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Income Inequality and Rising Household Debt
- Evidence from Sweden

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I. Rising debt and stagnant income growth

In 2014 the average debt ratio of households in the western countries[1] was 170, i.e. the total debt was on average 170 % higher than the average net disposable income. This was an increase of more than 60 % compared to twenty years earlier. In 1995, there were only 6 out of the 15 western countries with debt ratios over 100 % and none above 200 %. In 2014 13 of 15 countries had debt ratios over 100 % and 6 countries had over 200 %. (OECD, 2015a). Higher debt ratio is accompanied by larger leverage and in today's global and volatile economic environment, the consequences from unexpected events can be considerably intensified by this fact (OECD, 2014; André et al., 2006). For example, rising interest rates will increase the mortgage payments, which can be hard to handle for households with small margins. Furthermore, decreasing housing prices could result in higher mortgage than the market value of the house, putting the household in a vulnerable position. (Swedish Financial Supervisory Authority, 2016). The financial crisis in 2008 were preceded by a sudden and vigorous price fall on the housing market and the high debt ratios of households have been concluded to be one of the main reasons behind the depth of the crisis (Mckibbin and Stoeckel, 2009). After the crisis most of the western countries has observed falling debt ratios. However, in Sweden the debt ratio has increased annually even after 2008 (OECD, 2015a). The increase of household debt ratios has been blamed on the price inflation and favourable financial conditions on the housing market in combination with a more negligent approach towards risk-taking from debtors and creditors alike (Swedish Financial Supervisory Authority, 2015). This is not an isolated phenomenon in Sweden, but has been observed in the other western countries as well (André et al., 2006; Jacobsen and Naug, 2004). However, could there be other underlying causes explaining increased indebtedness?

Consumption is classically measured in absolute terms and the intertemporal consumption choice depends on the absolute disposable income, where lifetime consumption is taken into consideration (Mankiw, 2012). These absolute theories constitute the base for contemporary policy making regarding indebtedness (Swedish Financial Supervisory Authority, 2015). Yet, there is an alternative view of consumption theory. Frank (2007) and Duesenberry (1949) argue that addressing the issue through the classical theories will not solve the problem since they fail to identify the underlying cause of the high level of indebtedness. They argue that consumption is a relative matter and cannot be explained unless the social context is taken

[1] Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Netherlands, Norway, Sweden, Switzerland, United Kingdom and United States.

into consideration. According to these authors individuals do not only care about their absolute level of consumption but also their relative consumption compared to a reference group. Our contemporary open class society has enabled individuals' reference groups to expand beyond the immediate local peer group and include individuals throughout the entire spectrum. Consequently, the exposure to higher quality goods has increased, leading individuals to acquire more debt in an attempt to keep up with their reference group, i.e. "keeping-up-with-the-Joneses" (Frank, 2007).

Previous research has found evidence that income inequality drives the behaviour creating increased indebtedness. Frank (2007) found that the savings rate of any reference group will decline and consumption increase when income inequality within that group rises, Ostvik-White (2003) found that median house prices were substantially higher in school districts with higher levels of income inequality and Georgarakos et al. (2012) found that the Dutch population are more likely to borrow sizeable amounts when their income is low compared to that of their social circle. Furthermore, the consequences of this relationship have been found to be severe. Frank and Levine (2007) found that there is a positive relationship between the likelihood of bankruptcy and income inequality, Kumhof et al. (2010) found that when income inequality increase so does the risk of a financial crisis and lastly, Fitoussi and Saraceno (2010) found that inequality indirectly was an underlying cause of the financial crisis in 2008.

This thesis is an empirical analysis of how income inequality affects the debt ratio of the Swedish population based on the relative consumption theories. Sweden has one of the highest marginal taxes on income in the world and also one of the most equal income distributions after governmental reallocation (OECD, 2015b; Swedish Tax Agency, 2014). Still Sweden is one of few western countries where individuals' debt ratios have continuously increased even after the financial crisis of 2008 and thus the underlying problem seems to remain (Finocchiaro et al., 2011). Data from the Swedish Statistical Central Bureau (SCB) shows that the disposable income per consumption unit including capital gains rose more drastically for the 10^{th} (14,5 %) than for the 5^{th} income decile (8,7 %) in Sweden between the years 2008 and 2013 (SCB, 2016a). According to Frank (2007) the notion of substantially larger disposable income growth for the top income group, compared to the middle and lower groups, is the main driving force of higher marginal consumption and thereby higher level of indebtedness. An analysis of income inequality and debt ratio in Sweden is therefore

motivated and will be an addition in the empirical assessment of the relative income hypothesis by Duesenberry. Research on the indebtedness of Swedish individuals has been conducted before, for example Finocchiaro et al. (2011) who examined the underlying reasons and the macroeconomic consequences of household debt in Sweden. However, the authors' theoretical framework is based on absolute consumption theories. The relationship between income inequality and debt-related matters with a relative consumption framework in the context of Sweden has not been conducted before.

Data collected by Swedish government agencies for the year 2014 covering all Swedish municipalities has been used to test the hypotheses in this thesis and the result support a positive relationship between income inequality and debt ratio in the Swedish municipalities. Further, the results of this thesis also imply that a relationship between income inequality and the probability to acquire debt above one's ability is positive. These empirical findings give support for political intervention to mitigate the harmful effects of an unequal income distribution.

The remainder of this paper is structured as follows. In Section 2, relative income theories are covered adjacent to previous research regarding income inequality and individuals' debt to form the base for the empirical analysis in this thesis. In section 3, the research methodology in this study is described together with the data and descriptions of the variables. The result of the empirical analysis is presented in section 4 together with robustness checks for the findings. In section 5, the results are reviewed in the context of policy implications while limitations of the study are discussed leading to possible future research.

II. Relative income and the use of debt to keep up with the Joneses

The use of relative income theories to explain increasing consumption and debt levels in the context of stagnant real income growth have been reinvigorated in later years by a number of articles and books by prominent scholars. A majority of those works have found a statistically significant positive causality between income inequality and level of debt (Lucchino and Morelli, 2012; Frank and Levine, 2007; Christen and Morgan, 2005), income inequality and social wellbeing (Akay and Martinsson, 2012) and income inequality and positional concerns (Carlsson et al., 2007).

The common denominator for the studies listed above is their reference to the relative income hypothesis first developed by Duesenberry (1949). Duesenberry came to the conclusion that the aggregated savings ratio is independent of the absolute level of income, and instead related to the individual's percentile position in the relative income distribution. The lower percentile position an individual have, the lower the savings are for that individual. For the purpose of this thesis, Duesenberry's finding implies that greater income inequality leads to higher debt, as lower savings in combination with low margins inevitably leads to dissavings. His conclusion is derived through the notions of the "habit process formation" and the "demonstration effect". However, first it is necessary to go over the linkage between quality of goods and higher standard of living. According to Duesenberry (1949) a product's quality is measured in terms of how well it manages the task of fulfilling a need connected to either physical comfort or sustaining cultural activities, as consumption is merely an instrument to increase the subject's standard of living. Higher quality, or superior, products are naturally more expensive than inferior products as they otherwise would be eliminated from the market. This fact, in conjunction with the claim that superior products increase the standard of living of the subject implies that for an individual to increase its living standard, they must spend more on consumption. For a individual with fixed income, the only way to consume more will be to decrease savings or increase debt, which they normally would not do as they also have preferences for future improvements in living standard and balancing their budget. This is where the habit process formation and the demonstration effect come into the picture.

A consumption habit is an individual's repetitive consumption pattern formed over time in the context of the specific individual's income together with the consumption levels of the individual's local reference group. Since consumption habits are rigid they then acts as a protective shield against desires for superior goods. The equilibrium consumption habit for an individual will stay at a level where the frequency of contact with superior goods is tolerable. If this is not the case and too many unfavourable comparisons are made the disutility of the current consumption level would be too great and the only solution is to consume more. This means that with increased consumption by the individual's local reference group comes increased consumption for the individual in question as well. This applies even though no income increase was gained and no change in prices occurred. This is referred to as the "demonstration effect", where frequent demonstrations of other good's superiority can make an individual break its current habit and consume more, even though the individual did not experience an increase in income.

Frank and Levine (2007) have developed the theory of a similar process to the demonstration effect called "expenditure cascades". The core of this concept is based on a process starting with the distribution of relatively more income to the highest income groups. This group will then naturally spend more on consumption, especially on positional goods. As a reaction to this, the second highest income group (who compare themselves with the highest income group) will also spend more on consumption. This process will make its way down the entire income ladder to the lower income groups. However, these groups did not get an increased income in the first place, so the only way they can compete in terms of consumption is by dissaving. The reason this type of expenditure cascade is possible is due to the fact that incomes is not neatly packed into income groups, but rather a full spectrum of incomes distributed continuously from highest to lowest. The reference group for any individual is therefore not a group of individuals with the same income, but instead a number of individuals with both higher and lower income than the specific individual. Moreover, two of the most robust findings in behavioural sciences are the facts that individuals in general look above rather than below them on the income scale within their reference group and care the most about peers in close geographic proximity (Frank and Levine, 2007). Therefore these unfavourable comparisons are always present, but in equilibrium the disutility that follows is at a tolerable level. However, it leaves the individual very sensitive to uneven distribution of income gains that sparks the process of an expenditure cascade. It should be noted that while this process is reasonable for the majority of individuals on the income spectrum, for the lowest income group the relative level of positional goods are of little concerns, as they are already below their minimum preferred level of consumption due to budget constraints.

Previously the claim was made that consumption is merely an instrument to an end, however, Duesenberry (1949) acknowledges that this is not always the case as consumption can have intrinsic value. This is in line with the work of Veblen (1899) who coined the concept of "conspicuous consumption" or status consumption, which means consumption with the sole purpose of outwardly demonstrate an individual's wealth. In our contemporary society higher standard of living is closely connect to an individual's status and by that a person's self-esteem and notion of success. As higher standard of living is the same as the consumption of higher quality goods it becomes the main drive for maintenance of self-esteem. In our society status is given to successful people, and success is highly correlated with income. Because of this, a high consumption pattern is needed to gain high status. (Duesenberry (1949). All this future strengthens the case that social context, more specifically relative income, is an

important factor when trying to determine consumption and debt choices for individuals, as it is an important factor for the individuals themselves. Because of this and the underlying economic conditions in Sweden, the first hypothesis for this thesis is as follows:

Hypothesis 1: *Municipalities with higher income inequality have a higher debt ratio in general compared to municipalities with lower income inequality, ceteris paribus*

While the concepts of the demonstration effects and expenditure cascades discussed above seem plausible in the Swedish context, one can make the case that it is too strong of a statement to assume that these concepts have a profound effect on the entire population. As touched upon above, while individuals have preferences for keeping a specific minimum level of relative consumption today, they also have preferences for keeping that same level of relative consumption in the future. Any rational individual would then come to the conclusion that if they increase their consumption level today, and thereby decreases their savings or increases their debt, with a fixed income, their consumption in the future must decrease. This would mitigate the effects of the concepts discussed above. However, this is not the case if the individual is myopic (Frank and Levine, 2007). For certain assailable individuals the disutility of experiencing a low relative living standard today might completely eradicate the prospect of lower relative living standard in the future as it is only imaginable at that point in time. Because of this these individuals might take debt above their ability just to keep their current relative standard of living at a tolerable level. This notion should be more common in areas with higher income inequality as unfavourable comparisons are more frequent, leading to unbearable levels of disutility for these assailable individuals. Therefore a second hypothesis will also be tested:

Hypothesis 2: *Some individuals are more exposed to the notion of keeping-up-with-the-Joneses and will therefore have a higher propensity to be in debt above their ability, which can be observed to a larger extent in municipalities with higher income inequality than in municipalities with lower income inequality, ceteris paribus*

In order for the demonstration effect to occur, frequent contact with superior goods is required (Duesenberry, 1949). Duesenberry also refers to the fact that the savings rate in general is higher in rural than in urban areas. Frank and Levine (2007) only include highly populated areas in their paper on income inequality and bankruptcy and argue that the

individuals in those areas find it harder to live within their means. As support they cite Verblen (1899) who claims that "… consumption claims a relatively larger proportion of the income of the urban than of the rural population… [because] the serviceability of consumption as a mean of repute is at its best… where the human contact of the individuals is widest and the mobility of the population is greatest" (Frank and Levine, 2007, p.14). The main content of this statement is that the aspect of status is of greater importance in the urban areas. Connecting this to the previous discussion, relative consumption of positional goods is of greater concern in urban areas, thereby enhancing the effect of income inequality. Because of this it would be interesting to see if this is applicable in Sweden. A third hypothesis is therefore included:

Hypothesis 3: *Income inequality has, on average, a greater positive effect on debt ratio in urban areas than in rural areas, ceteris paribus*

III. Methodology

To test the hypotheses, three baseline models are used; one for hypothesis 1 and two for hypothesis 2. All three model specifications are regressed using OLS to test the effect of income inequality on indebtedness and excessive debt while controlling for a number of economic and demographic factors. Moreover, a number of variables are logged to increase the goodness of fit of the models due to outliers. Logging some variables also allows for better understandings of their coefficients since they can be interpreted as elasticities (Dougherty, 2011). Further details will be provided in the variable section that follows.

