

# Exploring regional differences in the regional capacity to absorb displacements

Kristina Nyström<sup>1,2</sup>

[kristina.nystrom@indek.kth.se](mailto:kristina.nystrom@indek.kth.se)

and

Ingrid Viklund Ros<sup>1</sup>

[ingrid.ros@indek.kth.se](mailto:ingrid.ros@indek.kth.se)

## Abstract

Every year there is a substantial turbulence in an economy with respect to new firm formation and business closures. Each year, according to Tillväxtanalys (2009), about 100 000 Swedish employees lose their job due to a business closure. However, the share of firm closures vary substantially across Swedish regions (Nyström, 2007; 2009) and consequently the number of workers affected by the firm closure can be expected to vary across regions. In this paper we explore the patterns of regional displacements and to what extent there are differences in the regional capacity to re-employ displaced workers within one year. We use individual-firm level data to identify all establishment closures and re-employments in Sweden during the period 2001-2009. On average the share of displaced workers is 1.22 percent, but the regional variation is substantial. We find that the regional share of re-employments within the region where the displaced worker was employed varies between 15 and 85 percent. We do not find any correlation between the share of displacements and the capacity to absorb displaced workers.

**Keywords:** Displacements, exit. Labor mobility, regional development

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<sup>1</sup> Division of Entrepreneurship and Innovation and Center of Excellence for Science and Innovation Studies, Department of Industrial Economics and Management, The Royal Institute of Technology, Lindstedsv 30, SE-100 44 Stockholm, Sweden

<sup>2</sup> The Ratio Institute, P.O Box 3203, SE103 64, Stockholm, Sweden.

## 1. Introduction

Every year there is a substantial turbulence in an economy with respect to new firm formation and business closures. Job displacement i.e. an involuntary loss of job due to economic downturns or structural change affects millions of workers each year. A recent cross-country comparison by OECD (2013) reveals that displacements affect 2-7 percent of the employees every year. For the Swedish case an average displacement rate of about 2 percent is reported for the time period 2000-2008. According to Tillväxtanalys (2009)<sup>3</sup> annually more than 100 000 Swedish employees lose their job due to a business closure.<sup>4</sup> Through the process of creative destruction, in which old and obsolete firms exit due to the entry of new and more productive firms, the resources used in the exiting firms are re-allocated and possibly more efficiently used in the new firms. In a best case scenario the competence of the workers affected by a business closure can be used in another employment. However, in some cases displaced workers are not able to find a new job in particular if, for example, the employee's competences do not match the current demands in the labor market. Furthermore, the possibilities to find a new job after a closure may vary substantially depending on the regional conditions in the labor market. It may, for instance, be more difficult to find a new job after a business closure if the unemployment rate in the region is already high or if the displacement is connected to a closure of locally dominant firm.

Among policy-makers there is clearly an interest in the effects of business closures. Previous Swedish large-scale closedowns, which have received a lot of attention from policy-makers, include, for example, Ericsson in Norrköping 1999<sup>5</sup> (telecom industry), Kockums in Malmö<sup>6</sup> (shipyard industry), and most recently SAAB in Trollhättan<sup>7</sup> (automobile industry). It is undoubtedly the case that the closure of locally dominant firms such as these firms may have large effects on the regional labor market. At the regional level the number of firm closures (exit rates) varies substantially (see e.g. Nyström 2007 and 2009 for a description of the Swedish case). However, we know little about what happens to the employees after the

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<sup>3</sup> Tillväxtanalys (2009) present data on number of employees affected by business closures 2001-2007. We have not been able to find more recent data published by this authority on this matter.

<sup>4</sup> In this paper we use the terminology "business closure". A business closure may include bankruptcies or closures due to too low profitability. However, it should be emphasized that a business closure should not always be regarded as a failure. There may be many reasons for why the owners of a business decide to discontinue their business. In fact, many owners who choose to close down still describe their business as a successful businesses (Bates, 2005). The reason for closing down their business may, for example, be that they want to pursue other attractive opportunities or that they want to end their entrepreneurial careers before they retire (see e.g. Gimeno et. al. 1997; DeTienne et.al. 2008).

<sup>5</sup> The cutback was initiated 1997 with major lay-offs. The plant was closed 1999. At the plant PCBs (*printed circuit board*) for the telecom industry. The plant had at most 2400 employees.

<sup>6</sup> As a result of the severe crises of the Swedish shipyard industry in the 1970s Kockums was incorporated in Svenska Varv AB owned by the Swedish government in 1979. However, all civil production of ships was closed down in 1986.

<sup>7</sup> SAAB Automobile AB was filed for bankruptcy 2011 after two years of turbulence when GM announced that they wanted to sell the company. At this point the plant had about 3500 employees. GM was since 1998 was the sole owner of SAAB Automobile AB. In 2012 the National Electric Vehicle Sweden (NEVS) bought the bankrupt's estate and re-started producing cars. However, in autumn 2014 also NEVS was filed for bankruptcy by one of the subcontractors due to unpaid debts.

closure of these businesses. In order to be able to formulate well-targeted labor market policies, aiming at reducing the costs incurred to the displaced workers at the time of a plant closure, understanding how the re-employment conditions differ between regions is of great importance. In regions where the re-employment probability is low and joblessness durations often are long, large-scale closures might lead to severe consequences for the region if the displaced workers are forced to move to another region in order to become re-employed. The migration from the region then might cause further unemployment and even worsened economic climate. Thus, regional policy should aim at providing necessary conditions for quicker absorption of displaced workers.

The literature on the individual consequences of displacement, unemployment duration, multiple job loss and earning losses is extensive (See Hammermesh 1989 and OECD (2013) for a recent review of the literature). Studies by for instance Eliason and Storrie (2004), Kuhn (2002), Jacobson et. al (1993) investigate how these losses differ amongst individuals. Displaced workers are found to suffer from longer periods of unemployment, reduced earnings and multiple job loss compared to non-displaced workers. Older, female, less educated, with long previous tenure are often found to suffer the most from displacement, by reduced earnings and, or, long periods of joblessness, compared to their counterparts. The literature on the regional consequences of closures as well as on regional differences in joblessness durations due to displacements is however limited. Previous studies regarding the regional patterns of Swedish displacements primarily provide knowledge based on individual case studies.<sup>8</sup> This paper intends fill the knowledge gap of the regional effects of business closures by exploring the regional differences in the capacity to absorb<sup>9</sup> employees from business closures. What are the patterns of regional displacements? Which regions manage to re-employ the largest share of employees affected by a firm closure? The empirical part of the paper uses a unique dataset of matched firm-employees that enable us to study the labor mobility induced by firm closures during the period 2001-2009.

The paper is organised as follows. In section 2, we present the theory and previous research on the role of labour mobility and regional displacements. The section also includes a review of some of the early Swedish case studies at the regional effect of primarily large scale business closures. Section 3 provides a description of the data the empirical strategy employed to define displacements. The empirical results are discussed in section 4. Finally, we discuss our main conclusions and suggestions for future research in section 5.

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<sup>8</sup> As noted by Eliasson and Storrie (2006) prior to their study (a first version published in Eliasson and Storrie, 2004) previous Swedish research on the consequences of displacements are based on case studies.

<sup>9</sup> In the paper we discuss the regional capacity to absorb displacements. However, it should be noted that the regional absorption capacity of course is depending on the displaced individuals, education, competence and ability that needs to be matched to a new job.

