

Carrasco, R. (1999). Transitions to and from Self-employment in Spain: An empirical analysis. *Oxford Bulletin of Economics and Statistics*, 61, 315-341.

Clark, K., & Drinkwater, S. (2009). Immigrant self-employment adjustment: ethnic groups in the UK. *International Journal of Manpower*, *30*(1/2), 163-175.

Constant, A. F., & Zimmermann, K. F. (2004). Self-employment dynamics across the business cycle: migrants versus natives. IZA discussion paper 2004;1386.

Cowling, M., & Taylor, M. (2001). Entrepreneurial women and men: two different species?. *Small Business Economics*, *16*(3), 167-175.

Dustmann, C., & Faber, F. (2005). Immigrants in the British Labour Market*.*Fiscal Studies*, *26*(4), 423-470.

Engström, P., & Holmlund, B. (2009). Tax evasion and self-employment in a high-tax country: evidence from Sweden. *Applied Economics*, *41*(19), 2419-2430.

Evans, D. S., & Jovanovic, B. (1989). An estimated model of entrepreneurial choice under liquidity constraints. *The Journal of Political Economy*, 808-827.

Evans, D. S., & Leighton, L. S. (1989). Some empirical aspects of entrepreneurship. *The American Economic Review*, 519-535.

Fairlie, R. W., & Meyer, B. D. (1996). Ethnic and racial self-employment differences and possible explanations. *Journal of human resources*, 757-793.

Frenette, M. (2004). Do the Falling Earnings of Immigrants Apply to Self-employed Immigrants?. *Labour*, *18*(2), 207-232.

Giannetti, M., & Simonov, A. (2004). On the determinants of entrepreneurial activity: Social norms, economic environment and individual characteristics.*Swedish Economic Policy Review*, *11*(2), 269-313.

Glaeser, E. L., Kallal, H. D., Scheinkman, J. A., & Shleifer, A.. (1992) Growth in Cities. *Journal of Political economy*, 100(6), 1126-1152.

Hamilton, B. H. (2000). Does entrepreneurship pay? An empirical analysis of the returns to self-employment. *Journal of Political economy*, *108*(3), 604-631.

Hammarstedt, M. (2004). Self-employment among immigrants in Sweden–an analysis of intragroup differences. *Small Business Economics*, *23*(2), 115-126.

Hammarstedt, M. (2006). The predicted earnings differential and immigrant self-employment in Sweden. *Applied Economics*, *38*(6), 619-630.

Hammarstedt, M., & Shukur, G. (2009). Testing the home-country self-employment hypothesis on immigrants in Sweden. *Applied Economics Letters*,*16*(7), 745-748.

Heckman, J.J. (1981), "The Incidental Parameter Problem of Initial Conditions in Estimating a Discrete Time-Discrete Data Stochastic Process", in Manski, C. (Ed.), *Structural Analysis of Discrete Data with Econometric Applications.* MIT Press: Cambridge, pp.179-195.

Hsiao, C. (1986). *Analysis of panel Data.* Cambridge University Press.

Johansson, E. (2000). Self-employment and liquidity constraints: Evidence from Finland. *The Scandinavian journal of economics*, 123-134.

Kihlstrom, R. E., & Laffont, J. J. (1979). A general equilibrium entrepreneurial theory of firm formation based on risk aversion. *The Journal of Political Economy*, 719-748.

Lin, Z., Picot, G., & Compton, J. (2000). The entry and exit dynamics of self-employment in Canada. *Small Business Economics*, *15*(2), 105-125.

Lindh, T., & Ohlsson, H. (1996). Self-employment and windfall gains: evidence from the Swedish lottery. *The Economic Journal*, 1515-1526.

Lofstrom M. (2002) Labour market assimilation and the Self-employment decision of Immigrant Entrepreneurs. *Journal of Population Economics*,15, 83-114.

Lohmann, H. (2001). Self-employed or employee, full-time or part-time?: gender differences in the determinants and conditions for self-employment in Europe and the US (No. 38). Mannheim: MZES.

Long, J. S., & Freese, J. (2006). Regression models for categorical dependent variables using Stata. Stata press.

Lucas Jr, R. E. (1978). On the size distribution of business firms. *The Bell Journal of Economics*, 508-523.

Moore, C. S., & Mueller, R. E. (2002). The transition from paid to self-employment in Canada: the importance of push factors. *Applied Economics*,*34*(6), 791-801.

Moulton, B. R. (1990). An illustration of a pitfall in estimating the effects of aggregate variables on micro units. The review of Economics and Statistics, 334-338.

Ohlsson, H., Broomé, P., & Bevelander, P. (2012). Self-employment of immigrants and natives in Sweden–a multilevel analysis. *Entrepreneurship & Regional Development*, *24*(5-6), 405-423.

Persson, M.R., (2008). Pushed or Pulled to Self-Employment? Self-employment among immigrants in Sweden 1985-2001. *Lund Papers in Economic History*, 110.

Scott, K. (1999). The Immigrant Experience: Changing Employment and Income Patterns in Sweden, 1970-1993. Lund. Lund University Press.

Stark, O. (1991). *The migration of labor*. Basil Blackwell, Cambridge.

Statistics Sweden. (2006). Ny källa till företagarpopulationen i den registerbaserade arbetsmarknadsstatistiken. Statistics Sweden.

Yuengert, A. (1995). Testing hypothesis of Immigrant Self-employment. *Journal of Human Resources*, 30, 194-204.

Verheul, I., Thurik, R., Grilo, I., & van der Zwan, P. (2012). Explaining preferences and actual involvement in self-employment: Gender and the entrepreneurial personality. *Journal of Economic Psychology*, *33*(2), 325-341.

Von Greiff, J. (2009). Displacement and self-employment entry. *Labour Economics*, *16*(5), 556-565.

Zimmermann, K. (2005). *European Migration. What do we know?* Oxford: Oxford University Press.

Zissimopoulos, J. M., & Karoly, L. A. (2007). Transitions to self-employment at older ages: The role of wealth, health, health insurance and other factors.*Labour Economics*, *14*(2), 269-295.

Appendix A. Definition of Labour Market Status

For each year a given individual is assumed to have a distinct labour market status: non-employment, wage- employment or self-employment. In order to distinguish labour market status and identify transitions in the data, the full annual income-profile of the individual is taken into consideration. We use the declared income from work and income from active business activity. The definition of labour market status is based on the individual's' main activity in a given year. A threshold value is therefore chosen, based on Basic Amounts (BA), which is a government stipulated level that follows price trends. In 2001, 1 basic amount equalled 23, 900 SEK or approximately 4000 USD. In addition, the income threshold is assumed to reflect/capture the fact that the individual is fairly active in the labour market.

Self-Employment

Previous research illustrates that there are indications that the self-employed underreport their income as a result of tax evasion (Engström & Holmlund, 2009). Engström & Holmlund (2009) estimate that self-employed in Sweden underreport their income by around 30 percent. We follow Statistics Sweden and multiply the self-employment income by a factor of 1.6 to obtain comparable incomes with the non-employed and wage-employed (see Statistics Sweden, 2006). An individual is defined as being self-employed (with or without employees) if income from business activity is greater than 2 basic amounts and is the major source of income.

Wage-Employment

An individual is defined as being wage-employed if the work income in a given year is greater than 2 basic amounts and is the major source of income.

Non-Employment

An individual is defined as being non-employed if the reported income from work in a given year is less than 2 basic amounts and if no income is reported from active business activity.

Although the vast majority of the individuals have only one source of income in a given year there are a few individuals receiving income from both business activity and wage-employment. One reason for this could be that income from self-employment varies from year to year, because the revenues for the firm differ from year to year. Another reason could be that the process of entering self-employment is gradual and implies that there is a period of "double income" before a decision is taken on the main activity. If the sum of income from work and business activity exceeds 2 basic amounts, while the respective sources of income do not, it is difficult to decide the main activity. Activity during the following year is taken into account where possible, but otherwise the individual's labour market status is decided on the basis of the major source of income. The reason for the use of threshold is that our focus is on the main activity and that the employed or self-employed were deemed to be active in the labour market. Annual income will always reflect employment variation to some extent, regardless of the chosen threshold. We therefore also perform robustness checks of the results using alternative thresholds for i) zero income and ii) 3 basic-amounts.

Paper II

Early retirement pension and regional economic conditions: The case of immigrants in Sweden, 1982-2003.

Mats R. Persson

Centre for Economic Demography, Lund University
Department of Economic History, Lund University

Abstract

This paper analyses early retirement pensions among immigrants during a period when the labour market has tightened and when there has been an increase in disability retirement, in particular for immigrants. By using longitudinal register-data from Longitudinal Individual Data for Sweden (LINDA), we examine the relationship between the county-level unemployment rate and disability pension transitions. The results show that early retirement pension transitions are affected by regional labour demand. The impact of worsened labour market conditions operates differently on early retirement pension transitions in different labour market contexts and states of the economy. While we find that individuals are more likely to withdraw from the labour force into early retirement pension in response to worsened local labour demand in the 1990s, we find no such relationship during the 1980s, a period characterized by high economic activity with more job opportunities.

Key words: early retirement pension, immigrants, regional labour demand

JEL Classification: J26, J15, J14, J23

1. Introduction

During the past 20 years the Swedish economy has been characterized by a structural transformation with a restructuring of several sectors of the economy. In the beginning of the 1990s Sweden experienced a deep economic downturn, which in many aspects was the largest crisis since the 1930s, and more profound than the financial crisis in 2008. The downturn resulted in a drastic increase in unemployment. Almost a third of all low-skilled workers left the labour market between 1987 and 1993 (Lundgren, 1996). Immigrants (foreign-born) were highly affected by the economic crises and the unemployment rate among foreign citizens was three times higher than for Swedish citizens in 1993-1995. When the economy recovered by the end of the 1990s there was still a labour market gap between natives and immigrants, a situation similar to that found throughout Western Europe (Zimmermann, 2005). Moreover, the employed immigrants were more often found in temporary agency work and/or self-employment (Andersson/Joona & Wadensjö, 2008), indicating that immigrants used alternatives to regular employment.

The crises period also generated a large and continuous increase in the number of people dependent on the social insurance system through long-term sickness absence and early retirement pension. In conformance with several other OECD countries, the labour force participation rate decreased in Sweden during the 1990s. In combination with an increasing proportion of elderly people in the population such development clearly constitutes a challenge for social policy, since it implies a withdrawal of resources from production, a lowered tax base and an increased burden on pension and fiscal systems.

The use of early retirement pension in Sweden should in principle mainly be health induced, but there are several indications that the early retirement pension relates to weak labour market attachment or unsatisfactory employment conditions and thus constitutes a substitute for unemployment. First, previous research shows that individuals' retirement decision depends on economic incentives. Both changes in eligibility rules (Jönsson et al, 2012; Wadensjö, 1996) and relative early retirement pension income (Skogman Thoursie, 1999; Palme & Svensson, 2004) seem to affect early retirement, such that the inflow into early retirement pension does not relate to changes in population health (Johansson et al, 2014a). Moreover, there are indications of a grey area between unemployment, sickness insurance and

early retirement pension, where the different income security systems operates as communicating vessels (Karlström et al, 2008). Second, there are differences in early retirement propensity between socio-economic and ethnic groups, and groups facing problems on the labour market are also over-represented as early retirement pensioners. For example, foreign born (immigrants) experience higher levels of early retirement pensions and comprise a non-proportional part of the newly granted disability pensions since the mid1980s (National Insurance Board, 2001). Third, there are large regional differences in levels of sickness absence and early retirement pensions (National Insurance Board, 2004), and the proportion of early retirement pensions and sickness absence benefits is generally high in regions with a high unemployment rate (Lundberg, 2007).

This paper aims at investigating the link between county-level unemployment rate and early retirement pension transitions among immigrants.[1] The hypothesis is that worsened regional labour market conditions increase the risk of experiencing a transition to early retirement pension. Analysing the situation for immigrants gives important insight to this issue, since if regional labour market conditions are important for early retirement pension, then this link would be evident for a group with weak labour market attachment such as immigrants.

There are several potential explanations to the hypothesis of a positive relationship between worsened regional labour demand and early retirement pension probability. Individuals may become discouraged in their job search if there are few available jobs and withdraw from the labour force into early retirement. In particular, harder competition for jobs may have a negative impact on individuals with reduced working capacity. There may also be a mismatch between the individuals' human capital and the local demand for labour, limiting the ability to remain in the labour force. Another potential explanation to the hypothesis is that workers (in particular older workers) are laid off via public or contractual systems, since employers have incentives due to seniority based wage distribution and "first-in last-out" system for

[1] Focus is put on disability pensions since it is the most common type of public sector financed early exit from the labour force for those under age 65 in Sweden. This paper does not focus on individuals that are early retired via contractual systems since these individuals do not directly influence the public finances and since the mechanism behind their early exit might be different.

termination of employees (Wadensjö, 1996; Hallberg, 2011). Finally, social norms may induce a positive relationship between county-level unemployment and early retirement pension. There may be an interaction between regional labour market conditions and the social insurance scheme, such that early exit from the labour market are facilitated during economic downturns.

This study goes beyond previous research in several ways. First, while earlier studies (for Sweden) on early retirement among immigrants has been performed in a cross-sectional framework, our study uses longitudinal register data following individuals over time, which allows for an approach exploring if early retirement pension is affected by regional labour market conditions. Analysing county-level data on labour market conditions imply that we do not have to treat Sweden as a single labour market. Using the variation in local economic conditions across counties and time we can identify the impact of regional labour market conditions on early retirement pension. This regional approach also makes it possible to account for differences in practices between the social insurances at the county level due to social norms. Second, in contrast to previous studies on the relationship between unemployment rate and early retirement, we make a distinction between natives and foreign-born. Moreover, the rich data makes it possible to distinguish between immigrant groups and thereby not treating immigrants as a homogenous group. Thus, this study analyses both refugees and labour migrants from European countries arriving during the 1950s and 1960s as well as refuges and tied movers from non-European countries entering Sweden in the 1970s and 1980s.

The analysis includes employed and unemployed individuals in the analysis. This approach allows for a distinction between different "pathways" into early retirement pension, by exploring whether the link between county-level unemployment and early retirement pension is different based on the individuals' labour market position.

Finally, the period under study, 1982-2003, is characterized by substantially different labour market and social insurance contexts. The economy was transformed from a period of high employment and expansion of the welfare state during the 1980s, into a state of mass unemployment during the deep economic downturn at the beginning of the 1990s, and subsequently a tightening labour market and increased use of the social insurance system at the end of the 1990s and onwards. This allows us to capture whether the effects from worsened regional economic conditions

operates differently in different labour market contexts and states of the economy.

The remainder of this paper is organized as follows. Section 2 presents the institutional setting and Section 3 describes the development regarding disability pensions in Sweden. Section 4 deals with theory and previous research. Section 5 presents method and research strategy and Section 6 describes the data. Section 7 presents summary statistics and the results are presented in Section 8. Section 9 summarizes the results and concludes this paper.

2. The Institutional Setting

Early retirement pension (disability pension) is the most frequent pathway for early exit out of the labour force, i.e. retiring before the normal retirement age, in Sweden. In the early 1990s, around 35 percent of men and women in ages 60-64 received disability pension and the corresponding number in 2009 was 20 percent for men and 30 percent for women. In comparison to other OECD-countries, Sweden is characterized by relatively high employment rate among older workers, simultaneously as a comparatively large share of the population receives support from the disability pension system (Gruber & Wise, 2010). One explanation for this pattern is that Sweden, in contrast to many other European countries, did not introduce any generous early retirement programs in the 1970s and 1980s.

Early retirement pension is meant for individuals whose capacity for work is completely or partially reduced before they are eligible for their old age retirement pension. The disability insurance aims at replacing forgone earnings for individuals with a permanent reduction in work ability due to health reasons. All Swedish citizens and all persons residing in Sweden and aged 16 to 64 are eligible for early retirement pension if their working capacity is decreased due to poor health (physical and/or psychological reasons). Hence, early retirement pension is not restricted for individuals being active in the labour market.

During the time period under study the early retirement pensions could be granted for a certain period or for an unspecified time, at a full or partial rate. Early retirement pension benefits were received from the basic national retirement scheme (folkpension), and from the national supplementary pension scheme (ATP). The latter was received by individuals that had worked at least thirty years during their working life. Early retirement

pension benefits replaced 60 percent of an assumed income of the individual based on previous income, but the amount was reduced if the residence time in Sweden was less than 40 years.

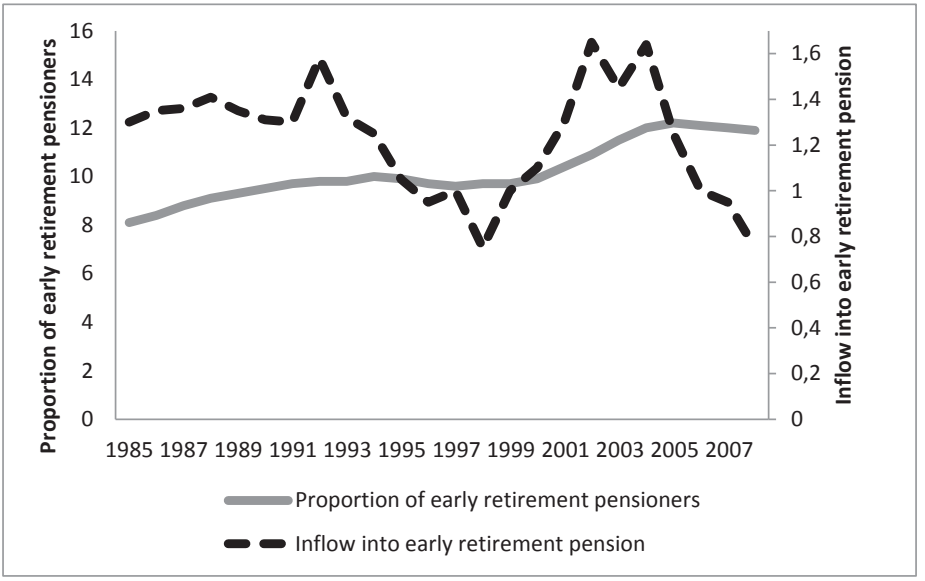
The regulatory framework for the early retirement pension system is stipulated at the national level. However, until 2005, local Social Insurance Offices, organised at the county level as autonomous authorities with full responsibility for the public social insurance and the disability pension system, administrated the disability pension system. The local social insurance agencies awarded disability pension benefits and there should in principle be a medical basis for the decision of reduced capacity of work. An application for early retirement pension was often the result of an interaction between the insured worker, the employer and officials at the local social insurance agencies. Sometimes an individual were able to apply on his or her own initiative to the local Social Insurance Office. In some cases there was no application process; here the social insurance office made a one-sided decision to replace the sickness benefits by early retirement pension. In practice, early retirement pension was permanent, since the benefits last until official retirement age.

The eligibility rules for the early retirement pension have changed over time. New rules have been introduced in order to give more consideration is to other factors than health, in particular for older individuals (Jönsson et al, 2012). In the early 1960s the determinant factors for early retirement pensions in Sweden were solely medical, but a decade later – and until 1991- labour market opportunities were also considered in determining early retirement pensions, particularly for individuals 60-64 years (Palme & Svensson, 2004). Individuals older than 60 years of age who had more or less exhausted their entitlement to unemployment compensation were eligible for early retirement pension though no illness was involved. The share of newly granted early retirement pensions explicitly given for labour market reasons increased remarkable during the 1970s and 1980s (Wadensjö, 1996). In 1991 the law terminated the use of the labour market considerations for receiving early retirement pensions. See Appendix for a detailed description of the early retirement pension system.

3. Early Retirement Pension among Immigrants and Natives in Sweden

Figure 1 shows the proportion of early retirement pension and the proportion of newly granted early retirement pension benefits during the period 1985-2008. The proportion of the population aged 30-64 having disability pension increased from 8 to 12 percent between 1985 and 2008. The figure also shows the large variation in inflow into early retirement pension over time. The very drastic increase in 1992 and 1993 followed from changes in the institutional setup. In 1992, when ambitions for rehabilitation were raised, the number of early retirement pensioners increased rapidly and the number of individuals on long-term sickness leave decreased rapidly. This one-off increase led to a decreased inflow into disability pension during the subsequent years. As the economy improved in the latter part of the 1990s, there was a substantial increase in the inflow to early retirement pension between 1998 and 2004.

Figure 1. Proportion of early retirement pensioners and the proportion of newly granted early retirement pension, age 30-64, 1985-2008.



Source: Johansson et al (2014a)

As the inflow has exceeded the outflow, there has been a large and continuous increase in the number of disability pensions from 1985 and onward. In 1985 the number was around 325 000, in 1999 around 425 000 and in 2005 the number peaked at 556 000 individuals. In 2013, 365 000 individuals received disability pension benefits.

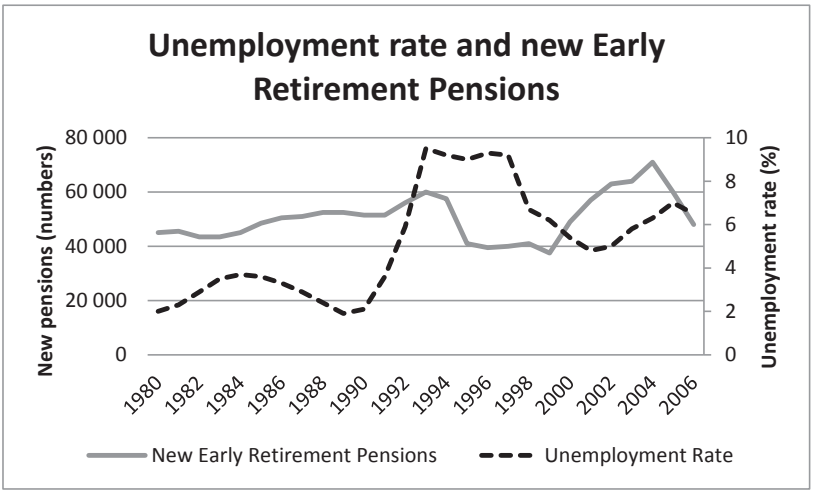
Early retirement pension have developed differently across age, gender and ethnicity during this period. The mean age among disability pensioners have shifted downwards over time, which can not be explained by changes in the age-composition of the population (Stattin 1998). As a result, the proportion of newly granted disability pensioners among those over age 60 decreased during the 1990s. In addition, the proportion of newly granted early retirement benefits was higher among women than men during the whole period, and the difference between the sexes increased during the second part of the 1990s (National Insurance Board, 2007).

Immigrants have comprised a non-proportional part of the newly granted disability pensions since the mid1980s and experience higher levels of early retirement pensions than natives (National Insurance Board, 2001). There are however large differences within the immigrant population based on country of origin and time of residence. Hammarstedt (2000) shows that immigrants from Nordic countries and from Eastern and Southern Europe had higher proportion of early retirement than natives in the second part of the 1980s, whereas immigrants from outside Europe (Africa, Asia and Latin America) had lower rates than natives. In addition, while foreign-born individuals immigrating before 1967 had higher early retirement rates than native Swedes, the early retirement share was low among more newly arrived immigrants during the 1980s. Turning to the pattern for the 1990s a similar pattern is found. While immigrants from the Nordic countries and Southern Europe are overrepresented among early retirement pensioners those from Western Europe and outside Europe (Africa, Asia and Latin America) have lower rates than natives (National Insurance Board, 2001).

The use of the social insurance developed differently across regions in the 1990s and there were large regional differences in levels of sickness absence and early retirement pensions (National Insurance Board, 2004).

Figure 2 shows a weak relationship between unemployment rate and the inflow of early retirement pensions.

Figure 2. Unemployment rate (%) and New Early retirement pensions (numbers), 1980-2006.



Source: Social Insurance Board and Statistics Sweden.

The unemployment rate was extremely low during the business cycle peak in the late 1980s and the number of newly granted early retirement pension benefits was stable around 50,000 each year. The number of new disability pensions increased simultaneously with the drastic increase in the unemployment rate during the beginning of the 1990s. However, when the economy improved and the unemployment rate decreased in the latter part of the 1990s, there was a substantial increase in the inflow to early retirement pension between 1998 and 2004.

The pattern of the relation between unemployment and early retirement pensions at the regional level suggest that the use of the social insurance system in Sweden over time to some extent has been a product of regional labour market conditions. While an inverse relation is observed between the local unemployment rate and the number of disability pensioners at the local level for the period 1984-1993 (Grape & Lindqvist, 1997), the second part of the 1990s and onwards is characterised by a regional pattern where the

proportion of disability pensioners is high in regions with high unemployment rates (Lundberg, 2007).[2]

There are indications that the inflow into early retirement pension relates to the attractiveness of other income security programs (Karlström et al, 2008; Larsson, 2006).[3] It is common that an individual starts the exit route into early retirement pension in another income security program. A significant proportion of the early retirement pensioners have benefits from the sickness insurance as their main source of income before transitioning to disability pension.[4] In addition, as in several other OECD developed countries, a common pathway into early retirement in Sweden is a period of unemployment.[5]

4. Theory and Previous Research

From a theoretical perspective there are several explanations to the assumed link between regional labour demand, i.e. the availability of jobs in the region, and early retirement pension. *A priori* it is reasonable to assume a positive relationship between worsened regional unemployment and early retirement pension entries.[6]

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[2] Similar regional variation in disability pensions is also found in for U.S. and U.K. (see McVicar, 2006) and for Norway, with a similar welfare model as Sweden, Krokstad et al (2004) and Krokstad & Westin (2004) finds that the social structure in the municipality affects the disability pension risk, which is interpreted such that the incidence of disability pension is related to non-medical factors.

