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Should the lower educated people fear or embrace the influx of high-educated?

A study of the direct and indirect effects of high educated people on the unemployment rate in the Netherlands

Abstract: This paper studies the impact of education on the unemployment rate for all 393 Dutch municipalities, using several regressions to look for two different effects, namely possible spill-over effects and a displacement effect of high educated people. By making a distinction between the total unemployment rate, the unemployment rate among high educated people and the unemployment rate among low educated people, the results show that mostly high educated people benefit by a low unemployment rate. This is in line with the idea that high educated people have the benefits of spill-over effects but do not suffer from a displacement effect. The spill-over and displacement effects seem to appear off-setting for the lower educated people.

Keywords: Education policy; local labour markets

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I. Introduction

Many Dutch municipalities try to attract highly educated people. An increasing number of high educated people should create more job opportunities for low educated people, the argument goes (Marlet & van Woerkens, 2014). Finishing higher education brings many advantages with it. Literature describes many advantages, both for the individual and the society as a whole. When we look at the individual advantages of higher education it is about the skills high educated people possess: they could easier search for a job and have more skills that are demanded by firms. Besides their skills, high educated people have the option to accept a job below their educational level, while low educated people cannot elicit a job offer above their educational level. These theories could lead to the idea that there is a negative impact of the education level on the unemployment rate: the higher the average level of education in a region, the lower the unemployment rate.

Besides the individual advantages, there could be other advantages of high educated people for a region or city. Many Dutch cities argue that high educated people also create opportunities for low educated people. This 'trickle down' effect or spill-over effect tells us that high educated people create jobs for low educated people in different ways (Mazzolari & Ragusa, 2013). Consumption effects of high educated people, who will earn more money, could create jobs for low educated people. Also production effects -low educated people could be more effective by learning skills and working together with high educated people- could create extra jobs, which will decrease the unemployment rate.

There seems to be many advantages of high educated people and it seems a logical policy of many Dutch municipalities to attract them. However, there are other theories which describe the negative side of high educated people: attracting high educated people, without creating extra jobs, could create a displacement effect. This means that the unemployment rate among low educated people will increase instead of decrease.

There is existing empirical literature studying the impact of education on the regional unemployment for different regions. Riddell and Song (2011) find positive individual effects of education for the US labour market, concluding that an additional year of schooling increases the chance of getting a job by 4.7%. Wolbers (2000) finds the same results for the Dutch labour market, when looking for individual effects of education. Besides the individual effects of education, which are very clear, this paper will look for indirect effects of education, as the (positive) consumption or (negative) displacement effect. Shapiro (2006) and Kaplanis (2010) find consumption effects caused by an increase in high educated people. Looking for effects in the Netherlands, Marlet et al. (2015) also find consumption effects, but see another important result: this positive effect will not always lead to a lower unemployment rate among low educated people. This indicates the existence of a displacement effect. However, Marlet et al. focusses mostly on people working below their education level, but do not look for the direct link between the average education level of a municipality and the unemployment rate among low educated people. Besides that, this paper will look for all 393 municipalities instead of the 57 cities Marlet et al. use.

This paper is mostly an addition to the current empirical literature. First the different theories which describe the impact of the education level on the regional unemployment rate will be discussed. Starting with the benefits of high educated people, as more skills, positive consumption and production effects, I will show the benefits of high educated people. Thereafter, the possible

disadvantages like the displacement effect will be discussed. After explaining the different theories, the effect of the education level on the regional unemployment rate will be empirically tested for Dutch municipalities with help of regressions. Using data for all 393 municipalities (2015) provided by CBS, this paper studies the impact of the regional education level on (i) the total unemployment rate, (ii) the unemployment rate among high educated people and (iii) the unemployment rate among low educated people for the years 2003 – 2013. I control for time fixed effects and cross section fixed effects, since there will be natural differences in unemployment rates between different regions and between different time periods.

The basic results show a significant negative impact of the average education level on the total unemployment rate and an even bigger negative impact on the unemployment rate among high educated people. This is in line with the idea that high educated people have individual benefits with respect to their skills and the idea that high educated people benefit from potential spill-over effects but do not suffer from the displacement effect. No significant impact is found for the impact of education on the unemployment rate among low educated people. This indicates that the positive spill-over effects and the negative displacement effects cancel out each other. These results therefore do not support the claim that a higher-educated workforce improves the employment prospect for all workers: attracting high educated people to create jobs for the low educated citizens does not work. Although high educated people could create jobs, this does not mean a lower unemployment rate among low educated people.

This paper is organised as follows. Section II discusses the main theories in the field of education and its impact on job opportunities as a basis for the empirical part. Besides this, it reviews the empirical literature about the impact of education on the unemployment rate. Section III describes the data used, while section IV explains the empirical strategy. Section V reports and discusses the results of the regressions done. The paper ends with a conclusion and summary of the results in section VI.

II. Theoretical Framework

A. Current theories

When we look at the current theories about the link between the level of education and the regional unemployment rate, we could make a distinction between two different possible observations:

1) Within a municipality, higher educated people are more likely to have a job than less educated people
2) Between different municipalities, the proportion of higher educated people could affect the number of less educated people with a job, because of two different effects:
   a. Spill over effect (positive)
   b. Displacement effect (negative)

B. Downward effect of education on unemployment rate

As will be discussed in the literature review (IID), almost all empirical studies find a positive link between the level of education and the regional unemployment rate: this means that people who have finished higher education have better prospects to get a job. The literature provides three possible explanations for this effect of education on the unemployment rate (Elhorst, 2003):

1) Higher educated people have more skills that could help them to get a job: they have more skills that are demanded by firms, especially in a developing economy with technological

progress (Elhorst, 2003). Here it is important that the higher benefits of high educated people through skills outweigh the higher cost of high educated people through wages. Besides possessing skills that firms demand, the skills of higher educated people make it easier for them to search and find a suitable job. The last argument for more skilled workers to get a job is that these people are less prone to layoffs in times of recessions and so will have more job security (Kettunen, 1997).