To test whether municipalities with higher income inequality have higher levels of indebtedness in general, average debt over disposable income is regressed over the gini-coefficient for the respective municipality as shown in model (1). As a number of other variables have been proved to influence indebtedness on an aggregated level, these are included in the model under the vector *X'*. More specifically the vector includes; average selling price for villas, average income, proportion of immigrants, proportion in the age group 25 to 44, population density and an index over the expectation of the future economic situation for the households. All variables are collected on municipality level and the variables are explained in more detail in the following section.

$$(1)\ logDebt_i = \alpha_0 + \alpha_1 logGini_i + \alpha_2 X'_i + \varepsilon_i$$

To test hypothesis 2, namely if assailable individuals are more prone to take on debt over their ability in municipalities with higher income inequality, two models are used; (2) and (3). The first model regresses the proportion of individuals in the Swedish Enforcement Authority's register over the gini-coefficient for the Swedish municipalities. The model uses four additional control variables and thus the vector X' is replaced by the vector Y'. Vector Y' includes all control variables in vector X' with the addition of: (open) unemployment rate, proportion with higher education, proportion of singles households and long-term sick leave.

$$(2)\ Population\ with\ claim_i = \beta_0 + \beta_1 Gini_i + \beta_2 Y'_i + \varepsilon_i$$

The second model to test hypothesis 2 uses another measure of excessive debt as dependent variable. More specifically, the dependent variable measures average debt for the individuals registered at the Swedish Enforcement Authority for each respective municipality. Thus, model (2) measures if the probability to acquire debt above one's ability increase with higher income inequality, while model (3) measures to what extent one does so. The reason to use two different dependent variables to test hypothesis 2 is to give a more comprehensive view of the issue. All independent variables are the same as in model (2).

$$(3)\ logAverage\ claim_i = \delta_0 + \delta_1 logGini_i + \delta_2 Y'_i + \varepsilon_i$$

The third hypothesis states that the effect of income inequality on indebtedness is higher in urban compared to rural areas. Therefore the models (1), (2) and (3) are divided into three sub-models. The first sub-model includes all municipalities, the seconds only those in urban areas and the last one only the rural areas. The division into urban and rural is made according to the Swedish Board of Agriculture (2013) and originally include four different types of areas (see figure 1):

Metro (dark blue) – Municipalities where 100 % of the population live in areas with 10 000 or more people, including suburbs where commuting to densely populated areas is regular. In the large city areas (Stockholm, Gothenburg, Malmo) the commuting inhabitants have to live within a radius of 60 km while in areas with less inhabitants the radius is between 20 and 30 km.

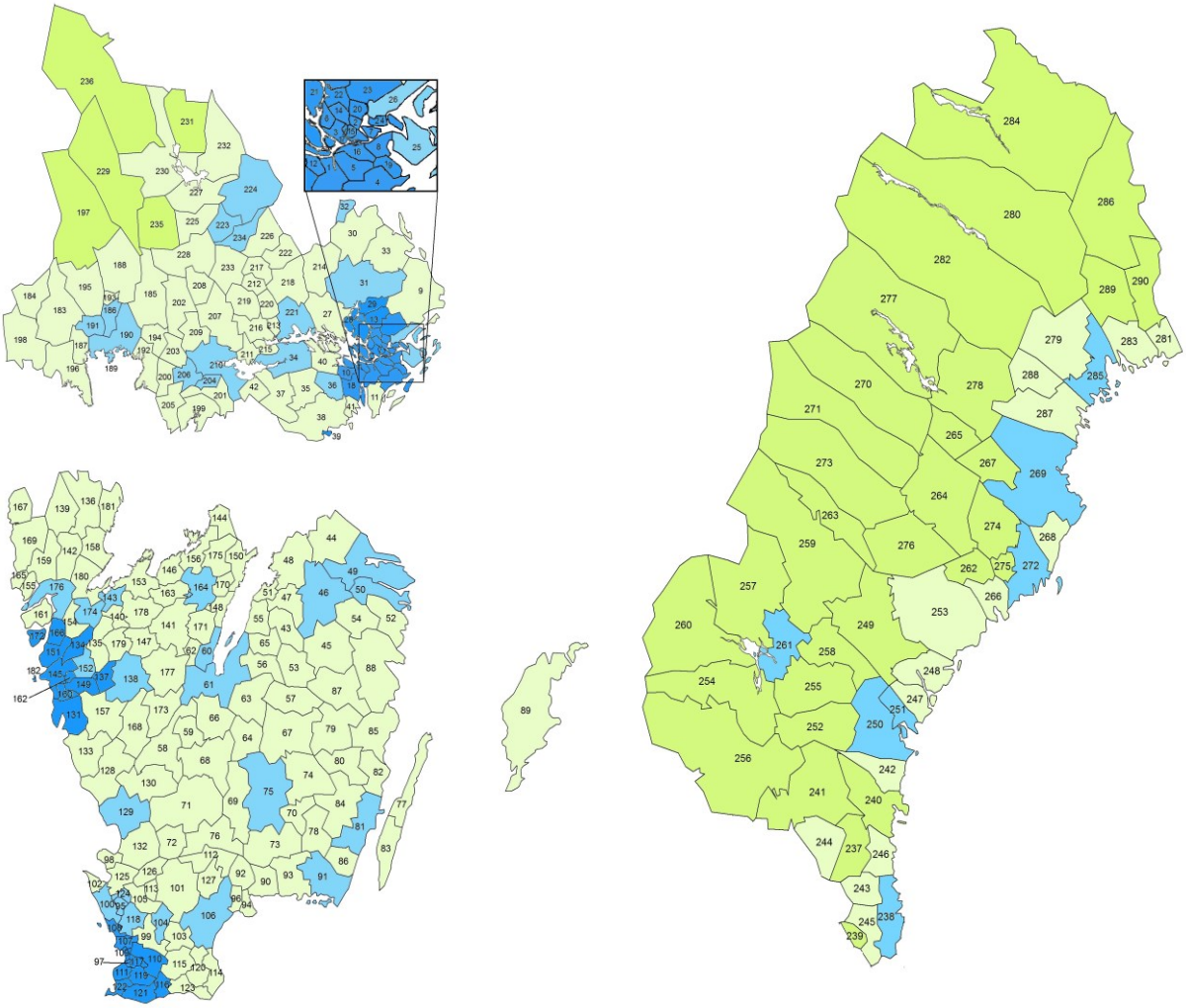
City (light blue) – Municipalities with a total population of minimum 30 000 inhabitants and/or where the largest town has a minimum of 25 000 inhabitants. Neighbouring

municipalities where 50 % or more of the inhabitants commute to a Metro or City municipality are also included.

Country (light green) – Municipalities that do not meet the criteria for *Metro* and *City* but have a population density of more than five inhabitants per km^2.

Backcountry (bright green) – Municipalities that do not meet the criteria for *Metro* and *City* and have a population density of less than five inhabitants per km^2.

Figure 1: Distribution of area types in Sweden



In the regressions, *Metro* and *City* are merged into *urban* while *Country* and *Backcountry* are merged into *rural*, a division often used by the Swedish Board of Agriculture (2013). Out of Sweden's 290 municipalities, 92 are classified as urban areas and 198 are classified as rural areas. The municipality classifications are displayed in figure 1 and the names of the specific municipalities connected to each number in figure 1 is found in the appendix (see table A.9).

As shown in figure 1, northern Sweden is substantially less populated than the rest of the country. Most densely populated is the largest city areas namely; Stockholm, Gothenburg and Malmo with surroundings.

Data

The data used in the empirical analysis is collected on municipality level. All data is from 2014 and since the observations are averages for the municipalities, it has been possible to merge statistics from different sources. The majority of the variables are collected from the Swedish Statistical Central Bureau (SCB), which is an impartial governmental administrative authority that foremost collects data to the government and other agencies as well as researchers (SCB, 2016b). The other data sources used are the Swedish Real Estate Statistics (SRES), a company collecting data in cooperation with the largest real estate agencies in Sweden, covering 85 % of the total sales in Sweden (SRES, 2016), The Swedish Enforcement Authority (SEA), an impartial authority established to make sure the balance of payments are complied (SEA, 2016), the National Institute of Economics Research (NIER), a governmental agency operating under the Ministry of Finance and mainly provide forecasts used as basis for economic policy in Sweden (NIER, 2016a), Economic facts, which is a part of the Swedish employers' association Confederation of Swedish Enterprise and collect statistics from official Swedish and international sources (Carlgren, 2015), the Swedish Association of Local Authorities and Regions (SALAR), a member and employers' organisation where all Swedish municipalities, country councils and regions are members (SALAR, 2016) and lastly the Swedish Central Bank. Links to the data sources for all variables used can be found in the appendix (see table A.1).

The datasets for the variables contains data from all 290 Swedish municipalities except the dataset provided by SRES and SALAR, which affects two variables; *House price* and *Sick leave*. The dataset from SRES on housing prices only contains 250 municipalities, as their minimum requirement to calculate the average villa price in a municipality is 25 individual sales (SRES, 2016). Some indications of the characteristics of the 40 omitted municipalities can be seen in table 1.

Table 1: Average values of variables for municipalities omitted in the regressions

VARIABLES	Shortfall (n=40)	Left in sample (n=250)
Debt	187	279
Population with claim	4.03	3.73
Average claim	172 074	190 332
Gini	0. 308	0.331
Average income	245 635	270 281
Urban	3	89
Rural	37	161

Sources: Swedish Central Bank, SEA, SCB and Swedish Board of Agriculture

As can be seen in the table 1, the average yearly income together with the gini-coefficient in the omitted municipalities is substantially lower than the average of the municipalities used in the regression. The debt ratio is also substantially lower, which is in line with hypothesis 1 and indicates that the loss of the regions would not qualitatively change the results. Regarding hypothesis 2, and the relation between income inequality and assailable individual's propensity to take debt above their ability, the indications of the statistics are not fully favourable. While the average debt registered at the SEA are lower in the omitted regions, which is in line with hypothesis 2, the proportion of individuals in the register to the total population of the municipality is in fact higher in the omitted regions. This goes against hypothesis 2 and leads us to be more cautious when extrapolating the results derived from model (2). The omitted municipalities are in vast majority located in rural areas, which could affect hypothesis 3 because some of the contradicting observations are omitted. This could result in a significant relationship between income inequality and the different measures of debt when in fact there is no clear relationship if all municipalities would be part of the sub-group models. The omitted variables located in rural areas are under 20 % of the total sample, which is not a critical problem for the results of this thesis as long as consideration is taken to the implications discussed above. More detailed information on which municipalities are omitted is found in appendix (see table A.9).

The dataset form SALAR (*Sick leave*) is short of 17 municipalities. The omitted variables only affect hypothesis 2 but there is reason to believe that the shortfall is random and thus will not substantially affect the regressions. SALAR receive data from the administration office in each municipality on a non-compulsory condition. Data is collected in an attempt to facilitate the cooperation amongst the municipalities which implies that the incentives of

providing data are too low rather than that a common characteristic in the omitted municipalities exist (SALAR, 2016). The omitted municipalities are listed in the appendix (see table A.9).

Dependent variables

To test the hypothesis 1, the total individual debt over disposable income is used to measure indebtedness of individuals (*Debt*). The Swedish Central Bank provides the data of debt ratios and the sample only includes individuals with debt. Because of this the sample includes approximately 4 million adults is almost 2 million households. The Central Bank has collected the debt data from the eight largest banks in Sweden on a monthly basis. Mortgages make up 95 % of the total debt and the remaining 5 % consists of credit card debt (0.6 %) and other types of debts (4.3 %) (Alfelt and Winstrand, 2015). The shortfall of individuals without debt results in higher average debt ratios. Since the purpose of this thesis is to examine the relationship between relative level of debt and income inequality amongst municipalities, this is of no concern for the results. For more meaningful interpretations of the coefficients (elasticity) the variable *Debt* is logged.