[3] Larsson (2006) points to substantial movement between the Unemployment Insurance and the Sickness Insurance system, as the benefits from the Unemployment Insurance approaches expiration date. Similarly, Karlström et al, (2008) points to the short term effect from stricter eligibility rules in the disability insurance system being crowded out by effects in the unemployment and sickness insurance programs.

[4] Palme & Svensson (2004) follows the cohorts born in 1927-1932 and shows that approximately 20 percent of the men and 27 percent of the women had their main income from sickness insurance before exiting the labour force into early retirement pension.

[5] See Gruber & Wise (2004) for an overview. Palme & Svensson (2004) shows that 7 percent of older workers in Sweden were unemployed prior to early retirement. The corresponding proportion in Denmark is 20 per cent (Larsen & Pedersen, 2008) and 15 per cent in Belgium (Dellis et al, 2004).

[6] A higher unemployment rate might also decrease the early retirement probability due to the "added worker effect". This effect refers to the situation where the spouse increase the participation at the labour market due to that the husband/wife become unemployed or have a

According to job search theory, the individual limit the search activities as the cost of job search is high (see Lippman & McCall, 1976 for an overview). In poor economic times, it is harder to find a new job and the search costs increase and the individual may become discouraged in the job search since there is higher competition and less available jobs, thereby withdrawing from the labour force into early retirement. If, for example, older workers are laid off, they might find themselves competing with better-educated and younger workers for jobs in new and growing industries. As the average unemployment spell has risen for all workers, this might encourage older workers to enter early retirement pension rather than continue their search for new jobs. Similarly, Autor & Daggan (2003) present a framework where "conditional applicants" seek benefits in the event of job loss, but not otherwise, implying that this group of workers prefers disability benefits over search for new employment. Harder competition for jobs may also exclude individuals with lack in working capacity, which relates to the structural transformation of the labour market, in the sense that the transformation might lead to mismatch between labour demand and the individuals' human capital. There may be an excluding process for the individuals that do not have the possibility to adapt to the new demands. This notion/process is consistent with the hypothesis of "skill-biased technological change", a shift in the production technology increasing the demand for more educated workers (see Katz & Autor, 1999 for an overview).

There are several mechanisms operating as unemployment experience increases the likelihood of early retirement. In line with the aforementioned notion that there is a grey area between unemployment and early retirement pension unemployed individuals might consider early retirement as a way to receive an alternative source of finance and claim early retirement pension benefits even when health status remains unchanged**.** Another potential mechanism behind the assumed effect from unemployment on early retirement pension is that job loss and unemployment might lead to adverse

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higher risk to job loss. The empirical findings for the added worker effect are ambiguous. Lundberg (1985) finds a small and significant effect whereas Maloney (1991) does not find support for the added worker effect. Since the labour marker participation rates in Sweden are rather similar for men and women we do no expect the added worker effect to be important in Sweden.

health. Empirical studies support the notion of a relation between individual unemployment experience and disability pension risk, where individuals with weak labour market attachment are excluded from the labour market into disability retirement. For the U.S., evidence shows that job displacement have negative effect on earnings, both in the short and long run (e.g. Jacobson et al, 1993; Ruhm, 1991; Stevens, 1997) and Chan & Stevens (2001) find that job loss results in a large and lasting negative effects on future employment for older workers. Several studies on Norway shows that plant downsizing increase the disability entry rate of workers in the affected plants, and also affecting future earnings and health (Bratsberg et al, 2013; Huttunen et al, 2011; Rege, et al (2009). In the case of Sweden, Gustafsson et al (2014) show that weak labour market attachment increases the disability pension risk. Using data on plant closures in Sweden between 1987 and 1999, Eliason & Storrie (2006) show that job displacement has long-term effects on employment, in particular for early labour force exit, and that this effect is strengthened by poor macroeconomic conditions.

Another theoretical explanation to the positive relationship between worsened regional unemployment and early retirement pension is the employer incentives during poor economic times, in particular if the retirement decision is a joint decision between the worker and the employer and not only a matter of the behaviour of the employee (Hutchens, 1999; Topel, 1984). When firms decrease their workforce during a recession employers may see an opportunity to retire workers with long length of service and workers having problems adapting to new demands via public or contractual systems. This process also relates to seniority-based wage system, giving the employer incentives to change the age-composition of the labour force in order to reduce labour cost. In the Swedish context, this incentive is strengthen by the labour market legislation, stipulating that workers with high seniority ("first in –last out-rule") are protected during a downturn. An agreement of an early retirement pension might be a strategy for the employer and employee to avoid this legislation. For Finland Hakola & Uusitalo (2005) find support for the notion that employers influences the retirement decisions of their employees. In the case of Sweden, Hallberg (2011) shows that there is a relationship between the unemployment rate at the industry level and early exit via the contractual systems during the 1990s, in particular in the public sector.

A third theoretical explanation to the assumed link between less available jobs in a region and the early retirement pension risk is the presence of social

norms. Lindbeck et al (1999; 2003) presents models of the formation of social norms, emphasizing that the local/regional unemployment rate affects the attitudes towards leisure and towards the use of the social insurance system, which also could affect the interpretation and use of the regulatory framework for disability pension across the social insurance offices. Thus, the relationship between the regional unemployment rate and the disability pension risk is not only related to labour market exclusion but also a result of attitudes regarding the use of the social insurance system. This theoretical notion is strengthen in the context of Sweden during the period under study, since disability pension benefits was awarded by Social Insurance agencies at the county level. Palme & Svensson (2004) points to that despite that the regulatory framework for disability pensions in Sweden are the same throughout the country the large variation in grants for the local social insurance offices indicates that the implantation of the rules varies.

Most empirical studies on OECD countries support the theoretical notion of a positive relationship between unemployment rate and disability retirement. Coile & Levine (2007; 2010) investigate the relationship between the state unemployment rate and early retirement in United States. They find that the individual retirement decision is sensitive to labour market downturns, but only when workers are near the age when they become eligible for social security benefits. The results are interpreted as if individuals adopt their labour supply in response to macro shocks**.** For Denmark, Larsen & Pedersen (2008) distinguish between different pathways into early retirement and identifies a positive relationship between the county level unemployment rate and early retirement for both employed and unemployed individuals. Analysing employees in the private sector in Norway, Bratsberg et al (2013) show that worsened local labour market conditions increases the effect of job losses on the disability pension risk. In a cross-sectional study for Sweden, Stattin (1998) investigates whether individuals working in a shrinking industry of the labour market experience a higher risk becoming early retirement pensioner in 1993, and finds no general positive effect of changes at the national level, whereas the probability to become an early retirement pensioner increases if the individual works in an industry that is reduced at the local level. One exception in this literature is Riphahn (1997), who finds no correlation between the age-group specific unemployment at the national level and the probability of disability retirement using German data.

Studies on Sweden show that foreign born have higher rates of disability pension than natives and a higher risk to be on disability pension, controlling

for age and education (Hammarstedt, 2000; Österberg & Gustafsson, 2006). The higher risk for immigrants might relate to differences in health status, due to differences in life-style habits and that sickness incidence and risk factors for sickness may increase after migration.[7] Another explanation is the presence of discrimination. The discrimination term has two components; the direct discrimination in the social insurance system and the "indirect discrimination effect" where discrimination has an effect on health, leading to disability.

The higher early retirement pension risk among immigrants may also relate to their weaker labour market attachment. There is an extensive literature on the labour market situation for immigrants establishing that immigrants over time have experienced a worsened labour market performance in terms of relative income and employment (see Zimmerman, 2005 for an overview).[8] In Sweden, immigrants face higher barriers entering the labour market and use other alternatives to regular employment, in terms of temporary agency work and self-employment (Andersson/Joona & Wadensjö, 2008).

Previous studies points to the importance of macro-economic conditions and business cycle-effect on immigrants' labour market outcome, and suggest that the unemployment probability of immigrants being more cyclically sensitive than natives. For the U.S., Chiswick et al. (1997) show that employment of immigrants is more adversely affected by macroeconomic downturns than natives and Bratsberg et al (2006) find that the wages of immigrants are more sensitive than native wages to changes in local labour market conditions. For Canada, McDonald & Worswick (1997) show that unemployment incidence of immigrant men increases more during an economic downturn compared to that of natives. Dustmann et al (2010)

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[7] For example, Sundqvist & Johansson (1998) find that male immigrants from southern Europe experienced a significant increase in BMI compared to a Swedish control group. Lindström & Sundqvist (2002) shows that some immigrant groups have a higher prevalence of some risk factors for cardiovascular diseases. In addition, immigrant disability pensioners considered their self-reported health, a well-known predictor of future morbidity and mortality, less satisfactory than their native counterparts (Eden et al, 1995).

[8] The labour market attachment of immigrants has changed over time. In the 1970s, the employment rates and incomes levels among foreign-born men were the same as for their native counterparts, the employment levels among foreign- born women were higher than those among native women. During the 1980s the picture of immigrants in the labour market changed, and during both the 1980s and 1990s the relative earnings and employment rates declined (Scott, 1999; Bevelander, 2000).

investigate the business cycle-effect among immigrants in Germany and the UK and find that the unemployment probability of immigrants is more cyclically sensitive. For Norway, Hardoy & Schone (2013) investigate the effect of plant closures on employment over the business cycle and find that the effect is more severe in a recession and particularly for immigrants and Barth et al (2004) find that the earnings of immigrants from outside the OECD area are more affected by local labour market conditions than natives.

The pattern that the employment among immigrants is more cyclically sensitive indicate that the early retirement pension risk of immigrants is more affected by changes in the characteristics at the labour market in terms of the unemployment rate, structural and technological change and the working environment. Thus, we expect a stronger relationship between the county level unemployment rate and early retirement risk for immigrants than natives. One explanation is that immigrants are overrepresented in educational groups and sectors and in occupations experiencing the largest job losses during an economic downturn (see Orrenius & Zavodny, 2009 for an overview). Another explanation is that there over time may have been an increasing demand for country-specific human capital among employers, due to more flexible work organization (Rosholm, Scott & Husted (2006). Since immigrants presumably have relatively lower country-specific human capital and since we expect employers to keep their most productive workers first during an economic downturn, potentially immigrants are displaced by more skilled employees as they move down the skill chain during a recession (Deveraux, 2004). This hypothesis receives support from earlier studies, indicating that immigrants have a higher probability of experiencing an unemployment related pathway in to disability retirement (Larsen & Pedersen, 2008 for Denmark and Riphahn, 1997 for Germany).

It is important not treating immigrants as a homogenous group. Previous research for several OECD-countries, including Sweden, shows that there are differences in labour market and social insurance outcome between different immigrant groups depending on country of origin and year since migration. For Norway, Bratsberg et al (2014) show that there are large differences in disability retirement probability based on country of origin. While western European labour migrants arriving in the 1970s have similar disability pension probability as natives, the Turkish and Pakistani labour migrants arriving at the same time have substantially higher disability pension probability than natives. In addition, also refugees and tied movers from non-European countries arriving in the 1980s and refugees from the

Balkan countries arriving in the 1990s have higher disability probabilities than natives 15 years after arrival. Bratsberg et al (2010) point to deteriorating labour market conditions over time. Labour migrants arriving from developing countries in the 1970s have high disability pension rates later in life despite high employment level upon arrival.

As mentioned above, there is an existing literature on the importance of labour market conditions and early retirement pensions and on immigrants' health and performance at the labour market. In this study, we combine these perspectives with an investigation of the relationship between regional labour market conditions and early retirement pension transitions among immigrants. Thus, this study extends the existing literature on early retirement among immigrants by analysing the link between regional labour market conditions and early retirement among immigrants using longitudinal registers data.

5. Method and Research Design

The empirical analysis consists of two parts. The first part addresses if immigrants and natives have different disability pension risk.[9] The second part examines how county-level unemployment affects the risk of experience a transition into early retirement. The relationship between the county-level unemployment rate and early retirement is estimated by the following regression model:

$$y_{ijt} = \alpha_1 + \beta_1 X_{ijt} + \beta_2 Z_{jt} + \theta_j + \gamma_t + \varepsilon_{ijt} \quad (1)$$

where i=1,…,M, j=1,…,N and t=1,…,T. The dependent variable y_{iit} =1 if individual *i* living in county *j* in time period *t* have a transition to early retirement pension. Equation (1) is applied to all observations where y_{ijt-1} =0. The probability is a function of individual and household characteristics X_{ijt} and the regional unemployment rate Z_{jt}, which varies between counties and over time but is fixed for individuals living in the same county in a given time period. The exogenous character of the county-level unemployment rate

[9] We estimate regressions on the pooled sample in order to analyse if natives and immigrants differ in terms of disability retirement probability, controlling for a set of covariates.

reflects variation in labour demand in terms of individual employment opportunities. If disability retirement is a response to worsened regional labour market conditions, we expect the β_2 coefficient - the key parameter of interest - to be positive.

The county-level unemployment rate also reflects differences in social structure between the regions. A high regional unemployment rate might partly be due to social norms, i.e. attitudes towards work and leisure, potentially also affecting the interpretation and use of the regulatory framework for early retirement pension among the social insurance offices. In order to capture long-standing differences in "traditions" and social norms between the administrative regions, county-specific effects θ_j are included in the model.[10]

Another potential problem is "policy endogenity", i.e. when policies are set in response to labour market conditions - either more restrictive or generous, which might bias the estimation. For example, an observed negative relationship between the county level unemployment rate and disability pension transition might be a product of that the rules around the social insurance system becomes less generous when the labour market is tightened. This problem is less problematic in the context of Sweden, since the regulatory framework is stipulated at the national level and does not allow variation in benefits and rules between the local social insurance offices. Hence, if there is a change in regulation in response to the labour market situation it will occur on an annual basis at the national level. It is assumed that changes in the regulatory framework at the national level are captured including year-specific effects γ_t in the model.

The inclusion of county-specific and year-specific effects implies that a potential bias of the estimated effect from regional unemployment rate is taken into consideration. Thus, this effect reflects if disability pension is a response to the local labour market situation facing the individual and is not influenced from other characteristics at the county level and institutional changes at the national level.

In order to identify the effect from local labour demand it is an advantage that the investigated time period contains both downturns and upturns in the

[10] The county-specific effects does not, however, capture regional variation in social norms that changes over time.

economy.[11] Moreover, county-level unemployment rates do not only follow the national business cycle. This pattern is crucial in view of that the inclusion of the time-specific effect removes the variation in unemployment rates that follows from the national time trend and national business cycle. Hence, it is likely that the regional unemployment rate varies sufficiently identify the impact from local labour market conditions.

We estimate the regressions (equation 1) as linear probability models.[12] When combining aggregated data with individual level data there is generally an assumption that the errors are uncorrelated within groups. However, since it is reasonable to expect that location that share an observable characteristic also share unobservable characteristics, this assumption is problematic and might lead to downward biased standard errors (Moulton, 1990). Therefore, the standard errors are adjusted for intra-group (cluster) correlation.

In view of that the risk to experience a transition into early retirement is highly age- related, we estimate the models separately for different age groups. This approach increases our understanding if there are different mechanisms behind the early retirement pension decision for different age groups, e.g. if individuals close to the official retirement age are more sensitive to the local labour market situation. We also estimate the models separate for natives and immigrants and for different country of origin-groups. In order to capture gender-differences, we estimate separate regressions for men and women.

Unfortunately the data does not contain any information regarding health status. One approach to deal with this problem would be to consider sickness absence as a proxy for health status. However, there are indications that the sickness absence in Sweden is affected by the labour market situation. Furthermore, since the process to early retirement pension often comprises a period with sickness absence (see Palme & Svensson, 2004), we also expect a strong correlation between sickness absence and early retirement pension. Thus, sickness absence is not considered as a proxy for health status.

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[11] As mentioned in section 3, the unemployment rate were extremely low during the business cycle peak in the late 1980s, reached its highest level 1993 during the economic crises and were then stable up under a period of recovery up to the end of the 1990s when the economy peaked. The regional unemployment rate varies from 2 to 19 percent, showing that this study analyses different states of the economy.

[12] Estimating the models as logit models give similar qualitative results as in the linear probability models.

In order to partly deal with this potential omitted variable problem, we also estimate a fixed effect model, analysing within-individual variation in the outcome, i.e. comparing the outcome of individual *i* at time *t* with the outcome of the same individual at time, *t+1*. Within this framework, the estimated coefficients are based on intrapersonal changes instead of differences between individuals. The inclusion of an individual specific fixed effect in the model implies that individual characteristics that are stable over time are removed which eliminates potential sources of bias. However, whereas this approach control for the time-invariant health status of the individual, changes in health status over time are not taken into account. Potentially, the error term ε_{ijt} consist of an individual effect that is both time-variant, due to unobserved heterogeneity, e.g. health status and individual preferences towards retirement, both being affected by the regional unemployment rate.

If the individual is more likely to withdraw from the labour force into early retirement when the regional unemployment rate is high, we expect the β_2 coefficient to be positive. Following Kohli and Rein (1991), we distinguish between different pathways into early retirement pension and explore whether the link between county-level unemployment and early retirement pension is different based on the individuals labour market position. We estimate Equation (1) examining the interaction effect between regional unemployment rate and labour market status in t-1, distinguishing between unemployment, sickness absence and employment. Employment is treated as the reference category in these estimations. If worsened labour market conditions increase the early retirement pension risk in general, then we expect a higher regional unemployment rate to raise the retirement probability for individuals being unemployed or sickness absent compared to those being employed.

6. Data and Variables

Data comes from LINDA (Longitudinal Individual Data for Sweden), which is a rich administrative register-based longitudinal data set for Sweden with yearly information from 1968 to 2003. It consists of a large panel of individuals and their household members. The core registers are the Income Registers and Population Censuses. LINDA consists of two separate samples: a primary sample of approximately three percent of the total Swedish population (roughly 300,000 individuals) and a non-overlapping immigrant

sample of 20 percent of the foreign-born population.[13] The panel is representative of the Swedish population and includes demographic and socio-economic information. Since it is not possible to identify disability pensioners in the data before 1982, we use data from this year onwards. An attractive feature of LINDA is that it contains information of county of residence, which is used to match in county-level data on regional unemployment rate.[14]

An important advantage of the data is that it contains direct register information on early retirement pension benefits, and that problems related to survey data (e.g. self-reported information) are absent. In addition, the data allows us to perfectly observe the decision of early retirement pension, to distinguish between whether the disability pension is on part or full time. An individual is defined as early retirement pension if he or she receives early retirement pension on part-time basis or more.

Early retirement is treated as an absorbing state, i.e. the retirement decision is assumed to be terminal and possible mobility to other statuses is neglected. An examination of the data confirms the presumption that practically no disability pensioners return to work. Thus, we estimate the probability to enter disability pension in time t conditioned that the individual is not on disability pension in time t-1. In view of that the we estimate transitions, individuals who only end up in the data during one year and thereby are not on risk to experience a new transition are excluded.

The panel data contains information on different types of income, which makes it possible to identify labour market status by comparing income from work, unemployment insurance benefits and sickness insurance benefits. Thus, the sample is not conditioned on the individual being employed. Individuals can also have several types of income in a given year. In order to define labour market status the whole income profile of the individual is considered, allowing us to identify the main source of income. An individual is defined as sickness absent if sickness benefits are more than 2 basic amounts (BA) and if income from work is less than 2 BA.[15] An individual is

[13] For more information about LINDA, see Edin & Fredriksson (2000).

[14] The county-level unemployment rate is defined as the share of the labour force in the ages 20-64 in the counties that are unemployed or in labour market programs. The register-based regional unemployment statistics comes from The Swedish Labour Market Board.

[15] The term Basic Amount is an administrative indexation unit that most public transfers in Sweden are related to. The level of the Basic Amount is stipulated yearly by the Swedish

classified as unemployed if income from work is less than 2 BA, if sickness benefits are less than 2 BA and if income from work is not the major source of income.

The empirical analysis is conducted on two different periods, 1982-1991 and 1992-2003. The reason for this division is found in the aforementioned changes in the institutional setup regarding the disability pension system (see Appendix for an overview). In 1991, the law terminated the use of labour market considerations in the disability pension decision. In order to avoid this institutional change affecting our results, we therefore estimate separate regressions for the different periods. In addition, this approach allows to identify whether the effects from worsened regional economic conditions is different in different labour market contexts.

The two samples consist of 62, 741 individuals (37, 818 natives and 24, 923 immigrants) who experience a transition into disability pension. The sample for the period 1992-2003 is larger (n=38, 813) than the sample for the period 1982-1991 (n=23, 372). We restrict the sample to individuals aged 40-64. The sample is representative for this age group through the whole period since new 40 -year -olds are added every year.

Both men and women are included in the analysis. While previous studies often focus on men, such a restriction is not appropriate in an analysis of Sweden, since women have a very high participation rates at the labour market compared to countries outside Scandinavia.

There is an obvious gender division of labour in the labour market where women dominate the public sector employment. The gender division is also obvious in the household, such that women undertake a much higher proportion of household work (Stanfors, 2003).

Variables reflecting individual and household characteristics are age, sex, civil status and size of household (an indicator of children in the household). In line with previous research, we expect women to have a higher early retirement pension risk. Civil status is included in the model, due to the assumption that the retirement decision could be seen as a "joint decision" within in the family, with a spill- over effect when the spouse retires (Blau,

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Government and changes over time in line with the inflation rate. In 2003, 1 base amount was 38 600 SEK, or approximately 3900 Euros. Income from work consists of the sum of income from business activity, earnings from work, parents allowance and care allowance.

1998). In order to capture the process of immigrants accumulating human capital, in terms of work experience, seniority, union membership and intrapersonal networks in the host country, we include a variable for year since migration in the model. The sample consists of individuals migrating to Sweden during the period 1940 to 2000.16

Thus, this study analyses both refugees and labour migrants from European countries arriving during the 1950s and 1960s, and the refugees and tied movers from non-European countries entering Sweden in the 1970s and 1980s. Previous research in the case of Sweden also shows that there are differences based on country of origin. While immigrants from Western Europe and non-European English speaking countries have labour market performance in parity to natives, non-European immigrants have lower labour force participation rates and higher unemployment levels in compared to natives (Edin & Åslund, 2001; Scott, 1999; Rooth, 1999). In order to capture differences based on country of origin, we divide the immigrant population into five categories based on country of birth.[17]

We assume an inverse association between the individuals' socio-economic position and the early retirement pension risk. Two different indicators are used to proxy socioeconomic position. In the regressions for the period 1982-1991 the individuals' income is included as a proxy for socio-economic position. In the regressions for the period 1992-2003 the individuals' educational level is included. Education is divided into three categories, primary education, vocational education and higher education.[18] For each category a dummy variable is constructed with primary education as the reference category. In line with the human capital approach the educational level is assumed to reflect socioeconomic position and thus we expect a negative relation between educational level and the risk to have a transition

[16] Immigration in Sweden from 1945 to the present day can be divided into two phases. During the period 1945 to 1970, immigration into Sweden was dominated by refugees and labour migrants from Europe. From the 1970s onwards, immigration was dominated by refugee migration and tied movers from non-European countries.

[17] The categories are, "Nordic countries", "Western Europe", "Eastern Europe", "Southern Europe" and "Non-Europe".

[18] The educational categories are based on the Swedish SUN code, containing of 5 levels. The information comes from the Swedish Education Register, which contains of information of the individuals highest education, received either in Sweden or in the country of origin, where a foreign education are translated to Swedish circumstances.

into disability pension. Income is chosen as an indicator since the data contains no information of education during the 1980s.

The county unemployment rate is used as an indicator of local labour demand. The county level is chosen since the decision regarding disability pension is taken from the Social Insurance Board, organised at the county level, and that there might be an interaction between the development at the labour market and the social insurance schemes such that early exit from the labour market are facilitated when the economy turns down. Moreover, the counties correspond to a high extent to the Swedish labour market regions and are therefore assumed to reflect the local labour market facing the individual. In the estimations, the regional unemployment rate is lagged one year, since it is reasonable that the link between local economic conditions and the retirement decision is not always immediate, e.g. the transition year could be in *t-1* while the outcome is observed in *t*. In addition, using the lagged unemployment rate reduces the otherwise problem of a functional relation to the individual choice.[19]

7. Summary Statistics

Table 1 shows the descriptive statistics for individuals experiencing a transition into early retirement pension. Immigrants become disability pensioners at younger ages than natives, but the average immigrants who have a transition to disability pension have been in Sweden for more than 20 years. Almost 50 percent of the foreign born disability pensioners are from the Nordic countries, which likely relate to that many immigrants from Finland approach the statutory retirement age. Immigrants and natives have similar educational levels similiar proportion of men and women.