2) High educated people can accept a job below their educational level, but low educated people cannot elicit a job offer above it: this makes that higher educated people have more possibilities to get a job (Groot & Oosterbeek, 1992).
3) The migration motive: the situation of regions with many low educated people will deteriorate since the lower educated people do not have a motive for migration. They will be uncompetitive in other regional labour markets. This means that the low educated people will stay in their city and firms will move to other regions, causing high unemployment rates. As the high educated people will move from these regions with high unemployment rates to regions with low unemployment rates, it will only worsen the situation. This trend is called a low skill poverty trap. Poor economic performance of a particular region create an outflow of the high educated people to more attractive regions, creating an even worse region with respect to productivity and level of education. This only attracts more low skilled workers and has negative effects on the region and the supply of labour (Mincer, 1991).

As is explained in point 1, the level of education could be a strong determinant of the unemployment rate of individuals, as the level of education shows an important part of the skills a potential employee possesses. So within a country, the distribution of low educated people and high educated could be a good explanation of different regional unemployment rates. However, as discussed in point 2 and 3, there are many more reasons.

Besides the skills needed for jobs, there is another explanation why high educated people are less likely to be unemployed and the lesser duration of unemployment. This explanation is focused on the search behaviour of people. When looking for other jobs, while being employee of a firm is called on-the-job search. The costs of on-the-job search are lower relative to cost of of-the-job search for high educated people. Besides this, higher educated people also are more efficient in obtaining and processing information for possible new jobs and higher educated people search more and more intensively for a high skilled job, according to models written by Jacob Mincer (Mincer, 1991). These three trends with regard to search behaviour could also explain the lower unemployment rate among high educated people.

The low skill poverty trap, discussed in point 3, is an effect of the migration habits of people: higher educated people are more likely to migrate geographically, since this move from one city to another will be compensated with higher wages. As these high educated people will choose for regions with low unemployment rates, there will be a positive inflow of higher educated people, which also attracts companies and firms to move (DaVanzo, 1983).

From above, we can conclude that there is a (theoretical) negative link between the level of education and the unemployment rate. In all cities, higher educated people are more likely to have or to get a job: they have more skills which are demanded by firms, more skills to find a job and have the opportunity to migrate to regions with better career perspectives.

C. Proportion of higher educated affect number of less educated with a job

Before, we have only looked for the effect of education on the unemployment prospects of individual persons. However, between different municipalities, the proportion of higher educated people could affect the number of less educated people with a job. Literature describes two different effects that could influence this difference between education and unemployment rate between different regions:

1) Spill-over effects (positive for low educated people)
2) Displacement effect (negative for low educated people)

To start with possible spill-over effects, the intuition behind this effect is as follows: there is a distinction between (i) people who are consumers in the market of services that substitute for home production activities and (ii) providers of home production activities. Home production activities are usually time intensive services like cleaning, repair services or delivery services. The main idea is that high educated people (and thus high skilled workers) will be consumers of home production services, while low educated people will be providers of these services. The standard prediction in theory is that high educated people do less home production than low educated people, as the opportunity costs of time are higher for them in comparison with low educated people, and that high educated people consume more home goods and services from the market than low educated people. This is a result of the theory of allocation of time (Becker, 1965). Following the theory of Manning (2004) where individuals are equally productive at producing so-called 'home goods' X and a standard good Y, it is possible to see the positive effect of high educated people on the unemployment rate. Assume a world with two types of people (high educated people and low educated people) and two types of goods (a 'standard' good Y made by firms using all kinds of people and a domestic good X made by a time-intensive activity, which can be made by everyone but also can be bought in the market) and the idea that high educated people have higher opportunity costs of time. Besides this, as there will be a competitive labour market, the wage of high educated people will be higher than for low educated people. As high educated people have more skills to produce good Y, all unskilled workers will produce good X with a lower wage. This will lead to the conclusion that high educated people will be buyers of time intensive products, in this case domestic products, and low educated people will be producers and sellers of this product (Mazzolari & Ragusa, 2013). The production of good X (home good) is not a voluntary choice, but will be a real job. Besides the assumptions already made, it is important to see that the level of education has to be a relevant reflection of the level of skills of people. In this theoretical example, it is easy to see that a change in the number of high educated people will affect the number of jobs for low educated people: with a rising number of high educated people, the demand for home production services will also rise and firms need more people in order to meet this demand. This theory is mostly based on possible spending effects of the high educated people, who earn more money, which will help to create jobs for low educated people. Besides the domestic production services mentioned before, you can also think of other jobs as the hotel and catering industry, recreational facilities and personal services. These sectors consist of jobs with low education requirements and an increase in this kind of jobs will provide opportunities especially for low educated people (Ponds et al., 2015). It is important to see that the presence of high educated people could create more jobs, as high skilled workers earn higher wages and consume more services (mostly produced by low educated workers). However, this generates only a higher employment rate and not necessarily a lower unemployment rate. If there is already unemployment, this theory helps

lowering the unemployment rate. Therefore, we assume that there is already involuntary unemployment, for example, because of too high real wages or the existence of Dutch unions.

Besides the positive consumption effects discussed above, there are also possibilities for production effects. High educated people have special knowledge, learning skills and creativity. These skills have direct positive effects in 2 ways: it increases the productivity of other high educated people by working together, but it also increases the productivity of other groups in the labour market. Low educated people also benefit from this knowledge through learning effects and working together with high educated people (Venhorst et al., 2011). However these production effects are considerably stronger at the firm level instead the regional level (Broersma et al., 2015). These productions effects will have a positive influence on the number of jobs available and the demand for low educated people.