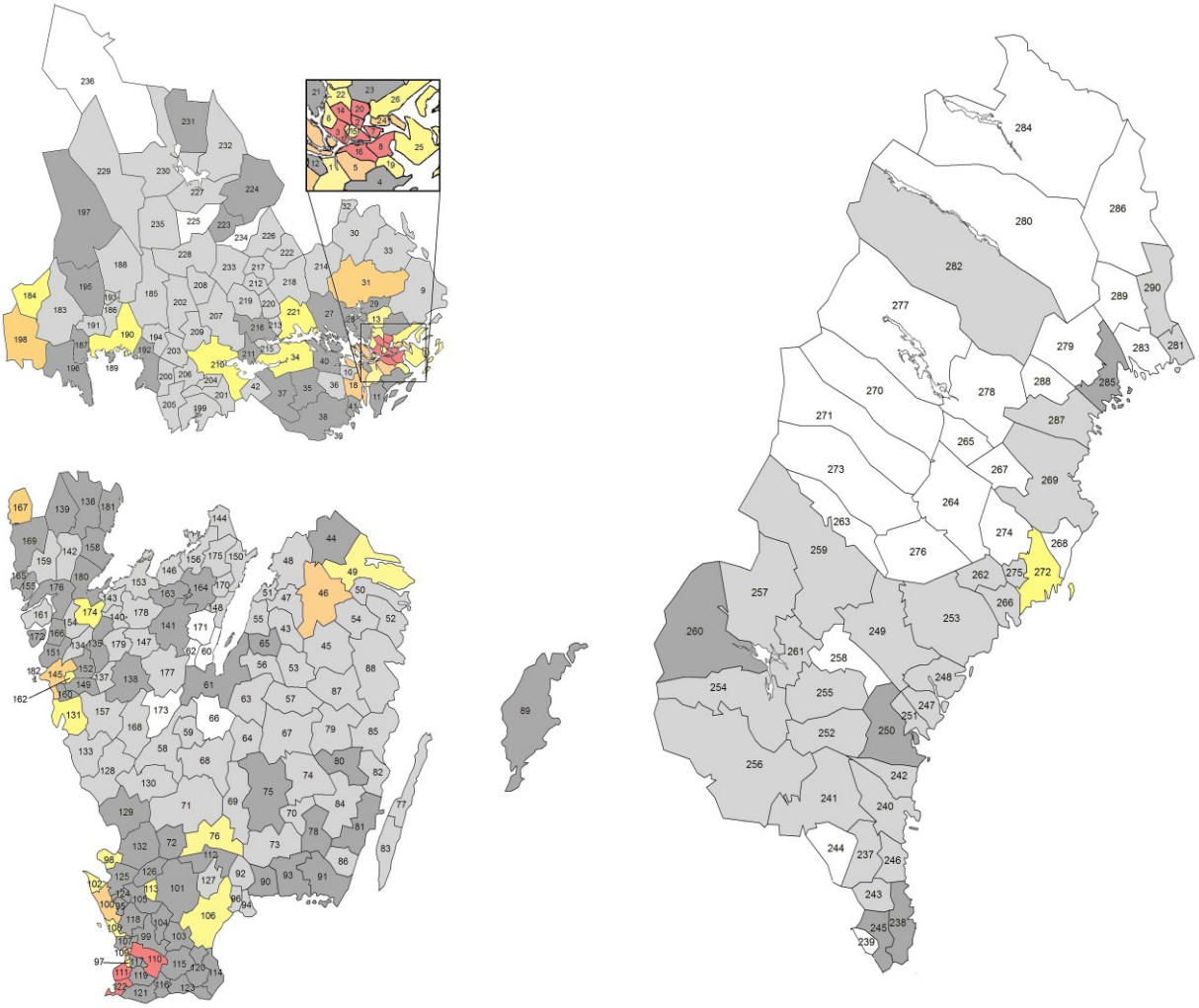
To test hypothesis 2, two different dependent variables are used, both provided by SEA. In the sample only individuals in SEA's register are included and to qualify one must have missed payments or other neglecting behaviour and thus required the SEA to intervene on the behalf of the part with claim (SEA, 2016). The first variable (*Population with claim*) is derived from the number of registered inhabitants in a municipality over the total population and measures if a municipality with higher income inequality push more inhabitants to acquire debt above their ability. The second variable (*Average claim*) addresses to what extent the registered individuals are excessively in debt and is created as the average debt of the individuals registered at SEA. *Average claim* is logged to increase the goodness of fit of the model due to some extreme outliers in the sample.

Independent variables

The independent variable in this thesis is income distribution, measured by the gini-coefficient (*Gini*). The variable is calculated and collected by SCB and is used in the baseline regressions. The well-used gini-coefficient is calculated from the difference in area under the accumulated income curve (Lorenz curve) of all individuals and the 45-degree curve of equal distribution. Therefore 0 represent perfectly equal income distribution and 1 represent the

opposite when one individual receive all income (World Bank, 2016). The sample includes inhabitants twenty years old or older who are registered in Sweden both 1st of January 2014 and 31st of December 2014. The raw data for income is collected from the Swedish Tax Authority complied according to the taxation year. Thus the data capture the exact reported income for all Swedish adults and the SCB sample therefore includes the precise information for all individuals that meet the criteria (Lindberg, 2016).

Figure 2: Gini-coefficients in the municipalities



The gini-coefficients of the municipalities are displayed in figure 2. The municipalities with red colour (*Gini* > 0.4) have the most unequal income distribution followed by orange (0.375-0.4), yellow (0.35-0.374), dark grey (0.325-0.349), light grey (0.3-0.324) and white (<0.3). Municipalities in and close to Stockholm and Malmo have the highest income inequality. The general pattern observed is that more densely populated areas have higher gini-coefficients in

general. The municipality connected to each number in figure 1 and the municipalities' absolute value of the gini-coefficient is found in the appendix (see table A.9).

To test the robustness of the results *Gini* is later replaced with *P90P50*. The variable measures income inequality as the ratio of the 90^{th} and 50^{th} income percentile for each municipality and is created of data from SCB. While both choices of independent variables are in line with previous research, the gini-coefficient is the first choice for the baseline regression because of the more thorough measurement it provides (Lorenz consistent) (Maestri and Roventini, 2012; Frank and Levine, 2007). In comparison *P90P50* is a ratio depending on the absolute numbers of the percentile incomes and will be more affected by potential extreme values in the top 10 % income group while *Gini* is more comprehensive as it measures the entire spectra of incomes. *P90P50* still measures what is intended and is therefore used in the robustness test. Both *Gini* and *P9050* are logged due to outliers and in order to grant more easily interpreted results.

Control variables

A number of control variables are used to single out the clear effect of income distribution on indebtedness in Swedish municipalities. The main driver of individual debt in Sweden is house prices since housing debt on average constitutes 80 % of a individual's total debt (Swedish Financial Supervisory Authority, 2015). As average house price varies greatly with municipality (see table 2), and thereby the size of the mortgage, average house price in each municipality must be controlled for. The variable *House price* is collected from SRES and measures the average resale price for villas in each municipality under the year of 2014 (SRES, 2016). The variable is logged since it contained extreme outliers.

Debt ratio depends on disposable income and therefore median yearly income is included as a control variable in the regressions *(Income)*. If the total debt remains constant, the higher income an individual has the lower the debt ratio will be. Another reason to have income as control variable is that with higher income, larger debt can be acquired since the capacity to manage changing circumstances improves and thus the risk for the creditor is reduced (Swedish Financial Supervisory Authority, 2016). The data is collected from SCB, which in turn collected it from the Swedish Tax Authority congruently to the raw data for *Gini*. Median income is chosen over average income in order to avoid the possible misleading values of outliers. This variable is logged due to the presence of outliers.

Immigration in Sweden has increased since the 1980s. Between 2005 and 2014 the annual number of immigrants in Sweden went from around 75 000 to above 125 000 (SCB, 2015). In a report from SCB (2013) it is concluded that the integration is dysfunctional and leave many immigrants segregated. Statistics show that immigrants in general have lower salaries, less education and higher unemployment and thus will in general have worse conditions to acquire mortgages. Municipalities with larger proportion immigrants would therefore have lower debt ratios in general. Proportion of immigrants in relation to a municipality's total population (*Immigrants*) is controlled for. The variable is created from demographic data collected from SCB. Due to outliers the variable is logged.

According to the life-cycle hypothesis people in the age group 25 to 45 tend to borrow the most (Christen and Morgan, 2005). Moreover, different age groups have different patterns of acquiring debt with the extreme of underage individuals who do not have the possibility to take loans. These notions are control for using the variable *Peak age* which measures the proportion of a municipality's total population in the age group 25-44. The data is collected from SCB and includes all registered individuals per the 31st of December 2014.

Both Duesenberry (1949) and Frank (2007) make the case that individuals in more densely populated areas have a different attitude towards debt than individuals in less populated areas and will therefore have higher levels of debt on average. Moreover, the demonstration effect discussed in the theory section is more evident in more highly populated areas as the number of comparisons are increased. The variable constructed to control for this notion is based on the number of registered inhabitants over the total land area of the respective municipality, thereby measuring inhabitants per km^2 (*Population density*). The raw data the variable is constructed from is collected by SCB. Because of the high population density in the big city areas in comparison to the less populated countryside, there are some extreme outliers in the sample and therefore the variable is logged.

The last control variable of those used in the model for hypothesis 1 is household's expectations of their future economic situation. Expectation of the future economic situation has a strong connection to current level of debt, as it determines the sustainable level of debt accounting for expected future income gains or losses (Mankiw, 2012). The variable constructed for this (*Expectations*) is an index of household's views of their economic situation in one year's time. The data is collected by phone and qualitative questions are

asked by NEIR. Every month 1 500 individuals between 16 and 84 years old are randomly chosen to participate in the survey (NIER, 2016b). The variable *Expectations* is created as an average value for the entire year of 2014 for three different regions. The regions are not based on municipalities but instead on the groups: "Big city regions", "Forest regions" and "Other regions" as specified in the appendix (see table A.9). This gives a rough indication of different regions optimistic or pessimistic views of the future and thereby the inhabitant's current willingness to acquire loans.

In the models testing hypothesis 2 another four variables are included. The inclusion of the additional variables is motivated by the research conducted by SEA (2008), which specifies the factors that increase the probability for an individual to end up in a position with debt above their ability. Unemployment increase this probability since mortgages are a long term commitments and with the loss of income, whether it is temporary or long term, some people fall to far behind to successfully handle their level of debt. The variable *Unemployment* is a ratio of open unemployment over the total population. The variable *Education* is included because lack of economic knowledge and strategy is overrepresented among the individuals in the register of SEA. When the individual has small or no economic margins, lack of knowledge tends to worsen the situation. *Education* is a percentage of the number of people with education above high school level. Both *Education* and *Unemployment* is collected from Economic facts. Another contributing factor to excessive debt is the number of people per household. A household with only one individual has smaller margins than households with an additional income source. S*ingle households* is therefore included as control variable and is collected from SCB as a ratio of single household in relation to total number of households in the municipalities. The last additional control variable is *Sick leave*. One of the most common reasons for excessive debt according to SEA's report (2008) is sick leave during extensive periods. The variable is collected from SALAR and measures the ratio of the total time of sick leave, 60 days or more, in relation to ordinary working time in the municipalities.

Descriptive statistics

In table 2, the descriptive statistics of the variables used in the regressions are reported. The statistics show high levels of variation in all variables, most notably for the variables *House prices*, *Immigrants* and *Population density*. Moreover, the variation in the dependent and independent variables are also high.

Table 2: Summary statistics

VARIABLES	N	Mean	Standard. Dev.	Min	Max
Debt	290	266	90.0	108	517
Population with claim	290	0.04	0.01	0.01	0.08
Average claim	290	$1.9•10^5$	$1.3•10^5$	$9{,}7•10^4$	$1.6•10^6$
Gini	290	0.33	0.03	0.28	0.52
P90P50	290	1.83	0.12	1.63	2.81
House price	250	$1.8•10^6$	$1.2•10^6$	$3.5•10^5$	$9.0•10^6$
Income	290	$2.7•10^5$	$3{,}5•10^4$	$2.2•10^5$	$5.2•10^5$
Immigrants	290	0.13	0.06	0.04	0.40
Peak age	290	0.22	0.03	0.15	0.38
Population density	290	146	519	0.20	$5{,}1•10^3$
Expectations	290	15.7	0.80	14.5	16.3
Unemployment	290	0.08	0.03	0.02	0.15
Education	290	0.19	0.08	0.10	0.57
Single households	290	0.36	0.05	0.22	0.45
Sick leave	273	0.03	0.01	0.01	0.07

Source: Swedish Central Bank, SEA, SCB, SRES and NIER, Economic facts, SALAR

To complement these statistics, some initial tests where undertaken to form a better understand of the sample data and the relation between the variables. A correlation check (see table A.2) between the variables reveals high positive correlation between *Gini* and *Debt* (0.71) but substantially lower correlation between the dependent variables used for hypothesis 2. The relationship between the gini-coefficient of different municipalities and the dependent variables are further explored by the used of scatter plots over each connection (see figure A.1-A.4). What can be seen is that there is a strong relationship between increasing income equality and debt ratio that seems to be diminishing as the value of the gini-coefficient increase. The relationship between *Population with claim* and *Gini* is less clear although positive. The same holds for the relationship between *Average claim* and *Gini*. This relationship gets clearer once the two outliers with exceptionally high average debt registered at SEA are removed.

IV. Empirical findings

The estimation results for the baseline regressions regarding hypothesis 1 and 3 are reported in table 3. Regression (1) includes all Swedish municipalities while regression (2) and (3) includes the sub-groupings of urban and rural areas respectively. All variables but *Population density* are significant in regression (1) and with the model's goodness-of-fit measured by R^2 of 88.3 %, this indicates that the model explains the determining factors of debt level for

Swedish individuals well. The independent variable, *Gini*, is significant at the 1 % level and has a positive, significant economic effect on debt. Both *Debt* and *Gini* are logged in the regression, which must be considered when interpreting the marginal effect of income distribution on debt level. The marginal effect of a 1 % increase in *Gini* constitute a 0.61 % increase in debt ratio as $1.01^{0.613}=1.0061$ (Dougherty, 2011). To put this into context, our model predicts that the debt level in Stockholm is 13.4 % higher than in Luleå, holding all other variables constant, as the gini-coefficient is 0.410 and 0.334 respectively. The strong, positive relationship between income inequality and debt level is in line with previous research in the area, e.g. Georgarakos et al. (2012) who found the same relationship in the Netherlands. As discussed in the theory section, higher income inequality created expenditure cascades that result in increased level of indebtedness.

Regarding the control variables in regression (1), the signs of the coefficients are generally as predicted by the discussions in the variable section. *House price* have a strong positive effect on debt level while an increased proportion of immigrants in the municipality have a negative effect on debt level. A more optimistic view of the future economic situation for the household also has a positive effect on level of debt, which is reasonable as individuals value their prospect of paying back current debt in the future more highly. The effect of higher average income in the municipality has a negative effect on debt level. This favour the explanation that higher income decreases the relative level of debt over the alternative explanation that higher income enables individuals to acquire larger debt. The variable *Peak age* goes against theory. As the variable measures the proportion of individuals in a municipality in the age 25 to 44 years old, the municipalities with a higher proportion of that age group should have more debt on average as they according to the life-cycle-hypothesis are the most prone to take on debt (Christen and Morgan, 2005). According to regression (1), a higher proportion of that age group in the population will lead to a lower level of debt. Lastly, *Population density* is insignificant. This could be due to the fact that expectations are grouped broadly into the three regions; “Big city regions”, Forest regions” and “Other regions” and might therefore act as a proxy for the population density of the municipalities.