## **2. The role of labour mobility and regional displacements**

### **2.1 Labour mobility and industrial dynamics**

According to Schumpeter (1934), innovative entry by entrepreneurs forces less innovative and less efficient firms out of business. Through the process of “creative destruction”, in which old and obsolete firms exit due to the entry of new and more productive firms, the resources used in the exiting firms are re-allocated and possibly more efficiently used in new firms (Schumpeter 1934 and 1942). Hence, this process of “creative destruction” is crucial for the diffusion of innovation and economic growth. If the mechanisms on the labor market are well functioning, business closures should lead to increased labor mobility through labor reallocation rather than increased unemployment and, or, decreased labor force, and in the longer term, to positive spillover effects and economic growth. By adopting the endogenous growth models of Lucas (1988) and Romer (1986;1990) viewing knowledge as embodied in the individual and the transfer of knowledge as a product of human interaction, workers’ movement between different employers and, or, different locations and regions cause the knowledge spill over to increase. This is one of the reasons for the importance of labor mobility within a well-functioning labor market (Israelsson, Strannefors and Tydén 2003; Andersson and Thulin 2008). Regional labor mobility leads to more intense knowledge diffusion and greater accumulation of human capital along with a higher quality and efficiency in the matching mechanisms on the labor market and should thus be a goal for the regional policy (Andersson and Thulin 2008). Labor mobility includes the geographical movement of workers, the occupational and the inter-industry movement of workers. The development of labor mobility however depends on several factors, amongst others the economic climate, business cycles and the legal system, of which all affect the possibilities of movement of workers. Furthermore, individual characteristics and possibilities, business cycles and local labor market conditions affect the mobility of the workers (Hedberg 2005). Firm and labor mobility are hence an important and substantial part of the transformation of the economy. Each year about 10 percent of the firms in the Swedish manufacturing industry enter or close down. In service sectors, entry and exit rates are even higher (Nyström 2007; 2009). Labor market turbulence is also substantial (see e.g. Israelsson, Strannefors and Tydén 2003, Andersson & Tegsjö 2006 and Andersson & Thulin, 2008). Andersson & Thulin (2008) find that during the period 1987-2005 on average 12.5 per cent of the employees in the private sector change employment every year.

### **2.2 Regional displacements**

The origin and the reason for the labor mobility can be either voluntary or involuntary. The first could spur out of increased incentives to change workplace, which could include being offered a higher wage, more stimulating tasks, and change in family or marital status. The latter, in which the labor movement is involuntary, the workers are forced to change

employment through an involuntary job loss due to either poor performance by the worker or due to establishment downsizing or an establishment closure. By studying establishment closures one can follow the individuals that become displaced as an effect of the closure and investigate when and where they become re-employed. Some individuals become re-employed within the same industry and within the same regions whereas some make inter-industrial or regional changes, some become self-employed and some leave the labor force. Common for all is that some mobility takes place, and with the mobility follows externalities which could be beneficial, if the displaced workers do not suffer from long time periods of joblessness and the knowledge is well absorbed by the receiving establishments. Investigating which regions that most efficiently manage to reemploy the displaced workers adds to the understanding of how labor mobility after establishment closures best can be facilitated.

There are some, mainly American, studies from the 70's and 80's that investigate the regional differences in re-employment prospects and post displacement earnings of displaced workers. Herzog and Schlottmann (1984) study how the re-employment prospects of displaced workers differ between four American regions, South, Northeast, Midwest and West, controlling for the human capital endowments. They conclude that white-male displaced workers who seek full-time jobs in the South face approximately 10 percent higher re-employment probabilities than those searching for jobs in any of the other regions. The Northeast-region is found to have a relative structural disadvantage in reemployment prospects, which is found to mainly derive from job-search outcomes in New England, where workers are found to be both at increased risk to displacement and once displaced also face less possibilities to reemployment than workers elsewhere. Jacobson (1977) find that workers that are displaced in a local labor market with an unemployment rate above the average suffered from higher income losses than other displaced workers. The local unemployment rate is also found to affect the younger workers the most. In Jacobson (1984), a one-percentage point change in the unemployment rate is found to have a large effect on the earning losses of the displaced workers. Bendick and Devine (1981) find that displaced workers in growing regions<sup>10</sup> experienced almost half of the unemployment duration experienced by those in declining regions. Podgursky and Swaim (1987) find that high area unemployment levels reduce the reemployment earnings of displaced workers. Howland and Peterson (1988) study how local economic conditions affect the re-employment success of displaced workers in the manufacturing sector in the US. Blue-collar workers are found to be sensitive to local employment growth in their 2-digit SIC industry of displacement. The re-employment success of white-collar workers are on the other hand found to be more dependent on the overall labor supply and employment growth. Younger workers with low pre-layoff wage, with short tenure, well-educated and white and during periods when the economy was strong experienced smaller losses than other displaced workers.

Boschma et al. (2009), find that firms and plants benefit less from labor inflow of similar skills and competence that is already present in the plant. It is discussed that new employees

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<sup>10</sup> Defined as SMSAs (standard metropolitan statistical areas)

might bring new ideas and valuable knowledge to the firm, but to what extent and to what value is dependent on the specific kind of knowledge that is brought and how it matches the already existing knowledge. This implies that the positive effects from labor mobility, in terms of knowledge spill overs, are only visible when one distinguishes between different types of labor inflows, for example, labor from within the same regions or from outside of the region. When workers with the same skills as is already present at the plant are recruited, there is a risk of a lock-in problem. However, Boschma et al. (2009), argue that this problem is only worsened if the newly recruited worker comes from within the same region. If a firm hires workers from firms within the same sector and region, these individuals are less likely to bring new valuable knowledge to the hiring firm. The reason is that local firms within the same sector are claimed very much alike. The negative effect from recruiting workers from the same region would be less if the two firms were only related (in opposition to similar). In this case the individual has something to add to the existing knowledge base. Boschma et al. (2009) further find that extra-regional knowledge is not enough; the receiving region needs to be able to absorb the knowledge, without already possessing the knowledge, in order for growth to occur. The highest economic regional benefits originate from extra-regional knowledge from sectors that are related, but not similar, to those sectors already present in the region. Knowledge from unrelated sectors are on the other hand less valuable to both the regions and the plants as the knowledge is not valuable and, or, understandable to the recipients.

As less diversified local labor markets might be the best at re-employing displaced workers after an establishment closure in the region this could together with the findings of Boschma et al. (2009) imply that these regions also experience less positive externalities, in the form of knowledge spill overs, than other regions. At the same time, the regions in which individuals stay jobless a longer time period (with a more diversified labor market for example) could be negatively affected by human capital depreciation, and thus experience less externalities as well.

In a study of the unemployment durations in the Netherlands, Folmer and Van Dijk (1988) distinguish between two types of causal variables – individual characteristics (such as gender, age and educational level) and variables that reflect the regional demand for labor, in order to investigate the determinants of unemployment duration. The regional labor demand is measured by including regional unemployment rates and the regional ratio of vacancies to unemployment. The probability of getting a job is found to be positively affected by the number of available jobs and negatively affected by the competition for jobs. Furthermore, Folmer and Van Dijk (1988) include interaction variables between some of the personal characteristics and the regional variables as previous research has shown that individuals with similar labor market characteristics tend to cluster in specific regions (Öberg and Oscarsson 1979). The results show that the differences in the unemployment duration are mainly due to individual characteristics and that the structure of the regional economy and the regional demand for labor is of less importance (Folmer and Van Dijk, 1988).

## 2.3 Research on displacements in Sweden

The recent literature on displacements in Sweden is limited. The previous mentioned study by OECD (2013) reports that about 90 percent of the displaced workers in Sweden are re-employed within one year. This is the highest share among the 15 countries that participated.<sup>11</sup> However, it should be noted that the OECD (2013) figures also include mass dismissals as well as displacements caused by firm closures. Magnergård (2013) study the displacements in Sweden 2000-2003 and find that about 80 percent of the workers are recovered (back to employment) within one year. In this process about, 35-40% has changed industry<sup>12</sup>, about 9 % has moved,<sup>13</sup> about 5 percent has become commuters, and about 2 percent has turned into self-employees. Furthermore, it is found that the probability of change of industry, moving and becoming self-employed increases with the time out of employment.

Regarding the individual characteristics OECD (2013) finds that the patterns in Sweden are in many aspects similar to other countries. Men have a higher incidence of displacement compared to women.<sup>14</sup> Younger employees (20-24 years) and employees with less than secondary education have higher incidence of displacement compared to employees in the middle ages (35-44 years) and employees with post-secondary education. However, in Sweden employees in the age of 55-64 have a relatively lower incidence of employment compared to employees in the age span 34-44 (OECD, 2003). As previously mentioned the time it takes for displaced workers to get back to work varies with individual characteristics. The probability to be re-employed within one year is relatively lower for young workers (age 20-24) and old workers (age 55-64) compared to middle-aged (35-44) (OECD, 2013). Ros, (2013) study the individual characteristics related to the probability of re-employment of Swedish displaced workers and find that being non-immigrant, in the mid-thirties, and having a short tenure at the closing establishment, is positively related to probability of becoming re-employed. Furthermore, men, immigrants, employees displaced from smaller establishments, and employees with previous experience as self-employed have a higher probability to enter self-employment after affected by a firm closure (Ros, 2013).