An increase in the number of high educated people seems to have a positive effect on the number of jobs for low educated people, if we follow the theory explained above. However, there is also an opposite effect of high educated people living in the region: the so-called displacement effect. As mentioned before, high educated people can fill in jobs below their educational level, but low educated people cannot elicit a job offer above it (Groot & Oosterbeek, 1992). In a labour market with a few jobs for high educated people and many high educated people, these people are forced to work below their original level of education and therefore there will be a displacement effect (Büchel & van Ham, 2003). Another theory about the displacement effect is the job competition model (Thurow, 1976): if we see the labour market as a two-sided market, in which one row of jobs is ranked from high skill level to low skill level and one row of people is ranked based on their qualifications (reflected in their level of education), everyone is trying to get the best job (highest skill level), as these jobs will provide the highest wages. Besides this, employers try to get the best people (highest level of education). As a result of this, the best jobs are linked to the employees with the highest level of education finished (Wolbers, 1998). In a tight labour market, this will not be a problem, since there is a sufficient number of jobs. However, in a labour market with more supply of jobs than demand of jobs, the people with the lowest level of education will have a problem: these people are most likely not to find a job or to remain unemployed. This does not mean that the total unemployment rate of a particular region will change: as the high educated people will take jobs of the low educated people, the unemployment rate will be the same. However it is possible that high educated people will be competitors and create a higher unemployment rate among low educated people.

As we have seen, there could be both positive and negative indirect effects with regard to the link between the level of education and the regional unemployment rate. The current theories do not explain which effect will be stronger, but it seems intuitive to say that the spill-over effect will be stronger for low educated people, as it creates more jobs and that this consumption and productivity effect will nullify the displacement effect.

From the theory discussed, we could derive that a higher level of education affects the unemployment rate in different ways. However, it seems obvious that a higher level of education has many benefits for individuals with respect to job prospects. All these theoretical arguments have led to the following hypothesis, which I would investigate in the next empirical sections for the Netherlands:

- *There will be a negative link between the level of education and the unemployment rate for Dutch municipalities.*

Besides studying this link between the level of education and the regional unemployment rate, this paper aims to study the indirect (spill-over and displacement) effects of education and see how these effects affect the unemployment rate among high educated people and among low educated people. It is unclear if a greater proportion of high educated people has a negative or positive effect on the unemployment rate of low educated people. If we assume that high educated people will be competitors of each other, but also create jobs, there will be a lower unemployment rate among low educated people. However, if there is actually a displacement effect, we will see the opposite: a higher unemployment rate among low educated people. With data of Dutch municipalities, these effects will be studied for the Netherlands.

D. Literature review

Many studies analyse the relationship between education and unemployment. Mincer (1991) finds evidence that higher educated people are less likely to be unemployed and that they are unemployed for a shorter period of time. This is in line with the theories that high educated people possess more skills and can accept a job below their educational level. Nickell (1979) finds the same results as Mincer, concluding that the individuals' level of education has a strong influence on the unemployment rate. An important limitation of Nickell's paper is the interpretation of the results: these results do not tell anything about the changes in the total unemployment rate. Nickell discusses that if high educated people are less likely to be unemployed, low educated people are more likely to be unemployed. Without using the definition, this is clearly the idea of a displacement effect.

When we look at comparisons between countries, there are two important papers. Weber (2002) makes a comparison between 14 European countries and concludes that the duration of education, and so the level of education influences the chance to get a job. Another important conclusion of this paper is about the inverse relationship between the level of education and the unemployment rate: one can imagine that people will study for a longer period of time, when the outlook of the labour market is very bad. Weber states that the choice for a particular level of education will not be influenced by unemployment, while making the (perhaps weak) assumption that the risk to be unemployment is independent of age and level of education. However, a possible correlation between unemployment and the level of education is still possible. This paper will keep in mind this possible inverse causality between unemployment and the level of education, since the regressions could be influenced by this fact. Also Brauns et al. (1999) make a comparison between countries: Germany, the United Kingdom and France. This study is more focused on youth unemployment, but gives some interesting insights. The risk for young people of getting unemployed is strongly related to their level of education: this applies to all 3 countries and the difference between early school-leavers and graduates from higher education is the biggest. This is in line with the discussed advantages for high educated people.

However, these papers do not explain differences inside a country or the regional differences in unemployment rates. An important overview study for regional unemployment differentials has been done by Elhorst (2003). Although Elhorst discusses many different factors of regional unemployment, educational attainment is an important explanatory variable. Education appears to have a negative effect on the unemployment rate, as evidenced by papers Elhorst discusses.

Riddell and Song (2011) study the relationship between education and the unemployment rate at the US labour market. Riddell and Song find that education significantly increases the success of getting re-employed for unemployed workers: graduating from American high school increases the success rate of getting re-employed by 40%. An additional year of schooling increases the chance of getting a job by 4.7%. The paper does not find a significant relationship when looking at the secondary schooling level, but only for higher education. An important implication of Riddell and Song is the statement that education could be used for public policy: their paper provides empirical evidence that education is an instrument against unemployment. Riddell and Song do not take into account the possible negative displacement effect, while other studies (discussed later in this section) make clear this could play an important role.

When we look at empirical research for the Netherlands, an important paper is written by Maarten Wolbers (2000). He investigates the relationship between education and unemployment in the period from 1980 until 1994 and tries to answer the question to what extent unemployment entry and exit rates depend on the level of education. The results are in line with already mentioned European and American research and find that unemployment among people with a lower level of education is significantly higher than unemployment among high educated people. On average, the results are in line with the job competition model (Thurow, 1976).

The studies mentioned before mostly describe the individual effects of education and look for the impact of a higher level of education on the unemployment rate. Looking for possible spill-over effects and displacement effects, the results are mixed. Shapiro (2006) finds a positive impact of an increasing share of high educated people on the number of jobs without requiring education for the United States. Kaplanis (2010) does a similar research for the United Kingdom and he finds that the presence of high educated people in a particular region leads to an increasing demand for low skill services. Besides this result, Kaplanis finds possible spill-over effects of high educated people, although these effects are not very strong.

For the Netherlands, there are three studies of interest looking for possible spill-over effects and displacement effects. Beginning with a study of Koopmanschap and Teulings (1987) who find that unemployment among low educated people is for a large part caused by displacement of high educated people. Koopmanschap and Teulings conclude that education is not the solution to reduce unemployment among low educated people, but extension of employment is necessary. A possibility for this could be the consumption effect of high educated people, who will consume more and create jobs.