The descriptive statistics further hints at immigrants and natives have different pathways into early retirement pension. Immigrants more often

[19] For example, if the individual is a subgroup of the total there would be a negative relation between the aggregate measurement and the individual outcome. However, since data for the local unemployment rate comes from another data source this problem would probably be minor even without lagging.

enter early retirement using an "unemployment related pathway", whereas it is more common among natives to experience an "employment related pathway". This pattern does not only reflect differences in labour market attachment, but indicates also that the mechanism behind early retirement transitions is different.

Table 1. Summary Statistics on the explanatory variables for individuals on Early Retirement Pension. Sample Mean. Natives and Immigrants. 1982-1991 and 1992-2003, respectively

	1982-1991				1992-2003			
	Immigrants		Natives		Immigrants		Natives	
Variable	**Mean**	**Std dev**	**Mean**	**Std dev**	**Mean**	**Std dev**	**Mean**	**Std dev**
Age	51.19	6.6	57.01		52.05	6.52	55.19	6.29
Women	0.54	0.50	.49		0.53	0.49	0.55	0.49
Married	0.56	0.50	0.54		0.58	0.49	0.49	0.5
Household size	2.46		2.08		2.48	1.4	2.25	1.03
Ysm	13.3		-	-	22.75	11.45	-	-
Educational level								
Primary	-	-	-	-	0.45	0.49	0.40	0.49
Secondary	-	-	-	-	0.41	0.49	0.44	0.50
University	-	-	-	-	0.13	0.34	0.15	0.36
Country of origin								
Norden	0.37	0.48	-	-	0.44	0.49	-	-
South Europe	0.27	0.45	-	-	0.2	0.4	-	-
West Europe	0.02	0.14	-	-	0.07	0.26	-	-
Eastern Europe	0.11	0.31	-	-	0.07	0.25	-	-
Non-Europe	0.15	0.36	-	-	0.22	0.42	-	-
Regional unemployment rate	2.06	1.10	2.96	1.66	7.19	2.97	8.37	3.1
Pathways into disability								
Unemployment related	0.18				0.24		0.18	
Employment related	0.32				0.24		0.49	
Sickness Absence related	0.50				0.52		0.33	
individuals (n)	**6024**	**17 348**			**18 899**		**20 470**	

8. Results

The empirical analysis consists of two parts. First, we estimate regressions on the pooled sample to analyse if natives and immigrants have different disability pension risk, controlling for a set of covariates. Second, we estimate if the disability pension risk is cyclically sensitive, i.e. the

regressions are performed separately for natives and immigrants, by gender and country of birth-region.

Table 2 presents the results from the estimation of the logistic regression on the pooled sample (both natives and immigrants) for the period 1982-1991 and 1992-2003, respectively. We use an interaction term between year since migration and country of birth with natives as the reference group in order to compare the disability pension risk for different immigrant groups.

Table 2. Logistic Regression Model on Early Retirement Pension transitions, 1982-1991 and 1992-2003, respectively. Pooled sample, age 40-64. Odds ratios

Variable	**1982-1991**	**1992-2003**
Women	0.982	1.488*
Married	1.067***	1.087***
Household size	0.591***	0.913***
Income	0.789***	-
Education		
Primary	-	ref
Secondary	-	0.700***
University	-	0.378***
Country of origin		
Sweden	ref	ref
Nordic countries <10 years	1.352***	1.856***
Nordic countries 11-20 years	1.784***	2.062***
Nordic countries >20 years	1.973***	1.638***
Western Europe <10 years	0.459***	1.785***
Western Europe 11-20 years	0.793*	3.179***
Western Europe >20 years	0.414**	1.171***
Southern Europe <10 years	3.445***	1.461***
Southern Europe 11-20 years	5.374***	4.423***
Southern Europe >20 years	5.428***	3.834***
Eastern Europe <10 years	1.088	1.388***
Eastern Europe 11-20 years	1.675***	2.796***
Eastern Europe >20 years	1.351***	2.176***
Non Europe <10 years	1.864***	1.814***
Non Europe 11-20 years	3.539***	3.326***
Non Europe >20 years	2.768***	3.028***
individuals (n)	23 372	38 813

Note: The regression model control for age.

* significant at 10%, ** significant at 5%, *** significant at 1% level.

In line with earlier studies (Hammarstedt, 2000; Österberg & Gustavsson, 2006), the results display a large variation in odds ratios between immigrants from different countries of origin and the early retirement pension risk increases with time spent in Sweden. Column 1 shows the result for the period 1982-91. All immigrant groups, except immigrants from Western Europe, have a higher disability pension risk than natives. Immigrants from the Nordic countries, Southern Europe and non-European immigrants have the highest disability pension risk in relation to natives.

Turning to the result for the period 1992-2003, presented in column 2, we see that all immigrant groups have a higher disability pension risk than natives. While immigrants from Western Europe experience a lower risk than natives during the 1980s they have a higher probability than natives during the 1990s. For several immigrant groups the relationship from time of residence is non-linear – we find the highest disability pension risk for those that resided 11-20 years in Sweden. The large odds ratios for immigrants from Southern Europe arriving during the 1960s and 1970s are in line with previous studies (see Österberg & Gustavsson, 2006). Non-European immigrants also experience a high risk to be on disability pension, in particular for those that spent more than 10 years in Sweden.

In the next step, we explore the link between the regional unemployment rate and the early retirement pension risk. Tables 3-4 display the results from the estimation of the linear probability model on the native and immigrant sample for the period 1982-91. For both natives and immigrants worsened local labour demand has no positive association with the disability pension risk during the 1980s. For natives, the relationship is negative and non-significant across age groups. For immigrants, a negative and statistically negative relationship is found, but this negative relationship is not found among older individuals (aged 55-64) where no support is found for the disability pension risk being cyclically sensitive.

Table 3. Linear probability model of transitions to early retirement pension, Natives, 1982-1991. Coefficients. (Standard errors are clustered at the regional level).

	(1)	(2)	(3)
Variables	All	Age 40-54	Age 55-64
Regional unemployment rate	-0.000	-0.000	0.000
	[0.000]	[0.000]	[0.001]
Woman	-0.002**	0.002**	-0.011***
	[0.001]	[0.001]	[0.002]
Married	0.000	0.001	-0.002*
	[0.001]	[0.001]	[0.001]
Household size	-0.001***	-0.002***	-0.005***
	[0.000]	[0.000]	[0.001]
Income	-0.005***	-0.003***	-0.008***
	[0.000]	[0.000]	[0.001]
Constant	-0.057***	0.005	-0.246***
	[0.010]	[0.003]	[0.032]
Observations	935,243	582,871	231,726
R-squared	0.021	0.003	0.014

The model includes control for age.

Region and year specific fixed effects are included in the model.

* significant at 10%, ** significant at 5%, *** significant at 1% level.

The weak link between county-level unemployment and early retirement pension during the 1980s is presumably a result of the high economic activity at this time, pointing to a weak exclusion process from the labour market during this period. For instance, in the event of job loss there were likely other jobs available.

Table 4. Linear probability model of transitions to early retirement pension, Immigrants, 1982-1991. Coefficients. (Standard errors are clustered at the regional level).

	(1)	(2)	(3)
Variables	All	Age 40-54	Age 55-64
Regional unemployment rate	-0.003**	-0.003**	-0.001
	[0.001]	[0.001]	[0.004]
Woman	0.013***	0.012***	0.021***
	[0.001]	[0.001]	[0.006]
Married	-0.001	-0.001	-0.002
	[0.001]	[0.001]	[0.006]
Household size	-0.001***	-0.001***	0.001
	[0.000]	[0.000]	[0.004]
Income	0.000	0.001	-0.001
	[0.001]	[0.001]	[0.002]
Year since migration	0.000***	0.000***	0.001
	[0.000]	[0.000]	[0.001]
Country of origin			
Nordic countries	reference	reference	reference
Southern Europe	0.040***	0.037***	0.090***
	[0.002]	[0.002]	[0.012]
Eastern Europe	-0.004	-0.002	-0.025**
	[0.003]	[0.002]	[0.011]
West Europe	-0.014***	-0.010***	-0.046***
	[0.001]	[0.001]	[0.007]
Non-Europe	0.012***	0.012***	0.021**
	[0.003]	[0.002]	[0.008]
Constant	-0.184***	-0.139***	-0.317***
	[0.010]	[0.009]	[0.079]
Observations	178,931	161,190	17,741
R-squared	0.032	0.020	0.024

The model includes control for age.

Region and year specific fixed effects are included in the model.

* significant at 10%, ** significant at 5%, *** significant at 1% level.

Turning to the results for the 1990s, presented in table 5 and 6, we see a drastic change in the importance of the local labour market situation. We find a positive relationship between the regional unemployment rate and the early retirement pension risk, in the case of both natives and immigrants, and across age-groups. The finding that worsening local economic conditions increases the likelihood of leaving the labour force into early retirement is in line with the hypothesis of increasing exclusion process from the labour force for individuals living in regions with lower economic activity and fewer job opportunities.

Table 5. Linear probability model of transitions to early retirement pension, Natives, 1992-2003. Coefficients. (Standard errors are clustered at the regional level).

	(1)	(2)	(3)
Variables	All	Age 40-54	Age 55-64
Regional unemployment rate	0.003***	0.001***	0.007***
	[0.000]	[0.000]	[0.001]
Woman	0.004***	0.004***	0.004***
	[0.000]	[0.000]	[0.001]
Education			
Primary	reference	reference	reference
Secondary	-0.005***	-0.003***	-0.007***
	[0.000]	[0.000]	[0.001]
University	-0.009***	-0.006***	-0.014***
	[0.000]	[0.000]	[0.001]
Constant	-0.052***	-0.015***	-0.123***
	[0.004]	[0.002]	[0.009]
Observations	1,982,523	1,470,533	511,990
R-squared	0.010	0.004	0.008

The model includes control for age, civil status and household size.

Region and year specific fixed effects are included in the model.

* significant at 10%, ** significant at 5%, *** significant at 1% level.

Table 6. Linear probability model of transitions to early retirement pension, Immigrants, 1992-2003. Coefficients. (Standard errors are clustered at the regional level).

	(1)	(2)	(3)
Variables	All	Age 40-54	Age 55-64
Regional unemployment rate	0.005***	0.004***	0.009***
	[0.001]	[0.001]	[0.001]
Woman	0.007***	0.008***	0.004***
	[0.000]	[0.000]	[0.001]
Year since migration	0.000	0.000***	-0.000
	[0.000]	[0.000]	[0.000]
Education			
Primary	reference	reference	reference
Secondary	-0.009***	-0.007***	-0.013***
	[0.001]	[0.001]	[0.001]
University	-0.018***	-0.015***	-0.028***
	[0.000]	[0.000]	[0.001]
Country of origin			
Nordic countries	reference	reference	reference
West Europe	0.002**	0.003***	-0.001
	[0.001]	[0.001]	[0.002]
Southern Europe	0.013***	0.012***	0.016***
	[0.002]	[0.002]	[0.003]
Eastern Europe	0.006***	0.004***	0.011***
	[0.001]	[0.001]	[0.003]
Non-European	0.008***	0.008***	0.007***
	[0.001]	[0.001]	[0.002]
Constant	-0.067***	-0.048***	-0.125***
	[0.003]	[0.003]	[0.015]
Observations	958,291	759,584	198,707
R-squared	0.013	0.009	0.011

The model includes control for age, civil status and household size.

Region and year specific fixed effects are included in the model.

* significant at 10%, ** significant at 5%, *** significant at 1% level.

The results show that the impact of count-level unemployment on early retirement operates differently in different states of the economy. Although the eligibility rules changed in 1991 and the use of the labour market considerations for receiving early retirement pensions was abolished, our findings show that regional labour demand increases the likelihood early of retirement pensions during the 1990s. This finding has several potential explanations. One explanation is that there was increasing mismatch between labour demand and the individuals' human capital and/or that individuals were discouraged in their job search during the 1990s, and despite stricter eligibility rules being implemented, these exclusion process increased early retirement pension transitions. Another explanation is that there was a lag in the interpretation of the new rules, presumably interacting with worsened regional labour market conditions.

In order to partly deal with the lack of direct information of health status, we estimate the specification as a fixed effect model, controlling for time-invariant factors of the individual. Table 7 presents the key parameters of the fixed effect model for the two time-periods and for natives and immigrants, respectively.

Table 7. Linear probability model of transitions to early retirement pension. Fixed Effect Models for period 1982-1991 and 1992-2003, respectively. Coefficients from regional unemployment rate (Z_{t-1}).

	(1)	(2)	(3)	(1)	(2)	(3)
Variable	All	Age 40-54	Age 55-64	All	Age 40-54	Age 55-64
1982-1991						
Regional unemployment rate	0.006***	-0.006***	-0.012*	-0.002***	-0.001**	-0.002
	[0.001]	[0.001]	[0.007]	[0.000]	[0.000]	[0.001]
Observations	178,931	161,190	17,741	935,243	582,871	231,726
1992-2003						
Regional unemployment rate	0.001***	0.001*	0.004***	0.002***	0.001***	0.004***
	[0.000]	[0.000]	[0.0010]	[0.000]	[0.000]	[0.000]
Observations	958,291	759,584	198,707	1,982,523	1,470,533	511,990

Standard errors are clustered at the regional level.

The model includes control for age, sex, civil status, household size, educational level and year since migration.

Region and year specific effects are included in the model.

* significant at 10%, ** significant at 5%, *** significant at 1% level.

The results confirm the results in the linear probability model. As expected, exploring within-individual variation rather than between–individual variation implies that the size of the effect decreases, suggesting that part of the effect from labour market conditions relates to individual preferences or health status. For the period 1982-1991 the estimates for natives are statistically significant in the fixed effect model.

In the next step, we solely put focus on the period 1992-2003, in order to explore the mechanisms underlying the positive relationship between county-level unemployment rate and early retirement pension. Table 8 reports the results from the estimation of the models with an interaction-effect between regional unemployment rate and labour market status in *t-1* for both natives and immigrants.

Table 8. Linear probability model of transitions to early retirement pension, 1992-2003, Natives and Immigrants respectively. Coefficients from interaction effect of lagged labour market status and regional unemployment rate (Z_{t-1}).

	(1)	(2)	(3)
	All	Age 40-54	Age 55-64
Immigrants			
Employment*Regional_UE	ref	ref	ref
Unemployment*Regional_UE	0.001***	0.001***	0.001***
	[0.000]	[0.000]	[0.000]
Sickness Absence*Regional_UE	0.040***	0.034***	0.060***
	[0.004]	[0.003]	[0.005]
Natives			
Employment*Regional_UE	ref	ref	ref
Unemployment*Regional_UE	0.001***	0.001***	0.001***
	[0.000]	[0.000]	[0.000]
Sickness Absence*Regional_UE	0.034***	0.026***	0.049***
	[0.002]	[0.002]	[0.003]

Standard errors are clustered at the regional level.

The model includes control for age, sex, civil status, household size, educational level.

Region and year specific effects are included in the model.

The estimation on the immigrants sample coontrols for year since migration country of birth-region

* significant at 10%, ** significant at 5%, *** significant at 1% level.

The findings show that the effect from worsened regional unemployment operates differently based on the individuals labour market position. As expected, individuals being unemployed or sickness absent are more likely than employed individuals to enter early retirement pension in response to worsen regional labour demand. The effect is strongest for individuals with an "sickness benefits related pathway", which is in line with previous finding that the process into early retirement pension often being gradual via receiving sickness benefits (see Palme & Svensson, 2004 for an overview).[20]

As mentioned above, we find that women have a higher early retirement pension risk than men. Table 9 presents the results from the regression on the pooled sample of native and immigrant women. The findings show that foreign-born women have higher disability pension probability than native women. Women arriving from southern Europe in the 1960s and 1970s have the highest risk. One potential explanation to the higher probability among immigrant women from these countries is that they arrived as labour migrants, worked long hours and full-time to a greater extent than native women. Another reason could be that they expected to stay in Sweden for only a short period and organized their lives to accomplish as great savings as possible in as short time as possible. In the short run this might encourage a high degree of overloading, especially for the woman in a family, i.e. working full time yet still having the main responsibility for the family. Thus, foreign-born women were potentially caught between the expectations from their country of origin where the rate of female employment was comparative low and the Swedish system with a high female employment rate (Eden, 1998).

In order to explore if the mechanisms are different for men and women, we estimate separate regressions for both natives and immigrants stratified by gender. The results show that there are small differences, i.e. men and women behave similar in terms of the respond to worsen local labour demand. The results indicate that the higher early retirement pension probability of women is not related to differences in behaviour, but rather a result of that women have other characteristics.

[20] We also examine the interaction effect for the different countries of origin- groups, generating similar results.

Table 9. Separate Logistic Regression Model on Early Retirement Pension transitions for men and women, 1992-2003, age 40-64. Odds ratios.

Variable	Women	Men
		1,488*
Married	1,22***	1,087***
Household size	0,943***	0,913***
Education		
Primary	ref	ref
Secondary	0,697***	0,700***
University	0,395***	0,378***
Country of origin		
Sweden	ref	ref
Nordic countries <10 years	1,634***	1,856***
Nordic countries 11-20 years	1,609***	2,062***
Nordic countries >20 years	1,555***	1,638***
Western Europe <10 years	1,449***	1,785***
Western Europe 11-20 years	3,149***	3,179***
Western Europe >20 years	1,174***	1,171***
Southern Europe <10 years	1,113***	1,461***
Southern Europe 11-20 years	3,894***	4,423***
Southern Europe >20 years	4,034***	3,834***
Eastern Europe <10 years	1,108***	1,388***
Eastern Europe 11-20 years	2,347***	2,796***
Eastern Europe >20 years	1,988***	2,176***
Non Europe <10 years	1,432***	1,814***
Non Europe 11-20 years	2,924***	3,326***
Non Europe >20 years	3,225***	3,028***
individuals (n)	38813	38813

Note: The regression model control for age.

* significant at 10%, ** significant at 5%, *** significant at 1% level.

In a final step, we estimate the models separately for different immigrant groups in order to explore if the effect from county-level unemployment operates differently for different country of origin-groups. Table 10 presents the results.

Table 10. Linear probability model of transitions to early retirement pension, stratified on country of origin-groups, 1992-2003. Coefficients from lagged regional unemployment rate (Z_{t-1}).

	(1)	(2)	(3)
Country of origin	All	Age 40-54	Age 55-64
Nordic countries	0.005***	0.004***	0.008***
	[0.000]	[0.000]	[0.001]
West Europe	0.002**	0.001*	0.004**
	[0.000]	[0.000]	[0.002]
Southern Europe	0.011***	0.011***	0.013***
	[0.003]	[0.002]	[0.005]
Eastern Europe	0.008***	0.006***	0.019***
	[0.000]	[0.000]	[0.004]
Non-Europe	0.005***	0.004	0.013***
	[0.000]	[0.000]	[0.003]

Standard errors are clustered at the regional level.
The model includes control for age, sex, civil status, household size, educational level and year since migration.
Region and year specific effects are included in the model.
* significant at 10%, ** significant at 5%, *** significant at 1% level.

We find the largest effect of worsened labour market conditions among immigrants from Southern Europe and Eastern Europe, whereas the lowest effect is found for immigrants from Western Europe. The effect increases by age, and particularly older immigrants from Southern Europe and Eastern Europe are being highly affected by county-level unemployment. One potential explanation to this pattern is that this age-group is dominated by individuals migrating to Sweden before 1970s as labour migrants and refugees and initially had high employment rates. In order to capture differences between labour migrants and those migrated after 1970, the models are estimated separately for immigrants from Southern Europe and Eastern Europe migrating before and after 1970. We find the strongest response to worsened labour market conditions among labour migrants from Southern Europe.

Sensitivity Analysis

The sensitivity analysis tests the robustness of the results to changes in the specification of the model and to other sample restrictions. First, in the analysis above the transition to disability pension is defined from whether the individual is part time or more on early retirement pension. The models are re-estimated for individuals who are on part time disability pension or less, but also for individuals that enter full time disability pension. The results are not affected using other definitions. Second, in order to capture the typical gradual process into early retirement we re-estimate the models and lag regional unemployment two years, rather than one year. The results are similar to our baseline findings and confirm the expectation of a gradual process into early retirement pension from decreased employment opportunities as regional labour market conditions are worsened. Estimating the models using a three year unemployment rate lag, however, generates small and not statistically significant estimates, indicating that the effect from worsened regional labour market conditions on transitions does not remain endlessly.

Because disability pension is highly age-related the separate regressions for the two age-groups also include control for age. In order to capture the potential U-shaped relation with age, we estimate the models also including age square, which nevertheless does not change the results. Moreover, we investigate if the results are robust for other age-classifications in order to analyse whether individuals near the official retirement age are more likely to enter disability pension in periods of a poor labour market situation. This is also motivated by the aforementioned eligibility rules for individuals aged 60-64, potentially affecting the results. In order to capture if the effect for the older age-group is driven by the eligibility rules, we estimate the models separately for individuals aged and 55-59 and 60-64. In addition, we also estimate the interaction-effect between regional unemployment rate and labour market status for the age-groups in order to see if the effect operates differently based on labour market position. The estimates are similar, indicating that the results are not driven by the eligibility rules. In addition, the results show that individuals near the official retirement age are not being more sensitive for a worsened local labour market situation.

9. Conclusions

The Swedish economy has been characterized by a structural transformation and a tightening labour market during the last decades. The unemployment rate increased dramatically during the first part of the 1990s as a result of the deep economic crisis. This declining labour market situation was particularly severe for the foreign born. Simultaneously, there was an increasing withdrawal from the labour force in terms of early retirement pension, with immigrants comprising a non-proportional part of this inflow.

This study analyses early retirement pensions among immigrants during a period when the labour market had tightened, and explores if downturns in the labour market increase early retirement transitions. By adopting a regional approach, we use the variation and fluctuation in local economic conditions across the regions in order to identify the impact of regional labour market conditions on early retirement pension. The regional approach also makes it possible to take differences in social norms at the regional level into account, thereby dealing with the potential interaction between regional labour market conditions and the social insurance schemes.

The results show that early retirement pension transitions are affected by regional labour demand. The positive relationship between county-level unemployment rate and early retirement is consistent with earlier studies. While Hallberg (2011) identifies a link between industry employment rates and early exits via occupational pension in Sweden, this study finds that worsened labour market conditions also affect early exits via the publicly financed early retirement pension system.

The result points to the incidence of early retirement pension in Sweden not only being health-induced, but also related to non-medical factors, which is consistent with earlier studies finding that large variations in early retirement pension inflow were not related to changes in population health (see Johansson et al, 2014a). The study adds to previous findings of the significance of changes in eligibility rules (Jönsson et al, 2012) and relative pension income (Palme & Svensson, 2004), by showing that the inflow into early retirement pension is also affected by regional labour demand.

The empirical analysis shows that the impact of worsened labour market conditions operates differently on early retirement pension transitions in different labour market contexts and states of the economy. While we find that individuals are more likely to withdraw from the labour force into early retirement pension in response to worsened local labour demand in the 1990s,

we find no such relationship during the 1980s, a period characterized by high economic activity with more job opportunities. The finding that the effect of unemployment (e.g. due to job loss) operates differently based on macro-economic conditions is in line with Eliason & Storrie (2006), who explore the long-term labour market effects of plant closures in Sweden during the 1980s and 1990s. Our finding of regional labour demand being more important over time in affecting early retirement transitions is consistent with the notion that the use of the early retirement pension in Sweden in the mid-1990s and early 2000s was a product of labour market, and that harder competition for jobs excluded low productivity individuals and/or discouraged individuals in their job search. In other words, higher unemployment in the 1990s has worked as an obstacle, limiting the ability for individuals to remain in the labour force. Interestingly, this exclusion process increased early retirement pension transitions, despite the eligibility rules becoming stricter during the 1990s.

The empirical analysis also shows that early retirement pension propensity is different based on gender and country of origin. Women have a higher early retirement probability than men and foreign-born women have higher probability than native women. Importantly, the foreign-born population is not homogenous and we find differences between different countries of origin-groups. Immigrants from the Nordic countries, Southern Europe and non-European countries have the highest early retirement pension probability and immigrants from Western Europe have lowest probability. Analysing the significance of regional labour demand across countries of origin, we find the largest effect of worsened labour market conditions among immigrants from Southern Europe and Eastern Europe, whereas the lowest effect is found for immigrants from Western Europe. A particularly strong effect is found for labour migrants from southern Europe. One potential explanation to this finding is that the labour migrants from Southern Europe, were initially recruited into the manufacturing industry, a sector of the economy that experienced drastic changes in the 1990s, experiencing skill-biased technological change which may have disproportionately impacted immigrants. In the case of foreign-born women from southern Europe, this process was presumably reinforced by combining full-time work with having the main responsibility for the household.

Our findings from the fixed effect model and the model estimating the interaction-effect indicate that health and weak labour market attachment may operate as mutually reinforcing mechanisms, such as poor health

affecting labour market status, which in turn influences early retirement pension probability.

This study contributes to our understanding by raising awareness of the importance of local labour market conditions as a determinant of disability pension transitions, which is important given the upcoming demographic changes with an ageing population in rich OECD countries. More efficient policies for promoting higher labour force participation are important in enhancing individual well-being in both the short and long term, because there may be long-lasting effects from labour market exclusion.