At the regional level research on the general patterns and effects of firm closure and displacements are scarce and the existing research tend to relay case studies. As previously mentioned there are some early studies from the 1960's and 1970's on displacements. Gonäs et. al. (1978) presents a summary of earlier studies on business closures in Sweden and discuss the results from the research in this period. Common for all of the earliest studies is that women, older workers and those without occupational education are found to have suffered the most as a consequence of these early closures. Women are found to leave the labor force when they are displaced to a greater extent than men. Furthermore, women who

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<sup>11</sup> The re-employment rates within one year of displacement vary between 30-90% where France and Portugal are reported to have the lowest re-employment rates and Sweden and Finland report the highest re-employment rates.

<sup>12</sup> Defined as a change in the 2-digit SIC classification code.

<sup>13</sup> Defined as a change in municipality of living.

<sup>14</sup> However, in many countries (except Sweden and Germany) the gender effect disappear when other factors such as industry and occupation are controlled for.

stay in the labor force are found to suffer from greater decreases in earnings than men. The median unemployment duration is however found to be rather short; about seven weeks. One of the studies included in Gonäs et al. (1978) study the closure of “Jössefors Bruk”<sup>15</sup>, a paper and pulp industry which was closed down 1969. About 30% of those that found new employment had moved to a new location. The workers that changed region of residence as a consequence of the job loss, moved to a location where they could keep the same occupation. Geographical proximity was of less importance to the workers. Alike the study of Jössefors Bruk, a study of the closure of the shipyard in Oskarshamn during the 1960’s finds that the workers that moved put less weight in the distance to move and more on the possibility of remaining in the same profession. Furthermore, Carlsson et al. (1993) find that the most common response to local labor market crisis (such as establishment closures) is geographic extension of the local labor market area. Hence, according to these studies the workers were reluctant towards changing occupation and less reluctant towards commuting and moving to another location. It should be mentioned that most of these early case studies on firm closures focus on regions that are dominated by a single industry, and it is likely to believe that the effects of business closures are different in more expansive and diverse areas.

More recent case studies on the regional effects of business closures include Ahlstrand (2010) study the employees involved in the closure of the Ericsson plant in Norrköping in 1997 and conclude that that, in this particular case, this business closure turned out to be the “start of a new beginning” both for many individuals and for the whole region. Fridh (2003) and Waxell (2005) study the effects of the closedown of the Pharamacia plant in Uppsala 1995 and find that the closure of this plant did not lead to decreased employment rate but instead lead to growth in the biotech cluster within the region. It is argued that skilled labor became available and new firms were created in the region and the labor mobility increased. Hence, the closure may have released innovative resources and stimulated the growth of existing plants and the formation of new ventures in the region

As discussed in Hedberg (2005) and argued by Storrie (1993) and Johansson and Persson (2000) the structural changes following closures have changed during the 1990’s. The labor market matching was earlier concerned with moving the displaced workers to new similar industries, but during the recent decades the labor market has become more diversified and similar employers are not always as easy to find, and therefore labor supply could be excessive and scarce at the same time in one regional labor market. These findings, together with the findings of Power and Lundmark (2004) and Waxell (2005) thus suggest that regions where the concentration of similar employers, demanding the same skills and competence, is high (such as clusters) are more likely to quickly absorb the displaced workers compared to more diversified labor markets.

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<sup>15</sup> The establishment had 200 employees when it closed down in 1969. At that time Jössefors had about 750 inhabitants and hence the closure of the establishment had severe effects on the labour market.



## 2. Data and empirical strategy

In order to identify business closures and the associated displacements we use individual-firm level data provided by Statistics Sweden through the Micro Data Online Access (MONA) database. Data from 2000 to 2010 is used to define business closure for the period 2001-2009 and contains information on all individuals that were employed in a firm or establishment in November each year. Each individual is identified by a personal identification number and is connected to an establishment and, or, to a firm through firm and establishment-specific identification numbers respectively. If an establishment which identification number was existing in November one year is non-existing in November the following year, it is defined as a closed establishment and can be so due to three different reasons; either, the establishment has closed due to a merger or due to a split, or the establishment has closed due to exit. The latter alternative is used to avoid problems with false firm deaths as discussed by Kuhn (2002). The acquisition of one firm by another would cause the bought firm's employer identity number to disappear. The same problem could arise when using establishment closure, as two establishments merge, one of the establishments will lose its identification number and thus seem to have disappeared although a majority of its workers are still employed and just have moved to the new larger establishment. Furthermore, if an establishment closed due to a split were included there would be a problem with false firm death as well. This is however avoided by only using the establishments that have closed due to exits. Even though the data is organised in such way that it recognises closures due to mergers, it is possible that one specific establishment is defined as a closure but a minority of its workers are re-employed within the same firm. These individuals are not considered to be displaced and thus excluded from the data. Furthermore, those who at the time of closure were self-employed are excluded as the closures then could reflect the productivity of the worker and thus could bias the results. Furthermore, our focus is on the regional capacity to re-employ displaced workers and hence we want to exclude transitions to necessity-based self-employment.

The definition of displacements varies substantially across studies, both in terms of how to define the displacements and with regard to which restrictions imposed regarding sectors and ages of employees included. Appendix A provides a summary and comparison of the definition of displacements that we have identified covering the Swedish case. In this paper we impose a flexible time window to define the closure process. A flexible time window is necessary since in many cases, in particular for large scale closures, the closure process starts several years before the actual closure is finalized. When using a wider and flexible time window for the closure process there is a possibility of including not only the displaced workers that are affected by the closure, but also some of the normal labour turnover, which would bias the results (Kuhn 2002). However, as the time of the displacement in the closure process has shown to affect the future of the workers, a too narrow time window will also bias the results. Eliason (2005) shows that setting an upper limit of three calendar years minimises

the risk of including normal labour turnover. We use the same definition and methodology to identify displacements as Eliason and Storrie (2004) and von Greiff (2009). Each closure process in the dataset is defined to be one, two or three years long, based on the size of the establishment and its worker flows. We define the length of the closing process according to the following:

- The closure process of a firm is defined to be *three* years long if the number of employees at the firm three years prior to the closure was 50 or more, and if the workforce was reduced by at least 20% each year during the closure process.
- The closure process is defined to be *two* years if it does not fulfil the requirements of a three-year closure process and if the number of employees, two years prior to the closure was at least 25, and if there was a reduction of the workforce by at least 10 employees, corresponding to at least a reduction of 20%, the year before the closure.
- The closure process is defined to be *one* year which simply corresponds to all the establishments that are not defined to have two- or three-year processes. Most establishments are defined to have a one-year closure process.<sup>16</sup>

Displaced workers are then defined as workers that are separated from a closing establishment, within one of the three time windows defined above. Alike von Greiff (2009) workers older than 55 and younger than 25 are disregarded in the year prior to displacement as older workers are likely to leave to retirement and younger workers are likely to leave to educational activities within the observational period. A drawback of the data is the uncertainty of what the jobless displaced workers really do during the spells of joblessness. With this data, it is not possible to distinguish which individuals that are unemployed (in the sense that they are without work, available for work and searching for a job), which individuals that receive unemployment insurance benefits and which individuals that leave the labour force for other reasons such as attend school or even are deceased.<sup>17</sup> We can only observe that they don't appear in the dataset as employees or self-employed any longer. If data on unemployment insurance benefits were available it could have been included as an explanatory variable since the level of benefits have proven to have a negative effect on exits from unemployment in some studies, for example in Meyer (1990) and Narendranathan et al. (1985).

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<sup>16</sup> For the years 2001-2007, which are the years where displacements are available according to all three definitions, 75-80 percent of the displacements are classified as a one year process, 15-20 percent as a two year process and 2-7 percent as a three year process.