More recent research for the Dutch labour market is done by Marlet et al. (2015). They find, with help of a regression for 57 cities in the period 1999 – 2013, a positive link between the number of high educated people and the number of jobs without requiring education. This is in line with the consumption spill-over effect. However, this positive link does not always lead to a lower unemployment rate for low educated people: if cities succeed in attracting more highly educated

people, the number of jobs will increase, but this will not always lead to a lower unemployment rate, as these high educated people could displace low educated people. This is in line with a paper of van Dijk et al. (2013). This paper adds the conclusion that learning effects on the level of companies do not occur when looking at the regional level and that, besides the possibilities for an increase in the number of jobs, wages of low educated people also are higher when there are relatively many high educated people living in the region. Thus, possible production spill-over effects do not occur on a regional level, but at company level concludes van Dijk, Edzes and Hamersma.

This paper will do further research in the Netherlands, with respect to all 393 municipalities (2015) for a more recent time period (2003 – 2013). In addition to increasing the data with respect to municipalities and time period, this paper will make a distinction between the total unemployment rate, the unemployment rate among high educated people and the unemployment rate among low educated people. In this way it is possible to study the different effects (i.e. positive spill-over effects and negative displacement effects) more precisely. As most Dutch cities try to attract high educated people, it is important to know if there are really positive effects for low educated people and if this policy is a good choice.

III. Data

In order to determine the impact of the level of education on the regional unemployment rate and to test the influence of the spill-over effects and the displacement effect, I have collected data on the number of people who have finished a particular level of education and data on the average unemployment rate for all 393 municipalities of the Netherlands (2015) over the period 2003-2013. All this data is freely published by the Dutch *Central Agency for Statistics* (CBS). With the help of CBS StatLine (the database of CBS), it is possible to make a distinction between different levels of education and different municipalities.

A. Level of education

To make a distinction between different levels of education, it is helpful to divide the Dutch population into three groups. The first group is low educated people and includes only people who have finished basic education, VBMO or HAVO/VWO. The second group (middle group) consists of people who have finished a MBO study. The last group (high educated people) consists of people who have completed higher professional education (HBO) or have completed a university degree.[1]

B. Unemployment rate

To look for the regional unemployment rate, there is a distinction between the average unemployment rate in a municipality and the unemployment rate divided by level of education. The

[1] Although CBS uses other definitions, namely the following: (i) low educated people who have finished basic education, VMBO, the first three years of HAVO/VWO or have finished their assistant training (MBO-1). (ii) The second group (middle group) consists of people who have finished the upper years of HAVO/VWO, the basic vocational training (MBO-2), vocational education (MBO-3) and includes people who have finished the middle management or specialist training (MBO-4). (iii) The last group includes people who have completed higher professional education (HBO) or have completed a university degree. However, CBS does not provide data for these groups.

unemployment rate shows the number of unemployed people as a percentage of the total labour force.[2]

C. Sample selection

There have been numerous reforms with regard to the numbers and to the size of the municipalities in the Netherlands during the period 2003 -2013 (CBS, 2014). It is therefore important to use the same list of municipalities for both the level of education and the unemployment rate. However, CBS provides only data about the unemployment rates for the municipalities of 2015, so I will use these 393 municipalities. A list of all municipalities including general information is provided in appendix A.

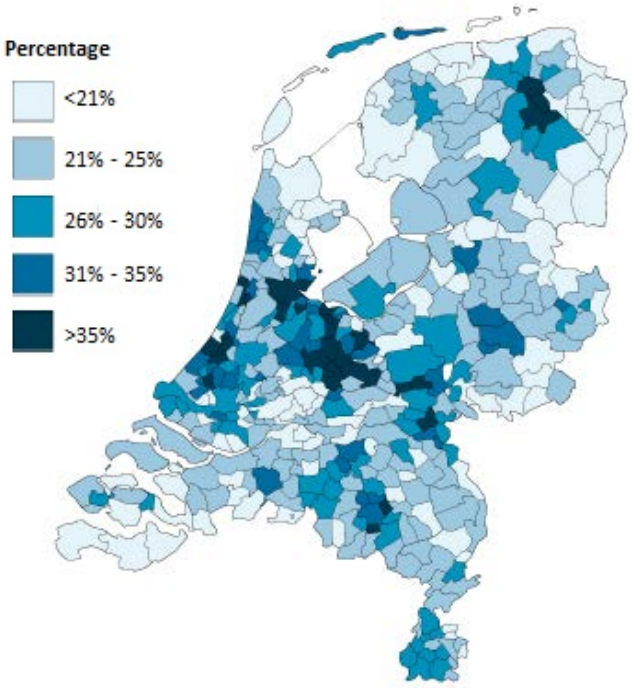

Figure 1: number of high educated people per municipality, 2014 (CBS)

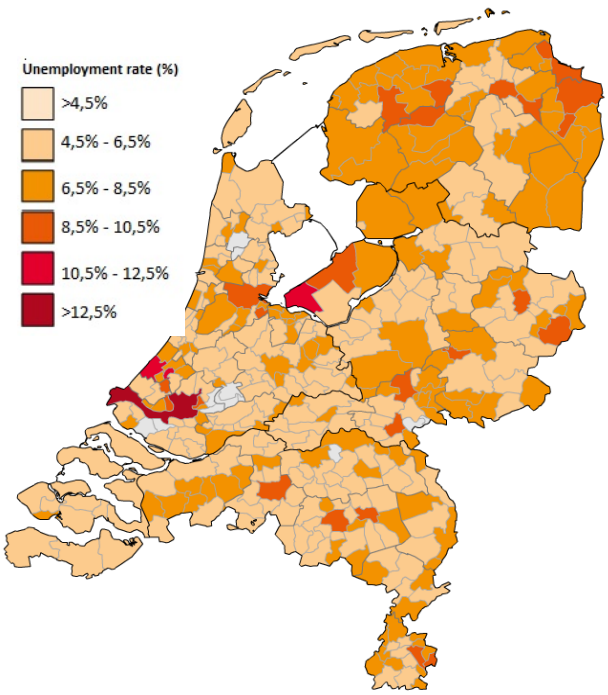

Figure 2: unemployment rate per municipality, 2014 (CBS)