A number of tests are conducted to check the robustness of the model specification. As heteroscedasticity would cause the regression to be inefficient, the assumption of homoscedasticity in the observation’s disturbance terms is tested with the Bresuch-Pagan test (Breusch and Pagan, 1979). With a p-value of 0.141 the null hypothesis of homoscedasticity

cannot be rejected and no correction of the model is therefore made. Furthermore, Ramsey's regression specification-error test (RESET) is used to test for model misspecification (Ramsey, 1969). With a p-value of 0.017 the null hypothesis that the model has the correct functional form is rejected on the 5 % level. Because of this another iteration of the model can be found in the robustness section where $Gini^2$ is incorporated. Lastly, the correlation between the predictors is measured using VIF to check for possible multicollinearity (see table A.3). No extreme values are found and all variables are therefore kept in the regression.

Table 3: Baseline regressions for hypothesis 1 and 3

VARIABLES	(1) ALL Debt (log)	(2) URBAN Debt (log)	(3) RURAL Debt (log)
Gini (log)	0.613***	-0.064	0.959***
	(0.137)	(0.153)	(0.244)
House price (log)	0.505***	0.545***	0.505***
	(0.027)	(0.058)	(0.033)
Income (log)	-0.660***	-0.366**	-1.196***
	(0.096)	(0.151)	(0.204)
Immigrants (log)	-0.083***	-0.067**	-0.090***
	(0.025)	(0.032)	(0.033)
Peak age	-0.775**	-0.510	0.064
	(0.366)	(0.501)	(0.581)
Population density (log)	0.009	0.001	0.012
	(0.009)	(0.013)	(0.013)
Expectations	0.054***	0.083***	0.043***
	(0.011)	(0.016)	(0.014)
Constant	6.449***	0.990	13.480***
	(1.086)	(1.446)	(2.188)
Breusch-Pagan	0.141	0.112	0.733
Ramsey	0.017	0.263	0.082
Observations	250	89	161
R-squared	0.883	0.875	0.835

Note: Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

To test whether there is a significant difference in propensity to take on debt in urban and rural areas of Sweden, regression (2) and (3) is run. For regression (2), which only includes urban municipalities, *Gini* is not significant whereas the variable is significant in regression (3), which only including rural areas. A meaningful comparison between the two groups in terms of the effect of income inequality is therefore not possible. However, the marginal effect of *Gini* in rural municipalities is significantly larger than for all municipalities. An

increase of the gini-coefficient by 1 % constitutes a 0.96 % increase of debt level in rural municipalities, which is substantially greater than the marginal effect of 0.61 % for all municipalities in Sweden. This implies that rural municipalities on average are affected by income inequality to a larger extent than all municipalities collectively. Indirectly, this implies that effect is larger in rural areas than urban areas. This goes against hypothesis 3, which states that the level of debt should be higher in urban areas than rural areas as the notion of conspicuous consumption is more pronounced there. The contradictory result from our models could be accredited to the fact that incomes are generally lower in rural areas. Relaxing the assumption that individuals only compare their standard of living with individuals in their local perimeter, but also compare themselves with individuals regionally or even nationally, their relative income in this context would be even lower. In that case individuals in rural areas would be affected even stronger by the notion of expenditure cascades and take on higher levels of debt relative to their income in an attempt to "keep-up-with-the-Joneses".

The control variables in regression (2) and (3) behave very similar to how they behave in regression (1). The main difference is that *Peak age* is no longer significant. The reason for this could be that with the small amount of observations in each regression, the variance in the variable is too small. The values of the coefficients are also very similar, with the exception of *Income*. The effect of an increase in average income for a municipality is substantially larger in rural areas than urban areas as the marginal effect on debt level of a 1 % increase in average income is -1.12 % and -0.36 % respectively. Going back to the fact that average income is generally lower in rural areas, this result implies that the effect of average income on debt level is non-linear and stronger for lower incomes.

Both regression (2) and (3) show no sign of heteroscedasticity as their p-value in the Breusch-Pagan test is 0.112 and 0.733 respectively. Furthermore, the results from the Ramsey test imply that while regression (2) has the correct functional form, regression (3) does not. To account for this $Gini^2$ will be included in the model in the appendix (see table A.5). As with regression (1), the VIF-test for regression (2) and (3) suggest that the correlation between the explanatory variables is at a tolerable level and that multicollinearity is not a problem in the models.

Moving on, the baseline regressions for hypothesis 2 and 3 are reported in table 4. Regression (4), (5) and (6) uses *Population with claim* as dependent variable where regression (4) includes all Swedish municipalities while regression (5) and (6) only include urban and rural municipalities respectively. *Gini* is significant for all three regressions and the goodness-of-fit measured by R^2 is high throughout the regressions, especially for rural areas. As *Population with claim* measures the proportion of the population in a municipality with a claim at SEA, the positive effect of *Gini* in all three regressions suggests that increased income inequality has a positive effect on individuals' propensity to take on debt above their ability. This supports hypothesis 2 and can be explained by the fact that some individuals are myopic and undervalue future consumption when making current consumption decision. When income inequality is greater, the demonstration effect is more profound thereby enhancing irrational consumption decisions for a number of individuals. These results are also in line with Frank and Levin's (2007) finding that increased income inequality has a significant positive effect on the number of personal bankruptcies in the US. Personal bankruptcies can be seen as a close substitute of the dependent variable as they both measure the notion of taking debt above one's ability, thereby giving further support for our finding.

Looking at the coefficients for *Gini* in regression (4), (5) and (6) the marginal effect of increased income inequality on excessive debt is the strongest in rural municipalities. A 1 % increase of income inequality constitutes, on average, a 0.082 percentage points increase of the population in a municipality with claims at SEA for rural municipalities. The marginal effect is 0.078 percentage points in urban municipalities whereas the marginal effect is 0.073 percentage points when all municipalities are included. While the effect is stronger in rural municipalities than urban municipalities, economically the difference is insignificant. Even so, the results give no support of hypothesis 3 and the fact that the propensity to take on debt is higher in urban areas. Using Gothenburg and Nyköping as an example, our model predicts that the proportions of individuals in SEA's register is 1.45 percentage points higher in Gothenburg, holding all other variables than *Gini* constant, than in Nyköping as the gini-coefficient in Gothenburg is 22 % higher.

Only some of the control variables are significant in regression (4), (5) and (6) and many of those have a negligible economic effect. *Population density* and *Education* are the only variables that are significant across all three regressions. While the positive marginal effect of *Population density* is in line with our prediction, the effect is very small. The control variable

of main interest is *Education* as its coefficient in all three regressions is significant and has a sizeable effect on *Population with claim*. An increase in the proportion of individuals with higher education in a municipality have according to our model a substantial negative effect on the proportion of individuals with excessive debt, which is in line with previous research.

Table 4: Baseline regressions for hypothesis 2 and 3

VARIABLES	(4) ALL Population with claim	(5) URBAN Population with claim	(6) RURAL Population with claim	(7) ALL Average claim (log)	(8) URBAN Average claim (log)	(9) RURAL Average claim (log)
Gini (log)	0.073***	0.078***	0.082***	1.126*	0.962	1.086*
	(0.014)	(0.017)	(0.019)	(0.579)	(1.126)	(0.640)
House price (log)	-0.005***	-0.015***	-0.003	0.104	0.315	0.083
	(0.002)	(0.004)	(0.002)	(0.084)	(0.302)	(0.093)
Income (log)	-0.021***	-0.012	-0.011	0.672**	-0.008	0.609
	(0.008)	(0.013)	(0.015)	(0.332)	(1.012)	(0.536)
Immigrants (log)	-0.003	0.005*	-0.008***	-0.088	-0.009	-0.153
	(0.002)	(0.003)	(0.003)	(0.095)	(0.178)	(0.127)
Peak age	0.070***	0.064	0.073*	-2.297*	-5.316	-1.488
	(0.024)	(0.041)	(0.038)	(1.187)	(3.560)	(1.471)
Population density (log)	0.002***	0.001*	0.003***	0.022	0.032	-0.003
	(0.001)	(0.001)	(0.001)	(0.025)	(0.062)	(0.035)
Expectations	-0.001**	-0.002*	-0.001	0.032	-0.030	0.068*
	(0.001)	(0.001)	(0.001)	(0.039)	(0.111)	(0.040)
Unemployment	0.059**	0.006	0.080**	-2.324**	-3.341	-2.000*
	(0.027)	(0.050)	(0.031)	(0.969)	(3.459)	(1.043)
Education	-0.130***	-0.105***	-0.189***	-0.951	-0.778	-1.439
	(0.014)	(0.015)	(0.026)	(0.792)	(0.943)	(1.263)
Single households	0.009	-0.008	0.009	0.098	0.451	-0.289
	(0.012)	(0.017)	(0.019)	(0.582)	(1.101)	(0.862)
Sick leave	-0.036	-0.040	-0.002	0.940	1.967	0.455
	(0.049)	(0.081)	(0.060)	(2.732)	(7.121)	(2.325)
Constant	0.455***	0.548***	0.308*	3.468	10.500	3.906
	(0.113)	(0.159)	(0.181)	(4.081)	(12.560)	(6.447)
Breusch-Pagan	0.000	0.041	0.000	0.000	0.041	0.000
Ramsey	0.001	0.013	0.132	0.033	0.611	0.000
Observations	238	86	152	238	86	152
R-squared	0.732	0.854	0.625	0.291	0.304	0.201

Note: Robust standard errors in parentheses for all regressions
*** p<0.01, ** p<0.05, * p<0.1

Conducting the Breusch-Pagan test for regression (4), (5) and (6); the null hypothesis is rejected in all three cases on the 5 % level. To correct for heteroscedasticity in the disturbance terms, robust standard errors are used for the regressions in table 4. The null hypothesis for the Ramsey test is rejected on the 5 % level for regression (4) and (5), suggesting that the models are miss-specified. As with regression (1), $Gini^2$ is included in an

alternative model specification in the robustness section for the model including all municipalities. For the models using urban and rural as subgroupings, the alternative model including $Gini^2$ is placed in the appendix (see table A.5). The VIF-test (see table A.4) for the three regressions show tolerable levels of correlation between the variables in regression (4) and (6). However, for regression (5), both *House price* and *Income* have values over 10. This implies multicollinearity between the variables and by that there is uncertainty of the correctness of the coefficients of those variables as they depend heavily on adding or dropping variables. Even so, *House price* and *Income* are only used as controls and our main interest is the interpretation of the variable *Gini*'s coefficient, which is not affected by multicollinearity.

Regression (7), (8) and (9) uses the same explanatory variables as regression (4), (5) and (6) but have *Average claim* as alternative dependent variable to test hypothesis 2. The three regressions have significantly lower explanatory power compared to the previous regressions as the R^2 value is never over 30.4 %. Moreover, very few explanatory variables are significant. *Gini* is significant in regression (7), including all municipalities, and regression (9), including only rural municipalities, but is not significant in regression (8), including only urban municipalities. According to regression (7), a 1 % increase of the gini-coefficient leads to on average a 1.13 % increase in average debt for the individuals registered at the SEA. Again using Gothenburg and Nyköping as an example, the 22 % higher gini-coefficient in Gothenburg leads to a 25.3 % higher average claim at SEA according to the model, holding all other variables constant. However, the poor goodness-of-fit for the model accompanied by the fact that *Gini* is only significant at the 10 % level put some doubt of how trustworthy the results are. The results give further support for hypothesis 2, but as they are frail the robustness of the results is tested in the next section.

As mentioned, *Gini* is significant when regressing the model on rural areas only; however, as in regression (7) the coefficient is only significant at the 10 % level. In this case the marginal effect is 1.09 % which is not substantially different from the marginal effect of when all municipalities are included. Once again, hypothesis 3 is rejected as no support for higher propensity to take on debt in urban areas is found.

Robust standard errors are used in the three regressions as the null hypothesis in the Breusch-Pagan test is rejected. Regression (7) and (9) might also have the wrong functional form as

they fail the Ramsey test on the 5 % level. An alternative iteration of regression (7) is conducted in the robustness section including $Gini^2$ while the respective model iteration for regression (8) and (9) is found in the appendix (see table A.5). As regression (7) through (9) uses the same explanatory variables and the same observations as regression (4) through (6), the VIF-test give the same values for the variables. This means high values for *House price* and *Income*, but once again they are only used as controls and their high values do not affect the viability of *Gini*'s coefficient.

To summaries the result of the baseline regressions, proof is found for hypothesis 1, i.e. income inequality has a significant positive effect on the level of indebtedness in Swedish municipalities. Furthermore, proof is also found for hypothesis 2. Both model (2) and (3) show a significant positive effect of income inequality on excessive debt. The regressions connected to model (2) have a substantially higher explanatory power and the coefficients are significant at a higher level, which implies that this is the preferred model when testing hypothesis 2. The regressions give no support for hypothesis 3, they rather indicates that the level of debt in rural municipalities are affected to a higher extent by income inequality.

Robustness tests

To test the robustness of the results in the previous section a number of model iterations are used. As a majority of the regressions failed the Ramsey test the same regressions are run again with the addition of $Gini^2$. The reason for this is to test if a non-linear model better describes the relationship between income inequality and the different measures of indebtedness. The estimation results from these regressions using all municipalities as sample are reported in table 5. The respective results for urban and rural municipalities can be found in the appendix (see table A.5).