References

Andersson/Joona, P., & Wadensjö, E. (2008). A note on Immigrant Representation in Temporary Agency Work and Self-employment in Sweden. *Labour*, 22(3), 495-507.

Andrén, D. (2001). *Work, Sickness, Earnings and Early Exits from the Labour Market. An Empirical analysis using Swedish longitudinal data.* Doctoral Thesis. Gothenburg University.

Autor, D. H., & Duggan, M. G. (2003). The Rise in the Disability Rolls and the Decline in Unemployment. *The Quarterly Journal of Economics*, 118 (1), 157-206.

Barth, E., Bratsberg, B., & Raaum, O. (2004). Identifying earnings assimilation of immigrants under changing macroeconomic conditions. *Scandinavian Journal of Economics*, 106(1), 1-22.

Bevelander, P. (2000). Immigrant Employment integration and structural change in Sweden, 1970-1995. Doctoral Thesis. Lund University.

Blau, D. (1998). Labor Force dynamics of older married couples. *Journal of Labour Economics* 17(3), 595-629.

Bratsberg, B., Barth, E., & Raaum, O. (2006). Local unemployment and the relative wages of immigrants: Evidence from the current population surveys. *The Review of Economics and Statistics*, 88(2), 243-263.

Bratsberg, B., Raaum, O., & Roed, K. (2010). When Minority Migrants Meet the Welfare State. *Journal of Labour Economics,* 28(3), 633-676.

Bratsberg, B., Fevang, E., & Røed, K. (2013). Job loss and disability insurance. *Labour Economics*, *24*, 137-150.

Bratsberg, B., Raaum, O., & Røed, K. (2014). Immigrants, labour market performance and social insurance. *The Economic Journal*, *124*(580), 644-683.

Coile, C., & Levine, P.B. (2007). Labor market shocks and retirement: Do government programs matter?. *Journal of Public Economics*, 91,1902-1919.

Coile, C., & Levine, P.B. (2010). Recessions, Retirement and Social Security. *American Economic Review*, 101 (3), 23-28.

Chan, S., & Stevens, A.H. (2001). Job Loss and Employment Patterns of Older Workers. *Journal of Labour Economics*, 19(2), 484-521.

Chiswick, B.R., Cohen, Y., & Zack, T. (1997). Labour market status of immigrants: effects of the unemployment rate at arrival and duration of residence. *Industrial Labour Relations Review*, 52, 289-303.

Deveraux, P.J. (2004). Cyclical Quality Adjustment in the Labor Market. *Southern Economic Journal*, 70(3), 600-615.

Dellis, A., Desmet, R., Jousten, A., & Perelman, S. (2004). Micro-modeling of retirement in Belgium. In Gruber, J & Wise, D (Ed.), *Social Security Programs and Retirement around the World: Micro-Estimation* (pp. 41-98). University of Chicago Press.

Dustmann, C., Glitz, A., & Vogel, T. (2010). Employment, wages, and the economic cycle: Differences between immigrants and natives. *European Economic Review*, *54*(1), 1-17.

Edén, L., Brokhöj, T., Ejlertsson, G., Leden, I., & Nordbeck, B. (1998). Is disability pension related to quality of life?. *Scandinavian Journal of Social Welfare*, *7*(4), 300-309.

Edin, P.A., & Fredriksson, P. (2000). *LINDA Longitudinal Individual Data for Sweden*. Working paper 19, Department of Economics, Uppsala University.

Eliason, M., & Storrie, D. (2006). Lasting or latent scars? Swedish evidence on the long-term effects of job displacement. *Journal of Labor Economics*, *24*(4), 831-856.

Grape, O., & Lindqvist, R. (1997). FoÈrtidspensioneringens dynamik [The dynamics of disability pensioning]. *Medikalisering, professionalisering och haÈ lsa. Ett sociologiskt perspektiv [Medicalization, professionalisation and health. A sociological perspective]. Lund: Studentlitteratur*, 126-142.

Gruber, J., & Wise, D. (2004). *Social Security and Retirement Around the World: Microestimates.* Chicago University Press: Chicago.

Gruber, J., & Wise, D. (2010). *Social Security and Retirement Around the World: The Relationship to Youth Employment.* Chicago University Press: Chicago.

Gustafsson, K., Aronsson, G., Marklund, S., Wikman, A., & Floderus, B. (2014). Peripheral labour market position and risk of disability pension: a prospective population-based study. *BMJ open*, *4*(8),

Hakola, T., & Uusitalo, R. (2005). Not so voluntary retirement decisions? Evidence from a pension reform. *Journal of Public Economics*, 89(11), 2121-2136.

Hallberg, D. (2011). Economic fluctuations and retirement of older employees.*Labour*, *25*(3), 287-307.

Hammarstedt, M. (2000). The Receipt of Transfer Payments by Immigrants in Sweden. International Migration Quarterly Review, 2, 239-268.

Hardoy, I., & Schøne, P. (2012). Does the impact of plant closure on labour market attachment differ between immigrants and native workers across the business cycle? *Empirical Economics*, 1-24.

Hutchens, R. (1999). Social security benefits and employer behavior: evaluating social security early retirement benefits as a form of unemployment insurance. *International Economic Review*, *40*(3), 659-678.

Huttunen, K., Møen, J., & Salvanes, K. G. (2011). How destructive is creative destruction? Effects of job loss on job mobility, withdrawal and income. *Journal of the European Economic Association*, 9(5), 840-870.

Jacobson, L. S., LaLonde, R. J., & Sullivan, D. G. (1993). Earnings losses of displaced workers. *The American Economic Review*, 685-709.

Johansson, P., Laun, L., & Laun, T. (2014a). Screening stringency in the disability insurance program. The BE Journal of Economic Analysis & Policy, 14(3), 873-891.

Johansson, P., Laun, L., & Palme, M. (2014b). Pathways to retirement and the role of financial incentives in Sweden. In Wise, D.A. (Ed.), *Social Security Programs and Retirement Around the World: Disability Insurance Programs and Retirement*. Chicago. University Press: Chicago.

Jönsson, L., Palme, M., & Svensson, I. (2012). Disability insurance, population health and employment in Sweden. In Wise, D.A. (Ed.), *Social Security and Retirement Around the World: Historical Trends in Mortality and Health, Employment, and Disability Insurance Participation and Reforms,* pp.79-126. University of Chicago Press.

Karlström, A., Palme, M., & Svensson, I. (2008). The employment effect of stricter rules for eligibility for DI: Evidence from a natural experiment in Sweden. *Journal of Public Economics*, *92*(10), 2071-2082.

Katz, Lawrence F., and David H. Autor. (1999). Changes in the Wage Structure and Earnings Inequality. In O. Ashenfelter & Card, D.E. (Ed.), *Handbook of Labor Economics. Vol. 3A*, pp. 1463–1555. Amsterdam: Elsevier B.V.

Kohli, M. and Rein, M. (1991), The changing balance of work and retirement, in Kohli, M., Rein, M., Guillemard, A.M. and Gunstern, H.v. (Ed), *Time for Retirement: Comparative Studies of Early Exit from the Labour Force*, pp. 1-35. Cambridge University Press, Cambridge.

Krokstad, S., & Westin, S. (2004). Disability in society—medical and non-medical determinants for disability pension in a Norwegian total county population study. *Social science & medicine*, *58*(10), 1837-1848.

Krokstad, S., Magnus, P., Skrondal, A., & Westin, S. (2004). The importance of social characteristics of communities for the medically based disability pension. *European Journal of Public Health*,14 (4), 406-412.

Lindbeck, A., Nyberg, S., & Weibull, J.W. (1999). Social Norms and Economic Incentives in the Welfare State. *Journal of Economics*, 114, 1-35.

Lindbeck, A., Nyberg, S., & Weibull, J.W. (2003). Social Norms and Welfare State Dynamics. *Journal of the European Economic Association,* 1(2-3), 533-542.

Larsen, M., & Pedersen, P.J. (2008). Pathways to Early Retirement in Denmark, 1984-2000. *International Journal of Manpower,* 29(5), 384 – 409.

Larsson, L. (2006). Sick of being unemployed? Interactions between Unemployment Insurance and Sickness Insurance in Sweden. *Scandinavian Journal of Economics*, 108(1), 97-113.

Lindström, M., & Sundquist, J. (2002). Ethnic differences in daily smoking in Malmö, Sweden: Varying influence of psychosocial & economic factors". *European Journal in Public Health,*12(4), 287-94.

Lippman, S. A., & McCall, J. (1976). The economics of job search: A survey.*Economic inquiry*, *14*(2), 155-189.

Lundberg, K. (2007). Sjukförsäkringens Geografi. In E. Palmer (Ed.), *Sjukförsäkring. Kulturer och Attityder*. Social Insurance Board.

Lundberg, S. (1985). The added worker effect. *Journal of Labour Economics*, 3, 11-37.

Lundgren, N-G. (1996). *De nordiska regionerna och 1990-talskrisen. Perspektiv på kort och lång sikt.* Luleå.

Maloney, T. (1991). Unobserved variables and the elusive added worker effect. *Economica*, 173-187.

McDonald, J. T., & Worswick, C. (1997). Unemployment incidence of immigrant men in Canada. *Canadian Public Policy/Analyse de Politiques*, 353-373.

McVicar, D. (2006). Why do disability benefit rolls vary between regions? A review of the evidence from the USA and the UK. *Regional studies*, *40*(5), 519-533.

Moulton, B. R. (1990). An illustration of a pitfall in estimating the effects of aggregate variables on micro units. *The review of Economics and Statistics*, 334-338.

Månsson, N. O., Eriksson, K. F., Israelsson, B., Ranstam, J., Melander, A., & Råstam, L. (1996). Body mass index and disability pension in middle-aged men — non-linear relations. *International Journal of Epidemiology*, *25*(1), 80-85.

Månsson, N. O., Råstam, L., Eriksson, K. F., & Israelsson, B. (1998). Socioeconomic inequalities and disability pension in middle-aged men.*International journal of epidemiology*, *27*(6), 1019-1025.

National Insuranance Board (2001), ”Invandrares förtidspensioner under 1990-talet”. RFV Redovisar 2001:7

National Insurance Board. (2004). *Regionala skillnader i utgifter för sjukpenning och förtidspension - En studie av utbetalade belopp i rikets kommuner 1993 – 2000*. Riksförsäkringsverket analyserar 2004:12. Stockholm.

National Insurance Board. (2007). *Inflöde till sjuk-och aktivitetsersättning- har reglerna någon betydelse?* Riksförsäkringsverket analyserar 2007:13. Stockholm.

Orrenius, P.M., & Zavodny, M. (2009). *Tied to the business cycle: how immigrants fare in good and bad economic times.* Washington, DC: Migration Policy Institute.

Palme, M., & Svensson, I. (2004). Income Security Programs and Retirement in Sweden. In Gruber, J., & Wise, D. (Ed.), *Social Security and Retirement Around the World: Microestimates*, pp.579-641. University of Chicago Press.

Rege, M., Telle, K., & Votruba, M. (2009). The effect of plant downsizing on disability pension utilization. Journal of the European Economic Association, 7(4), 754-785.

Riphahn, R.T. (1997). Disability retirement and unemployment-substitute pathways for labour force exit? An empirical test for the case of Germany. *Applied Economics*, 29, 551-561.

Rosholm, M., Scott, K., & Husted L. (2006). The Times They Are A-Changin‟: Declining Immigrant Employment Opportunities in Scandinavia. *International Migration Review*, 40(2), 318-347.

Ruhm, C. J. (1991). Are workers permanently scarred by job displacements?. *The American Economic Review*, 319-324.

Scott, K. (1999). *The Immigrant Experience: Changing Employment and Income Patterns in Sweden, 1970-1993*. Lund. Lund University Press.

Skogman Thoursie, P. (1999). *Disability and work in Sweden*. Swedish Institute for Social Research. Stockholm.

Stanfors, M. (2003). *Education, labor force participation and changing fertility patterns: a study of women and socioeconomic change in twentieth century Sweden.* Doctoral Thesis. Lund University. Almqvist & Wiksell International.

Stattin, M. (1998). *Yrke, yrkesförändring och utslagning på arbetsmarknaden-en studie av relationen mellan förtidspensionering och arbetsmarknadsförändring.* Umeå. Umeå universitet akademisk avhandling vid sociologiska institutionen, Umeå.

Stevens, A. H. (1997). Persistent effects of job displacement: The importance of multiple job losses. *Journal of Labor Economics*, 165-188.

Sundqvist, J., & Johansson, S-E. (1997). Long term illness among indigenous and foreign born people in Sweden. *Social Science & Medicine*, 44, 189-198.

Topel, R. H. (1984). Experience rating of unemployment insurance and the incidence of unemployment. *Journal of Law and Economics*, 61-90.

Wadensjö, E. (1996). Early Exit from the Swedish Labour Market. In E. Wadensjö (Ed.), *The Nordic Labour Markets in the 1990s*. Amsterdam.North-Holland.

Zimmermann, K. (2005). *European Migration. What do we know?* Oxford: Oxford University Press.

Österberg, T., & Gustafsson, B. (2006). Disability Pensions among Immigrants in Sweden", *Social Science & Medicine*, 63, 805-816.

Appendix: The Swedish Disability Pension System, eligibility rules, disability pension benefits and occupational pensions

Disability pension benefits

The period under study in this paper was characterized by a major reform in the public old-age pension system. Although this reform implied that the disability insurance was removed from the old public pension system into the social insurance system in 2003, the reform did not affected eligibility rules and the size of disability pension benefits.

In the public old-age pension system early retirement pension were received from the basic national retirement scheme (folkpension) and from the national supplementary pension scheme (ATP), the latter received by individuals with a sufficient labour market attachment. During the supplementary pension scheme (ATP) the disability pension benefits replaced 60 percent of the average of the individuals fifteen best years of earnings up to a social insurance ceiling. In the new system the disability pension benefits are calculated in a similar way, where the benefits are assumed on an assumed income, calculated as the average of the three highest annual earnings (up to a social insurance ceiling) during the period prior to the early retirement pension.

Table A1. Changes in the Eligibility rules in the Disability Pension System

Period	Medical Reasons	labour market and social conditions into account	Favorable rules for older workers	Pure labour market considerations
-1962	Yes	very small	No	No
1963-1970	Yes	some	No	No
1970-1972	Yes	yes	Yes, aged 63-66	No
1972-1974	Yes	yes	Yes, aged 63-66	Yes, aged 63-66
1974-1976	Yes	yes	Yes, aged 63-66	Yes, aged 60-66
1976-1991	Yes	yes	Yes, aged 60-64	Yes, aged 60-64
1991-1996	Yes	yes	Yes, aged 60-64	No
1997-2005	Yes	very small	No	No

Palme & Svensson (2010)

Table A1 shows the changes in eligibility rules for the disability pension system. Initially, eligibility was only based on health status. In 1970, there was a reform introducing unemployment as an additional criterion for early retirement pension and introducing special eligibility rules for older workers

(aged 63-66). Adding unemployment as criteria implied that long-term unemployed with functional limitations were entitled to disability pension. The special eligibility rules for older workers implied that the medical requirements for being considered unable to work was lower, that functional limitations related to ageing were considered for eligibility of disability pension, and there was no requirement of rehabilitation or retraining for older workers if their health status did not permit the individuals regular work (Jönsson et al, 2012). In 1972, pure labour market reasons were introduced for older individuals, which implied that older unemployed workers without health limitations were eligible for early retirement pension, when reaching the time limit in the unemployment insurance. As the normal retirement age was decreased from sixty-seven to sixty-five in 1976, the age limit for this labour market related criteria was lowered. In response to the economic crises in the 1990s and the increasing number of early retirement pensioners, the eligibility rules became stricter during the 1990s. In 1991, the criteria of pure labour market reasons were terminated and in 1997 the special eligibility rules for older workers was abolished.

Occupational pensions

The occupational pension system is an important feature of the Swedish pension system implies that the individual are entitled to claim pension benefits before retirement age. There are different occupational pension agreements based on the sector of employment and occupational type. There are four main programs; the Central government sector, the municipality sector, white-collar workers in the private sector and blue-collar workers in the private sector. Thus, white and blue-collar workers in private and public sector have different conditions for occupational pension.

Paper III

Regional and ethnic patterns in sickness benefit utilization in Sweden, 1993-2001

Mats R. Persson

Centre for Economic Demography, Lund University
Department of Economic History, Lund University

Abstract

The universal social insurance system is a central element in the Scandinavian welfare model. The increasing consumption of sickness benefits in Sweden from the 1990s and onwards constitutes a challenge for social policy. Sickness absence has been characterized by regional variation and differences between natives and immigrants. Previous studies have not combined these perspectives focusing on regional differences in sickness absence among immigrants, the topic of this study. We examine the influence from the economic structure on sickness absence for immigrants and natives during the period 1993-2001. We use a regional division of Sweden into labour market regions as the foundation of this study. Data comes from the Swedish Longitudinal Immigrant database. We find weak effects from the economic structure in the region where the individual live, indicating that the regional differences in sickness absence are more a function of differences in application of the rules and/or different social norms.

Key words: Sickness absence, Immigrants, Economic structure, Institutions, Social Insurance System

JEL Classification: J1, J2, J15,

1. Introduction

In the beginning of the 1990s, Sweden experienced the most severe economic crisis since the great depression in the 1930s. The downturn in the economy was characterized by a negative GDP growth rate coupled with a dramatic decline in the employment rate. Whereas sickness absence decreased at the peak of the economic crisis, long-term sickness absence increased dramatically as the economy recovered during the latter part of the 1990s and in the beginning of 2000s. Interestingly, this development was characterized by large regional variation and differences between natives and immigrants.

The aim of this study is to examine the effect of regional economic structure on long-term sickness absence. This regional approach is motivated for two reasons. First, it gives a more detailed picture of the patterns of sickness benefits consumption that appeared during the economic recovery. Second, this approach provides us with more information about if and how the economic structure in the region of residence affects individuals' usage of the sickness insurance system. The study also attempts to identify regional differences that could be attributed to the effect of different social norms, such as attitudes regarding the use of the sickness benefits system. Hence, we attempt to differentiate between explanations reflecting regional economic conditions and those focusing on the institutional framework surrounding the sickness insurance system.

The investigated period, 1993-2001, is important for several reasons. First, it was a period with intense debate concerning the use / misuse of sickness absence during a period of increasing economic hardship (SOURCE). Second, the period represents a complete business cycle, from economic trough of the recession to a business cycle peak. Third, this period shows variation in sickness absence frequency, characterized by a decline during the first years (up to 1997) followed by increases in sickness benefit usage from the late 1990s and onwards.

The focus on the importance of economic structure should be seen in the light of the several indications that the usage of the sickness insurance during this period was partially a symptom of weak labour market attachment and not purely health related. *First*, while there is an inverse relationship between the unemployment rate and sickness absence at the national level (see Arai & Skogman, 2001; Bäckman, 1998; Shapiro & Stiglitz, 1984), analyses of the regional pattern in Sweden indicate that unemployment is high in regions with high levels of sickness benefits (National Insurance Board, 2003).

Second, there are indications of overlaps between different social insurance systems due to differences in economic incentives in these systems. Larsson (2006) finds an interaction between the sickness insurance and the unemployment insurance in Sweden, with a movement into sickness insurance as the expiration date of an individual's unemployment insurance period approaches. *Third*, there are differences in sickness absence levels between social groups (Taylor, 1979) and between natives and immigrants (Bengtsson & Scott, 2006, 2008), where the latter face barriers entering labour market and when entering the labour market experience higher levels of sickness absence.

In contrast to previous research regarding sickness absence, this study differentiates not only between regions, but also between individuals born in Sweden (natives) and those who were born abroad and subsequently migrated to Sweden (immigrants). This division is motivated by the notion that if economic structure is important for sickness absence then this would be evident when analysing an economically marginalized group such as immigrants. Furthermore, it increases our understanding of the mechanisms behind sickness absence among immigrants.

Our *a priori* expectation is that the economic structure in the labour market region where the individual lives has importance for the propensity to experience sickness absence, and that this effect is larger for immigrants than natives. Differences in economic structure could be a matter of differences in production conditions, such as reliance on different branches, the level of know-how in production and access to skilled labour (Nutek, 2002). For example, we expect regions with a high proportion of modern technological production to have a different effect on the sickness absence pattern than regions with a higher reliance on traditional manufacturing techniques. Hence, we assume that regional and ethnic differences in sickness absence to a large extent can be explained by different labour market characteristics in the regions.

Separate regressions are performed for natives and immigrants and on the basis of two different regional classifications, i) the administrative regions (counties) and ii) "region-families", i.e. a regional classification based on economic structure in the labour market region. In this manner, we are able to differentiate between explanations focusing on the institutional framework of the sickness insurance system and those pointing to the importance of regional economic conditions.

The national sickness insurance system is compulsory and mainly publicly financed via proportional payroll taxes. The public system replaces forgone earnings due to decreasing working capacity from temporary health problems. All individuals in working-age are eligible for sickness benefits, which are related to the current or previous income of the individual. The Swedish Insurance Board has the responsibility for the public sickness insurance. The Swedish Insurance Board was, until 2005, organized as autonomous authorities at the county level. Thus, at the county level there may be differences that are explained by differences in application of the rules and/or regional variation in social norms. Given our hypothesis that the economic structure is important for sickness absence risk of both natives and immigrants, we expect a larger variation in sickness absence when replacing the heterogeneity of economic structures within the administrative regions (counties) with a more homogenous grouping using region families.

Increased understanding of these mechanisms is important because sickness absence affects individual well-being in terms of living conditions and life satisfaction. Moreover, sickness absence is associated with several adverse health outcomes, including mortality risk (Vahtera et al, 2004). Potentially, the effect of sickness absence might be more severe for immigrants than for natives, since the already slow process of integration becomes increasingly difficult.

Sickness absence is not only important for the individual, but also the company that the individual works for and, in extension, it constitutes a challenge for social policy not at least in the context of the Scandinavian universalistic welfare model, where universal social benefits and social policy being explicitly designed to promote equal rights (Esping-Andersen, 1990). Another feature in this welfare system is that replacement for income loss due to sickness absence is organised and largely financed via the sickness insurance system. Hence, the increase in sickness absence from the 1990s and onwards has constituted a financial challenge. Between 1998 and 2002, the work-absence, and thereby also the costs of the sickness insurance system, increased by almost 75 per cent in Sweden.

The article begins with a presentation of previous research regarding sickness absence and the regional pattern in Sweden. Thereafter, the data and method is presented, where focus is placed on the methodological problems our research strategy. Part four contains the results. The article is concluded in section five.

2. Previous Research

Besides being a function of an individual's health, earlier studies show that there are differences in sickness absence levels between social groups (Taylor, 1979), pointing to the importance of socio-economic status on sickness absence propensity (Fuhrer et al., 2002; North et al., 1993). Analysing sickness absence in nine OECD-countries during the period 1984-97, Barnby et al (2002) shows that sickness absence is increasing by age and women having higher sickness absence rates than men. Previous research also points to the importance of macroeconomic conditions (Askildsen, Bratsberg, & Nilsen, 2005; Ruhm, 2003) and workplace factors (Ose, 2005).

Sickness absence in Sweden has mainly been studied from two perspectives. The first perspective has focused on the sickness insurance system itself, examining whether it is socially optimal in terms of providing individuals the "right" incentives and the manners in which people respond to changes in the system (Henrekson & Persson, 2004; Johansson & Palme, 1996; 2002; Rikner, 2002).

Another strand of the literature has analyzed the driving forces behind sickness absence and the differences between different social groups (Knutsson & Goine, 1998; Vogel, 2002). Several studies have shown that women have a greater tendency to report sick days than men, which is explained in terms of gender differences in health, working conditions and/or economic incentives (Bäckman, 1998; Nilsson 2005).

Research for the Scandinavian countries illustrates that sickness absence is higher among foreign born than natives (Dahl et al, 2010; Brekke & Schøne, 2013 for Norway; Andrén, 2001 and Bengtsson & Scott, 2006 for Sweden). This native-immigrant gap in sickness absence is both a matter of incidence (more sickness periods) and duration (the length of the periods).

There are several potential explanations for differences between immigrants and natives in Sweden. The higher consumption of sickness benefits for immigrants in comparison with natives could be a matter of *working conditions*. Immigrants work to a higher extent than natives in high-risk jobs, and there are large differences within the immigrant population in this respect (National Insurance Board, 1996). Also related to workplace conditions is the situation when the individual experiences dissatisfaction due to labour market mismatch, e.g. placing highly-educated immigrants to work in employment below their qualification level and with worse working conditions than could be expected (Vogel, 2002). Another indication of the

importance of this labour market mismatch is that the probability to report sick is positively associated with to the extent the individuals' income does not correspond to the individual's educational level (Bengtsson & Scott, 2006; 2008).

Another explanation for the differences between immigrants and natives is differences in *health status*. These are both a product of present-day living conditions and collected experiences during the life-course. Refugees from developing countries may have experienced a special "environmental stress" from the home country yielding worse health for immigrants than natives (Vogel, 2002). Immigrants in general experience worse health than natives and health problems increase with the home countries' economic, geographic and cultural distance (National Insurance Board, 1996). The health differences also exist for those with employment, despite the fact that these could be considered a positively selected group (Vogel, 2002, p.136).