To show the potential impact of education on the regional unemployment, figure 1 shows the number of high educated people as a percentage of the total population per municipality. The darker blue areas represent regions with relatively more high educated people. It is clear that the 'randstad', the area between the centre and the west of the Netherlands and Groningen, in the north of the Netherlands, represent more high educated people. When we look at the unemployment rate, we see almost the oposite: the unemployment rate in the centre and west of the Netherlands as well as Groningen is very low. This data suggests that there is an important link between the level of education and the unemployment rate. However, we must be careful in drawing conclusions from this simple view: figure 1 does not say anything about the average level of education in a municipality

[2] Since I use data of CBS, it is important to know the exact definition of the unemployment rate CBS uses. The unemployment rate shows the unemployed labour force as percentage of the total labour force. The employed labour force consists of all people who are working at least 12 hours a week and receive a wage between the 15 and 65 years old. The unemployed labour force consists of all people who do not have work, but are searching for a job. People who are voluntary unemployed are not included in this data.

and does only take into account people who have completed HBO or an university degree. Therefore, I will do a regression, which will be explained in the next methodology section.

D. Control Variables

As will become clear in the empirical section, I will use a number of control variables. The control variables p*opulation growth, consumer confidence, investments, offices, industry* and *average income* are all based on statistics provided by CBS.

Population growth is measured by calculating the possible surplus or deficit through births, deaths and migration. The value used is measured per 1000 inhabitants per municipality.[3] A negative value displays an outflow of people, while a positive value displays an inflow.

Customer confidence is based on several subquestions , which are answered by over 1600 families. These people are randomly selected and answer question about the economic situation and their expectations about economic developments. The value used in this paper is a ratio between positive and negative answers. A negative value means poor expectations, while a positive value means positive expectations about the future economic developments.

The variable investments is the amount annualy spent on investment and includes fixed investment and import. Properties, machines, but also research and development are coverd by this variable and is measured in millions of euros.

The fourth control variable, offices, measures the number of buildings in a particular municipality used by a company for their operations. The higher this value, the greater the number of offices in a municipality with likely positive impacts on employment.

The fifth control variable measures the number of decling industries as a percentage of total industries. This is calculated by the total number of firms in declining industries divided by the total number of firms in each industry.

The last control variable looks for the average income of a family. This variable, average income, is the disposable income of a family, adjusted for the size and composition. In this way, it is possible to compare different families and different municipalities.

IV. Empirical strategy

The goal of this paper is studying the effect of level of education on the regional unemployment rate. As discussed in the theory section (II), we can distinguish different effects: the direct effects of higher levels of education (better job search, offer a job below educational level, etc.) and the indirect effects of education (spill-over and displacement effects). First I want to study if there is indeed a significant link between the level of education and the regional unemployment rate in the Netherlands. After that, I want to observe how the indirect effects relate to each other. Although it is almost impossible to claim that the spill-over effect or the displacement effect will be stronger, it might be interesting to see if one of these effects dominate the other.

[3] By measuring the relative population growth, it is possible to compare different regions, since larger cities do not have (dis)advantages of population growth.

A. Link between education and regional unemployment rate

To test if there is a negative link between level of education and the unemployment rate, I will use a linear regression model with the following regression:

(1) $$Unemployment\ Rate_{it} = \alpha + \beta_1 * EDU_{it} + \beta_2 * POP\ GROWTH_{it} + \beta_3 * CONFIDENCE_{it} + \beta_4 * INVEST_{it} + \beta_5 * OFFICE_{it} + \beta_6 * INDUSTRY_{it} + INCOME_{it} + \sigma_i + \sigma_t + \varepsilon_{it}$$

Where i indexes a particular municipality and t indexes a particular year (2003-2013). The unemployment rate is explained in the data section and is a representation of a particular municipality in a particular year. The constant term is displayed by α and ε_{it} is an error term. Education (*EDU*) is the most important dependent variable and will be calculated as follows:[4]

$$\frac{Number\ of\ low\ educated * 1 + Number\ of\ middle\ educated * 2 + Number\ of\ high\ educated * 3}{Total\ number\ of\ educated\ people}$$

The variable education will have a value between 1 and 3, where 1 is a very low average level of education and 3 displays the highest average level of education in a municipality. In the result section, the robustness of measuring the average level of education this way will be tested.

In this specification, fixed effects with regard to time and cross-section will be included, since there will be natural differences in unemployment rates between different regions and between different time periods. These effects are indicated by σ_i for municipality fixed effects and σ_t for time fixed effects.

There are some control variables that could influence the regional unemployment rate in a different way then education. Population growth (*POP GROWTH*) could play an important role in this story. Births and deaths, but more important, migration, could affect the labor supply in a region and therefore the unemployment rate. When there are more people searching for a job, while the number of available jobs remains the same, the unemployment rate will increase. By adding a control variable for the population growth, this effect is countered (Elhorst, 2003).

Besides population growth, the consumer confindence (*CONFIDENCE*) in the economy could play an important (indirect) role. Since there is correlation between consumer confidence and spending, this could affect the unemployment rate (CBS, 2007). It may be that more confidence in the regional economy increases the spending of consumers. An increasing demand for products will also increase the demand for workers and therefore there could be a negative link between consumer confidence and the unemployment rate.[5]

[4] I will use this formula as this will give a weighted average for every municipality for every year and makes it possible to compare different municipalities with respect to their level of education. As opposed to merely accounting for the fraction of highly educated workers, this formula also accounts for the difference in educational attainment of lower educated workers.