<sup>17</sup> The number deceased persons in the age group 25-55 were in 2008 4439 persons, which correspond to a mortality rate of 1.22 per thousand inhabitants (SCB, 2014). There are some regional differences in mortality rates (SCB, 2011). SCB (2012) find mortality rates to be higher for persons born in rural areas. Note that this finding is based on Standardized mortality rates which are the observed number of deceased persons in the age group compared to the expected number of deceased persons based on the mortality rates in the age group at the country level. Hence, they control for variations in age structure which may vary across regions. Since unemployment is found to be correlated with deaths at the individual level, displacements may be correlated with higher death rates. However, in the context of rapid downsizing Martikainen, Mäki and Jäntti (2007) find the effects of unemployment on mortality to be modest.

When studying the regional differences in displacements and re-employment ability the regional definition is highly important. A commonly used unit is the local labor market regions, henceforward denoted (LM) which is defined by Statistics Sweden. The administrative borders of these geographical units are based on patterns of commuting between municipalities and hence the number of and the actual geographic area could change over time. If municipalities were to be used instead, there is a risk of the regional re-employment ability to be misinterpreted or miscalculated. Individuals who lose their job in one municipality and are re-employed in another municipality would be excluded from the analysis, even though the new municipality is located within reasonable commuting distance and the worker does not change municipality of living. Such potential problems are avoided by using LM-regions instead. We use a definition where Sweden consists of 81 LM-regions.<sup>18</sup> You will find a map, which visualizes the definition of the 81 LM-regions in Appendix B.

The regional number of displacements and re-employments are constructed by summing the number of individuals displaced each year in each LM-region and by summing the number of individuals that are re-employed each year without changing LM-region. The re-employment capacity is calculated as the fraction of displaced workers who are re-employed within the same region, within a year after the displacement. We also calculate the total reemployment rates i.e. this share also includes re-employed workers regardless of if they were displaced in the same region. We denote this measure of re-employment total re-employment.

It should be noted that due to that our access to data end in 2010 and that we use the flexible window which is at a maximum implies a three year window for closure this implies that the number of displacements are truncated in the end of period. For instance we can't report the workers which may have been defined as displaced in 2009 due to that their firm closes in 2010 or later. This truncation will influence the number of displacements and re-employments and also the share of displacements. However, we argue that the truncation will have less influence on the re-employment rates since these are calculated as a share of the number of displaced workers. We did consider excluding these last years from our study, but since the main focus in this paper is on the regional differences in re-employment rates we decided to keep these years in the dataset.<sup>19</sup>

## 4 Empirical findings

Figure 1 presents the total number of number of displacements and re-employments within one year during the period 2001-2009. It should be noted that we find the number of displaced

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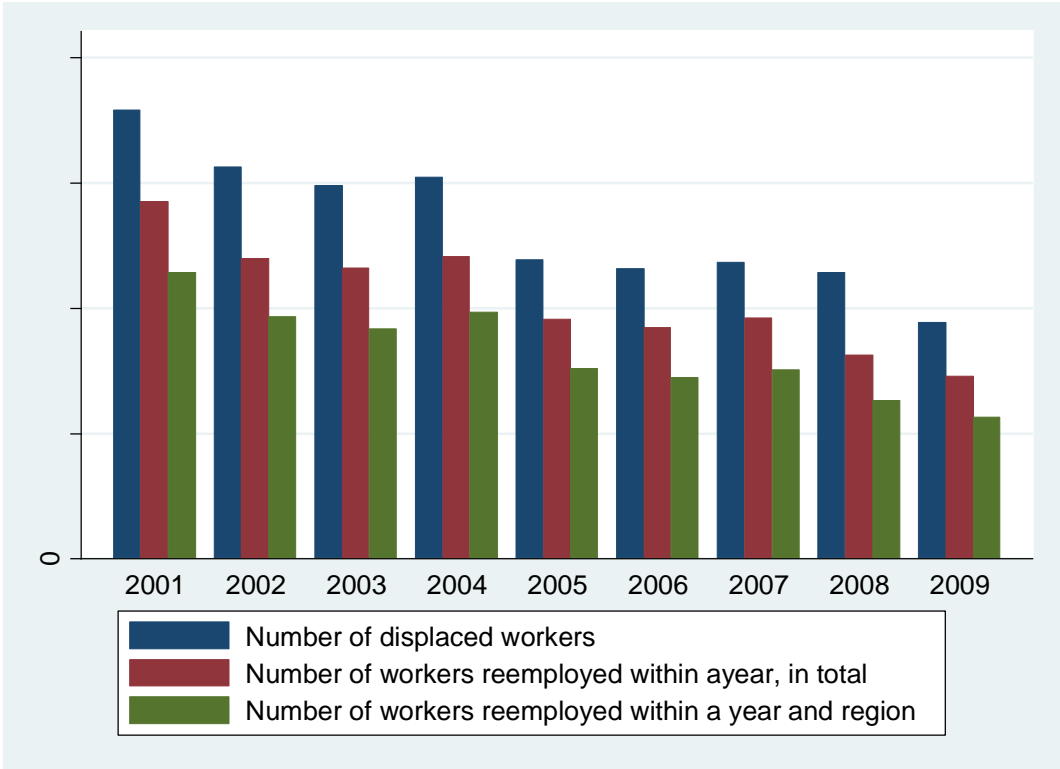
<sup>18</sup>See ITPS (2004) for a description of the definition and a complete list of which municipalities that are included in the regions.

<sup>19</sup> We also calculated the regional average re-employment rates and displacement rates for 2001-2007, which are the year in which no truncation influence the results, and compared them with the averages for the complete period 2001-2009. The difference in average for re-employment in the same region ranges between -2.9 and +5.6 percentage points. For total re-employment the difference ranges between -10.0 and 8.0 percentage points. For displacement rates the difference varies between -0.1 and 0.4 percentage points. It is however difficult to determine whether these differences are caused by the incessant regional and annual variation or due to any truncation bias.

workers to be lower than reported by Tillväxtanalys (2009) and OECD (2013). However, this can be explained by the fact that our definition of displaced workers differs compared to these studies. As previously mentioned the OECD measure for instance includes mass dismissals.

The number of displaced workers can be expected to vary with the business cycle. In the aftermath of the IT-bubble in the beginning of 2000s Sweden showed low levels of GDP growth.<sup>20</sup> Before the global financial crisis hit the economy GDP growth had recovered to 3.3 percent in 2007. Due to the global financial crisis the Swedish economy shrunk with 5% in 2009 which is the largest decline in GDP in modern times (SCB, 2014a). The ups and downs of the business cycle are also reflected in unemployment rates which increased from 6 percent during the beginning of 2001 up to about 8 percent in 2005. After 2005 unemployment rates decreased until the global financial crisis hit the economy and unemployment rates started increase again and reached 9 percent in the end of 2009 ( SCB, 2014a).<sup>21</sup> In terms of number of displacements the period 2001-2004 show high levels displaced workers. The improved situation in the economy from 2005 is visible in terms of lower levels of displaced workers. However, the effects of the global financial crisis are not visible in the 2009 figure of displacements. However, as previously mentioned, we have to be a bit careful with the interpretation of the number of displaced workers in our data set due to the truncation of the data.

**Figure 1: Number of displacements 2001-2009**



<sup>20</sup> GDP growth in fixed prices in 2001 was 1.3 percent (SCB, 2014b).

<sup>21</sup> In January 2001 the seasonally adjusted unemployment rate was 6.0 percent. In the summer of 2005 it reached 8.2 percent. In April 2008 unemployment rates had decreased to 5.6 percent but due to the global financial crisis unemployment rates started to increase and reached 9.0 percent in December 2009 (SCB, 2014a).