While much research on sickness absence takes its departure in the assumption that this is a measurement of shirking (Dunn & Youngblood, 1986; Winkelmann, 1996; Bradley et al, 2007), other research shows that, rather than overestimating poor health, sickness absence may actually underestimate health problems (Voss et al, 2008; Hansen & Andersen, 2009; Aronson et al, 2011; Helgertz et al 2013).

As mentioned above, previous research emphasizes that sickness absence is related to health status and labour market factors. Potentially, poor health and labour market attachment operate as mutually reinforcing mechanisms, such that poor health is likely to affect labor supply and productivity and vice versa.

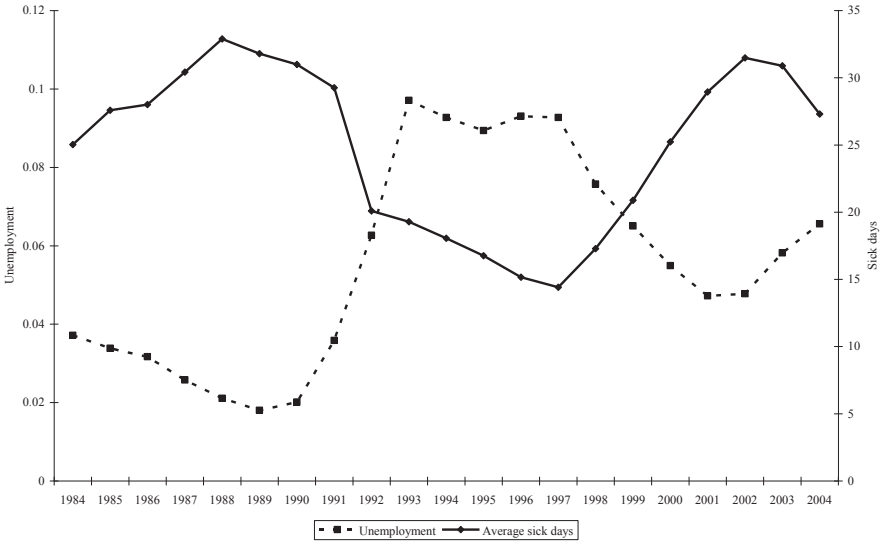
The institutional setup of the sickness insurance implies that the long-term sickness absence decision is a result of an interaction between the doctor who verifies the health status and the social security administration. Thus, there is a possibility for unequal treatment between immigrants and natives. This is empirically investigated in Jonsson (1998), who in a study of officials in a local social security authority finds that immigrants were considered to be problematic, due to lack of language skills and/or cultural differences. This could be interpreted as discrimination. Discrimination may also have an indirect effect on sickness absence, through its contribution to poor health and self-reported ill- health (Akhavan, 2006).

Bengtsson & Scott (2006, 2008) show in two studies for the periods 1981-1991 and 1993-2001, that there exist differences in sickness absence by country at birth, even after accounting for differences in socioeconomic

factors, education and, for the latter period, also workplace conditions and macroeconomic factors. In particular, it is immigrant cohorts from labour migrant countries arriving during the 1960s and 1970s that experience high levels of sickness absence, and these immigrant groups were also overrepresented in physically demanding jobs with poor working conditions.

There is an obvious relationship between sickness absence and the general economic climate. An example of this is the inverse relationship between unemployment and sickness absence visible in figure 1.

Figure 1. Unemployment rate and average number of sick days.



Source: Swedish National Insurance Board. Average number of days calculated as total sick days / labor force.

This could be the result of both a disciplining effect and a composition effect. The "worker discipline effect" means that the tendency to report sick decreases when the cost of losing the job is high, which is the case during periods of high unemployment (Shapiro & Stiglitz, 1984). The "composition effect" refers to the concept that individuals with poor health are more likely to leave the labour market when unemployment is high, thereby leaving a stock of relatively healthier workers (Leigh, 1985; Nilsson 2005).

While being present at the national level, this inverse relation does not appear to exist when analyzing the regional pattern in Sweden, however, with unemployment being high in regions with high levels of sickness absence and disability pension benefits. Previous research shows that there exist regional differences in sickness absence for the period 1990-2002, even after accounting for the different industrial structures in the regions (National Insurance Board, 2003). Hence, employees in a given industry have higher consumption of sickness benefits if they live in a region with high levels of sickness absence. Palme & Svensson (2004) show that despite the regulatory framework for disability pensions in Sweden being the same throughout the country, there is large variation in practice in the local social insurance offices, indicating varying implementation of the rules.

The observed positive relationship between unemployment and sickness absence at the regional level could be an effect of the construction of the unemployment insurance (UI) and sickness insurance (SI), where there exists an incentive for the unemployed to use the sickness insurance system instead of the unemployment insurance system when they near the end of their coverage period, thereby extending their time in the unemployment insurance system (Larsson, 2006).

This pattern might also be explained through regional differences in matching between individual human capital and the demand for labour, due to the different economic and social structures in the regions. Varying production conditions in the labour market regions give individuals different employment possibilities. For example, we expect regions with a high proportion of modern technological production to have a different pattern than regions with a higher reliance on the more traditional manufacturing industry.

Another interpretation is that that it is a question of different social norms when it comes to the use of the sickness benefits system (Ekbladh, 2007; Lindbeck et al, 1999; 2003). Lindbeck et al (1999; 2003) present theoretical models of how the interaction between social norms and economic incentives affects the labour supply decision. In this theoretical framework, social norms regarding attitudes towards work and leisure are related to the proportion of individuals working, such that an increase in the number of people receiving welfare benefits weakens the social norm of earning income from work. Potentially, “cultures of unemployment” are being created in areas (regions, municipalities and neighborhoods) with high unemployment, yielding social norms increasing the valuation of leisure and accepting welfare benefits from

the social insurance system. In this framework, social norms regarding attitudes towards work affect both the individual application/usage of sickness benefits and the interpretation and use of the regulatory framework for the sickness insurance among actors involved in the decision of sickness benefits, such as the social insurance offices and doctors.

Potentially, one mechanism behind this pattern could be an effect of doctors having different interpretations of the regulations, since "behind every sickness absence there is a responsible doctor" (Swedenborg, 2003, p.55). Olsson (2006) explicitly investigates the effect of differences in values among individuals, doctors, administrators and employers in different regions on the sickness insurance system, and finds that social norms in the regions are related to the level of sickness absence.

The pattern of regional differences is also present when focusing on immigrants' employment situation. Lundh et al (2002) show that the employment rate was higher than the country average for both natives and immigrants in some counties and lower for both groups in others. The differences in labour market outcomes between different regions could be explained by industrial structure, with different local networks for dealing with asylum seekers and the general labour market conditions in the region.

Previous research thus illustrates the motivation for a study on sickness absence with a regional dimension in order to distinguish between the importance of economic structure and institutions. While previous research has focused on the regional variation in employment for immigrants, this study moves one step further analysing the regional pattern of an indirect labour market outcome such as sickness absence.

3. Data and Method

This study uses the Swedish Longitudinal Immigrant Database (SLI), which is a register-based panel consisting of demographic and socioeconomic information on a sample of roughly 550,000 foreign and native born during the period 1968- 2001. The database comprises information on income, public transfers, health, workplace characteristics, industry and labour market experience. The immigrants in the database have their origin in 16 major sending countries and represent the entire spectrum from labour migrants of the 1960s through refugees and tied movers from more recent decades. The SLI is a nationally representative database with an oversampling of immigrants, making the regional analysis possible. The data is constructed

such that we have information over the whole life-cycle and therefore have repeated observations of the individual. The sample used in this study is comprised of 85,000 individuals, with approximately 43,000 foreign born. We have excluded individuals receiving disability pensions as a result of work injuries.

The analysis of sickness absence in Sweden entails certain measurement problems. First, there is a problem considering the type of sickness absence you are interested in. In this study we place interest in factors behind individual use of a large number of sick days, since the occasional sickness absence is not seen as a large societal problem, and may actually have productivity-increasing effects. Second, a measurement problem occurs because the system for reporting and financing sick days has changed over time. From 1992 onwards there was an "employer responsibility period," including the first fourteen days of every sickness period for the employee. Given our data, we can only calculate the number of observed sick days, but have no information on the number of absence spells, which is a potential source of error. For example a reported absence of two days could reflect two observed days in one continuous period (16 total days), but it could also be a result of two sickness periods and one extra day beyond the employer responsibility period in each period (30 total days). In view of this, our dependent variable is defined as having 15 or more continuous sick days in a year - an event which is obvious through a single registered sickness absence. Third, individuals have different incentive structures based on their income level (Henrekson & Persson, 2004). This is partly a result of the sickness insurance system having a ceiling (reimbursement of an income up to 7½ base amounts[1]) and that individuals with high income have characteristics that we cannot adjust for (e.g. flexible working conditions,). Consequently, individuals with an income over the ceiling are excluded. One shortcoming in the Swedish register data is that it does not contain information regarding weeks worked during a year, and thus cannot be used to differentiate between full-time and part-time employees. To partially account for this, only those

[1] The price base amount is an amount fixed by the Government for one year at a time on the basis of figures provided by Statistics Sweden. It is adjusted annually. When the Swedish Social Insurance Agency calculates, for example, the size of pensions and allowances, it makes use of the price base amount. One price base amount in 2015 is equal to SEK 44,500 or roughly €4,700.

with an income over 3½ base amounts are included. Thereby we restrict the sample to include only individuals displaying some substantial attachment to the labour market. In this way we receive a sample of individuals with rather similar incentive structures.

The panel construction of the data in combination with a binary outcome variable (1= if having more than 15 sick days in a year; 0= otherwise) motivates the use of a random effects logit model. This gives us both a panel-wide and individual-specific error term, making it possible to account for unobserved characteristics. We perform separate analysis for natives and immigrants.

In this study we use different regional classifications to capture how different regional characteristics affect the risk of experiencing long term sickness absence. One classification is based on the *administrative regions* (county), reflecting the organization of the Swedish Insurance Board during our study period. Each administrative region functioned as an autonomous authority with full responsibility for sickness absence in the county. This classification will capture differences between administrative regions that are based on differing interpretation and implementation of the rules (practice) in the regions. However, the county level gives no guidance concerning the economic structure, which is problematic since we have *a priori* expectations regarding the significance of regional labour market characteristics. The economic structure, in terms of production conditions, such as reliance on different branches, the level of know-how in production and access to skilled labour affects the types of available jobs. Potentially, regions are differently affected by structural change based on their economic structure. From this one might infer that any structural transformation of the labour market, leading to mismatch between labour demand (the structure of the jobs being available) and the individuals' human capital operates differently in the regions. Thus, we expect regions with a high proportion of modern technological production to have a different effect on the sickness absence pattern than regions with a higher reliance on traditional manufacturing techniques. Our *a priori* expectation is that the economic structure in the labour market region where the individual lives has importance for the propensity to experience sickness absence, and that this effect is larger for immigrants than natives. The hypothesis of immigrants being more affected by economic structure is based on the notion of immigrants being overrepresented in physically demanding jobs with poor working conditions. Moreover, there is a potentially increasing mismatch between the kind of jobs

available and country–specific human capital, due to organisational changes toward more flexible work organisation increasing the importance of country-specific human capital such as language proficiency (Rosholm et al, 2006). Hence, we assume that regional and ethnic differences in sickness absence to a large extent can be explained by different labour market characteristics in the regions.

In order to capture the importance of economic structure, we also use a classification devised by the Swedish Agency for Economic and Regional Growth, which link local labour market regions (which are based on commuting patterns between municipalities) into six different "*region-families*." These region families are based on similarities in the demographic (share of the population in working age and with higher education) and economic structure (access to higher education and density of companies). The region-families are classified as: larger cities, university regions, regional centres, secondary centres, small regions dominated by private-sector employment and small regions dominated by public-sector employment.

Lundh & Bevelander (2004) find differences in labour market success between immigrant groups dependent on which region family they live in. Immigrants from the Nordic countries and Western Europe have the highest employment probability in larger cities while immigrants from Eastern Europe and outside Europe have higher probabilities in smaller regions. One conclusion is that there is a feature of the regional labour market that impacts the labour market connection for immigrants in different directions. For several immigrant groups the probability of finding employment is larger in regions with a larger proportion of manufacturing industry than in regions with more service sector employment. However, there are indications that this pattern actually is the reverse concerning sickness absence for immigrants. The labour migrants from the 1960s were, to a large extent, employed in monotonous manufacturing occupations and consequently, as an effect of the working environment, had a higher consumption of sickness benefits (Bengtsson & Scott, 2006; National Insurance Board, 1996). On the other hand the more favourable employment situation in this region might also serve to decrease the consumption of sickness benefits.

We perform separate estimations for individuals in each administrative region and region family in an attempt to isolate differences in sickness absence behaviour as well as differences in the impact of various factors on absence. The regional differences reflect the net effect of several factors, such

as different compositions of the population in terms of individual characteristics and differences that reflect economic structure and workplace factors. Thus, the model is based on factors capturing characteristics at the i) individual, ii) workplace and iii) regional level, see table 1.

Table 1. Explanatory variables

Variables
Individual level
Age / Age^2
Sex
Educational level
Civil status
Number of children
Years since migration / YSM^2
Previous sickness absence
Previous hospitalization
Relative income
Workplace level
Workplace turnover
Workplace growth rate
Workplace size
Sector of employment
Immigrant share at workplace
Regional level
Municipal unemployment rate
Year dummies to capture institutional change

i) At the *individual level* we intend to capture the individuals' educational level in line with a traditional human capital approach; more educated individuals are assumed to be less likely to be sickness absent. In this respect we move one step further by introducing a variable that captures the degree to which an individual has a wage that corresponds to the educational level,

which is interpreted as a proxy for labour market matching and a transferability of human capital. The variable is defined as an individual's yearly income as a percent of the mean wage for the individual's educational level, using the Swedish 5 digit SUN educational code. Since we assume that sickness absence is partially a product of dissatisfaction, we expect this variable to be negatively correlated with sickness absence under the assumption that income yields satisfaction. It is important to note that we do not know in which direction the causality works, since you may have a lower income because of poor health, implying that the income deviation variable could be the result rather than the determinant.

We are also interested in demographic factors such as age, sex, and number of children. Individuals with children have a lower incentive to report sick since the qualifying day present in the sickness insurance system does not exist if you are compensated for the care of a sick child, giving parents of small children a more attractive alternative to report their child as ill. In line with previous research, we expect women to have a higher propensity to be absent. In the model for immigrants we include a continuous variable for time of residence in Sweden.

ii) *Workplace factors* are included to capture various conditions at the work place, since we expect these conditions to affect the individual's tendency to report sick. We attempt to capture workplace segregation through a variable recording the share of non-Nordic immigrants at the workplace. This is justified since previous research has shown a negative correlation between socioeconomic status and workplace segregation (see Åslund & Nordström Skans, 2010).

Workplace turnover, the growth rate of the work place and workplace size are used as indications of the work environment. As an indicator of industry, we use sector of employment, defined as either service sector or manufacturing. Although these variables do not automatically correspond to the experienced working conditions for the individual, they do capture some features that are thought to be important for the experienced working environment among employees.

iii) *Economic conditions* in the region, in terms of the business cycle, are measured by the municipal unemployment rate, in order to capture local labour demand, i.e. the number of jobs available. The economic conditions in

the region are otherwise reflected through the concept of region families in order to capture the economic structure, i.e. what types of jobs are available.

Consequently, regional differences are assumed to be a product of different population structure when it comes to human capital factors, differences in work place conditions between regions, the domination of different sectors in the regions, and on the basis of the economic structure in the region. For example, if one region has individuals with a higher average educational level than others, than we expect this region, *ceteris paribus*, to have a lower degree of sickness absence. If the differences are higher between the more homogenous region families than the heterogeneous counties, it points to the importance of the labour market situation. If the differences, however, are smaller, we interpret this as an indication of the importance of regional social norms or differing interpretation and implementation of the rules in the regions.

4. Results

Figures 2 and 3 present the annual mean number of sick days reported in the data. Figure 2 shows the number broken down by county for natives and immigrants, respectively. Figure 3 shows the raw data when the municipalities are regrouped into regional families. Immigrants consistently report more sick days than natives, and there is a variation between the counties in number of reported sick days. The average number of sick days for natives has a spread between 6 and 12 reported sick days, while immigrants vary by county between 11 and 20 days. Figure 3 shows something different. When the municipalities are regrouped into regional families (see figure 3) we see much less variation in number of reported sick days, at least for natives. Natives varied between 8 and 9½ days, while immigrants had somewhat higher variation, with a low of 12½ and a high of 17 days. This pattern could be an effect of individuals in the different counties and region families having different individual (e.g. age, education) and economic characteristics (e.g. work place conditions, sector distribution).

Figure 2. Mean sick days (annual) per employed by county, 1993-2001. Exclusive of qualifying periods.

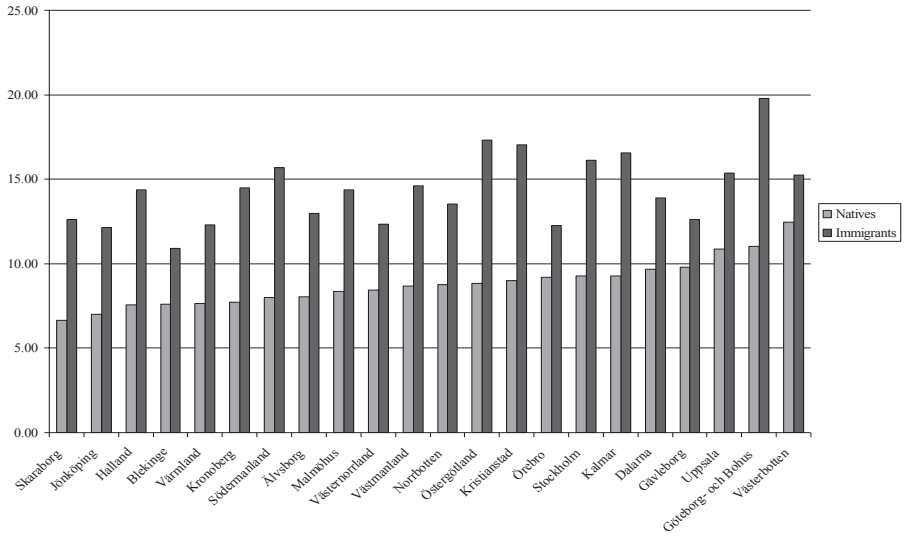
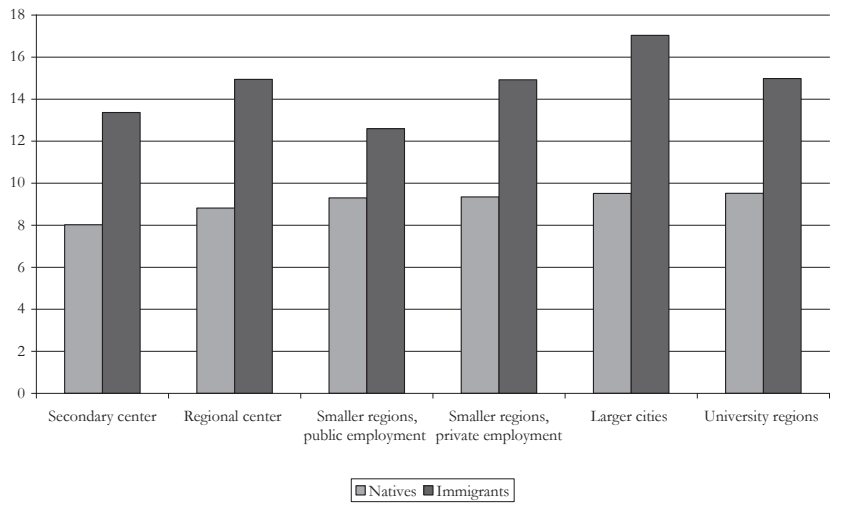


Figure 3. Mean sick days (annual) per employed by region family, 1993-2001. Exclusive of qualifying periods.



Thus, for the remainder of the paper we will be examining the probability of reporting sick days while controlling for various socioeconomic and demographic factors. We are interested in the probability for an "average" individual in each region to experience sickness absence. The predicted probabilities to utilize sickness benefits are calculated by using the estimated coefficients from the separate regressions and the means for the "average" individual in each region. However, we also want to take into account the different compositions in the different regions, i.e. how sickness absence would look in various counties if they had the same demographic and workplace characteristics. Therefore, we also calculate predicted probabilities using the county/region specific coefficients and the means for Stockholm County in the county regressions and the Larger Cities means in the regressions performed separately for regional families. In other words, we look at the effects of various individual characteristics on the probability of reporting sick days (using the estimates) for the different counties, and then apply them to the population of Stockholm and Larger Cities, respectively. This provides us with more comparable probabilities and shows the effect of living in a particular county or region family on sickness absence, *ceteris paribus* (controlling for our covariates).

Tables 2 - 3 show the probabilities of having more than 15 sick days in a given year for both native born and immigrants, controlling for individual characteristics (education, demographic factors), workplace factors and local labour demand in the administrative region (counties).

A look at the predicted probabilities calculated at the county means for *natives* shows that the average probability is 10 percent, but there is a spread from 6 percent (Malmöhus) to almost 15 percent (Uppsala). When we control for composition effects and impose the means for Stockholm County the spread in probabilitiy becomes much more dramatic, with a range from almost 8 percent (Gävleborg) to almost 21 percent (Norrbotten). The average probability for all counties remains roughly the same at 11 percent. Thus we see that the counties do indeed have different patterns of sickness absence, and that these patterns are the result of different effects of the covariates, and not merely different socioeconomic and demographic structures. This implies that there are unexplained differences between the counties that exist even after taking the different population structures and workplace conditions in the regions into account. This is not in line with *a priori* expectations that

there should not be any large differences after controlling for individual and economic factors.

Table 2. Predicted probability of incurring sick days 1993 – 2001 by county, native-born Swedes.

	At county means	At Stockholm means
Stockholm	0.110	0.110
Uppsala	0.147	0.134
Södermanland	0.104	0.133
Östergötland	0.085	0.098
Jönköping	0.086	0.089
Kronoberg	0.102	0.107
Kalmar	0.110	0.124
Blekinge	0.101	0.160
Malmöhus	0.063	0.088
Kristianstad	0.098	0.103
Halland	0.087	0.109
Göteborg	0.127	0.124
Älvsborg	0.082	0.102
Skaraborg	0.072	0.078
Värmland	0.111	0.117
Örebro	0.089	0.099
Västmanland	0.095	0.102
Dalarna	0.079	0.080
Gävleborg	0.091	0.076
Västernorrland	0.089	0.094
Västerbotten	0.137	0.130
Norrbotten	0.113	0.206

Note: Gotland and Jämtland counties are excluded due to too few observations.

Turning to immigrants in table 3 we see a more dramatic version of the same picture. The probabilities at the county mean range from a low of 8½ percent to a high of 21 percent, with an average probability of almost 16 percent for all counties. Imposing Stockholm county means increases the spread by lowering the probabilities for individuals in many counties. For immigrants

we are also interested in the probability of incurring sick days if the individuals have the same characteristics as an "average" native living in Stockholm. Once the composition effects between immigrants and natives are removed there is a spread from 3 percent (Västernorrland) to almost 25 percent (Gävleborg).

Table 3. Predicted probability of incurring sick days 1993 – 2001 by county, immigrants.

	At immigrant means		**At native means**	
	County means	Stockholm means	County means	Stockholm means
Stockholm	0.177	0.177	0.111	0.111
Uppsala	0.149	0.165	0.094	0.087
Södermanland	0.170	0.173	0.156	0.158
Östergötland	0.167	0.136	0.107	0.096
Jönköping	0.140	0.118	0.085	0.085
Kronoberg	0.162	0.168	0.084	0.085
Kalmar	0.164	0.139	0.062	0.055
Blekinge	0.144	0.153	0.101	0.120
Malmöhus	0.133	0.100	0.069	0.065
Kristianstad	0.149	0.134	0.097	0.092
Halland	0.160	0.169	0.097	0.110
Göteborg	0.196	0.178	0.129	0.121
Älvsborg	0.211	0.223	0.262	0.296
Skaraborg	0.193	0.193	0.089	0.110
Värmland	0.111	0.106	0.074	0.072
Örebro	0.133	0.149	0.087	0.087
Västmanland	0.152	0.131	0.104	0.089
Dalarna	0.210	0.231	0.090	0.105
Gävleborg	0.147	0.245	0.074	0.124
Västernorrland	0.084	0.031	0.091	0.034
Västerbotten	0.148	0.123	0.178	0.129
Norrbotten	0.149	0.094	0.059	0.050

Note: Gotland and Jämtland counties are excluded due to too few observations. The much lower probability of immigrants reporting sick in Norrbotten county is likely the result of a small number of immigrants.

Table 4 shows the difference in probabilities of incurring sickness absence between natives and immigrants by county. Using the Swedish Stockholm means we find that difference in probabilities between immigrants and natives is all but eliminated in many counties. This means that the differences in sickness absence risk between immigrants and natives are to a high extent a matter of composition effects, i.e. that natives and immigrants do not have the same demographic and socio-economic characteristics.