[5] CBS only provides data with regard to consumer confidence at the provincial level, so every city in a province will have the same value. I expect that this will not be a big problem, since the sizes of provinces are relatively small and the inhabitants will have approximately the same value.

An important factor for potential employment is the number of investments (*INVEST*) made in a region. In general, investments will create new work places, although it is possible that there are investments to replace workers for machines. We could expect that the amount of investments in a region affects the unemployment rate negatively. When there will be invested in (for example) buildings and research, there are people needed to work in this sectors.[6]

A variable that is associated with the number of investments is the number of offices per municipality (*OFFICE*). Someone could imagine that a greater number of offices will create a bigger number of jobs. This variable controls for the number of offices per municipality and per year.

The fifth variable is the share of different industries in a municipality (*INDUSTRY*). Intuitively, we could expect that regions specialided in declining industries, as agriculture, manufacturing and mineral extraction, will have higher (structural) unemployment rates than regions specialised in more 'modern' industries as communication and services (Elhorst, 2003). Therefore, I have included a variable that measures the share of declining industries divided by the total industries.[7]

The last variable (*INCOME*) could affect the unemployment rate in the way that a higher average income could affect spending in a positive way. This indirect effect could create more jobs and lower the unemployment rate.

B. Testing for indirect effects

Besides studying the impact of education on the regional unemployment rate, it is interesting to see the effect of a greater proportion of high educated people in a region. As discussed before, it is unclear if a greater share of high educated people has a negative or positive effect on the unemployment rate. If we assume that high educated people will be competitors of each other with no or almost no positive impact, we will see a higher unemployment rate among high educated people. I will test this using the following regression:

(2) $$Unemployment\ Rate\ High_{it} = \alpha + \beta_1 * EDU_{it} + \beta_2 * POP\ GROWTH_{it} + \beta_3 * CONFIDENCE_{it} + \beta_4 * INVEST_{it} + \beta_5 * OFFICE_{it} + \beta_6 * INDUSTRY_{it} + INCOME_{it} + \sigma_i + \sigma_t + \varepsilon_{it}$$

When there will be almost only competition between high educated people, we will see a higher unemployment rate when the proportion of high educated people is larger. This will be indicated by the variable *EDU* as mentioned before.

Another effect of a large proportion of high educated people will be the positive spill-over effects for low educated people. I will also study if we see mostly the possitive spill-over effects or the more negative displacement effect, using the regression:

(3) $$Unemployment\ Rate\ Low_{it} = a + \beta_1 * EDU_{it} + \beta_2 * POP\ GROWTH_{it} + \beta_3 * CONFIDENCE_{it} + \beta_4 * INVEST_{it} + \beta_5 * OFFICE_{it} + \beta_6 * INDUSTRY_{it} + INCOME_{it} + \sigma_i + \sigma_t + \varepsilon_{it}$$

[6] Again, CBS only provides data only at the COROP level. I use the same reasoning as at point 5.

[7] The declining industries I will take into account are: agriculture, fishing, forestry, industry and mineral extraction. Dividing the number of companies in these industries by the total number of companies will give a share of declining industries.

If the unemployment rate among low educated people will be negative linked with the proportion of high educated people, we could conclude that the spill-over effects are stronger than the displacement effect. The same control variables will be used as in regression 1 and are explained in section *IVA*.

V. Results

A. Effects of education

The results of the first regression, as described in the methodology section, are reported in table 1.
In the most extensive model (1) with time fixed effects and cross section fixed effects, the coefficient estimates all have the expected signs, except the variable for *investments* and *customer confidence*. Although investment was expected to have a negative sign, as it seems intuitive that more investments in a region will lead to more jobs and thus a decreasing unemployment rate, the impact of investment in all the regressions is positive. In the robustness section, I will try to find a possible explanation for this positive sign and do some robustness checks. However, I will still use this variable as it is significant at the 1 percent level and explains a large part of the increasing unemployment rate.

Another important characteristic of the first regression is that the *education* variable, although it has the expected sign, is not significant. The same applies to two other control variables *average income*, and *population growth*. Because of this lack of significant control variables, I will run different regressions, as can be seen from table 1. This will lead to a more precise value of the impact of education and it is possible to use more observations.

The data of the last three control variables, *average income*, *offices* and *industry share* starts in 2007: this explains the difference in the number of observations between the regressions. As these three control variables will make that a big number of observations is not included, I have made model 2, to see what will happen with the other variables if these three control variables are not captured in the model.

Model 2 shows a larger negative value for the education variable and this variable is significant at the 5 percent level. All the control variables are significant and have the expected sign except the variable for *population growth*, which is not significant.

When I omit *population growth* from the regression, since this variable is not significant, we see the last model (3). The values of the control variables remain nearly the same, while the coefficient value of the *education level* becomes slightly more negative. All the variables in model 3 are significant, so the value of the education level is more accurately.[8]

Model 3 makes clear that the educational level has a negative influence on the unemployment rate. It is hard to say something about the absolute value of the education variable, because the education variable is a calculated one, but it is possible to compare this value with the values that will result from the next two regressions.[9]

[8] Because of omitting insignificant variables, the estimation of the impact of education becomes more precisely, as there are no irrelevant variables in the regression.
[9] As described in the methodology part, there will be two more regressions to look for the specific effect of a higher educational level on the unemployment rate for low educated people and high educated people.