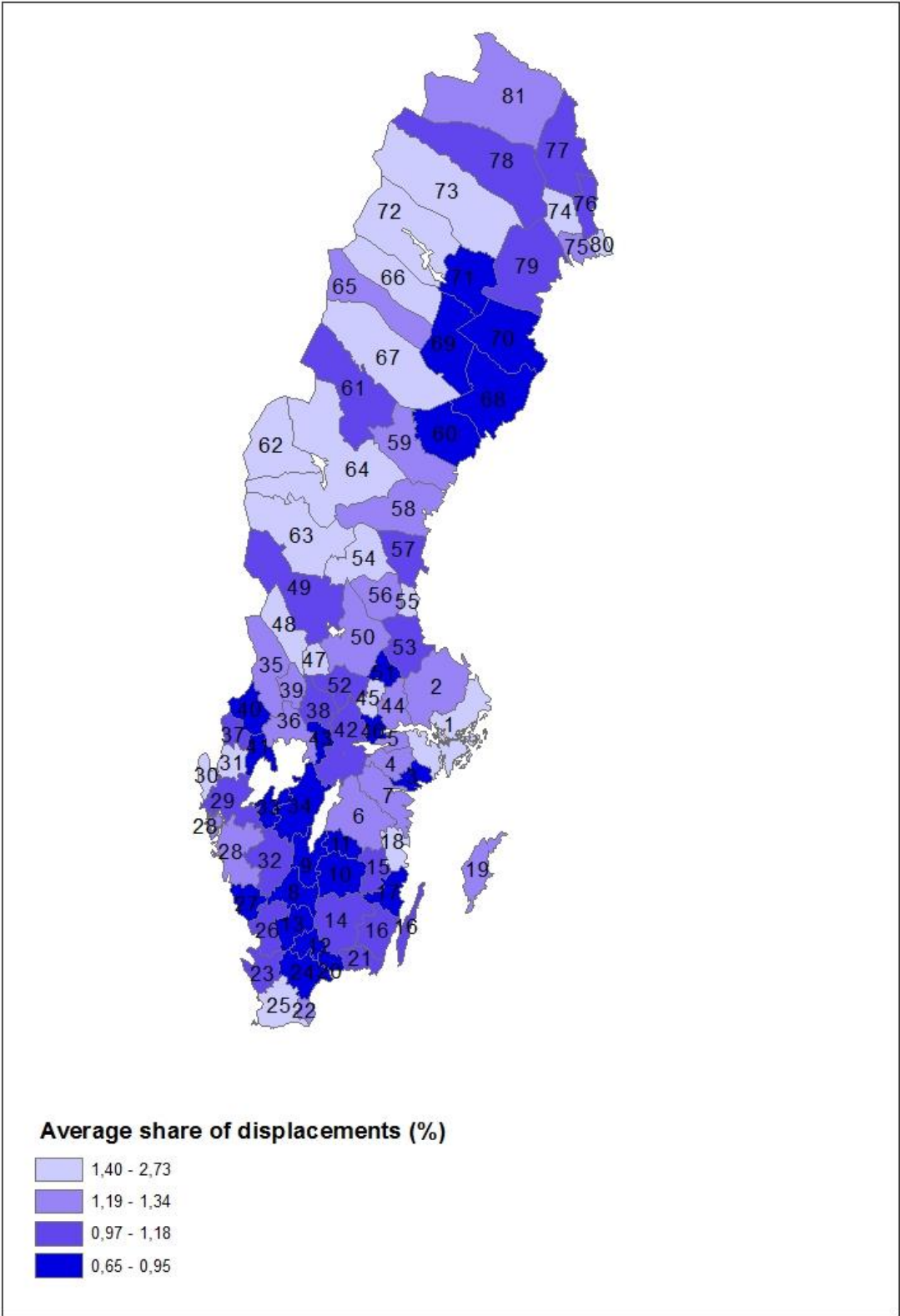
Table 1 presents some descriptive statistics of the data at the regional level. Data on displacement rates and re-employment rates at the regional level can be found in Appendix C. It can be observed that there is a substantial regional variation of displacements, varying from 2 to 27080 individuals. Accordingly the number of re-employed also varies substantially. In the table both the re-employments within the same region and the total re-employments in the region are displayed. As previously mentioned the latter includes individuals who are displaced in one region but re-employed in another. Hence, the number of total reemployments may exceed the number of displaced if the net transitions of displaced workers are positive. For the share of re-employments within the same region it varies between 15% and 85%. For the total share of reemployments it varies between 35 and 194 percent.

**Table 1: Summary statistics**

	Mean	Std dev	Min	Max
No displaced in each region	657.44	2187.309	2	27080
Number of re-employed in the region total	513.97	1716.50	1	21338
Number of re-employed in the same region	408.50	1515.19	1	19078
Share of displaced workers (%)	1.22	0.69	0.15	7.03
Share of re-employed in own region (%)	53.85	10.56	14.75	84.62
Share of re-employed total (%)	79.40	16.78	34.69	194.34

Figure 2 display the regional patterns of the share of displacements in Sweden. The four colours represent quartiles of the distribution of displacement shares. Among the regions with the highest displacement shares we find regions in the middle- and northeast part of Sweden such as Östersund (LM 64), Åre (LM 62), Arjeplog (LM 72) and Jokkmokk (LM 73) but also metropolitan areas such as the Stockholm (LM 1) and Malmö regions (LM 25).

Figure 2 Regional distribution of average displacement rates 2001-2009



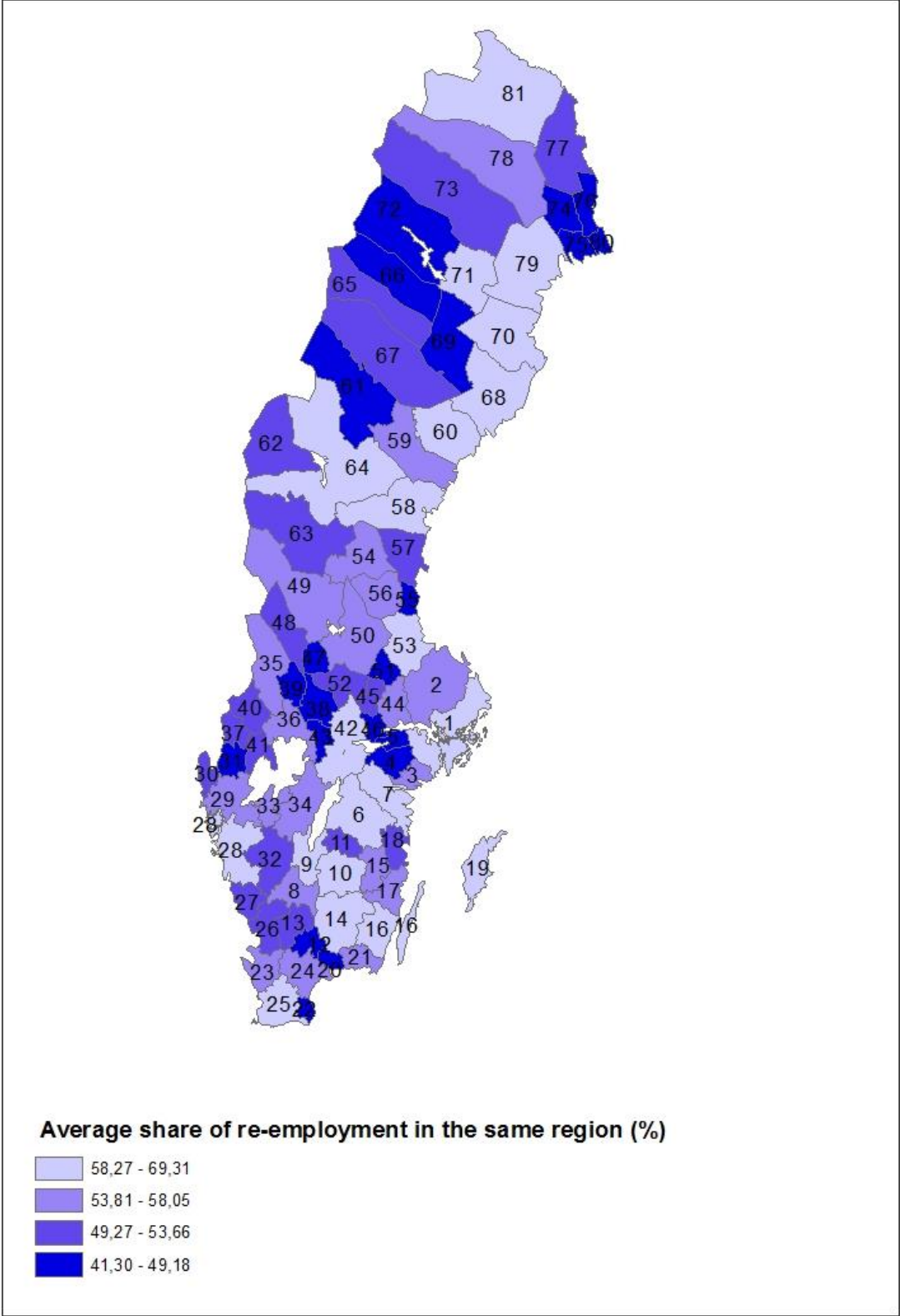
Since the regional displacement shares may vary across years we are also interested in to determine which regions that show persistently low or high shares of displacements. In order to do so we identify regions with persistently high own displacement rates as regions which are ranked among the 20 regions with highest displacement rates for more than five of the nine years included in the study. Furthermore, regions with persistently low displacement rates are defined as regions ranked among 20 regions with the lowest displacement rates during at least 5 years. Table 2 present which regions that has persistently low or high displacement rates according to this definition. For start-up rates Andersson and Koster (2011) find that they are highly persistent across regions. It is argued that path-dependence in start-up activity and the existence of spatially ‘sticky’ and durable determinants of start-up rates are possible explanations to this persistence. For firm closures it can be argued that path dependence, in terms of for instance having industries that show high exit rates in the region, may also make exit rates and hence the displacement rates rather persistent across regions. For instance metropolitan regions tend to have a higher share of service sector industries, which usually are more turbulent sectors in terms of entry and exit rates. Hence, it is not surprising to find that the metropolitan areas of Stockholm and Malmö have persistently high displacement rates.