Table 4. Differences between immigrants and natives in predicted probability of incurring sick days 1993 – 2001 by county, calculated at Stockholm means and at Swedish Stockholm means.

	At Group-Specific Stockholm means	At Swedish Stockholm means
Stockholm	0.067	0.00
Uppsala	0.031	0.05
Södermanland	0.04	-0.03
Östergötland	0.038	0.00
Jönköping	0.029	0.00
Kronoberg	0.061	0.02
Kalmar	0.015	0.07
Blekinge	-0.007	0.04
Malmöhus	0.012	0.02
Kristianstad	0.031	0.01
Halland	0.06	0.00
Göteborg- och Bohus	0.054	0.00
Älvsborg	0.121	-0.19
Skaraborg	0.115	-0.03
Värmland	-0.011	0.05
Örebro	0.05	0.01
Västmanland	0.029	0.01
Dalarna	0.151	-0.03
Gävleborg	0.169	-0.05
Västernorrland	-0.063	0.06
Västerbotten	-0.007	0.00
Norrbotten	-0.112	0.16

While a look at the probabilities by county is interesting, it may lead us to the wrong conclusion. Many counties contain a number of different types of labour markets, and if our belief regarding the importance of the economy holds true then the mixture of economic structures in a given county could lead to a cancellation of the interesting effects. Thus, we turn to the region families discussed in section 3.

Table 5 and 6 show the predicted probabilities of having more than 15 sick days in a given year for natives and immigrants by the region families. Here we will see if there is any differing pattern based upon the type of labour market region an individual resides in.

Table 5. Predicted probability of incurring sick days 1993 – 2001 by region family, native-born Swedes.

	At region family means	At "larger cities" means
Larger cities	0.116	0.116
University regions	0.109	0.110
Regional center	0.109	0.112
Secondary center	0.109	0.113
Smaller regions, private employment	0.127	0.126
Smaller regions, public employment	0.123	0.118

Table 6. Probability of incurring sick days 1993 – 2001 by region family, immigrants.

	At immigrant means		**At native means**	
	Region family means	"Larger cities" means	Region family means	"Larger cities" means
Larger cities	0.181	0.181	0.125	0.125
University regions	0.151	0.159	0.106	0.105
Regional center	0.169	0.174	0.095	0.096
Secondary center	0.160	0.155	0.133	0.131
Smaller regions, private employment	0.131	0.130	0.105	0.104
Smaller regions, public employment	0.147	0.121	0,126	0.096

Table 5 and 6 shows a clear convergence in predicted probabilities when the municipalities are regrouped into region families according to their economic structure. For natives, the spread in probabilities has declined from 9 percentage points for the county model to a mere 2 ½ points in the models using region families. If we control for different compositions in the region families (using the mean for larger cities) the results become even more striking, with the gap between the highest and lowest regions dwindling to only 1 ½ percentage points.

When composition effects between regional families are taken into account for immigrants, the variation in sickness absence probabilities between the individuals in the regions actually increase, rather than decrease as was the case for natives. We also find a decrease in probabilities using native means, independent of different composition effects in the regions.

Table 7 shows that there is a clear difference in sickness absence between immigrants and natives. However, taking differences in composition into account we see the same pattern as for counties. The difference in predicted probabilities between immigrants and natives is all but eliminated, which means that the differences between immigrants and natives to a high extent are a matter of differing demographic and socio-economic characteristics. Thus, differences between natives and immigrants do not appear to be fundamentally caused by differences in their behaviour in the sickness insurance system, but rather by differences in composition of the groups.

Table 7. Differences between immigrants and natives in predicted probability of incurring sick days 1993 – 2001 by region family.

	At immigrant means		**At native means**	
	Region family means	"Larger cities" means	Region family means	"Larger cities" means
Larger cities	0.065	0.065	-0.009	-0.009
University regions	0.042	0.049	0.003	0.005
Regional center	0.060	0.062	0.014	0.016
Secondary center	0.051	0.042	-0.024	-0.018
Smaller regions, private employment	0.004	0.004	0.022	0.022
Smaller regions, public employment	0.024	0.003	-0.003	0.022

5. Conclusions

This study shows that there are unexplained differences between the regions that exist even after taking different population structures, workplace conditions and industries in the regions into account. This is not in line with our *a priori* expectations; there should not be any large differences after controlling for individual and economic factors. This seems to be both a result of counties having different compositions and that there are differences in coefficients in the county regressions.

When municipalities are regrouped into regional families two things occur. One is that the heterogeneity of economic structure within the counties is replaced by a more homogenous structure. If one was to assume that the economic structure of a region was of importance in determining sickness absence then we should see a considerable variation between the region families. This does not occur to the extent one would expect. In fact, the variation between the regions is considerably smaller than between the counties, both for natives and for immigrants.

The second thing which occurs is that the influence of the county level has less importance, as it is watered down by the regrouping. Since we see a reduction of variance in economic structure as we regroup the municipalities into larger region families we interpret this result to be a support for the argument that differences between the counties are at least partially a reflection of differing application of rules and/or different social norms regarding sickness absence.

However, if this is important then we should find similar patterns in variation between the counties for immigrants and natives, which we do not. This could be a matter of national composition of immigrants in the counties, if the proportion of immigrant groups is spread unequally throughout the country. The unexplained regional effect could also be a result of the matching process between the individuals' educational level and labour market demand being different in different regions. It is possible that we, despite our efforts, fail to capture this mechanism.

This study shows that differences in sickness absence between immigrants and natives to a large extent are a matter of composition effects, i.e. that immigrants and natives do not have the same demographic and socio-economic characteristics. We illustrate the need to go one step further by not treating immigrants as a homogenous group. Such an approach places greater

demands on the data sources, requiring large groups of immigrants in order to observe their behaviour at the municipal level.

References

Akhavan, S. (2006). *The health and working conditions of female immigrants in Sweden*. Thesis for doctoral degree. Karolinska Institute, Stockholm.

Arai, M., & Skogman, P. (2004). Sickness absence: Worker and Establishment effects. *Swedish Economic Policy Review*,11, 9-28.

Aronsson, G, Gustafsson, K, Mellner, C (2011) "Sickness presence, sickness absence, and self-reported health and symptoms", *International Journal of Workplace Health Management* 4, p-228–243.

Askildsen, J. E., Bratberg, E., & Nilsen, Ø. A. (2005). Unemployment, labor force composition and sickness absence: a panel data study. *Health Economics*, 14(11), 1087-1101.

Barmby, T. A., Ercolani, M. G., & Treble, J. G. (2002). Sickness absence: an international comparison. *The Economic Journal*, *112*(480), 315-F331.

Bradley, S, Green, C, Leeves, G (2007) "Worker absence and shirking: evidence from matched teacher school data", *Labour Economics*, 14, p.319–334.

Bengtsson, T., & Scott, K. (2006). Immigrant consumption of sickness benefits in Sweden, 1982–1991. *The Journal of Socioeconomics*, 35(3), 440-457.

Bengtsson, T., & Scott, K. (2008). Workplace, human capital and ethnic determinants of sickness absence in Sweden, 1993-2001. IZA Discussion Paper No 3672.

Bäckman, O. (1998). *Longitudinal Studies on Sickness Absence in Sweden.* Swedish Institute for Social Research Dissertation Series 34.

Dunn, LF, Youngblood, SA (1986) "Absenteeism as a mechanism for approaching an optimal labor market equilibrium: an empirical study", *Review of Economics and Statistics,* 68, p.668–674.

Ekbladh, M. (2007). *Essays on Sickness Insurance, Absence Certification and Social Norms*. Lund Economic Studies.

Esping-Andersen, G. (1990). *The three worlds of welfare capitalism*. Princeton University Press.

Fuhrer, R., Shipley, M. J., Chastang, J. F., Schmaus, A., Niedhammer, I., Stansfeld, S. A., ... & Marmot, M. G. (2002). Socioeconomic position, health, and possible explanations: a tale of two cohorts. *American Journal of Public Health*, *92*(8), 1290-1294.

Hansen, CD, Andersen, JH (2009) "Sick at work–a risk factor for long-term sickness absence at a later date?" *Journal of Epidemiology and Community Health* 63, p.397–402.

Helgertz, J, Hess, W, Scott, K (2013) "Relative Deprivation and Sickness Absence in Sweden." *International Journal of Environmental Research and Public Health* 10, p.3930-3953.

Henrekson, M., & Persson, M. (2004). The effects on Sick Leave of Changes in the Sickness Insurance system. *Journal of Labor Economics*, 22, 87-113.

Johansson, P., & Palme, M. (1996). Do economic incentives affect work absence? Empirical evidence using Swedish microdata. *Journal of Population Economics*, 59, 195-218.

Johansson, P., & Palme, M. (2002). Assessing the Effect of Public Policy on Worker Absenteeism. The *Journal of Human Resources*, 37(2), 381-409.

Jonsson, T. (1998). Institutionalized strategies in face-to-face encounters: focus on immigrant clients. *Scandinavian Journal of Social Welfare*, 7, 27-33.

Knutsson, A., & Goine, H. (1998). Occupation and unemployment rates as predictors of long term sickness absence in two Swedish counties. *Social Science & Medicine*, *47*(1), 25-31.

Larsson, L. (2006). Sick of being unemployed? Interactions between Unemployment and Sickness insurance in Sweden. *The Scandinavian Journal of Economics*, 108(1), 97-113.

Leigh, J.P. (1985). The Effects of Unemployment and the Business Cycle on Absenteeism. *Journal of Economics and Business*, 37(2), 158-170.

Lundh, C., Bennich-Björkman, L., Ohlsson, R., Pedersen. P., & Rooth, D-O. (2002). *Arbete? Var god dröj! Invandrare i välfärdssamhället.* Stockholm: SNS Förlag.

Lundh, C., & Bevelander, P. (2004). Regionala variationer i sysselsättning för invandrade män år 2000, [Regional variation in Employment for immigrant men the year 2000] In: Ekberg, J. (Ed.), Egenförsörjning eller bidragsförsörjning, SOU 2004:21 Stockholm.

Lindbeck, A., Nyberg, S., & Weibull, J.W. (1999). Social Norms and Economic Incentives in the Welfare State. *Journal of Economics*, 114, 1-35.

Lindbeck, A., Nyberg, S., & Weibull, J.W. (2003). Social Norms and Welfare State Dynamics. *Journal of the European Economic Association,* 1(2-3), 533-542.

National Insurance Board (1996). Invandrarna i socialförsäkringen, sjukskrivning, rehabilitering, och förtidspensionering under 1990-talet [Immigrants in the social insurance; sickness absence, rehabilitation and disability pension during the 1990s]. Stockholm.

National Insurance Board. (2003). *Regionala Skillnader i Sjukskrivningar - hur ser de ut och vad beror de på?* Riksförsäkringsverket analyserar 2003:12. Stockholm

Nilsson, M. (2005). *Differences and similarities in work absence behavior–empirical evidence from micro data.* Doctoral Thesis.

North, F., Syme, S. L., Feeney, A., Head, J., Shipley, M. J., & Marmot, M. G. (1993). Explaining socioeconomic differences in sickness absence: the Whitehall II Study. *British Medical Journal,* 306(6874), 361-366.

Nutek (2002) [The Swedish Agency for Economic and Regional Growth]. Regionernas tillstånd 2002; en rapport om tillväxtens förutsättningar i svenska regioner [The conditions in the Regions 2002: a report on the prerequisites for Growth in Swedish Regions]. Stockholm.

Olsson S (2006). Attityder och regionala skillnader i sjukskrivningen. [Attitudes and Regional differences in the Sickness Insurance]. In Palmer E, ed. Sickness Insurance, Cultures and Attitudes: The perspective of four actors. The Swedish Social Insurance Agency.

Ose, S.O. (2005). Working conditions, compensation and absenteeism. *Journal of Health Economics,* 24(1), 161-188.

Palme, M., & Svensson, I. (2004). Income Security Programs and Retirement in Sweden, in Gruber, J & Wise, D (Ed.), *Social Security and Retirement Around the World: Microestimates*, pp.579-641. University of Chicago Press.

Rikner, K. (2001). *Sickness Insurance: design and behavior.* Lund Economic Studies 103.

Ruhm, C.J. (2003). Good times make you sick. *Journal of Health Economics*, 22(4), 637-658.

Shapiro, C., & Stiglitz, J.E (1984). Equilibrium Unemployment as a Worker Discipline Device. *American Economic Review*, 74(3), 433-44.

Swedenborg, B. (2003). *Varför är svenskarna så sjuka?* [Why are the Swedes sick?] SNS Förlag.

Taylor, D.E (1979). Absent workers and lost work hours. *Monthly Labor Review*, 102, 46-53

Vogel, J. (2002). *Integration till svensk välfärd* [Integration to Swedish Welfare] Statistics Sweden.

Voss, M, Stark, S, Alfredsson, L, Vingård, E, Josephson, M (2008) "Comparisons of self-reported and register data on sickness absence among public employees in Sweden", Occupational and Environmental Medicine 65, p.61–67.

Winkelmann, R (1996) "Markov chain Monte Carlo analysis of underreported count data with an application to worker absenteeism", Empirical Economics 21, p.575–587.

Åslund, O., & Skans, O. N. (2010). Will I see you at work? Ethnic workplace segregation in Sweden, 1985–2002. *Industrial & labor relations review*, *63*(3), 471-493.

Appendix. Regression Results

Table A1. Regression Results for natives and immigrants by county.

Natives	Stockholm	Uppsala	Söderman-land	Öster-götland	Jönköping	Kronoberg	Kalmar
Secondary	-0.14**	-0.35**	-0.25	0.10	-0.26*	0.29	-0.10
University	-0.57***	-1.00**	-0.66***	-0.54**	-0.73***	-0.61***	-0.54**
Sex	0.54***	0.59***	0.43***	0.45**	0.69***	0.44**	0.60***
Age	-0.08***	-0.07	-0.04	-0.02	-0.07	0.08	-0.06
Age^2	0.00***	0.00	0.00	0.00	0.00	0.00	0.00
Married	-0.07*	-0.12	0.08	-0.05	-0.27**	0.00	0.20
Number of children	0.06***	-0.03	-0.03	-0.02	0.12**	-0.06	-0.08
Relative income	-0.96***	-0.66**	-1.09***	-1.05**	-0.83***	-1.84***	-0.52
Dayslast	0.02***	0.03***	0.02***	0.02**	0.02***	0.02***	0.02***
Hosp5	0.14**	0.37**	0.45**	0.47**	0.36**	-0.03	0.70***
Hospitalization>6 days	0.80***	0.85***	0.20	0.96**	0.21	1.45***	0.77*
Unemp rate	0.02	0.02	-0.07*	-0.05	-0.01	-0.05	-0.09
Workplace Turnover	0.21*	-0.21	1.15***	-0.41	0.00	-0.16	0.88
Workplace Growth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Immigrant share at workplace	0.83***	0.13	0.99	1.82**	-0.42	0.67	-0.74*
Sector of employment	-0.04	-0.14	-0.32**	-0.02	-0.30*	-0.35*	-0.36
Work1120	0.22**	-0.11	0.17	1.18**	0.18	0.27	-0.29
Work21plus	0.38***	0.00	0.14	1.08**	0.17	0.30	-0.14
Constant	-0.57	0.32	0.24	-1.90	-0.38	-1.93	0.29

Natives	Blekinge	Malmöhus	Kristianstad	Halland	Göteborg- och Bohus	Älvsborg	Skaraborg
Secondary	0.22	-0.56***	-0.10	0.00	-0.17**	0.09	-0.25
University	-0.49	-1.15***	-0.81***	-0.54**	-0.73***	-0.66***	-0.56**
Sex	0.36	0.77***	0.49***	0.46**	0.48***	0.35**	0.89***
Age	-0.12	-0.05	-0.13***	-0.07	-0.05*	-0.09	-0.25**
Age^2	0.00	0.00	0.00***	0.00	0.00**	0.00	0.00**
Married	-0.12	-0.33**	-0.09	-0.09	-0.07	-0.11	-0.10
Number of children	0.13	-0.12	0.03	0.07	-0.03	0.02	0.10
Relative income	-0.69	-0.66*	-1.07***	-1.19**	-1.27***	-1.03***	-1.46***
Dayslast	0.02***	0.02***	0.02***	0.02**	0.02***	0.02***	0.02***
Hosp5	0.01	0.67***	0.45***	0.12	0.32***	0.57***	0.24
Hospitalization>6 days	0.37	1.28***	0.59***	0.48	0.67***	0.89***	0.57
Unemp rate	-0.11	-0.06	-0.01	-0.07	0.00	-0.03	-0.05
Workplace turnover	1.06	-0.04	0.36**	-0.22	0.06	0.14	0.11
Workplace Growth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Immigrant share at workplace	3.84**	2.84*	1.14***	2.15**	1.03***	2.89***	-0.41
Sector of employment	-0.04	0.06	-0.17**	-0.14	-0.12	-0.16	-0.79***
Work1120	0.33	0.90	0.27*	0.77**	0.17	0.56	0.37
Work21plus	0.11	1.21**	0.54***	1.14***	0.39***	0.63	0.66
Constant	0.62	-1.44	0.74	-0.20	-0.15	0.00	4.05*

Natives	Värmland	Örebro	Västman-land	Dalarna	Gävle-borg	Väster-norrland	Väster-botten	Norr-botten
Secondary	-0.01	0.12	-0.17	-0.13	-0.23	0.07	-0.59	-0.43**
University	-0.57***	-0.50**	-0.70**	-0.65**	-1.08**	-0.42	-0.88	-0.91**
Sex	0.38**	0.52**	0.56**	0.61**	0.65**	0.58**	0.63**	0.38**
Age	0.04	-0.03	0.02	-0.07	-0.04	-0.01	0.02	-0.10
Age^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Married	0.00	-0.07	-0.04	-0.14	0.08	-0.03	0.18	-0.04
Number of children	0.05	0.13	-0.02	0.01	0.01	0.07	-0.08	-0.12
Relative income	-1.34***	-1.07**	1.02**	-1.48**	-1.63**	-1.59**	-0.70	-0.69**
Dayslast	0.02***	0.02**	0.02**	0.02**	0.02**	0.03**	0.02**	0.03**
Hosp5	0.58***	0.53**	0.39**	0.22	0.68**	0.18	0.14	0.39
Hospitalization>6 days	0.72**	0.54	1.06**	0.96**	0.36	0.70*	1.54**	0.53**
Unemp rate	-0.05	0.01	0.00	0.06	-0.01	-0.05	-0.04	-0.15
Workplace Turnover	0.55	0.89*	0.24	0.27	-0.12	0.29	1.71	0.51**
Workplace Growth	0.00*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Immigrant share at workplace	-0.81	0.85	-0.69	1.27	-3.85	-2.16	-0.91	0.50
Sector of employment	-0.52***	-0.14	-0.07	-0.57**	-0.25	-0.15	-0.03	0.25
Work1120	-0.14	0.15	0.57	1.22	0.21	0.23	0.02	0.36
Work21plus	-0.27	0.40	0.46	1.45*	0.03	0.57	-0.02	-0.09
Constant	-1.09	-2.25	-2.02	-1.11	0.45	-1.29	-1.61	1.87

Immigrants	Stockholm	Uppsala	Söderman-land	Öster-götland	Jönköping	Kronoberg	Kalmar
Secondary	-0.07	-0.19	-0.08	0.08	-0.02	-0.06	-0.33
University	-0.56***	-0.88**	-0.44***	-0.77**	-0.44***	-0.22	-0.40*
Sex	0.67***	0.71**	0.40***	0.88**	0.78***	0.40***	0.70**
Age	0.00	-0.16**	0.07	-0.04	0.00	0.03	0.10
Age^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00
YSM	0.02***	0.06**	-0.02	0.00	-0.01	0.03	0.03
YSM^2	0.00***	0.00**	0.00	0.00	0.00	0.00	0.00
Married	0.02	0.00	-0.11	0.31**	0.18*	-0.08	-0.17
Number of children	0.00	-0.07	0.03	-0.01	0.01	0.14**	-0.04
Relative income	-0.78***	-0.66**	-1.08***	-1.24**	-1.16***	-0.78***	-1.42**
Dayslast	0.02***	0.02**	0.02***	0.02**	0.02***	0.02***	0.02**
Hosp5	0.34***	0.30*	0.24	0.00	0.35**	0.48**	0.50*
Hospitalization>6 days	0.59***	0.50*	0.80**	0.30	0.27	0.92***	0.20
Unemp rate	0.04**	0.04	0.02	0.11	0.05	0.09	0.02
Workplace Turnover	0.29***	0.24	0.25	-0.56	0.33	-0.33	0.56
Workplace Growth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Immigrant share at workplace	0.73***	0.59*	0.58	0.45	-0.19	1.20**	1.00
Sector of employment	-0.10**	-0.19	-0.17	-0.59**	-0.78***	-0.30*	-1.16**
Work1120	0.29***	0.13	1.04***	0.26	-0.59**	0.87**	0.91*
Work21plus	0.48***	0.14	0.84***	0.36	0.37*	1.31***	0.63
Constant	-2.77***	0.54	-3.36**	-1.47	-2.13*	-4.79***	-4.17**

Immigrants	Blekinge	Malmöhus	Kristianstad	Halland	Göteborg- och Bohus	Älvsborg	Skaraborg
Secondary	0.27	0.14	-0.01	-0.13	-0.23***	-0.04	-0.23
University	-0.40	-0.16	-0.63***	-0.66**	-0.52***	-0.59***	-1.04***
Sex	0.36*	0.72	0.59***	0.68**	0.59***	0.61***	0.79***
Age	-0.31	-0.09***	0.00	-0.06	0.02	-0.10	-0.17
Age^2	0.00	0.00***	0.00	0.00	0.00	0.00*	0.00
YSM	0.01	0.03	0.00	0.00	0.00	-0.06**	0.08*
YSM^2	0.00	0.00	0.00	0.00	0.00	0.00**	0.00**
Married	0.15	0.12	-0.01	-0.01	-0.01	-0.16	-0.53**
Number of chil	-0.03	0.08	-0.05*	0.00*	0.02	0.19***	0.07
Relative income	-1.25	-1.41***	-1.03***	-1.08**	-0.93***	-0.78***	-0.77
Dayslast	0.01***	0.03***	0.02***	0.02**	0.02***	0.03***	0.03***
Hosp5	0.56	-0.11*	0.43***	0.26	0.27***	0.31	-0.03
Hospitalization>	0.69	0.80	0.75***	0.80**	0.51***	1.08***	-0.29
Unemp rate	-0.13	-0.02	0.03*	0.02	0.01	-0.07	-0.07
Workplace Turn	0.09	0.68	0.38**	0.78*	0.02	0.04	0.05
Workplace Gro	0.00**	0.00	0.00	0.00	0.001*	0.00	0.00
Immigrant share	0.72	-0.82	0.83***	0.95**	0.77***	-0.59	-0.95
Sector of emplo	-0.59	-1.04**	-0.31***	-0.42**	-0.39***	-0.31**	-0.32
Work1120	0.11**	-0.58	0.45***	-0.34	0.28**	-0.45	0.72
Work21plus	0.43**	-0.45	0.73***	0.41	0.62***	-0.21	0.31
Constant	5.39**	0.86	-2.71***	-0.68	-2.48***	2.07	2.02

Immigrants	Värmland	Örebro	Västman-land	Dalarna	Gävle-borg	Väster-norrland	Väster-botten	Norr-botten
Secondary	-0.15	0.02	-0.06	0.12	0.01	0.30	0.31	-0.04
University	-0.67**	-0.48*	-0.50***	-0.44	-0.77*	-0.42	-0.47	-0.76*
Sex	0.17	0.70*	0.49***	0.50**	0.75*	0.88**	0.58*	0.70**
Age	0.03	-0.14	0.07	-0.04	0.23*	0.19	-0.20	0.00
Age^2	0.00	0.00*	0.00	0.00	0.00*	0.00	0.00*	0.00
YSM	0.01	0.01	0.00	0.07	0.06	-0.05	-0.03	0.08
YSM^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Married	0.15	-0.07	0.06	0.18	0.08	-0.13	-0.03	0.03
Number of chil	-0.07	0.02	0.03	0.19	-0.15	0.14	0.07	-0.01
Relative income	-1.32***	1.50*	-1.05***	-0.46	-1.06*	-0.97	-0.76	-1.92*
Dayslast	0.01***	0.03*	0.03**	0.02**	0.02*	0.01**	0.03*	0.02*
Hosp5	0.58*	-0.14	0.09	0.54	0.04	0.55	0.45	0.30
Hospitalization>	0.16	0.84*	0.00	0.24	0.79	0.74	0.07	1.29*
Unemp rate	0.06	0.07	0.11	-0.10	-0.17	0.50**	0.25*	0.03
Workplace Turn	0.36	0.59	-0.46	-0.51	-0.34	0.15	-0.51	0.81
Workplace Gro	0.00	0.00*	0.00	0.00	0.00	0.00	0.00	0.00
Immigrant share	-0.19	1.43*	0.48	0.72	1.06	0.50	0.36	-1.62
Sector of emplo	-0.04	-0.24	-0.40***	-0.54**	-0.14	-0.39	-0.34	-1.01*
Work1120	-0.25	1.09*	0.17	-0.40	0.96*	-0.19	0.38	0.23
Work21plus	0.54	1.48*	0.03	-0.16	1.22*	0.03	0.36	-0.11
Constant	-2.79	-0.22	-3.82**	-0.79	-5.73*	-10.99*	0.12	-1.71