Table 1

Dependent variable:	***Total unemployment rate***		
Model	**1**	**2**	**3**
Constant factor	4.1729***	4.6849***	4.6959***
(t-statistic)	(7.4416)	(18.3147)	(18.3610)
Education level	-0.1597	-0.2930**	-0.3004**
	(-0.9811)	(-2.0577)	(-2.1108)
Investment	0.4006***	0.4167***	0.4172***
	(4.6027)	(5.1504)	(5.1550)
Customer Confidence	-0.0004	-0.0104***	-0.0104***
	(-0.0919)	(-2.8666)	(-2.8556)
Population Growth	-0.0011	-0.0012	
	(-1.0235)	(-1.2795)	
Average Income	-0.0046		
	(-0.2554)		
Offices	-1.6178*		
	(-1.6904)		
Industry share	0.0534***		
	(9.0201)		
R^2	0.9590	0.9486	0.9485
Number of observations	2667	3413	3413
Time dummies	Y	Y	Y
Cross section dummies	Y	Y	Y

** significant at the 10 percent level*
*** significant at the 5 percent level*
**** significant at the 1 percent level*

B. Effect for low educated people and high educated people

Besides the impact of the regional education level on the total unemployment rate, I will study the effect on the unemployment rate for low educated people and high educated people separately. As discussed in the theoretical part, we could expect different effects which will have an impact on the unemployment rates. The spill-over effect tells us that a higher level of education has a positive impact on the unemployment rate for low educated people, while the displacement effect will have a negative impact.

The results of regression 2 (as explained in the methodology part) are reported in table 2. As shown by the results of model 1, none of the control variables is significant, except the variable for *industry share*. For the same reason as previously mentioned (increasing the number of observations) I have made model 2. When excluding the control variables *average income*, *offices* and *industry share*, the impact of education level on the unemployment rate for high educated people becomes significant at the ten percent level. Also the control variable *investment* becomes significant and is (again) positive. However, the other two control variables *customer confidence* and *population growth* are still not significant. By using model 3 and 4, I omit both insignificant control variables to get a more accurate coefficient value for the *education level*. When we compare this value with model 3 of table 1, we see that the value for education level is much more negative in this regression. Without drawing conclusions, it seems like the impact of the education level on the unemployment rate for high educated people is much greater than the impact on the total unemployment rate. The value is in fact -0.83 when looking for the impact of education level on the regional unemployment rate for high educated people, while the value is -0.30 when looking for the impact on the total regional unemployment rate.

Table 2

Dependent variable:	*Total unemployment rate (High educated)*			
Model	**1**	**2**	**3**	**4**
Constant factor	4.0026**	4.0725***	4.1896***	4.1960***
(t-statistic)	(2.4591)	(5.1394)	(5.4439)	(5.4535)
Education level	-0.6556	-0.8143*	-0.8274*	-0.8327*
	(-1.2718)	(-1.8747)	(-1.9075)	(-1.9204)
Investment	0.8935	0.9371*	0.9447*	0.9323*
	(1.5831)	(1.7302)	(1.7451)	(1.7233)
Customer Confidence	0.0104	-0.005288		
	(0.9665)	(-0.6229)		
Population Growth	0.0017	-0.001775	-0.0018	
	(0.5486)	(-0.7398)	(-0.7605)	
Average Income	-0.0179			
	(-0.3471)			
Offices	-1.2250			
	(-0.4923)			
Industry share	0.0631***			
	(3.7105)			
R^2	0.8502	0.8373	0.8373	0.8372
Number of observations	1166	1443	1443	1443
Time dummies	Y	Y	Y	Y
Cross section dummies	Y	Y	Y	Y

** significant at the 10 percent level*
*** significant at the 5 percent level*
**** significant at the 1 percent level*

Table 3

Dependent variable:	*Total unemployment rate (Low educated)*			
Model	**1**	**2**	**3**	**4**
Constant factor	5.0594***	7.1457***	7.1488***	7.3637***
(t-statistic)	(3.2360)	(10.6144)	(10.6287)	(11.3412)
Education level	0.1759	-0.2265	-0.2286	-0.2361
	(0.3873)	(-0.6044)	(-0.6107)	(-0.6308)
Investment	0.3599	0.4918**	0.4919**	0.5008**
	(1.4824)	(2.3095)	(2.3110)	(2.3538)
Customer Confidence	-0.0080	-0.0117	-0.0117	
	(-0.6036)	(-1.2228)	(-1.2222)	
Population Growth	0.0004	-0.0003		
	(0.1205)	(-0.1382)		
Average Income	-0.0013			
	(-0.0267)			
Offices	3.6224			
	(1.3572)			
Industry share	0.0667***			
	(4.0434)			
R^2	0.8957	0.8828	0.8828	0.8828
Number of observations	2667	3413	3413	3413
Time dummies	Y	Y	Y	Y
Cross section dummies	Y	Y	Y	Y

** significant at the 10 percent level*
*** significant at the 5 percent level*
**** significant at the 1 percent level*

Besides the impact of the education level on the regional unemployment rate for high educated people, I will look for the possible negative or positive (spill-over and displacement) effects of high educated people on the unemployment rate for low educated people. With help of the results of regression 3, reported in table 3, we could study this effect.

As can be derived from model 1, none of the variables is significant except the variable for *industry share*. To have a model which captures more observations, I have made model 2 again without the control variables *average income*, *offices* and *industry share*. We see that the positive value for education level in model 1 turns into a negative value, although the value is not significant at all. Looking at model 2, we see that the variable *investment* is significant here, but the other control variables are not significant. To look for a better model, I have done two regressions (model 3 and 4) without the insignificant control variables. However, there is one thing remarkable to see: the value of the education level has a positive sign in the models 1 and is insignificant in all the models. Besides this, we see that the value of the education level in model 4 (-0.2361) is much lower than the values shown in table 1 and table 2 (-0.3004 and -0.8327 respectively). Again, without drawing conclusions, it seems like that the effects of a higher average level of regional education has more positive effects for high educated people, than for low educated people.

From the discussed regressions, we could conclude some important things. The results from table 1 are in line with many studies: the average level of education affects the total regional unemployment rate negatively. Model 3 shows a significant negative value for the *education* variable.

Besides the impact of the education level on the total unemployment rate, there are opportunities to make a distinction between the benefits of the average education level for high educated people and low educated people. As described in the theoretical part, the expectation was that the impact of the education level is bigger for high educated people than for low educated people, since high educated people only have the advantages and do not suffer from the displacement effect. Another option is that when high educated people will be competitors of each other and create jobs for low educated people, the impact of high educated people will be bigger for the unemployment rate of low educated people and smaller for high educated people. However when looking at table 2 and 3 (especially model 4) the impact of education is much bigger for the higher educated people, since there is a negative significant value (-0.8327), while I do not find a significant effect of the education level on the unemployment rate for lower educated people. It seems like that high-educated people benefit from the spill-over effects and their skills, while this is not the case for low educated people. The spill-over effects and the displacement effects appear off-setting.