Regression (10) is the equivalent to regression (1) and from table 5 it is clear that the inclusion of $Gini^2$ increases the adjusted R^2-value from 88.0 % to 88.6 %. Moreover, both *Gini* and $Gini^2$ are significant at the 1 % level. According to the model the effect of a 1 % increase of the gini-coefficient differ between municipalities depending on their current value of the gini-coefficient. For Luleå with a gini-coefficient of 0.334 the marginal effect of a 1 % increase of the gini-coefficient will lead to a 3.33 % increase in debt level. For Stockholm with a gini-coefficient of 0.41 the marginal effect of a 1 % increase of the gini-coefficient will lead to a 2.82 % increase in debt level. The marginal effect is diminishing and thereby

changes in the gini-coefficient have a more profound effect in areas with a lower gini-coefficient.

The inclusion of $Gini^2$ in regression (11) and (12), which test hypothesis 2, only have a marginal positive effect on the models' goodness-of-fit. Moreover, the added variable is not significant in any of the regressions which imply that a linear model is a better estimation method for the relationship between income inequality and excessive debt.

Table 5: Robustness regression for gini²

VARIABLES	(10) ALL Debt (log)	(11) ALL Population with claim	(12) ALL Average claim (log)
Gini (log)	2.557***	0.0576*	-0.014
	(0.494)	(0.032)	(1.415)
$Gini^2$	-7.321***	0.062	4.462
	(1.653)	(0.109)	(5.642)
House price (log)	0.476***	-0.004**	0.121
	(0.027)	(0.002)	(0.082)
Income (log)	-0.477***	-0.023***	0.560*
	(0.115)	(0.009)	(0.327)
Immigrants (log)	-0.088***	-0.003	-0.089
	(0.027)	(0.002)	(0.095)
Peak age	-0.801**	0.071***	-2.213*
	(0.349)	(0.024)	(1.221)
Population density (log)	0.005	0.002***	0.024
	(0.014)	(0.001)	(0.024)
Expectations	0.053***	-0.001**	0.031
	(0.010)	(0.001)	(0.039)
Unemployment	–	0.059**	-2.278**
		(0.027)	(0.975)
Education	–	-0.131***	-1.009
		(0.015)	(0.826)
Single households	–	0.008	0.002
		(0.013)	(0.599)
Sick leave	–	-0.035	1.005
		(0.049)	(2.757)
Constant	7.550***	0.448***	2.893
	(1.428)	(0.112)	(4.199)
Breusch-Pagan	0.013	0.000	0.000
Observations	250	238	238
R-squared	0.890	0.733	0.293

Note: Robust standard errors in parentheses for all regressions
*** p<0.01, ** p<0.05, * p<0.1

As a second robustness test *Gini* is substituted for *P90P50* as independent variable as it is an alternative measure of income inequality. The measurement is used in previous research regarding income inequality both by Frank and Levine (2007) and Maestri and Roventini (2012). The results are reported in table 6. Regression (13) is the equivalent of regression (1) and it can be seen that *P90P50* is significant on the 5 % level. This gives further support for hypothesis 1 and the fact that income inequality has a significant positive effect on average level of debt in a municipality.

Looking at regression (14), which is the equivalent of regression (4), *P90P50* is significant at the 1 % level and have a positive effect on debt level. This gives further support for the claim that the estimation results in regression (4) are robust and supports hypothesis 2. In regression (15) on the other hand, which is the equivalent of regression (7), *P90P50* is not significant. This is in line with the discussion in the result section about the model's low explanatory power. This robustness test gives further support to question model 3 as a good model for testing the relationship between income inequality and excessive debt.

To test the robustness of the results regarding hypothesis 3, *P90P50* is also substituted into the respective baseline regressions only using urban and rural areas respectively as sample. The results are reported in the appendix (see table A.6). The estimation results give further support for the rejection of hypothesis 3 as none of the regressions shows a significantly higher propensity to acquire debt due to higher income inequality. Rather, regression (24) and (25) give further support for the claim that the opposite holds.

In a last effort to test the robustness of the baseline findings, an alternative regression method to OLS is used. The method is a version of Weighted Least Squares (WLS) called "iteratively reweighted least squares". The estimation results are reported in table A.7 in the appendix for regressions related to hypothesis 1 and table A.8 for regressions related to hypothesis 2. The regressions give further support for the previous findings. The effect of income inequality on debt level is positive and significant, which supports hypothesis 1. The effect of income inequality on the proportion of individuals in a municipality with a claim at SEA is positive and significant, which supports hypothesis 2. The effect of income inequality on the average claim at SEA is significant and further supports hypothesis 2. Lastly, there is not a significantly higher propensity to take on debt in urban areas than rural areas due to income inequality, rather the opposite. This gives further support for the rejection of hypothesis 3.

Table 6: Robustness regression for P90P50

VARIABLES	(13) ALL Debt (log)	(14) ALL Population with claim	(15) ALL Average claim (log)
P90P50 (log)	0.415**	0.099***	1.182
	(0.174)	(0.014)	(0.729)
House price (log)	0.535***	-0.003**	0.134
	(0.025)	(0.001)	(0.082)
Income (log)	-0.708***	-0.040***	0.405
	(0.126)	(0.008)	(0.314)
Immigrants (log)	-0.056**	-0.001	-0.038
	(0.026)	(0.002)	(0.084)
Peak age	-0.715*	0.121***	-1.965
	(0.396)	(0.027)	(1.344)
Population density (log)	0.014	0.002***	0.022
	(0.016)	(0.001)	(0.025)
Expectations	0.049***	-0.002**	0.028
	(0.010)	(0.001)	(0.039)
Unemployment	–	0.034	-2.604**
		(0.026)	(1.006)
Education	–	-0.126***	-0.713
		(0.012)	(0.761)
Single households	–	0.002	0.028
		(0.012)	(0.596)
Sick leave	–	-0.030	0.808
		(0.048)	(2.777)
Constant	5.784***	0.534***	4.528
	(1.472)	(0.108)	(3.978)
Breusch-Pagan	0.021	0.000	0.000
Observations	250	238	238
R-squared	0.876	0.757	0.289

Note: Robust standard errors in parentheses for all regressions
*** p<0.01, ** p<0.05, * p<0.1

V. Concluding remarks and policy implications

This thesis tests three hypotheses regarding the effect of income inequality on indebtedness using data from Swedish municipalities. The empirical results support the first hypothesis that higher income inequality has a positive effect on level of indebtedness. Furthermore, the empirical findings support the second hypothesis that higher income inequality has a positive effect on individuals' propensity to take on debt above their ability. These phenomena are explained by relative consumption theories, which highlights the comparing side of human nature and by that the importance of social context when explaining individuals' consumption patterns. The results did not, however, support the third hypothesis that the positive effect of higher income inequality on level of indebtedness is greater in urban than rural areas.

In summary, the empirical findings in this thesis suggest that income inequality is an important explanatory factor for the increasing and uneven levels of debt in contemporary Sweden. As high levels of debt compared to disposable income is connected to high levels of financial risks and the probability of a financial crisis, policies to mitigate income inequality are therefore justified.

Palley (2008) suggest two possible policies to limit the effects of income inequality. The first policy is to tax the consumption of luxury goods. With a higher increase in income growth for the top earners in Sweden compared to median worker, a higher proportion will be spent on status consumption that is highly positional by nature. This means that the unfavourable comparisons for individuals in the lower percentiles intensifies and can have a profound effect on those individuals' debt patterns. By taxation of that kind of consumption, the positive effect on indebtedness can be lessened as the opportunity cost for spending on luxury products increases for the top earners. A second policy suggestion by Palley (2008) is to have a more progressive tax structure. This would limit the skewedness in growth of disposable income seen today and work against increasing income inequality; thereby halting the increase in consumption that is leading to higher indebtedness.

While the findings in this thesis are both plausible and noteworthy, the thesis faces some limitations. The major concern is that the causality between income inequality and debt cannot be proven due to the cross-sectional nature of the data. With panel data the study could not only prove this but also give stronger support for the hypotheses due to a bigger sample. The time aspect in itself is also very interesting because of the empirical patterns of increasing debt and income inequality discussed in the introduction of this thesis and its inclusion would provide another dimension.

A further limitation of this thesis is that it is assumed that the comparisons of relative consumption are made primarily with peers in a close geographical proximity. While we have found support for such a claim, one can make the case that the comparisons are not only made in close geographical proximity but also on a national or even international level. Aronsson and Johansson-Stenman (2015) have found support for this claim. Moreover, the comparisons may neither be limited to geographical comparisons, but could also for example be an individual's working group. This opens up for further research to grant a more complete view of how income inequality affects the indebtedness of individuals.

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Appendix

Table A.1: Sources for the dataset

Variable	Data Provider	Source (2014)
Debt	Central Bank*	http://www.riksbank.se/sv/Statistik/
Population with claim	Enforcement Authority*	https://www.kronofogden.se/download/18.73c55da914b3fa1855a29dfb/1453274847872/antal_skuldsatta_2010_2015.pdf
Average claim	Enforcement Authority*	https://www.kronofogden.se/download/18.73c55da914b3fa1855a29dfb/1453274847872/antal_skuldsatta_2010_2015.pdf
Gini	Statistical Central Bureau*	http://www.scb.se/sv_/Hitta-statistik/Statistik-efter-amne/Hushallens-ekonomi/Inkomster-och-inkomstfordelning/Inkomster-och-skatter/#c_li_303216
P90P50	Statistical Central Bureau*	http://www.scb.se/sv_/Hitta-statistik/Statistik-efter-amne/Hushallens-ekonomi/Inkomster-och-inkomstfordelning/Inkomster-och-skatter/#c_li_303216
House price	Real Estate Statistics*	http://www.maklarstatistik.se/maeklarstatistik/riket.aspx?typ=Boratter&srt=asc&tab=namn
Income	Statistical Central Bureau*	http://www.scb.se/sv_/Hitta-statistik/Statistik-efter-amne/Hushallens-ekonomi/Inkomster-och-inkomstfordelning/Inkomster-och-skatter/#c_li_303216
Immigrants	Statistical Central Bureau*	http://www.scb.se/sv_/Hitta-statistik/Statistik-efter-amne/Befolkning/Befolkningens-sammansattning/Befolkningsstatistik/#c_li_26051
Peak age	Statistical Central Bureau*	http://www.statistikdatabasen.scb.se/pxweb/sv/ssd/START__BE__BE0101__BE0101A/BefolkningNy/?rxid=9698ca00-ea94-4688-b8bd-a4116608c0b1
Population density	Statistical Central Bureau*	http://www.statistikdatabasen.scb.se/pxweb/sv/ssd/START__BE__BE0101__BE0101C/BefArealTathetKon/?rxid=180146cb-c0dc-44d6-b984-3cd36fd21673
Expectations	National Institute of Economics Research	http://www.konj.se/statistik-och-data.html
Unemployment	Economic Facts	http://www.ekonomifakta.se/Fakta/Regional-statistik/Din-kommun-i-siffror/Nyckeltal-for-regioner/?var=17255
Education	Economic Facts	http://www.ekonomifakta.se/Fakta/Regional-statistik/Din-kommun-i-siffror/Nyckeltal-for-regioner/?var=17251
Single households	Statistical Central Bureau*	http://www.statistikdatabasen.scb.se/pxweb/sv/ssd/START__BE__BE0101__BE0101S/HushallT03/?rxid=180146cb-c0dc-44d6-b984-3cd36fd21673
Sick leave	Association of Local Authorities and Regions*	http://skl.se/ekonomijuridikstatistik/statistik/personalstatistik/sjukfranvaroredovisningen.8837.html

* *Swedish (…)*

Table A.2: Correlation table

VARIABLES	Debt	Population with claim	Average claim	Gini	P90P50	House price	Income	Immigrants	Peak age	Population density	Expectations	Unemployment	Education	Single households	Sick leave
Debt	1														
Population with claim	-0.441	1													
Average claim	0.265	-0.216	1												
Gini	0.714	-0.204	0.219	1											
P90P50	0.626	-0.211	0.252	0.925	1										
House price	0.882	-0.529	0.296	0.808	0.785	1									
Income	0.683	-0.651	0.305	0.617	0.694	0.876	1								
Immigrants	0.247	0.266	-0.049	0.494	0.316	0.279	0.042	1							
Peak age	0.514	-0.202	0.004	0.492	0.255	0.533	0.336	0.529	1						
Population density	0.456	-0.150	0.113	0.574	0.539	0.603	0.450	0.396	0.503	1					
Expectations	0.375	-0.082	0.067	0.226	0.183	0.257	0.173	0.297	0.156	0.130	1				
Unemployment	-0.494	0.644	-0.268	-0.104	-0.137	-0.461	-0.566	0.390	-0.068	-0.076	-0.1034	1			
Education	0.698	-0.635	0.234	0.756	0.705	0.838	0.780	0.116	0.584	0.507	0.115	-0.405	1		
Single households	-0.537	0.420	-0.188	-0.145	-0.174	-0.438	-0.565	0.052	-0.165	-0.052	-0.347	0.565	-0.289	1	
Sick leave	-0.006	0.018	-0.015	-0.062	-0.092	-0.008	-0.048	0.084	0.055	-0.015	-0.187	0.068	-0.052	0.158	1

Scatterplots

Figure A.1: Debt over disposable income and gini-coefficient for Swedish municipalities