Table A2. Regression Results for natives and immigrants by regional family

Natives	Larger cities	University regions	Regional center	Secondary center	Smaller regions, private employment	Smaller regions, public employment
Secondary	-0.15***	-0.13*	-0.04	-0.17*	0.08	-0.01
University	-0.65***	-0.68***	-0.69***	-0.53***	-0.59***	-0.53***
Sex	0.54***	0.53***	0.45***	0.57***	0.44***	0.54***
Age	-0.08***	-0.06**	-0.02	-0.07*	0.02	-0.09
Age^2	0.00***	0.00***	0.00	0.00**	0.00	0.00
Married	-0.10***	-0.08	0.03	-0.12	0.02	0.23
Number of children	0.03**	0.02	-0.02	0.07*	-0.04	0.05
Relative income	-1.00***	-1.03***	-1.21***	-0.87***	-1.67***	-1.49***
Dayslast	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***
Hosp5	0.24***	0.33***	0.44***	0.43***	0.12	0.11
Hospitalization>6 days	0.72***	0.78***	0.88***	0.54***	0.61*	0.66**
Unemp rate	0.01	0.02	-0.02	0.01	-0.04	-0.10**
Workplace Turnover	0.19**	0.33*	0.45**	0.51*	-0.62	1.50***
Workplace Growth	0.00	0.00	0.00	0.00	0.00	0.00
Immigrant share at workplace	0.95***	0.68*	0.49	0.26	0.47	-3.78*
Sector of employment	-0.09**	-0.10*	-0.28***	-0.22**	-0.32**	-0.29
Work1120	0.19**	0.29*	0.45**	0.13	0.29	0.58
Work21plus	0.40***	0.36***	0.48***	0.26	0.24	0.40
Constant	-0.25	-0.87	-1.06*	-0.49	-0.59	1.42

Immigrants	Larger cities	University regions	Regional center	Secondary center	Smaller regions, private employment	Smaller regions, public employment
Secondary	-0.09***	-0.09	-0.02	0.02	-0.06	0.21
University	-0.57***	-0.69***	-0.60***	-0.41***	-0.56**	-0.43*
Sex	0.64***	0.67***	0.53***	0.62***	0.64***	0.53**
Age	0.00	-0.08**	0.02	0.02	0.03	0.12
Age^2	0.00*	0.00***	0.00	0.00	0.00	0.00
YSM	0.01**	0.02	0.04***	-0.02	-0.02	0.01
YSM^2	0.00	0.00	0.00***	0.00	0.00	0.00
Married	0.01	-0.01	0.07	0.11	-0.02	-0.23
Number of children	0.00	-0.01	0.01	-0.02	0.18**	0.05
Relative income	-0.81***	-0.96***	-1.27***	-1.02***	-0.86**	-1.24***
Dayslast	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***
Hosp5	0.35***	0.15	0.23**	0.44***	0.78***	0.23
Hospitalization>6 days	0.62***	0.53***	0.68***	0.35*	0.21	0.67
Unemp rate	0.00	0.01	-0.03	0.02	-0.02	0.06
Workplace Turnover	0.27***	0.14	0.15	0.25	-0.13	-1.02
Workplace Growth	0.00	0.00	0.00	0.00*	0.00	0.00
Immigrant share at workplace	0.77***	0.64***	0.56***	0.17	0.90	0.32
Sector of employment	-0.20***	-0.34***	-0.47***	-0.45***	-0.60***	-0.52**
Work1120	0.29***	0.46***	0.42***	-0.19	0.00	0.08
Work21plus	0.53***	0.58***	0.59***	0.39**	1.42***	0.32
Constant	-2.32***	-0.81	-2.26***	-2.31***	-3.69*	-4.65*

Note: * significant at 10%, ** significant at 5%, *** significant at 1%.

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Early life conditions and long-term sickness absence during adulthood – A longitudinal study of 9000 siblings in Sweden

Jonas Helgertz [a, b], Mats R. Persson [a, b, *]

[a] Centre for Economic Demography, Lund University, Sweden
[b] Department of Economic History, Lund University, Sweden

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ABSTRACT

This study examines the influence of health conditions experienced during the individual's first year of life on the incidence of sickness absence during adulthood. Using a sample of approximately 9000 biological siblings from 17 countries of origin and living in Sweden during the time period 1981–1991, sibling fixed effect models are estimated. This approach is combined with the use of an exogenous measurement of early life conditions, operationalized as the infant mortality rate. The link between early life conditions and later life outcomes is examined both with and without intermediary characteristics observed during the individual's childhood and adulthood, aiming for a better understanding regarding to what extent the effect of exposure to an early life insult can be mediated. The results suggest that exposure to worse health conditions during the first year of life is associated with an elevated risk of experiencing sickness absence during adulthood. An increase in infant mortality rate by ten per thousand is associated with a four percentage point higher probability of experiencing sickness absence. Despite the importance of adulthood socioeconomic status on sickness absence propensity, these factors do not mediate the influence from the health conditions experienced during the first year of life, suggesting that the association from early life conditions on sickness absence in adulthood operates as a direct mechanism. The link between early life conditions and sickness absence is only present for children to parents with primary schooling and not for individuals with more educated parents. These findings suggest that families with more abundant resources have the ability to protect their child from exposure to adverse health conditions during early life, or to cancel out the influence from an early life insult.

1. Introduction

Results from several studies show that conditions experienced early in life have long-run effects on health throughout the life-course (Galobardes et al., 2004, 2008). Individuals who experience adverse health conditions during early life are likely to suffer from a permanent physiological debilitation, with health repercussions remaining throughout the remainder of life (Davey Smith et al., 1998; Hertzman and Power, 1997; Susser and Stein, 2002). In the framework proposed by Heckman (2007) and Cunha and Heckman (2007), health is considered as a capacity affecting the production of several future capabilities, emphasizing the importance of early environmental conditions on the development of adolescent and adult cognitive and non-cognitive skills. In this framework, poor child health is likely to affect future health, in turn influencing labour supply and productivity (see Currie, 2009, for an overview). Consequently, exposure to adverse early life conditions may result in a reduction of the individual's capacity to work and thereby increasing the probability of long-term sickness absence. In Sweden and elsewhere, sickness absence represents a major societal and public health problem. Not only does it represent a heavy burden on the welfare system, as well as negatively affecting the individual's earnings and career prospects, but it has also been observed to be associated with several adverse health outcomes, including mortality risk (Vahtera et al., 2004). This study explores the relationship between health conditions experienced during the individual's first year of life on the incidence of sickness absence during adulthood.

The models proposed in the literature on the link between early life and later life health can be categorized into two groups: accumulation of risk models, emphasizing the importance of exposure to risk factors throughout the life-course as determinants of health, and critical period models, attempting to identify periods during

* Corresponding author. Department of Economic History, Lund University, Box 7083, 220 07 Lund, Sweden.
E-mail address: mats.persson@ekh.lu.se (M.R. Persson).

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which exposure to adverse conditions may result in a potentially irreversible poorer health (Ben-Shlomo and Kuh, 2002; Kuh and Shlomo, 2004). Within the critical period framework, two not necessarily competing hypotheses emerge. First, the foetal origins of adult disease hypothesis predicts that insults experienced while in-utero result in disrupted foetal growth and, potentially, adverse later life outcomes (Barker, 1995; Gluckman et al., 2008). The disadvantage associated with the majority of existing empirical studies investigating the relevance of this hypothesis relates to the fact that the stressor does not measure the individual's exposure, but rather the result of their in-utero circumstances. If individuals respond differently to a given insult, due to their genetic endowment or other characteristics, it may be difficult to identify the true influence caused by a given insult.

Second, the infancy inflammation hypothesis defines the critical period as occurring during the first year of life. This hypothesis emphasizes the development of several key physiological functions that occur during the individual's first year of life (Kuh and Shlomo, 2004). Exposure to disease or other environmental insults during this period has been suggested to trigger a permanent inflammatory response, elevating the risk of experiencing a range of diseases throughout the remainder of life (Elo and Preston, 1992). Empirical support has been obtained from several studies, pointing to a relationship between exposure to environmental insults during infancy and the risk of stroke (Leon and Smith, 2000), rheumatic heart disease (Elo and Preston, 1992), cardiovascular diseases (Forsdahl, 1977; Buck and Simpson, 1982) and stomach cancer mortality (Leon and Smith, 2000). Finch and Crimmins (2004) and Crimmins and Finch (2006) further emphasize that yearly variations in the exposure to infections during infancy to a large extent explain between-cohort differences in age-specific mortality.

In testing the infancy inflammation hypothesis, previous studies have relied on macro-level indicators as exogenous measurements of early life conditions. In analysing the link between early life conditions and mortality, Bengtsson and Lindström (2000, 2003) use variation in food prices and the infant mortality rate (IMR) measured during the individual's first year of life. Van Den Berg et al. (2006, 2010) uses the business cycle in a similar fashion.

While a link between early life conditions and health later in life has been supported by ample empirical research, the effect could at least partly be operating indirectly, through the generation of the individual's socioeconomic status (Bengtsson and Mineau, 2009; Heckman, 2007; Kuh and Wadsworth, 1993). More specifically, the physiological debilitation resulting from an early life insult could simultaneously be restricting the individual's educational and occupational attainment. Poor health and a weak labour market attachment may thereby work as mutually reinforcing mechanisms. To the extent that the individual's socioeconomic status influences the individual's health, the consequences of exposure to an early life insult may hence become accentuated throughout the life-course. The link between early life conditions and adulthood socioeconomic outcomes has been explored in several studies. For Norway, Kristensen et al. (2004) find that low birth weight and childhood disease are associated with unemployment during adulthood. For the U.S., Case et al. (2005) similarly finds that children who experience poor health have lower educational attainment, poorer health and socioeconomic status in adulthood, controlling for parental income, education and social class. Using a sample of biological siblings in Sweden, Helgertz (2010) shows that adverse early life conditions during infancy have a negative effect on income attainment later in life.

Despite the empirical support for the link between early life conditions and health in adulthood, research investigating the link between early life conditions and the reduction of an individual's capacity to work are scarce. Bäckman and Palme (1998) explore the role of a range of early life factors on the probability of sickness absence in 1980 among a cohort of individuals born during 1953 in Stockholm, Sweden. They find that socioeconomic background is a more important factor in explaining sickness absence than biological factors, including birth weight and gestational age. Analysing the influence of early life factors on sickness absence due to musculoskeletal disorder in a Norwegian cohort, Kristensen et al. (2007) similarly point to the importance of parents' socioeconomic position rather than health circumstances around the time of birth.

In this study, the literature on the link between early life conditions and sickness absence is advanced in several respects. Firstly, the use of longitudinal data allows for a life-course approach, tracking individuals from childhood and into adulthood, thereby analysing the long run effect from early life conditions on sickness absence propensity. Secondly, following Finch and Crimmins (2004), Crimmins and Finch (2006) and Bengtsson and Lindström (2000, 2003), the IMR is used as an instrument of the health environment experienced during early life. The use of the IMR furthermore implies that the measurement of early life conditions can be considered to be exogenous to the individuals' health status later in life. This feature is important since unobserved "third factors" (e.g. genetic endowments) may influence both childhood health and adult circumstances. More specifically, socioeconomic conditions early in life and health outcomes later in life might be jointly influenced by certain unobserved characteristics of the individual. For instance, the educational attainment of the parents is partially a result of unobservable factors that also influence the health of the individual later in life. Thirdly, using a sample of biological siblings from different countries (although the sample are dominated by native born) and including sibling fixed effects, this allows for the cancelling out of the influence of unobserved and time constant characteristics shared by the siblings at the family level such as common genetic factors, traditions, norms and household practices. This is desirable, as such characteristics might otherwise influence the magnitude of the effect from early life conditions and thereby yield biased results if not taken into account.

In line with the infancy inflammation hypothesis, the à priori expectation is that exposure to adverse conditions during the first year of life increases the risk of experiencing long-term sickness absence during adulthood. The effect may primarily operate as a direct impact on the individuals' health, but it might also affect the sickness absence propensity indirectly, through its influence on the individual's attained socioeconomic status. Examining the relationship both with and without intermediary socioeconomic characteristics, such as attained education and workplace conditions, allows us to partly disentangle if the exposure to early life insults affects the sickness absence propensity directly or indirectly.

This study also investigates whether the magnitude of the effect from early life conditions are affected by the individual's socioeconomic resources during childhood. This approach is motivated by the literature, documenting a strong association between socioeconomic status in childhood and adult health and mortality (Currie, 2009; Preston et al., 1998). Presumably, the presence of an intergenerational transmission of socioeconomic status and differences in terms of knowledge and resources between parents and children implies that the influence of early life conditions on sickness absence might be mitigated or exacerbated by the individual's socioeconomic status in childhood.

2. Data and variables

The empirical analysis uses individual level data from the Swedish Longitudinal Immigrant Database (SLI). The SLI consists of demographic and socioeconomic information on 550,000 native

and foreign born individuals, being representative of the Swedish population. The database contains information from several administrative registers, including yearly information on the receipt of sickness benefits. Information on sickness benefits relates to the compensation received by the individual and not due to the illness of any other family member, and is obtained from the income register, limiting the problems related to the use of survey data (e.g. self-reported information). Hence, the data distinguishes between the different reasons for being absent from work in a fundamental way, as the measurement of sickness absence relates to the reduced capacity to work of the individual and not due to the absence from work due to the illness of a child.

The sample consists of individuals born in the period 1932–1974 living in Sweden during the period 1981–1991. The investigated time period is motivated by legislative changes in 1992, causing the information on the receipt of sickness absence benefits from 1992 and onwards not being comparable with the data between 1981 and 1991. Through the multigenerational register, individuals have been linked to their siblings, identified by having the same biological parents. The sample is restricted to sibling-combinations born in the same country. This approach is primarily motivated by cross-country comparisons of infant mortality being problematic due to differences in the definition and measurement procedures between countries (Graafmans et al., 2001). Although restricting the sample to siblings born in the same country does not address the problem of differences in measurement over time for a given country, it is appealing as it minimizes the problems relating to systematic between-country differences.

Following Böhlmark (2008), a sibling approach using cross-sectional data is employed. Here, time-varying information on the individual level enters the model through within-individual means. The sample consists of 8622 siblings from 3209 families and 17 countries of origin. Individuals born in Sweden dominate the sample, corresponding to 5622 individuals and 2134 families.

Since all individuals between 16 and 64 are eligible for sickness absence benefits in Sweden, the sample also includes individuals who at some point during their time under observation are likely to be unemployed or self-employed. Individuals never observed with an occupation or sector of employment in the censuses of 1980/1985/1990 are, however, excluded from the sample, thus excluding individuals with a very weak labour market attachment.

While the exact number of days of sickness absence is not directly observable in the data, information on income from sickness benefits and income from labour and social transfers can be combined to obtain a quite accurate approximation (see Bengtsson and Scott, 2006). This measurement is made possible due to sickness absence benefits being directly based on the individual's income. It is arguably not appropriate to focus on the occasional and brief sickness absence spell, since these are likely to be the result of the seasonal flu or a sore throat. Instead, the main interest is directed towards more extended spells of sickness absence. Hence, the analysis focuses on the link between early life conditions and experiencing at least 30 days of sickness absence during a given year. More specifically, sickness absence is operationalized as a dichotomous variable, indicating whether an individual have at least one year with 30 days or more of sickness absence during the time period during which they are observed. In sensitivity analyses, a continuous specification, as well as using thresholds of 60 and 90 days of sickness absence has been applied (available upon request), not changing the conclusions.

The main analysis is conducted on an unbalanced sample, allowing individuals to enter and exit the sample throughout the period 1981–1991. 90 per cent of the individuals in the sample are, however, observed for at least six consecutive years and 60 per cent are observed during the whole investigated time period.

Table 1
Infant mortality rates, by country of birth.

Year	Austria**	Chile***	Denmark**	Finland****	France**	UK: England and Wales**	Greece**	Iraq*	Italy**	Yugoslavia****	Norway**	Poland**	Czechoslovakia**	Turkey*	Germany***	USA****	Sweden**
1930	104	234	82	75	84	60	99		106	153	46	143	137		85	80	55
1935	99	251	71	67	72	57	113		101	149	44	127	123		99	68	46
1940	74	217	50	88	91	57	98		103	137	39		99		64	59	39
1945	162	184	48	63	114	46			103		36		137			47	30
1950	66	139	31	44	52	30	35	197	64	119	28	108	78	155		36	21
1955	46	120	25	29	39	25	44	135	51	113	21	81	34	155	44	28	18
1960	38	125	22	21	27	22	40	139	44	88	19	56	24	173	35	26	17
1965	28	107	19	17	22	19	34	124	36	72	17	42	26	141	24	25	13
1970	26	79	14	13	18	19	30	20	30	56	13	33	22	150	23	20	11
1975	21	58	10	10	14	16	24	33	21	40	11	25	21	158	19	16	9

Sources: * World Bank (1993), ** Mitchell (2007a), *** Mitchell (2007b), **** 1930–1951: Mitchell (2007a), 1952–1975: World Bank (1993), ***** Aboulharb and Kimball (2007).

IMR has widely been used as an indicator of a country's socio-economic development, in studies on historical as well as modern contexts. The data on IMR used in this study is obtained from four different sources (Mitchell, 2007a, 2007b; World Bank, 1993; Abouharb and Kimball, 2007). The selection of countries included in our analysis is based on characteristics of the data, where all years for which data evidently has been intra-or extrapolated are excluded from the analysis. Qualitatively and quantitatively important differences in IMRs still remain to this day, particularly accentuated between countries at different stages of development. The birth cohorts of interest for this article were born into contexts characterized by improving conditions over time for survival through infancy. Sweden remains the best practice country throughout the period, and the countries that consistently lag the furthest behind are those in the sample from South America and Asia.

IMR is measured on an annual basis, at the national level. Table 1 shows the development of IMR over time in the countries of origin included in the sample, vividly illustrating the differing infant mortality regimes that characterize the countries of birth of the individuals included in the study.

Previous research has demonstrated a cohort effect in mortality and health (Kermack et al., 1934; Preston and Van de Walle, 1978), where individuals born in the same year of birth share a specific environment such as the prevalence of infectious diseases, the quality of water, availability of food and a level of medical knowledge affecting mortality risk and health status throughout life. Despite accounting for the effect of the IMR, there may be additional cohort-specific factors that affect the outcome. Therefore, birth year controls are included in the model. Moreover, the birth year effect also captures the effect of age on later life health.

In order to account for possibly mediating factors throughout the individual's life course, a range of potentially important characteristics, measured at various points in time during the individual's life are included in the analysis. Theory suggests that exposure to adverse early life conditions could both result in a direct effect on the individual's later life health as well as an indirect effect, through childhood and adulthood characteristics. Consequently, the effect of conditions experienced during early life may be mediated or exacerbated by factors intervening throughout the life-course. Besides being a function of an individual's health, sickness absence is influenced by workplace factors (Ose, 2005), the unemployment rate (Askildsen et al., 2005; Ruhm, 2003), and the existing social insurance system (Johansson and Palme, 1996, 2002). In addition, sickness absence is related to socioeconomic position (Fuhrer et al., 2002; North et al., 1993) and ethnic background (Baker and Pocock, 1982; Bengtsson and Scott, 2006). Table 2 presents summary statistics for the explanatory variables. Variables reflecting childhood factors are birth order, sex and – among the foreign born – the age at migration. Adulthood characteristics include several factors that are indicative of the individual's socioeconomic status. More specifically, the socioeconomic position of the individual is reflected by educational attainment and occupation. The educational variable is measured by the highest obtained educational level of the individual and is assumed to reflect not only knowledge, but also ability and motivation. A distinction is made between blue-collar and white-collar workers, using information on occupational attainment. In addition, since sickness absence is more common in the public sector, a variable is included distinguishing between being mainly employed in the private or public sector of the labour market. In order to take the importance of regional economic conditions on sickness absence into account, data on the municipal unemployment rate is used.

Table 2
Variable means and standard deviations.

	Pooled sample		Native born		Foreign born	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Sickness absence, days	7.965	25.450	7.188	22.970	9.421	29.491
Infant mortality rate	40.145	45.822	17.228	6.194	83.091	55.984
Deviation from family IMR	0.000	5.859	0.000	2.514	0.000	9.318
First born	0.303	0.460	0.306	0.461	0.299	0.458
Age	25.880	6.976	26.988	7.685	23.803	4.754
Age at migration	4.116	6.385	N/A	N/A	11.828	5.092
Sex (Female = 1)	0.490	0.500	0.496	0.500	0.480	0.500
Educational attainment						
Primary	0.239	0.426	0.207	0.405	0.298	0.457
Secondary	0.577	0.494	0.592	0.492	0.550	0.498
Tertiary	0.184	0.387	0.201	0.401	0.152	0.359
Parental educational attainment						
Primary	0.410	0.492	0.355	0.479	0.514	0.500
Secondary	0.450	0.498	0.486	0.500	0.381	0.486
Tertiary	0.140	0.347	0.158	0.365	0.105	0.307
Workplace factors						
Private sector employment	0.855	0.330	0.842	0.342	0.879	0.306
Public sector employment	0.145	0.330	0.158	0.342	0.121	0.306
Blue collar occupation	0.580	0.425	0.586	0.423	0.569	0.429
White collar occupation	0.158	0.315	0.185	0.336	0.108	0.264
Undefined occupation	0.261	0.359	0.229	0.336	0.322	0.391
Local unemployment rate	2.623	1.018	2.670	1.036	2.535	0.978
Year	1986.4	1.062	1986.4	0.923	1986.5	1.281
Individuals	8622		5622		3000	
Families	3209		2134		1075	

3. Method

Using pooled cross-sectional data for the period 1981–1991, the relationship between early life conditions and long-term sickness absence is estimated according to the following regression model:

$$y_{ij} = \alpha + \beta X_{ij} + \theta Z_{ij} + \mu_j + \varepsilon_{ij} \quad (1)$$

Where $i = 1,\ldots, M$ and $j = 1,\ldots, N$.

The dependent variable $y_{ij} = 1$ if sibling i in family j is sickness absent and $y_{ij} = 0$ if sibling i in family j is not. The probability of sickness absence y_{ij} for sibling i in family j is modelled as a function of individual and socioeconomic characteristics X_{ij} and early life conditions, Z_{ij}. ε_{ij} is the error term. The parameter μ_j represents the sibling fixed effects, capturing time invariant characteristics common to all siblings within a given family. The inclusion of the family fixed effect implies that all explanatory variables that do not vary between the siblings, observed and unobserved, are cancelled out from the estimation.

The key parameter of interest θ reflects the estimated effect from the individual's early life conditions, measured as the infant mortality rate (IMR) during the year after birth, on long-term sickness absence. For example, if an individual is born in Sweden in 1950, the early life conditions are captured using the IMR-value for Sweden during 1951. The hypothesis is that exposure to adverse conditions during first year of life increases the risk to experience sickness absence during adulthood. Identification of the coefficient θ relies upon within-family variation in both the dependent and

independent variable. Importantly, the inclusion of sibling fixed effects implies the coefficient θ is not affected by factors at the family-level that are correlated with the IMR.

The motivation of using the IMR during the year *after birth* – in contrast to using the IMR during the year of birth – is that the exposure thereby is certain to occur after birth and not while in utero. More specifically, when using the IMR during the year of birth, the measurements for those born during in the late part of the year will to a large extent capture pre-natal rather than post-natal circumstances. In estimating the effect from the IMR, the obtained parameter is based on deviation from the family mean. Consequently, an individual who experienced a more elevated IMR than their sibling(s) will be characterized by a positive within-family IMR deviation.

A potential problem is presented by the long-term decline in IMR, which may result in later born children systematically being characterized by a negative deviation from the IMR family mean (being born with a lower IMR than their older siblings). In the analysis, this potential concern is dealt with by controlling for year of birth, as well as restricting the sample to siblings born within ten years. Furthermore, models (not shown, available at request) are estimated where the individual's IMR has been replaced by the IMR for, respectively, three years before and after the year of birth. If the estimates obtained in the main analysis were solely the result of the secularly declining IMR, similar results should be obtained when using the placebo IMR values. The sensitivity analysis, however, results in IMR estimates approaching zero as well as being statistically insignificant.

In addition, the interaction between IMR and parents' highest educational level is explored. This is motivated by the presumed impact on the later life health of children that is linked to the socioeconomic position of the family. Thus, the influence of early life conditions on sickness absence might be mitigated or exacerbated by the socioeconomic status of the family during the individual's childhood. In with previous literature, the hypothesis is that the effect from adverse conditions during first year of life is stronger for children with lower socioeconomic status in childhood.

The models are estimated as linear probability models. Robust standard errors are used in order to perform more conservative hypothesis tests due to the potential risk of heteroskedasticity. As a sensitivity analysis (not shown, available at request), models are estimated as fixed effect logit models, yielding similar results. The results from the regression analyses are obtained using the STATA software package, version 12.