**Table 2: Regions with persistently high displacement rates**

Persistently low displacement rates (LM)	Persistently high displacement rates (LM)
Tranås (11)	Stockholm (1)
Ljungby(13)	Åre (62)
Karlskoga (43)	Östersund (64)
Oskarshamn17	Haparanda (80)
Karlshamn (20)	Härjedalen (63)
Älmhult (12)	Malung (48)
Lycksele (69)	Malmö (25)
Köping (46)	
Lidköping (33)	
Arvika (40)	
Nyköping (3)	
Värnamo (8)	

Figure 3 displays the regional distribution of re-employment rates within the same regions as the displacements took place. Among the regions with the highest share of re-employment within the region we find regions in the north-eastern part of Sweden such as Örnsköldvik (LM 60), Skellefteå (LM 70) and Luleå (LM 79) but also the metropolitan areas of Gothenburg (LM 28) Malmö (LM 25) and Stockholm (LM 1). Regions located in, for example, the north-western part of Sweden display lower re-employment rates. Using the same definition of persistence as above we identify regions with persistently low or high ability to absorb displacements in the same region. Table 3 display regions with persistently low and high re-employment rates respectively in the same region as the displacement took place. In addition to Stockholm some regions in the north-eastern part of Sweden show persistently high ability to absorb displacements within their regions. However, the pattern of persistently low ability to re-employ displacements is rather dispersed.

**Figure 3: Regional distribution of average reemployment rates within one year in the same region 2001-2009.**





**Table 3: Regions with persistently high re-employment in the same regions**

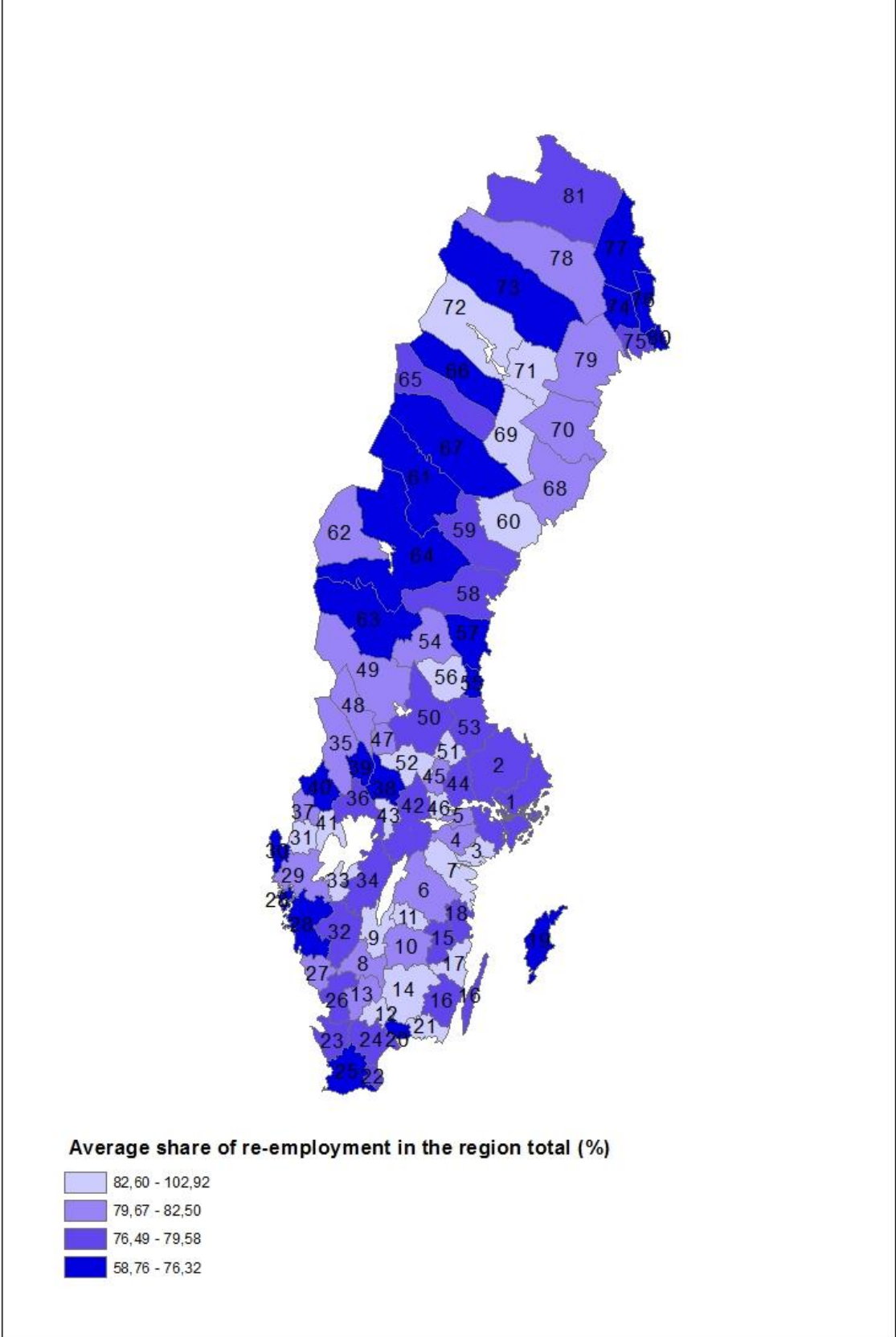
Persistently low re-employment rates (LM)	Persistently high re-employment rates in the same region (LM)
Karlshamn (20)	Stockholm (1)
Sorsele (66)	Örnsköldsvik (60)
Övertårneå (76)	Luleå (79)
Hagfors (39)	Skellefteå (70)
Älmhult(12)	Arvidsjaur (71)
Tranås (11)	Jönköping (9)
Lycksele (69)	Sundsvall (58)
Simrishamn (22)	Växjö (14)
Köping (46)	

Figure 4 displays the share of re-employment rates in the labour market in total. Remember that these figures can be above 100%, which implies that the region re-employs more individuals than was displaced by re-employing individuals, which was displaced in other regions. Here some regions in, the area of Småland such as Jönköping (LM 9) and Växjö (LM 14) have high shares of total re-employment. Again we find the lowest re-employment rates in north-western part of Sweden. Regions in the northwestern part of Sweden, which show low capacity to absorb displacements total reemployment rates, are regions such as Östersund (LM 64), Villhelmina (LM 67) and Strömsund (LM 61). As displayed in Table 4 no region qualify for the criteria of persistently high re-employment rates. Hence, there is a non-persistency in terms of regions with high capacity to absorb displacements using this measure of re-employment. However, we identify a number of regions with persistently low ability to absorb displacements. Two of these regions, Sorsele (LM 66) and Övertårneå (LM 76) , are in addition regions that both experience persistently low capacity to absorb displacements in the own region and persistently low capacity to absorb displacements in total.