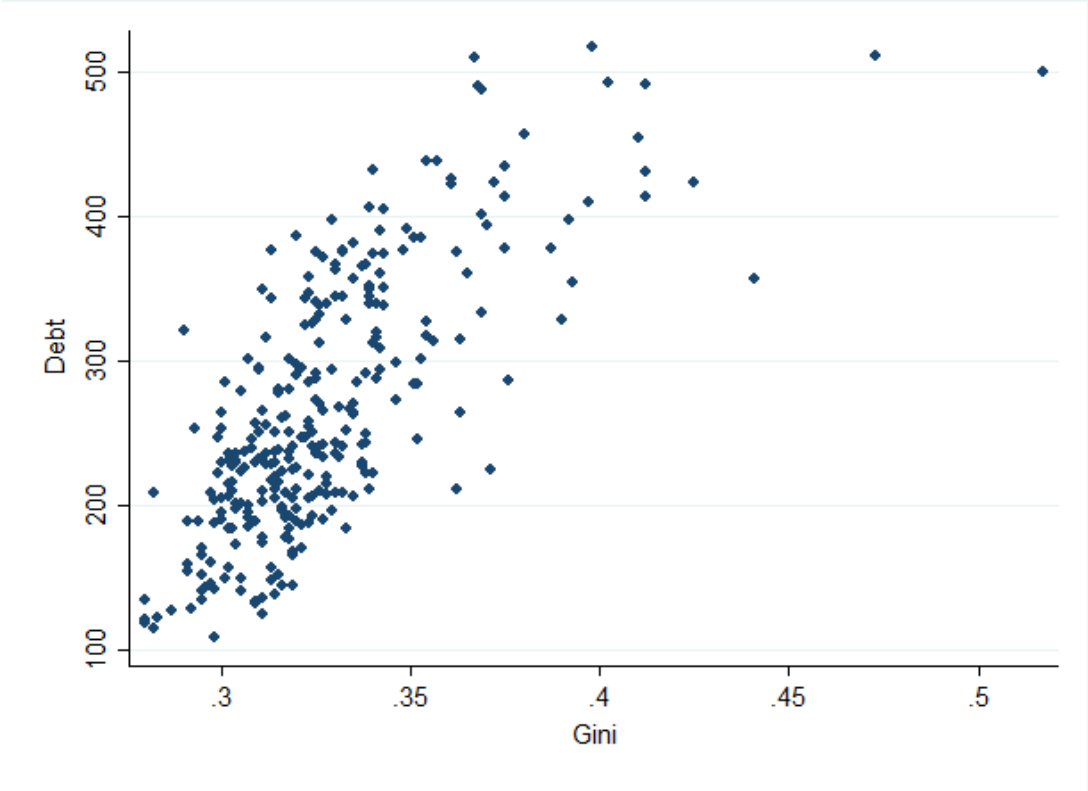


Figure A.2: Proportion of inhabitants in municipality with claims at the Swedish Enforcement Authority and gini-coefficient

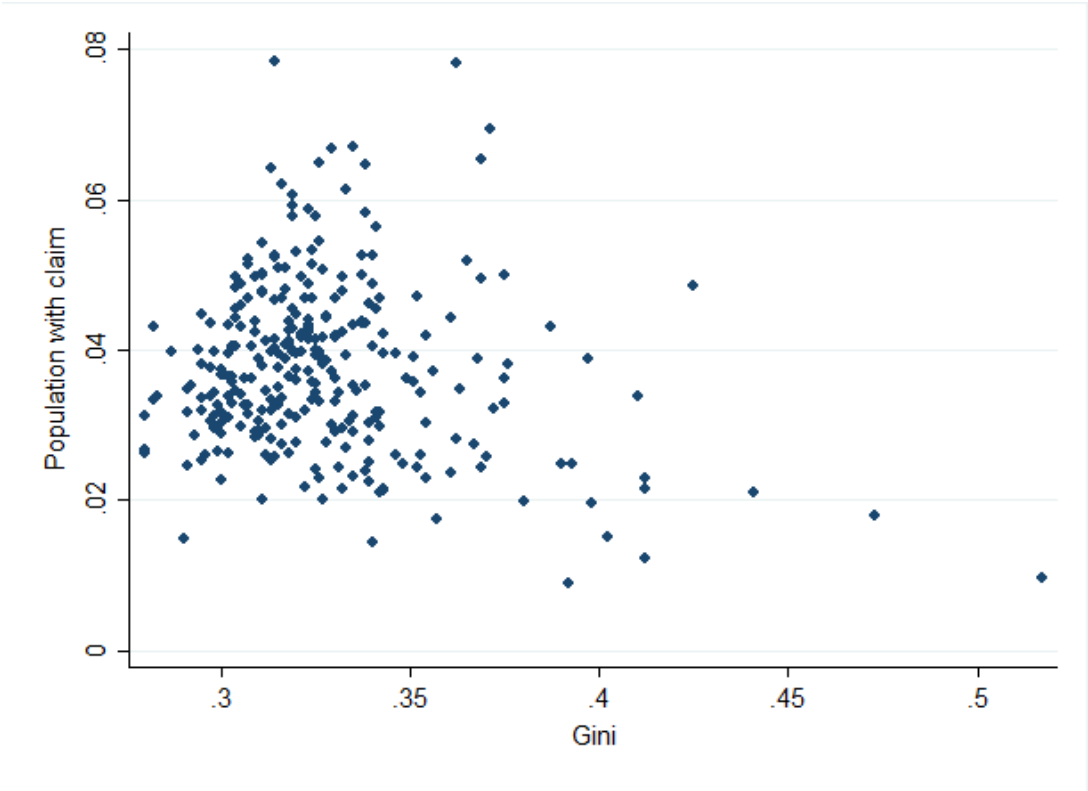


Figure A.3: Average claim at the Swedish Enforcement Authority for inhabitants in municipality and gini-coefficient

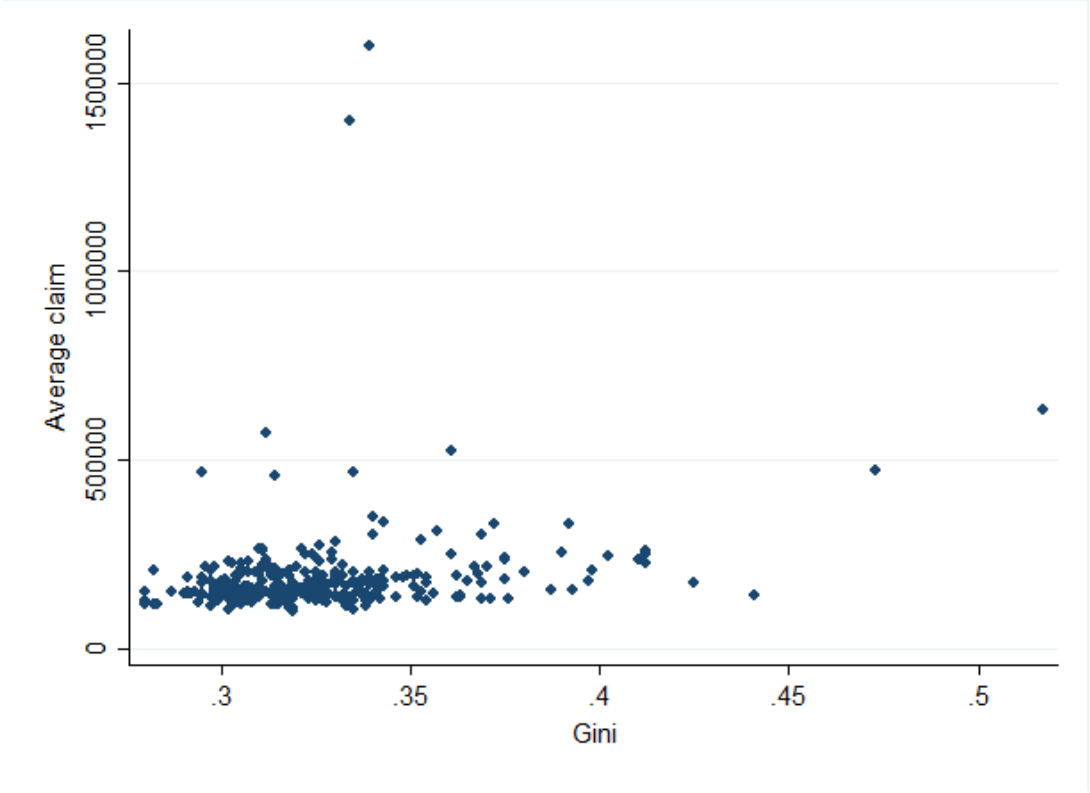
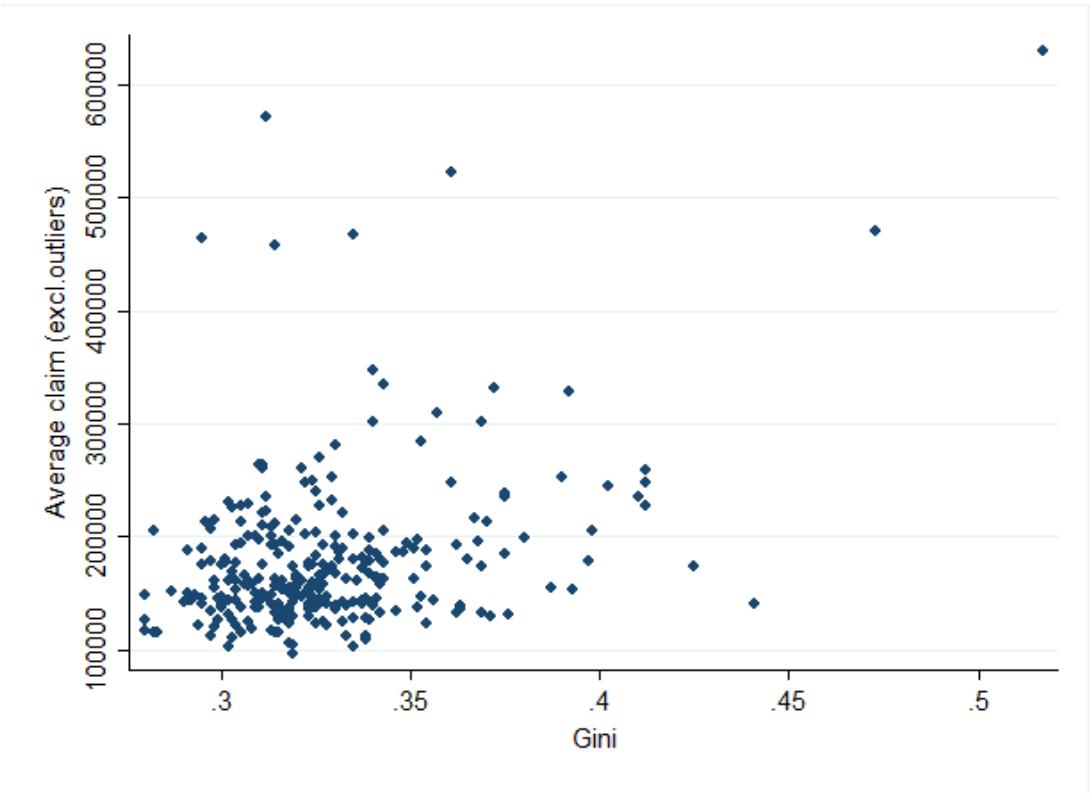


Figure A.4: Average claim at the Swedish Enforcement Authority for inhabitants in municipality (excl. outliers Tjörn and Luleå) and gini-coefficient



Multicollinearity test for regressions

Table A.3: VIF tests for hypothesis 1

REGRESSION	(1) ALL Debt (log)	(2) URBAN Debt (log)	(3) RURAL Debt (log)
VARIABLES	VIF	VIF	VIF
Gini (log)	3.02	3.12	2.21
House price (log)	5.50	8.69	2.90
Income (log)	2.85	5.97	2.17
Immigrants (log)	2.14	2.99	1.79
Peak age	2.29	2.34	1.33
Population density (log)	3.89	3.31	2.08
Expectations	1.45	1.34	1.78
Mean VIF	3.02	3.97	2.04

Table A.4: VIF tests for hypothesis 2

REGRESSION	(4) ALL Population with claim	(5) URBAN Population with claim	(6) RURAL Population with claim	(7) ALL Average claim (log)	(8) URBAN Average claim (log)	(9) RURAL Average claim (log)
VARIABLES	VIF	VIF	VIF	VIF	VIF	VIF
Gini (log)	5.39	8.30	2.74	5.39	8.30	2.74
House price (log)	6.40	10.04	3.44	6.40	10.04	3.44
Income (log)	5.56	10.69	2.69	5.56	10.69	2.69
Immigrants (log)	3.74	5.61	2.94	3.74	5.61	2.94
Peak age	3.32	3.77	1.61	3.32	3.77	1.61
Population density (log)	4.36	3.57	2.33	4.36	3.57	2.33
Expectations	1.73	1.61	2.34	1.73	1.61	2.34
Unemployment	2.83	6.14	2.28	2.83	6.14	2.28
Education	7.56	8.04	2.81	7.56	8.04	2.81
Single households	2.39	3.49	1.86	2.39	3.49	1.86
Sick leave	1.16	1.53	1.14	1.16	1.53	1.14
Mean VIF	4.04	5.71	2.38	4.04	5.71	2.38