While the sibling fixed effect model effectively deals with time-invariant factors shared by siblings, this approach does not address the concern of time-varying differences within families, such as the consequences of systematic differences in the treatment of siblings. Previous research shows that parents tend to favour earlier-born children in terms of resource allocation. Later-born siblings are less likely to be vaccinated (Kaplan et al., 1992) and the oldest sibling typically enjoys a higher educational attainment (Black et al., 2004). Furthermore, there are indications of the existence of a U-shaped pattern, where oldest and youngest children perform better in school compared to middle children (Hanushek, 1992). In order to deal with this *parity effect*, we include an indicator of birth order as well as being first-born in the model.

4. Results

Table 3 presents the results from the linear probability models. The aim is to obtain an understanding regarding to what extent the influence of early life conditions are mediated or exacerbated by characteristics operating through the life-course, as well as by the socioeconomic resources available to the individual during childhood. Therefore, models are estimated in a stepwise manner, gradually extended to include characteristics observed during the individual's childhood and, subsequently, adulthood.

Table 3
Linear probability model. Pooled sample, 1981–1991. Coefficients. Sickness absence defined as 30 days or more.

	(1)	(2)	(3)
Infant mortality rate	0.009 (0.001)***	0.004 (0.002)**	0.003 (0.001)**
Birth order:			
First born		reference	reference
Second born		0.037 (0.021)*	0.017 (0.021)
Third born		0.053 (0.038)	0.028 (0.034)
Fourth born		0.132 (0.048)***	0.097 (0.048)**
Fifth born		0.159 (0.064)**	0.123 (0.064)*
Age at migration		0.018 (0.010)*	0.016 (0.010)
Age at migration, squared		−0001 (0.000)	−0001 (0.000)
Men		reference	reference
Women		0.255 (0.016)***	0.247 (0.016)***
Educational level:			
Primary education			reference
Secondary education			−0.095 (0.020)***
University education			−0.213 (0.030)***
Workplace factors:			
Private sector			reference
Public sector			0.101 (0.027)***
Blue collar			reference
White collar			−0.292 (0.030)***
Employment type unknown			−0.027 (0.024)
Local unemployment rate			0.016 (0.013)
Birth year controls	No	Yes	Yes
Constant	0.17 (0.04)***	0.21 (0.10)**	0.38 (0.11)***
ρ	0.03	0.18	0.18
R squared, within	0.01	0.11	0.14
Individuals	8622	8622	8622
Number of families	3209	3209	3209

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Huber–White robust standard errors in parenthesis.

The baseline model disregards the potential influence from both childhood and adulthood characteristics on the link between early life conditions and the propensity to experience at least 30 days of sickness absence during a year. The estimate from Model 1 suggests a higher probability of sickness absence among individuals exposed to comparatively disadvantageous conditions during their first year of life. Recalling that the models rely on within-family variation in the parameters, the estimate indicates that an increase in the IMR of 10 per thousand (measured as the deviation from the family average) is linked to 9 percentage point increase in the probability of sickness absence.

Turning to the subsequent Model 2, characteristics observed during childhood are added. Birth year controls are included in the model in order to capture both the cohort effect and age effect. The estimates show that birth order is important, with a higher parity birth being linked to an increased risk of sickness absence. The results also suggest substantial gender differences, with females typically experiencing a higher propensity of sickness absence. Among immigrants, age at migration is not related sickness absence in adulthood. Including childhood characteristics and birth year controls influence the size of the early life effect on sickness absence probability. More specifically, the point estimate is approximately half its previous size, now suggesting an elevation in the probability of sickness absence of 4 percentage points resulting from being exposed to 10 per thousand higher IMR than their sibling during the first year of life. Despite the decrease in the size of the effect, the estimate, however, remains statistically significant.

Model 3 adds the complete set of adulthood socioeconomic characteristics, ranging from workplace conditions to the

individual's highest attained education. Comparing Models 2 and 3 allows for the analysis of whether socioeconomic status in adulthood mediates the effect from early life conditions. The results confirm the à priori expectations, implying a higher prevalence of sickness absence among individuals with lower educational attainment and among those employed in white-collar occupations. The influence from early life conditions, however, remains unchanged compared with the results from Model 2. Hence, the influence of socioeconomic factors does not further modify the effect of the conditions to which the individual was exposed during the first year of life.

Next, the importance of childhood socioeconomic resources on the magnitude of the effect from early life conditions is examined. Table 4 shows the results from the models estimating interaction effects between IMR and parents' educational level. The results suggest that the socioeconomic position of the family strongly influence the effect from early life conditions on sickness absence. The full model shows that while IMR has a significant and positive effect for children to parents with primary education, the positive effect for children to parents with secondary and university education is neither statistically nor economically significant. Thus, the link between exposure to adverse early life conditions and later life sickness absence appears mainly to be driven by individuals originating from comparatively disadvantaged socioeconomic backgrounds.

In order to test the sensitivity of the results for different definitions of the outcome variable, the models are estimated using different definitions of sickness absence. Results are consistent when the models are estimated as linear models treating sickness absence as a continuous variable. In the sensitivity analysis, 60 and 90 days are also used as thresholds for sickness absence. The results are qualitatively similar, although some of the estimates are not statistically significant in the full model specifications, most likely due to a reduced sample size. Although our results suggest large gender differences in sickness absence risk, separate analyses for men and women show that the effect from adverse early life conditions are similar for men and women. Furthermore, estimating models separately for native and foreign born gives similar results, suggesting that the influence from early life conditions is similar for individuals born within and outside Sweden, implying that the results are not driven by the foreign born in the sample.

In order to assure that we have identified a critical period during the first year in life with long run associations on later life health, models are estimated using different timing of the exposure to the IMR, using years both preceding and subsequent to birth. If our hypothesis of the existence and importance of a critical period during the first year in life is confirmed, exposure outside the "critical window" should not have long lasting health effects. Since no effect is found for the estimates of IMR the years after and preceding birth (available upon request), the conclusion is that the timing of exposure is important and that the first year of life represents a critical period.

Table 4
Linear Probability model. Pooled sample, 1981–1991. Coefficients. Interaction effects between Parents educational level and the infant mortality rate.

	(1)	(2)	(3)
Parents with primary education*IMR	0.009 (0.001)***	0.005 (0.002)***	0.005 (0.002)***
Parents with secondary education*IMR	0.007 (0.002)***	0.002 (0.002)	0.001 (0.002)
Parents with university education*IMR	0.011 (0.005)**	−0.001 (0.005)	0.002 (0004)
Birth order:			
First born		reference	reference
Second born		0.035 (0.021)*	0.016 (0.021)
Third born		0.052 (0.034)	0.027 (0.034)
Fourth born		0.132 (0.050)***	0.096 (0.048)**
Fifth born		0.163 (0.063)***	0.127 (0.063)**
Age at migration		0.019 (0.010)*	0.017 (0.010)*
Age at migration, squared		−0.001 (0.000)	−0.001 (0.000)
Men		reference	reference
Women		0.255 (0.015)***	0.247 (0.016)***
Educational level:			
Primary education			reference
Secondary education			−0.094 (0.020)***
University education			−0.212 (0.030)***
Workplace factors:			
Private sector			reference
Public sector			0.102 (0.027)***
Blue collar			reference
White collar			−0.292 (0.030)***
Employment type unknown			−0.027 (0.024)
Local unemployment rate			0.015 (0.013)
Birth year controls:	No	Yes	Yes
Constant	0.17 (0.04)***	0.21 (0.10)***	0.38 (0.11)***
ρ	0.28	0.22	0.21
R squared, within	0.01	0.11	0.14
Individuals	8622	8622	8622
Number of families	3209	3209	3209

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Huber–White robust standard errors in parenthesis.

5. Discussion

The results are in line with the hypothesis that exposure to adverse conditions early in life increases the risk of experiencing sickness absence during adulthood. An IMR increase by one standard deviation of 5.9 raises the sickness absence risk by approximately two (1.8) percentage points according to the full Model 3.

Although the link between early life conditions and sickness absence operates as a direct effect on the individuals' health, it might also indirectly affect sickness absence through its influence on the individuals' attained socioeconomic position. By including socioeconomic characteristics in the model, the indirect effect from early life conditions on sickness absence is partly taken into account. Interestingly, although there are substantial effects from socioeconomic factors on the sickness absence propensity, the estimate of the IMR parameter is not mediated at all. The results thereby suggest that the adversely affected health resulting from an early life insult is not mediated through an individual's attained socioeconomic status in adulthood. Even if the early life effect to some extent affects sickness absence risk through its influence on the individual's attained socioeconomic position, the *direct* effect from early life conditions on sickness absence in adulthood remains. Hence, the observed link between early life conditions and sickness absence later in life appears to a large extent be explained by the direct influence from early life conditions on the individuals' health later in life.

In addition, the results show that parents' educational level influences the impact from IMR on the sickness absence risk experienced by their children. The link between early life conditions and sickness absence is only present for children to parents with primary schooling and not for individuals with more educated parents. Hence, the socioeconomic status of the parents affect the link between early life conditions and sickness absence later in life, which implies that the influence of the early life effect is cancelled out by increasing socioeconomic resources. Similar results have been observed in previous research (Case et al., 2005) and several potential mechanisms can explain this pattern. One mechanism implies that parents with higher socioeconomic status have more resources and knowledge and thereby is able to protect their children from an early life insult. Another mechanism refers to

intergenerational transmission of economic status such that parents with a higher education have more resources, knowledge and abilities, which mitigate the effect of an adverse live event, both in terms of better conditions for the children in young ages and through educational and economic transfers later in life.

Comparing the results to those obtained in other studies that address the relationship between early life conditions and sickness absence might be problematic, as studies differ in terms of the early life factors that are investigated as well as the empirical strategies that are chosen. Bäckman and Palme (1998) and Kristensen et al. (2007) point to the importance of parents' education rather than poor health in childhood as a determinant of sickness absence. In contrast, the results of this study suggest that early life conditions during infancy have a direct effect on sickness absence in adulthood. The empirical strategy of this article, using a macro-level indicator as an instrument of early life conditions, allows us to overcome problems relating to the early life condition not being exogenous to the individual. In addition, the sibling approach allows us deal with unobserved and time constant characteristics at the family level. This approach arguably provides a methodological advantage over several previous studies examining the link between early life factors and sickness absence.

There are several limitations in this study. Since the IMR is measured at the national level, it is possible that regional data more accurately would capture the early life conditions facing the individual. Unfortunately, for several of the countries where the siblings in our sample are born, there exists no such data to the best of our knowledge. Another limitation pertains to the lack of information on the medical diagnosis that underlies the observed number of days of sickness absence. Several studies show that early life conditions may have different impact on different diseases (Galobardes et al., 2004). Access to such data would arguably offer a more detailed picture regarding the mechanism that links the health environment as instrumented by the IMR and the incidence of sickness absence.

Another concern is that the identification strategy chosen to deal with endogeneity problems and estimation bias is not optimal. The underlying assumption of no time-variant unobserved characteristics at the family level may be violated in the presence of treatments effects, e.g. if parents compensate within the family such that children experiencing poor health induced by early life conditions receive more resources and attention than their siblings. Should this be the case, such heterogeneity within the family would, however, imply that we underestimate the effect from early life conditions. Thus, if such heterogeneity bias exists, the true effect should be greater than that indicated by the regression estimates.

A final concern is sample selection. In studies exploring the effect from early life conditions on health in adulthood there is a concern of selection bias in terms of that exposure to infectious diseases during the first year give raise to immunity and thereby a protection against similar diseases later in life. In addition, there is a selection where only the most robust individuals survive to adulthood and are included in the estimated sample. The presence of these mechanisms should, however, imply that the effect from IMR is underestimated (see Gagnon and Bohnert, 2012).

The concern of sample selection also raises the question of the results being generalizable to a wider population. In order to obtain a representative sample, we have sought to minimize the number of selection requirements. For instance, since all individuals between 16 and 64 are eligible for sickness absence benefits in Sweden, the sample is not restricted to employed individuals and also includes individuals who at some point during their time under observation are unemployed or self-employed. In addition, the foreign born in the sample reflects migration patterns during the post second world war period, including both refugees and labour migrants from several nationalities. Another aspect of generalizability is the magnitude of the effects. Analysing siblings implies that we estimate within-family variation, which gives smaller effects compared to analysing a sample of randomly chosen individuals and estimating between-individual variation not conditioning on living in the same family, since the fixed effect framework allows us to deal with unobserved heterogeneity among siblings. Altogether, we draw the conclusion that the magnitude of our results – if anything – are underestimated.

These limitations notwithstanding, this study has several strengths. It is among a limited number of studies using data covering a sufficient long time period in order to follow individuals from birth and into adulthood. In addition, this paper advances the literature exploring exogenous indicators of early life factors on mortality risk, partly by focussing on sickness absence and partly by analysing siblings. Combining a sibling approach and the use of an exogenous early life indicator allows us not only to deal with the aforementioned endogeneity problem of early life factors, but also to cancel out the influence of shared unobserved and time constant characteristics at the family level such as genetic factors, traditions, norms and household practices.

This study contributes to our understanding of the link between early life health and later life outcomes by identifying health conditions during infancy as a critical period with long run effects for health and labour market attachment later in life. While several studies identify a causal link between early life factors and mortality risk (Bengtsson and Lindström, 2000, 2003; Van Den Berg et al., 2006), our study shows that early life conditions during infancy also influence health status and labour market attachment in middle age. Overall, our findings provide support for pathways models, such that adverse health conditions during childhood result in poor health and a reduction of the capacity to work manifested in higher sickness absence propensity, which in turn presumably is associated to other health problems and higher mortality risk (Vahtera et al., 2004).

Several policy implications can be gathered from our findings. The implications of the results reinforce the necessity to monitor and intervene in the case of exposure to health insults during early life. The results highlight the importance of finding and using interventions (such as childhood health care), combating the effect from adverse early life conditions. In line with Heckman (2007), emphasizing the importance of investments early in life, the timing of these arrangements is crucial. In addition, our evidence suggests, in the context of the Swedish welfare system, that these actions should be put in place not only in all sectors of the population, but should also be targeted to families with low socioeconomic resources. To what extent the consequences of adverse early life conditions can be cancelled out by medical intervention should be of considerable relevance, given the large share of immigrants from developing countries in many of today's developed countries.

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References

Abouharb, M. Rodwan, Kimball, Anessa L., 2007. A new dataset on infant mortality rates, 1816-2002. Journal of Peace Research 44 (6), 743–754.

Askildsen, J.E., Bratberg, E., Nilsen, Ø.A., 2005. Unemployment, labor force composition and sickness absence: a panel data study. Health Economics 14 (11), 1087–1101.

Bäckman, O., Palme, J., 1998. Social background and sickness absence: a study of a Stockholm cohort. Acta Sociologica 41 (4), 349–362.

Baker, C., Pocock, S., 1982. Ethnic differences in certified sickness absence. British Journal of Industrial Medicine 39 (3), 277–282.

Barker, D.J., 1995. Fetal origins of coronary heart disease. British Medical Journal 311 (6998), 171.

Ben-Shlomo, Y., Kuh, D., 2002. A life course approach to chronic disease epidemiology: conceptual models, empirical challenges and interdisciplinary perspectives. International Journal of Epidemiology 31 (2), 285–293.

Bengtsson, T., Lindström, M., 2000. Childhood misery and disease in later life: the effects on mortality in old age of hazards experienced in early-life, southern Sweden, 1760-1894. Population Studies 54 (3), 263–277.

Bengtsson, T., Lindström, M., 2003. Airborne infectious diseases during infancy and mortality in later life in southern Sweden, 1766–1894. International Journal of Epidemiology 32 (2), 286–294.

Bengtsson, T., Mineau, G.P., 2009. Early-life effects on socioeconomic performance and mortality in later life: a full life-course approach using contemporary and historical sources. Social Science & Medicine 68 (9), 1561–1564.

Bengtsson, T., Scott, K., 2006. Immigrant consumption of sickness benefits in Sweden, 1982–1991. The Journal of Socioeconomics 35 (3), 440–457.

Black, S.E., Devereux, P.G., Salvanes, K.G., 2004. The More the Merrier? The Effect of Family Composition on Children's Education. National Bureau of Economic Research.

Böhlmark, A., 2008. Age at immigration and school performance: a siblings analysis using Swedish register data. Labour Economics 15 (6), 1366–1387.

Buck, C., Simpson, H., 1982. Infant diarrhoea and subsequent mortality from heart disease and cancer. Journal of Epidemiology & Community Health 36 (1), 27–30.

Case, A., Fertig, A., Paxson, C., 2005. The lasting impact of childhood health and circumstance. Journal of Health Economics 24 (2), 365–389.

Crimmins, E.M., Finch, C.E., 2006. Infection, inflammation, height, and longevity. Proceedings of the National Academy of Sciences of the United States of America 103 (2), 498–503.

Cunha, F., Heckman, J., 2007. The technology of skill formation. American Economic Review 97 (2), 31–47.

Currie, J., 2009. Healthy, wealthy, and wise: socioeconomic status, poor health in childhood, and human capital development. Journal of Economic Literature 47 (1), 87–122.

Davey Smith, G., Hart, C., Blane, D., Hole, D., 1998. Adverse socioeconomic conditions in childhood and cause specific adult mortality. British Medical Journal 316 (7145), 1631–1635.

Elo, I.T., Preston, S.H., 1992. Effects of early-life conditions on adult mortality: a review. Population Index 58 (2), 186–212.

Finch, C.E., Crimmins, E.M., 2004. Inflammatory exposure and historical changes in human life-spans. Science 305 (5691), 1736–1739.

Forsdahl, A., 1977. Are poor living conditions in childhood and adolescence an important risk factor for arteriosclerotic heart disease? British Journal of Preventive and Social Medicine 31 (2), 91–95.

Fuhrer, R., Shipley, M., Chastang, J., Schmaus, A., Niedhammer, I., Stansfeld, S., Marmot, M., 2002. Socioeconomic position, health, and possible explanations: a tale of two cohorts. Journal Information 92 (8).

Gagnon, A., Bohnert, N., 2012. Early life socioeconomic conditions in rural areas and old-age mortality in twentieth-century Quebec. Social Science & Medicine 75 (8), 1497–1504.

Galobardes, B., Lynch, J.W., Smith, G.D., 2004. Childhood socioeconomic circumstances and cause-specific mortality in adulthood: systematic review and interpretation. Epidemiologic Review 26, 7–21.

Galobardes, B., Lynch, J.W., Smith, G.D., 2008. Is the association between childhood socioeconomic circumstances and cause-specific mortality established? Update of a systematic review. Journal of Epidemiology & Community Health 62 (5), 387–390.

Gluckman, P.D., Hanson, M.A., Cooper, C., Thornburg, K.L., 2008. Effect of in utero and early-life conditions on adult health and disease. New England Journal of Medicine 359 (1), 61–73.

Graafmans, W.C., Richardus, J.H., Macfarlane, A., Rebagliato, M., Blondel, B., Verloove-Vanhorick, S.P., Mackenbach, J.P., 2001. Comparability of published perinatal mortality rates in Western Europe: the quantitative impact of differences in gestational age and birthweight criteria. BJOG: an International Journal of Obstetrics & Gynaecology 108 (12), 1237–1245.

Hanushek, E.A., 1992. The trade-off between child quantity and quality. Journal of Political Economy 100 (1), 84–117.

Heckman, J.J., 2007. The economics, technology, and neuroscience of human capability formation. Proceedings of the National Academy of Sciences 104 (33), 13250–13255.

Helgertz, J., 2010. Immigrant Careers: Why Country of Origin Matters. Lund University.

Hertzman, C., Power, C., 1997. Social and biological pathways linking early life and adult disease. British Medical Bulletin 53 (1), 210–221.

Johansson, P., Palme, M., 1996. Do economic incentives affect work absence? Empirical evidence using Swedish micro data. Journal of Public Economics 59 (2), 195–218.

Johansson, P., Palme, M., 2002. Assessing the effect of public policy on worker absenteeism. The Journal of Human Resources 37 (2), 381–409.

Kaplan, B.A., Mascie-Taylor, C.G.N., Boldsen, J., 1992. Birth order and health status in a British national sample. Journal of Biosocial Science 24 (1), 25–33.

Kermack, W.O., McKendrick, A.G., McKinlay, P., 1934. Death-rates in Great Britain and Sweden: expression of specific mortality rates as products of two factors, and some consequences thereof. Journal of Hygiene 34 (04), 433–457.

Kristensen, P., Bjerkedal, T., Irgens, L.M., 2004. Birthweight and work participation in adulthood. International Journal of Epidemiology 33 (4), 849–856.

Kristensen, P., Bjerkedal, T., Irgens, L.M., 2007. Early-life determinants of musculoskeletal sickness absence in a cohort of Norwegians born in 1967–1976. Social Science & Medicine 64 (3), 646–655.

Kuh, D., Shlomo, Y.B., 2004. A Life Course Approach to Chronic Diseases Epidemiology, vol. 2. Oxford University Press, USA.

Kuh, D., Wadsworth, M.E.J., 1993. Physical health status at 36 years in a British national birth cohort. Social Science & Medicine 37 (7), 905–916.

Leon, D.A., Smith, G.D., 2000. Infant mortality, stomach cancer, stroke, and coronary heart disease: ecological analysis. British Medical Journal 320 (7251), 1705–1706.

Mitchell, B.R., 2007a. International Historical Statistics Europe 1750-2005. Palgrave MacMillan, New York.

Mitchell, B.R., 2007b. International Historical Statistics The Americas 1750-2005. Palgrave MacMillan, New York.

North, F., Syme, S.L., Feeney, A., Head, J., Shipley, M.J., Marmot, M.G., 1993. Explaining socioeconomic differences in sickness absence: the Whitehall II study. British Medical Journal 306 (6874), 361–366.

Ose, S.O., 2005. Working conditions, compensation and absenteeism. Journal of Health Economics 24 (1), 161–188.

Preston, S.H., Van de Walle, E., 1978. Urban French mortality in the nineteenth century. Population Studies 32 (2), 275–297.

Preston, S.H., Hill, M.E., Drevenstedt, G.L., 1998. Childhood conditions that predict survival to advanced ages among African–Americans. Social Science & Medicine 47 (9), 1231–1246.

Ruhm, C.J., 2003. Good times make you sick. Journal of Health Economics 22 (4), 637–658.

Susser, M., Stein, Z., 2002. Civilisation and peptic ulcer. International Journal of Epidemiology 31 (1), 18–21.

Vahtera, J., Pentti, J., Kivimäki, M., 2004. Sickness absence as a predictor of mortality among male and female employees. Journal of Epidemiology & Community Health 58 (4), 321–326.

Van Den Berg, G.J., Lindeboom, M., Portrait, F., 2006. Economic conditions early in life and individual mortality. The American Economic Review, 290–302.

Van den Berg, G.J., Deeg, D.J.H., Lindeboom, M., Portrait, F., 2010. The role of early-life conditions in the cognitive decline due to adverse events later in life. The Economic Journal 120 (548), 411–428.

World Bank, 1993. International Economics Dept. (1997): World Tables of Economic and Social Indicators 1950-1992 [Computer File]. Washington, D.C.: World Bank, International Economics Dept. [producer]. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [Distributor], 1997.

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Växelkurspolitik och marknadsintegration. De utländska växelkurserna i Sverige 1834–1880 (Exchange Rate Policy and Market Integration.Foreign Exchange Rates in Sweden 1834-1880), 2000.

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Economic of Transport: the Swedish Case 1780-1980, 2000.

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"Institutions", What Is In a Word? A Critique of the New Institutional Economics, 1999.

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Welfare, Security and the Level of Fertility: A Global Analysis, 1985 and 1995, 1999.

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The Immigrant Experience: Changing Employment and Income Patterns in Sweden, 1970 – 1993, 1999.

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Control and Rent-Seeking, The Role of the State in the Thai Cassava Industry, 1998.

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The Institutional Root of China's Rural Industry and Gradual Reform, 1998.

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Arbetslöshetsfrågan i historisk belysning. En diskussion om arbetslöshet och social politik i Sverige 1830-1920 (The Unemployment Question in Historical Perspective. A Discussion on Unemployment and Social Policy in Sweden, 1830-1920), 1996.

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Technological Development and Industrial Exhibitions 1850-1914. Sweden in an International Perspective, 1995.

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Från ägarmakt under ansvar till företagsledarmakt upa. En studie över maktförskjutningen i tre svenska verkstadsaktiebolag (The Transition of Power from Shareholders to Top-Management. A Study of Three Swedish Engineering Firms), 1995.

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Svenskt smör. Produktion, konsumtion och utrikeshandel 1861-1913 (Swedish Butter. Productivity, Consumption, and Foreign Trade, 1861-1913), 1995.

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Åtstramning och Expansion. Den ekonomiska politiken i Sverige 1971-1982 (Retrenchment and Expansion. Swedish Economic Policy 1971-1982), 1995.

1 Lundh, Christer (ed.)
Population, Economy and Welfare. Scandinavian Population Studies, vol 10, 1995.

0 Ahlström, Göran
Technological Development and Industrial Exhibitions 1850-1914. Sweden in an International Perspective, 1995.