**Table 4: Regions with persistently high re-employment total**

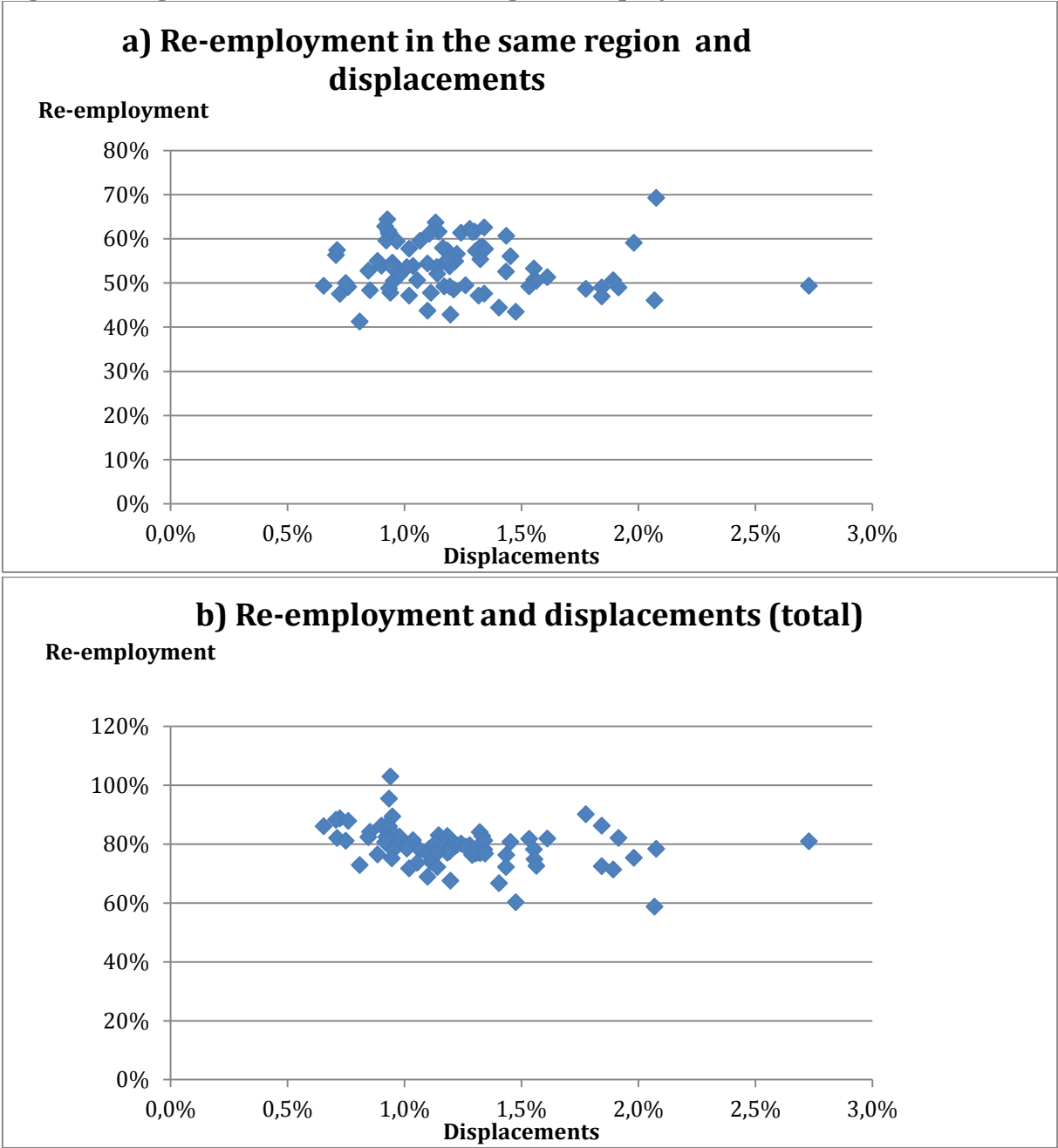
Persistently low re-employment rates total	Persistently high re-employment rates total
Haparanda (80)	
Sorsele (66)	
Övertårneå (76)	
Jokkmokk (73)	
Villhemina (67)	

Figure 4: Regional distribution of average re-employment rates total 2001-2009.



Do regions with high displacement rates have lower ability to re-employ displacements and is it easier to re-employ displaced workers if the regions do not suffer from high displacement rates? If that is the case we would expect a negative relationship between displacement rates and re-employment rates. We explore this relationship by plotting and calculating the correlation between displacement rates and the regional ability to re-employ workers in the same region as the displacement took place. Figure 5a and b displays no obvious relationship between displacement rates and re-employment capacity for our both measures of re-employment. The correlation between displacements and re-employment is negative but quite small; -0.08 for the correlation between displacements and re-employment in the same region and -0.34 for the correlation between displacements and total re-employment.

**Figure 5: Regional distribution of average re-employment rates total 2001-2009.**



## 4 Conclusions and suggestions for future research

In this paper we explored the regional patterns of displacements and to what extent there are differences in regional capacity to absorb displaced workers within one year. In contrast to many other previous studies in the area, we do not have to rely on case studies and are able to show the patterns for all Swedish regions. For our empirical analysis we use individual-firm level data, which enable us to identify establishment closures and calculate the regional capacity to re-employ, displaced workers within one year in Sweden during the period 2001-2009. Our findings suggest substantial variation in displacement rates across regions and that they may be rather persistent. We also find substantial variation in the regional capacity to absorb displaced workers measured by the share of re-employments in the same region within one year or the share of total re-employments which includes displaced workers in other regions moving in order to find a new job. We find that the regional share of re-employments within the region varies between 15 and 85 percent and the total re-employment rates vary between 35 and 194 percent. We also explore the possible relationship between the regional share of displacements and the capacity to absorb displacements. However, we do not find any strong correlation between the share of displacements and capacity to re-employ displaced workers. Hence, other aspects of the regional economic environment may be important for explaining the substantial variation in re-employment capacity. For instance if displacement takes place in a region which already suffers from high levels of unemployment it may be more difficult for displaced workers to find a new job. It can also be argued that larger and expanding regions in terms of employment and population, such as the metropolitan regions, may have better possibilities to absorb re-employments. Furthermore, the sector composition in the region and origin of the displacements may influence the possibility of re-employment. In regions with higher share of service sectors, which experience a more turbulent market in terms of entry and exit (Nyström 2007 and 2009) it may for instance be a faster re-employment process. On the other hand regions where the workers hold industry specific competence which may be difficult to utilize in other sectors the re-employment process may be more difficult. Hence, for further studies it would be interesting to study which regional characteristics that influence the capacity to re-employ workers affected by a firm closure.

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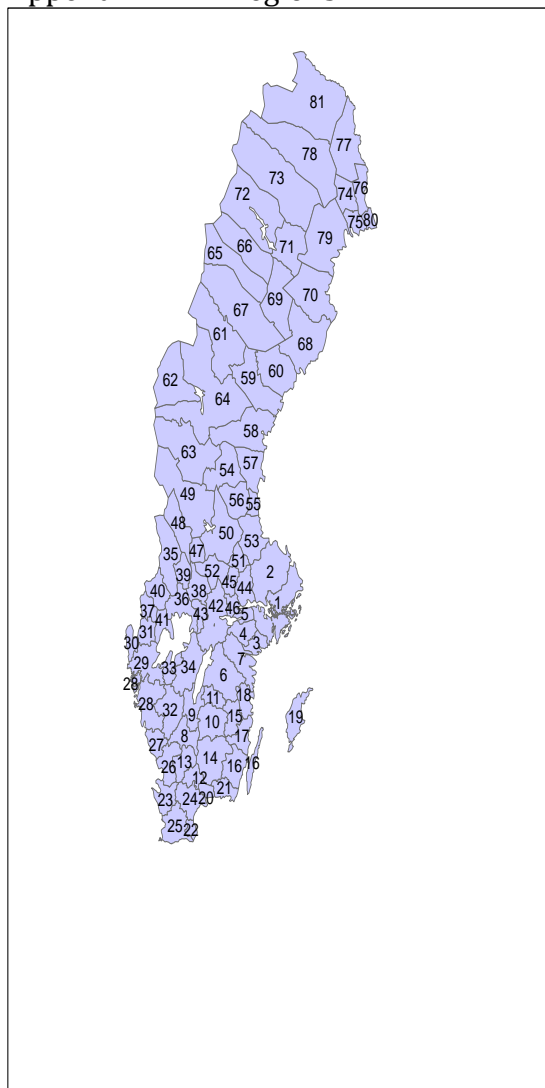
## Appendix A: Definitions of Displacements in Sweden