Table A.5: Gini^2 urban and rural

VARIABLES	(16) URBAN Debt (log)	(17) RURAL Debt (log)	(18) URBAN Population with claim	(19) RURAL Population with claim	(20) URBAN Average claim (log)	(21) RURAL Average claim (log)
Gini (log)	1.224**	1.482	0.056	0.287	-0.319	3.188
	(0.602)	(2.085)	(0.042)	(0.182)	(3.276)	(4.822)
Gini^2	-4.361**	-2.426	0.074	-0.961	4.387	-9.870
	(1.974)	(9.610)	(0.117)	(0.897)	(10.380)	(21.780)
House price (log)	0.501***	0.505***	-0.015***	-0.003	0.359	0.080
	(0.060)	(0.033)	(0.005)	(0.002)	(0.330)	(0.094)
Income (log)	-0.241	-1.188***	-0.015	-0.011	-0.170	0.611
	(0.158)	(0.207)	(0.013)	(0.014)	(1.079)	(0.538)
Immigrants (log)	-0.070**	-0.090***	0.006*	-0.007***	-0.003	-0.144
	(0.031)	(0.033)	(0.003)	(0.003)	(0.221)	(0.126)
Peak age	-0.502	0.066	0.064	0.074*	-5.303*	-1.473
	(0.489)	(0.583)	(0.041)	(0.038)	(3.179)	(1.474)
Population density (log)	0.002	0.011	0.001	0.003***	0.0302	-0.005
	(0.013)	(0.014)	(0.001)	(0.001)	(0.066)	(0.036)
Expectations	0.081***	0.042***	-0.002*	-0.002	-0.032	0.064
	(0.016)	(0.014)	(0.001)	(0.001)	(0.087)	(0.040)
Unemployment	–	–	0.007	0.068**	-3.290	-2.124*
			(0.051)	(0.031)	(3.454)	(1.075)
Education	–	–	-0.104***	-0.188***	-0.736	-1.430
			(0.016)	(0.026)	(1.405)	(1.264)
Single households	–	–	-0.011	0.006	0.307	-0.320
			(0.017)	(0.019)	(1.481)	(0.884)
Sick leave	–	–	-0.039	-0.005	2.067	0.422
			(0.081)	(0.058)	(6.672)	(2.333)
Constant	1.976	14.230***	0.541***	0.651**	10.06	7.436
	(1.481)	(3.720)	(0.162)	(0.306)	(12.64)	(9.947)
Breusch-Pagan	0.060	0.744	0.037	0.000	0.077	0.000
Observations	89	161	86	152	86	152
R-squared	0.883	0.835	0.855	0.632	0.306	0.202

Note: Robust standard errors in parentheses for regression; 18, 19 and 21
*** p<0.01, ** p<0.05, * p<0.1

Table A.6: P90P50 urban and rural

VARIABLES	(22) URBAN Debt (log)	(23) RURAL Debt (log)	(24) URBAN Population with claim	(25) RURAL Population with claim	(26) URBAN Average claim (log)	(27) RURAL Average claim (log)
P90P50 (log)	-0.190	0.310	0.095***	0.115***	0.760	1.332**
	(0.196)	(0.294)	(0.019)	(0.019)	(1.638)	(0.618)
House price (log)	0.548***	0.566***	-0.011***	-0.002	0.381	0.096
	(0.056)	(0.031)	(0.004)	(0.002)	(0.284)	(0.091)
Income (log)	-0.327**	-1.515***	-0.033**	-0.029**	-0.176	0.350
	(0.156)	(0.196)	(0.014)	(0.013)	(1.163)	(0.478)
Immigrants (log)	-0.062*	-0.038	0.007**	-0.004	0.021	-0.093
	(0.031)	(0.032)	(0.003)	(0.003)	(0.180)	(0.102)
Peak age	-0.614	0.111	0.091**	0.131***	-5.438	-0.852
	(0.512)	(0.644)	(0.045)	(0.038)	(3.584)	(1.563)
Population density (log)	0.004	0.024*	0.001	0.003***	0.028	-0.000
	(0.013)	(0.014)	(0.001)	(0.001)	(0.057)	(0.033)
Expectations	0.082***	0.032**	-0.002**	-0.002	-0.031	0.061
	(0.016)	(0.014)	(0.001)	(0.001)	(0.106)	(0.038)
Unemployment	–	–	0.001	0.040	-3.066	-2.495**
			(0.049)	(0.031)	(3.649)	(1.094)
Education	–	–	-0.097***	-0.173***	-0.485	-1.189
			(0.015)	(0.022)	(0.923)	(1.161)
Single households	–	–	-0.009	-0.001	0.477	-0.382
			(0.017)	(0.020)	(1.120)	(0.868)
Sick leave	–	–	-0.032	-0.008	1.830	0.312
			(0.084)	(0.058)	(7.369)	(2.306)
Constant	0.679	15.540***	0.607***	0.361**	10.170	5.062
	(1.458)	(2.294)	(0.167)	(0.167)	(13.470)	(6.120)
Breusch-Pagan	0.080	0.941	0.011	0.000	0.043	0.000
Observations	89	161	86	152	86	152
R-squared	0.877	0.819	0.853	0.671	0.301	0.206

Note: Robust standard errors in parentheses form regression; 24, 25, 26 and 27
*** p<0.01, ** p<0.05, * p<0.1

Table A.7: Robust regressions hypothesis 1

VARIABLES	(28) ALL Household debt (log)	(29) URBAN Household debt (log)	(30) RURAL Household debt (log)
Gini (log)	0.525***	-0.149	0.978***
	(0.138)	(0.159)	(0.253)
House price (log)	0.520***	0.536***	0.508***
	(0.027)	(0.061)	(0.034)
Income (log)	-0.514***	-0.337**	-1.123***
	(0.097)	(0.157)	(0.211)
Immigrants (log)	-0.058**	-0.053	-0.082**
	(0.025)	(0.033)	(0.034)
Peak age	-0.610*	-0.594	0.067
	(0.370)	(0.521)	(0.602)
Population density (log)	-0.011	0.006	0.007
	(0.010)	(0.013)	(0.014)
Expectations	0.051***	0.080***	0.041***
	(0.011)	(0.017)	(0.014)
Constant	4.446***	0.751	12.610***
	(1.096)	(1.505)	(2.265)
Observations	250	89	161
R-squared	0.880	0.863	0.825

Note: Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A.8: Robust regressions hypothesis 2

VARIABLES	(31) ALL Population with claim	(32) URBAN Population with claim	(33) RURAL Population with claim	(34) ALL Average claim (log)	(35) URBAN Average claim (log)	(36) RURAL Average claim (log)
Gini (log)	0.079***	0.076***	0.084***	0.742**	0.877	0.278
	(0.010)	(0.017)	(0.017)	(0.367)	(0.661)	(0.568)
House price (log)	-0.004**	-0.016***	-0.001	0.034	-0.059	0.065
	(0.002)	(0.004)	(0.002)	(0.058)	(0.167)	(0.075)
Income (log)	-0.027***	-0.010	-0.021	0.830***	1.273**	0.413
	(0.008)	(0.014)	(0.014)	(0.270)	(0.538)	(0.472)
Immigrants (log)	-0.003	0.005*	-0.007**	-0.052	-0.212*	0.008
	(0.002)	(0.003)	(0.003)	(0.067)	(0.117)	(0.091)
Peak age	0.057**	0.065	0.067*	-2.298**	-1.324	-2.505*
	(0.025)	(0.043)	(0.039)	(0.896)	(1.694)	(1.314)
Population density (log)	0.002***	0.001	0.003***	0.031	0.080**	0.009
	(0.001)	(0.001)	(0.001)	(0.020)	(0.035)	(0.029)
Expectations	-0.002***	-0.002*	-0.002*	0.034	0.079*	0.031
	(0.001)	(0.001)	(0.001)	(0.024)	(0.046)	(0.033)
Unemployment	0.042*	0.011	0.065**	-1.224	0.960	-1.530
	(0.022)	(0.046)	(0.029)	(0.793)	(1.840)	(0.991)
Education	-0.130***	-0.103***	-0.190***	-0.406	-0.657	0.489
	(0.014)	(0.019)	(0.025)	(0.482)	(0.747)	(0.861)
Single households	0.005	-0.006	0.008	-0.015	-0.078	-0.262
	(0.013)	(0.019)	(0.023)	(0.464)	(0.768)	(0.788)
Sick leave	-0.040	-0.026	-0.021	0.777	2.783	0.931
	(0.050)	(0.090)	(0.065)	(1.773)	(3.553)	(2.191)
Constant	0.544***	0.512***	0.430***	1.907	-3.823	6.392
	(0.097)	(0.169)	(0.160)	(3.442)	(6.711)	(5.410)
Observations	238	86	152	238	86	152
R-squared	0.738	0.830	0.632	0.415	0.595	0.183

Note: Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A.9: Municipality list and omitted observations

Number	Municipality	Type of area	Gini-coefficient	Expectations - regions	Omitted - house prices	Omitted - sick leave
1	BOTKYRKA	Metro	0,369	Big city region	–	–
2	DANDERYD	Metro	0,517	Big city region	–	–
3	EKERÖ	Metro	0,38	Big city region	–	–
4	HANINGE	Metro	0,339	Big city region	–	YES
5	HUDDINGE	Metro	0,375	Big city region	–	–
6	JÄRFÄLLA	Metro	0,362	Big city region	–	–
7	LIDINGÖ	Metro	0,473	Big city region	–	–
8	NACKA	Metro	0,412	Big city region	–	–
9	NORRTÄLJE	Country	0,323	Big city region	–	–
10	NYKVARN	Metro	0,313	Big city region	–	–
11	NYNÄSHAMN	Country	0,332	Big city region	–	–
12	SALEM	Metro	0,342	Big city region	–	–
13	SIGTUNA	Metro	0,361	Big city region	–	–
14	SOLLENTUNA	Metro	0,412	Big city region	–	–
15	SOLNA	Metro	0,369	Big city region	YES	–
16	STOCKHOLM	Metro	0,41	Big city region	–	–
17	SUNDBYBERG	Metro	0,368	Big city region	YES	–
18	SÖDERTÄLJE	Metro	0,375	Big city region	–	–
19	TYRESÖ	Metro	0,354	Big city region	–	–
20	TÄBY	Metro	0,412	Big city region	–	–
21	UPPLANDS-BRO	Metro	0,349	Big city region	–	–
22	UPPLANDS-VÄSBY	Metro	0,351	Big city region	–	–
23	VALLENTUNA	Metro	0,343	Big city region	–	–
24	VAXHOLM	Metro	0,398	Big city region	–	–
25	VÄRMDÖ	City	0,367	Big city region	–	–
26	ÖSTERÅKER	City	0,361	Big city region	–	–
27	ENKÖPING	Country	0,33	Other region	–	–
28	HÅBO	Metro	0,33	Other region	–	–
29	KNIVSTA	Metro	0,343	Other region	–	–
30	TIERP	Country	0,324	Other region	–	–
31	UPPSALA	City	0,393	Other region	–	–
32	ÄLVKARLEBY	City	0,32	Other region	–	–
33	ÖSTHAMMAR	Country	0,312	Other region	–	–
34	ESKILSTUNA	City	0,352	Other region	–	YES
35	FLEN	Country	0,337	Other region	–	–
36	GNESTA	City	0,323	Other region	–	–
37	KATRINEHOLM	Country	0,33	Other region	–	–
38	NYKÖPING	Country	0,325	Other region	–	YES
39	OXELÖSUND	Metro	0,304	Other region	–	–
40	STRÄNGNÄS	Country	0,343	Other region	–	–
41	TROSA	Country	0,33	Other region	–	–

42	VINGÅKER	Country	0,304	Other region	–	–
43	BOXHOLM	Country	0,303	Other region	YES	–
44	FINSPÅNG	Country	0,335	Other region	–	–
45	KINDA	Country	0,313	Other region	–	–
46	LINKÖPING	City	0,39	Other region	–	–
47	MJÖLBY	Country	0,315	Other region	–	–
48	MOTALA	Country	0,323	Other region	–	–
49	NORRKÖPING	City	0,354	Other region	–	–
50	SÖDERKÖPING	City	0,322	Other region	–	–
51	VADSTENA	Country	0,318	Other region	–	–
52	VALDEMARSVIK	Country	0,311	Other region	–	–
53	YDRE	Country	0,314	Other region	YES	–
54	ÅTVIDABERG	Country	0,308	Other region	–	–
55	ÖDESHÖG	Country	0,324	Other region	YES	–
56	ANEBY	Country	0,306	Other region	–	–
57	EKSJÖ	Country	0,316	Other region	–	–
58	GISLAVED	Country	0,302	Other region	–	–
59	GNOSJÖ	Country	0,302	Other region	YES	–
60	HABO	City	0,29	Other region	–	–
61	JÖNKÖPING	City	0,333	Other region	–	–
62	MULLSJÖ	Country	0,298	Other region	–	–
63	NÄSSJÖ	Country	0,315	Other region	–	–
64	SÄVSJÖ	Country	0,316	Other region	–	–
65	TRANÅS	Country	0,327	Other region	–	–
66	VAGGERYD	Country	0,293	Other region	–	–
67	VETLANDA	Country	0,305	Other region	–	–
68	VÄRNAMO	Country	0,309	Other region	–	–
69	ALVESTA	Country	0,318	Other region	–	–
70	LESSEBO	Country	0,318	Other region	–	–
71	LJUNGBY	Country	0,31	Other region	–	–
72	MARKARYD	Country	0,328	Other region	–	–
73	TINGSRYD	Country	0,32	Other region	–	–
74	UPPVIDINGE	Country	0,307	Other region	–	–
75	VÄXJÖ	City	0,346	Other region	–	–
76	ÄLMHULT	Country	0,352	Other region	–	–
77	BORGHOLM	Country	0,32	Other region	–	–
78	EMMABODA	Country	0,326	Other region	–	–
79	HULTSFRED	Country	0,321	Other region	–	–
80	HÖGSBY	Country	0,333	Other region	YES	–
81	KALMAR	City	0,341	Other region	–	–
82	MÖNSTERÅS	Country	0,31	Other region	–	–
83	MÖRBYLÅNGA	Country	0,311	Other region	–	–
84	NYBRO	Country	0,312	Other region	–	–
85	OSKARSHAMN	Country	0,31	Other region	–	–