Source	Period	Sample characteristics	Definition of displacement
OECD (2013) (Data for Sweden)	1991-2009 (Displacements 2000-2010 reported in the publication)	Employees aged 20-64 with a tenure of one year or more in establishments with ten or more employees. Excluding ISIC Rev 3 groups L, O and Q. Not excluding multiple job holders.	Firm identified separation from an establishment experiencing mass <sup>22</sup> dismissal or closure.
Tillväxtanalys (2009)	2001-2007	No age or industry restrictions	Firm closures based on separation from an establishment and labour mobility patterns which reduce errors due to for instance mergers and acquisitions
Von Greiff (2009)	1987-1988	Age span 25-55 Excluding the construction industry and mining industry. Excluding self-employment	Establishment closures affecting at least 10 employees Flexible window one to three years depending on establishment size and worker flows. (the same definition is used in this paper.) Closing?
Magnergård (2013) and Ros (2013)	2000-2003	Age span 25-55 No industry restrictions. Excluding self-employment	All establishment closures. Flexible window one to three years depending on establishment size and worker flows. (same definition is used in this paper.)
Eliason and Storrie (2004)	1987	Age 21-50. Excluding the construction sector and a sector not adequately defined. excluding self-employment.	Establishment closures for establishments with at least 10 employees. Flexible window one to three years depending on establishment size and worker flows. (the same definition is used in this paper.)

<sup>22</sup>Mass dismissal is defined as a relative reduction in employment of more than 30%.



## Appendix B: LM-regions



Labour market	Region	Labour market	Region
1	Stockholm	41	Säffle
2	Uppsala	42	Örebro
3	Nyköping	43	Karlskoga
4	Katrineholm	44	Västerås
5	Eskilstuna	45	Fagersta
6	Linköping	46	Köping
7	Norrköping	47	Vansbro
8	Värnamo	48	Malung
9	Jönköping	49	Mora
10	Nässjö	50	Falun/Borlänge
11	Tranås	51	Avesta
12	Älmhult	52	Ludvika
13	Ljungby	53	Gävle
14	Växjö	54	Ljusdal
15	Vimmerby	55	Söderhamn
16	Kalmar	56	Bollnäs
17	Oskarshamn	57	Hudiksvall
18	Västervik	58	Sundsvall
19	Gotland	59	Kramfors
20	Karlshamn	60	Örnsköldsvik
21	Karlskrona	61	Strömsund
22	Simrishamn	62	Åre
23	Helsingborg	63	Härjedalen
24	Kristianstad	64	Östersund
25	Malmö	65	Storuman
26	Halmstad	66	Sorsele
27	Varberg	67	Vilhelmina
28	Göteborg	68	Umeå
29	Trollhättan	69	Lycksele
30	Strömstad	70	Skellefteå
31	Bengtstors	71	Arvidsjaur
32	Borås	72	Arjeplog
33	Lidköping	73	Jokkmokk
34	Skövde	74	Överkalix
35	Torsby	75	Kalix
36	Karlstad	76	Övertorneå
37	Årjäng	77	Pajala
38	Filipstad	78	Gällivare
39	Hagfors	79	Luleå
40	Arvika	80	Haparanda
41	Säffle	81	Kiruna

Appendix C. Regional average displacement and re-employment rates 2001-2009

Labour market (LM)	Region	Re-employment share in the same region (%)	Total re-employment share (%)	Displacement rate (%)
1	Stockholm	69.31	78.44	2.08
2	Uppsala	53.81	77.50	1.19
3	Nyköping	53.96	86.26	0.90
4	Katrineholm	47.60	81.27	1.34
5	Eskilstuna	48.59	80.24	1.21
6	Linköping	61.37	80.22	1.24
7	Norrköping	58.27	82.80	1.33
8	Värnamo	57.51	82.07	0.71
9	Jönköping	61.13	86.00	0.93
10	Nässjö	59.62	82.50	0.92
11	Tranås	49.36	86.12	0.65
12	Älmhult	47.82	102.92	0.94
13	Ljungby	50.01	81.14	0.75
14	Växjö	61.63	83.05	1.15
15	Vimmerby	54.42	76.77	1.10
16	Kalmar	61.14	78.36	1.11
17	Oskarshamn	56.31	88.26	0.71
18	Västervik	53.28	78.21	1.55
19	Gotland	61.67	78.25	1.30
20	Karlshamn	41.30	72.90	0.81
21	Karlskrona	57.37	82.80	1.18
22	Simrishamn	47.19	77.14	1.32
23	Helsingborg	55.28	77.09	1.18
24	Kristianstad	54.30	77.99	0.95
25	Malmö	60.71	76.29	1.44
26	Halmstad	53.59	76.76	1.14
27	Varberg	52.78	82.36	0.84
28	Göteborg	61.60	76.32	1.29
29	Trollhättan	57.79	79.67	1.02
30	Strömstad	50.82	74.87	1.56
31	Bengtsfors	48.99	86.28	1.84
32	Borås	53.63	78.44	1.01
33	Lidköping	54.64	89.36	0.95
34	Skövde	55.02	76.49	0.88
35	Torsby	56.60	79.71	1.22
36	Karlstad	57.73	76.80	1.34
37	Årjäng	49.27	79.73	1.17
38	Filipstad	47.18	71.78	1.02
39	Hagfors	42.87	67.58	1.20
40	Arvika	53.66	75.14	0.95
41	Säffle	50.51	83.33	0.95
42	Örebro	59.55	78.01	1.07
43	Karlskoga	49.11	87.91	0.76
44	Västerås	54.97	79.31	1.22
45	Fagersta	49.29	81.80	1.53

Absorb 46	Köping	47.58	88.76	0.72
47	Vansbro	48.99	82.11	1.91
48	Malung	51.37	81.86	1.61
49	Mora	53.86	81.33	1.04
50	Falun/Borlänge	57.27	76.92	1.30
51	Avesta	48.81	84.90	0.93
52	Ludvika	51.78	82.60	0.98
53	Gävle	59.49	79.49	0.97
54	Ljusdal	56.12	80.76	1.45
55	Söderhamn	47.00	72.53	1.84
56	Bollnäs	58.05	84.05	1.32
57	Hudiksvall	50.67	73.65	1.05
58	Sundsvall	62.31	79.58	1.28
59	Kramfors	55.42	76.98	1.32
60	Örnsköldsvik	64.42	86.66	0.93
61	Strömsund	47.83	74.08	1.11
62	Åre	49.37	80.94	2.73
63	Härjedalen	50.52	72.65	1.56
64	Östersund	59.10	75.36	1.98
65	Storuman	49.52	79.13	1.26
66	Sorsele	43.48	60.29	1.48
67	Vilhelmina	52.63	72.27	1.43
68	Umeå	62.88	80.65	0.92
69	Lycksele	48.35	84.22	0.85
70	Skellefteå	61.82	81.46	0.93
71	Arvidsjaur	61.39	95.51	0.93
72	Arjeplog	48.70	90.16	1.78
73	Jokkmokk	50.62	71.34	1.89
74	Överkalix	44.44	66.68	1.40
75	Kalix	49.18	78.56	1.19
76	Övertorneå	43.78	68.89	1.10
77	Pajala	52.09	72.26	1.14
78	Gällivare	57.96	81.17	1.16
79	Luleå	63.76	80.42	1.13
80	Haparanda	46.07	58.76	2.07
81	Kiruna	62.58	78.20	1.34