86	TORSÅS	Country	0,323	Other region	YES	–
87	VIMMERBY	Country	0,3	Other region	–	–
88	VÄSTERVIK	Country	0,318	Other region	–	–
89	GOTLAND	Country	0,325	Other region	–	–
90	KARLSHAMN	Country	0,331	Other region	–	–
91	KARLSKRONA	City	0,342	Other region	–	–
92	OLOFSTRÖM	Country	0,317	Other region	–	–
93	RONNEBY	Country	0,325	Other region	–	–
94	SÖLVESBORG	Country	0,321	Other region	–	–
95	BJUV	City	0,326	Big city region	–	–
96	BROMÖLLA	Country	0,318	Big city region	–	–
97	BURLÖV	Metro	0,365	Big city region	–	–
98	BÅSTAD	Country	0,372	Big city region	–	YES
99	ESLÖV	Country	0,342	Big city region	–	–
100	HELSINGBORG	City	0,387	Big city region	–	–
101	HÄSSLEHOLM	Country	0,337	Big city region	–	–
102	HÖGANÄS	Country	0,37	Big city region	–	–
103	HÖRBY	Country	0,34	Big city region	–	–
104	HÖÖR	City	0,341	Big city region	–	–
105	KLIPPAN	Country	0,335	Big city region	–	–
106	KRISTIANSTAD	City	0,351	Big city region	–	–
107	KÄVLINGE	Metro	0,339	Big city region	–	–
108	LANDSKRONA	Metro	0,369	Big city region	–	–
109	LOMMA	Metro	0,392	Big city region	–	–
110	LUND	Metro	0,441	Big city region	–	–
111	MALMÖ	Metro	0,425	Big city region	–	–
112	OSBY	Country	0,33	Big city region	–	–
113	PERSTORP	Country	0,362	Big city region	–	–
114	SIMRISHAMN	Country	0,343	Big city region	–	–
115	SJÖBO	Country	0,326	Big city region	–	–
116	SKURUP	Metro	0,337	Big city region	–	–
117	STAFFANSTORP	Metro	0,338	Big city region	–	–
118	SVALÖV	City	0,341	Big city region	–	–
119	SVEDALA	Metro	0,325	Big city region	–	–
120	TOMELILLA	Country	0,325	Big city region	–	–
121	TRELLEBORG	Metro	0,34	Big city region	–	–
122	VELLINGE	Metro	0,402	Big city region	–	–
123	YSTAD	Country	0,332	Big city region	–	–
124	ÅSTORP	City	0,338	Big city region	–	–
125	ÄNGELHOLM	Country	0,339	Big city region	–	–
126	ÖRKELLJUNGA	Country	0,338	Big city region	–	–
127	ÖSTRA GÖINGE	Country	0,32	Big city region	–	–
128	FALKENBERG	Country	0,31	Other region	–	–
129	HALMSTAD	City	0,339	Other region	–	–

130	HYLTE	Country	0,319	Other region	–	–
131	KUNGSBACKA	Metro	0,357	Other region	–	–
132	LAHOLM	Country	0,329	Other region	–	–
133	VARBERG	Country	0,322	Other region	–	–
134	ALE	Metro	0,313	Big city region	–	–
135	ALINGSÅS	Country	0,328	Big city region	–	–
136	BENGTSFORS	Country	0,339	Big city region	–	–
137	BOLLEBYGD	Metro	0,312	Big city region	–	–
138	BORÅS	City	0,336	Big city region	–	–
139	DALS-ED	Country	0,338	Big city region	YES	–
140	ESSUNGA	Country	0,314	Big city region	–	–
141	FALKÖPING	Country	0,325	Big city region	–	–
142	FÄRGELANDA	Country	0,311	Big city region	YES	YES
143	GRÄSTORP	City	0,315	Big city region	YES	–
144	GULLSPÅNG	Country	0,317	Big city region	YES	–
145	GÖTEBORG	Metro	0,397	Big city region	–	–
146	GÖTENE	Country	0,303	Big city region	–	–
147	HERRLJUNGA	Country	0,314	Big city region	–	–
148	HJO	Country	0,316	Big city region	–	–
149	HÄRRYDA	Metro	0,342	Big city region	–	–
150	KARLSBORG	Country	0,302	Big city region	–	–
151	KUNGÄLV	Metro	0,327	Big city region	–	–
152	LERUM	City	0,332	Big city region	–	YES
153	LIDKÖPING	Country	0,318	Big city region	–	–
154	LILLA EDET	Country	0,315	Big city region	–	–
155	LYSEKIL	Country	0,325	Big city region	–	–
156	MARIESTAD	Country	0,312	Big city region	–	–
157	MARK	Country	0,311	Big city region	–	–
158	MELLERUD	Country	0,33	Big city region	–	–
159	MUNKEDAL	Country	0,323	Big city region	–	YES
160	MÖLNDAL	Metro	0,348	Big city region	–	–
161	ORUST	Country	0,324	Big city region	–	–
162	PARTILLE	Metro	0,353	Big city region	–	–
163	SKARA	Country	0,327	Big city region	–	–
164	SKÖVDE	City	0,331	Big city region	–	–
165	SOTENÄS	Country	0,329	Big city region	–	–
166	STENUNGSUND	Metro	0,335	Big city region	–	–
167	STRÖMSTAD	Country	0,375	Big city region	–	–
168	SVENLJUNGA	Country	0,309	Big city region	–	–
169	TANUM	Country	0,335	Big city region	–	–
170	TIBRO	Country	0,313	Big city region	–	–
171	TIDAHOLM	Country	0,294	Big city region	–	–
172	TJÖRN	Metro	0,339	Big city region	–	–
173	TRANEMO	Country	0,295	Big city region	–	–

174	TROLLHÄTTAN	City	0,363	Big city region	–	–
175	TÖREBODA	Country	0,324	Big city region	–	–
176	UDDEVALLA	City	0,341	Big city region	–	–
177	ULRICEHAMN	Country	0,308	Big city region	–	–
178	VARA	Country	0,314	Big city region	–	–
179	VÅRGÅRDA	Country	0,307	Big city region	–	–
180	VÄNERSBORG	Country	0,327	Big city region	–	–
181	ÅMÅL	Country	0,34	Big city region	–	–
182	ÖCKERÖ	Metro	0,34	Big city region	–	–
183	ARVIKA	Country	0,323	Forest region	–	–
184	EDA	Country	0,371	Forest region	–	–
185	FILIPSTAD	Country	0,316	Forest region	–	YES
186	FORSHAGA	City	0,317	Forest region	–	–
187	GRUMS	Country	0,329	Forest region	–	–
188	HAGFORS	Country	0,311	Forest region	–	–
189	HAMMARÖ	City	0,326	Forest region	–	–
190	KARLSTAD	City	0,353	Forest region	–	–
191	KIL	City	0,319	Forest region	–	–
192	KRISTINEHAMN	Country	0,332	Forest region	–	–
193	MUNKFORS	Country	0,319	Forest region	–	–
194	STORFORS	Country	0,319	Forest region	YES	–
195	SUNNE	Country	0,335	Forest region	–	YES
196	SÄFFLE	Country	0,338	Forest region	–	–
197	TORSBY	Backcountry	0,332	Forest region	–	–
198	ÅRJÄNG	Country	0,376	Forest region	–	–
199	ASKERSUND	Country	0,305	Other region	–	–
200	DEGERFORS	Country	0,305	Other region	–	–
201	HALLSBERG	Country	0,311	Other region	–	–
202	HÄLLEFORS	Country	0,309	Other region	YES	–
203	KARLSKOGA	Country	0,324	Other region	–	–
204	KUMLA	City	0,305	Other region	–	–
205	LAXÅ	Country	0,302	Other region	–	–
206	LEKEBERG	City	0,3	Other region	–	–
207	LINDESBERG	Country	0,321	Other region	–	–
208	LJUSNARSBERG	Country	0,314	Other region	YES	–
209	NORA	Country	0,32	Other region	–	–
210	ÖREBRO	City	0,356	Other region	–	–
211	ARBOGA	Country	0,327	Other region	–	–
212	FAGERSTA	Country	0,319	Other region	–	–
213	HALLSTAHAMMAR	Country	0,321	Other region	–	YES
214	HEBY	Country	0,322	Other region	–	–
215	KUNGSÖR	Country	0,316	Other region	–	–
216	KÖPING	Country	0,328	Other region	–	–
217	NORBERG	Country	0,319	Other region	YES	–

218	SALA	Country	0,317	Other region	–	–
219	SKINNSKATTEBERG	Country	0,313	Other region	YES	YES
220	SURAHAMMAR	Country	0,307	Other region	–	–
221	VÄSTERÅS	City	0,363	Other region	–	–
222	AVESTA	Country	0,323	Forest region	–	–
223	BORLÄNGE	City	0,333	Forest region	–	–
224	FALUN	City	0,335	Forest region	–	–
225	GAGNEF	Country	0,299	Forest region	–	–
226	HEDEMORA	Country	0,318	Forest region	–	YES
227	LEKSAND	Country	0,32	Forest region	–	–
228	LUDVIKA	Country	0,323	Forest region	–	–
229	MALUNG-SÄLEN	Backcountry	0,306	Forest region	–	–
230	MORA	Country	0,3	Forest region	–	–
231	ORSA	Backcountry	0,328	Forest region	–	–
232	RÄTTVIK	Country	0,304	Forest region	–	–
233	SMEDJEBACKEN	Country	0,303	Forest region	–	–
234	SÄTER	City	0,299	Forest region	–	–
235	VANSBRO	Backcountry	0,315	Forest region	YES	–
236	ÄLVDALEN	Backcountry	0,297	Forest region	YES	–
237	BOLLNÄS	Backcountry	0,314	Forest region	–	–
238	GÄVLE	City	0,346	Forest region	–	–
239	HOFORS	Backcountry	0,295	Forest region	–	–
240	HUDIKSVALL	Backcountry	0,319	Forest region	–	–
241	LJUSDAL	Backcountry	0,304	Forest region	–	–
242	NORDANSTIG	Country	0,304	Forest region	–	–
243	OCKELBO	Country	0,314	Forest region	–	–
244	OVANÅKER	Country	0,291	Forest region	–	–
245	SANDVIKEN	Country	0,337	Forest region	–	–
246	SÖDERHAMN	Country	0,307	Forest region	–	–
247	HÄRNÖSAND	Country	0,318	Forest region	–	–
248	KRAMFORS	Country	0,311	Forest region	–	–
249	SOLLEFTEÅ	Backcountry	0,309	Forest region	–	–
250	SUNDSVALL	City	0,326	Forest region	–	–
251	TIMRÅ	City	0,307	Forest region	–	–
252	ÅNGE	Backcountry	0,305	Forest region	YES	YES
253	ÖRNSKÖLDSVIK	Country	0,309	Forest region	–	–
254	BERG	Backcountry	0,302	Forest region	YES	–
255	BRÄCKE	Backcountry	0,311	Forest region	YES	–
256	HÄRJEDALEN	Backcountry	0,303	Forest region	YES	–
257	KROKOM	Backcountry	0,301	Forest region	–	–
258	RAGUNDA	Backcountry	0,297	Forest region	YES	–
259	STRÖMSUND	Backcountry	0,301	Forest region	YES	–
260	ÅRE	Backcountry	0,326	Forest region	–	–
261	ÖSTERSUND	City	0,32	Forest region	–	–

262	BJURHOLM	Backcountry	0,3	Forest region	YES	–
263	DOROTEA	Backcountry	0,28	Forest region	YES	–
264	LYCKSELE	Backcountry	0,297	Forest region	–	–
265	MALÅ	Backcountry	0,283	Forest region	YES	–
266	NORDMALING	Country	0,304	Forest region	–	–
267	NORSJÖ	Backcountry	0,28	Forest region	YES	–
268	ROBERTSFORS	Country	0,282	Forest region	YES	YES
269	SKELLEFTEÅ	City	0,3	Forest region	–	–
270	SORSELE	Backcountry	0,295	Forest region	YES	YES
271	STORUMAN	Backcountry	0,298	Forest region	YES	–
272	UMEÅ	City	0,354	Forest region	–	–
273	VILHELMINA	Backcountry	0,297	Forest region	YES	–
274	VINDELN	Backcountry	0,291	Forest region	YES	–
275	VÄNNÄS	Backcountry	0,3	Forest region	–	–
276	ÅSELE	Backcountry	0,287	Forest region	YES	–
277	ARJEPLOG	Backcountry	0,298	Forest region	YES	–
278	ARVIDSJAUR	Backcountry	0,28	Forest region	–	–
279	BODEN	Country	0,298	Forest region	–	YES
280	GÄLLIVARE	Backcountry	0,295	Forest region	–	–
281	HAPARANDA	Country	0,323	Forest region	–	YES
282	JOKKMOKK	Backcountry	0,313	Forest region	YES	–
283	KALIX	Country	0,295	Forest region	–	–
284	KIRUNA	Backcountry	0,291	Forest region	–	–
285	LULEÅ	City	0,334	Forest region	–	–
286	PAJALA	Backcountry	0,296	Forest region	YES	–
287	PITEÅ	Country	0,302	Forest region	–	–
288	ÄLVSBYN	Country	0,292	Forest region	–	–
289	ÖVERKALIX	Backcountry	0,282	Forest region	YES	–
290	ÖVERTORNEÅ	Backcountry	0,311	Forest region	YES	–