C. Instrumental variable

A potential empirical problem of the regressions done could arise in two ways: (1) there are potential confounders that affect both the education variable and the unemployment rate and (2) the dependent variable, the unemployment rate, could affect the education level. In particular, the last problem could play a role in these regressions. There are theories which describe that a high unemployment rate makes that people continue studying in order to create better job opportunities for themselves. Because the previous regressions give possibly biased results, I have done a regression with an instrumental variable to overcome this endogeneity problem.

The instrumental variable(s) used in this regression will be the average distance to a school that offers VMBO education and a school that offers HAVO/VWO education.[10] These variables give a good indication of the level of education, since a greater distance to a school intuitively leads to a lower level of education. Besides this, the unemployment rate will not affect the distance to a school and the distance to school is likely to affect the unemployment rate only through the level of education. [11]

The first stage of the regression will be as follows:

$$(4) \quad EDU_{it} = \alpha + \beta_1 * DIST\,VMBO_{it} + \beta_2 * DIST\,VWO_{it} + \beta_3 * CONFIDENCE_{it} + \beta_4 * INVEST_{it} + \sigma_i + \sigma_t + \varepsilon_{it}$$

The second stage will be as follows:

$$(5) \quad Unemployment\ Rate_{it} = \alpha + \beta_1 * \widehat{EDU}_{it} + \beta_2 * CONFIDENCE_{it} + \beta_3 * INVEST_{it} + \sigma_i + \sigma_t + \varepsilon_{it}$$

The results of the two-stage least squares regression are reported in the first two columns of table 4. As can be seen from the table, only the distance to a school that offers VMBO-education is significant in the first stage of the regression. When we look at the second stage regression, the value of education has become greater, while the values of both control variables (investment and customer confidence) have decreased.

The value of education with help of the instrumental variable is -5.57, while the value of education using OLS-regression was -0.30. Although this difference is very large, there is an important reason why this is the case. Since the education variable is significant at the ten percent level, the standard error is also large. The instruments used (distance to education) is not very strong and correlates with investments and customer confidence. This creates strong multicollinearity and an inaccurate estimate of the education variable.

Besides the impact of the education level on the total unemployment, I also use the instrumental variable for the regressions (2) and (3) as described in the empirical section. The results of these regressions are reported in column 3 and 4 of table 4. We still see a significant negative value (-12.74) for the impact of the education level on the unemployment rate for higher educated people. The expectation that higher educated people mostly benefit from their skills and spill-over effects are also visible with the help of this instrumental variable. Again, the great value for education could be explained by the big standard error. The impact of investment and customer confidence are both insignificant in this regression.[12] Besides this, the value for investment has decreased.

Looking at the last column (4), we still see an insignificant impact of the education level on the unemployment rate for low educated people. The results in general do not change by using an instrumental variable, although the value for the impact of the education level on the total unemployment rate becomes greater.

[10] This data is also provided by CBS.

[11] These are the main conditions for a good working instrumental variable.

[12] In the original regression with the unemployment rate for high (low) educated people, I did not take customer confidence into account. However, the values of the other variables almost do not change and the significance of the variables remains the same.

Table 4

Column	1	2	3	4
Stage	**(1)**	**(2)**	**(2)** [13]	**(2)** [14]
Dependent variable	**Education level**	**Total unemployment rate**	**Unemployment rate high educated**	**Unemployment rate low educated**
Education level (t-statistic)		-5.5749* (-1.8603)	-12.7432* (-1.8467)	-8.4094 (-1.0140)
Constant factor	1.7623*** (120.7114)	13.8263*** (2.6587)	25.2477** (2.0679)	21.2202 (1.4745)
Investment	-0.0446*** (-4.1042)	0.1628 (1.0685)	0.1360 (0.2145)	0.1094 (0.2595)
Customer Confidence	0.0008 (1.5391)	-0.00492 (-1.1849)	0.0073 (0.7558)	-0.0090 (-0.7796)
Distance VMBO	-0.0050* (-1.8871)			
Distance HAVO/VWO	-0.0017 (-1.3017)			
R^2	0.9169	0.9552	0.8412	0.8878
Number of observations	2987	2987	1282	2987
Time dummies	Y	Y	Y	Y
Cross section dummies	Y	Y	Y	Y

** significant at the 10 percent level*
*** significant at the 5 percent level*
**** significant at the 1 percent level*

D. Robustness checks

The results of the first regressions seem to be in line with the theories discussed. However, as could be concluded from the regressions done with the help of the instrumental variable, these results do not look so strong at all. To see whether these results are valid, I have done several robustness checks to look what will happen with the results.[15]

The first thing that could be called into question is the calculation of the variable *education level*. To see what happens when we calculate this variable in a different way, I have made the same models as reported in table 1, 2 and 3, but with two different variables for the education level: in the first three columns of table 5, the education level is calculated with different weights for middle and high educated people. The results are reported in table 5. Since the number of high educated people is smaller, it is clear that we see a smaller value for the education variable in the columns 1 to 3. More important to see is that the education level is still significant when the dependent variable is the total unemployment rate or the unemployment rate for high educated people. The impact of the average education level on the unemployment rate for low educated people is still insignificant.

[13] As described, it is important to see that the dependent variable in this regression is the unemployment rate among **high educated people** instead of the total unemployment rate.
[14] As described, it is important to see that the dependent variable in this regression is the unemployment rate among **low educated people** instead of the total unemployment rate.
[15] A robustness check for cross section fixed effects on another level than municipalities (i.e. COROP/Province) does not work, since the cross section fixed effect at the municipal level is of such importance, that the value of education switches sign at another level.

Another way to measure the education level is by calculating the percentage of high educated people. I will do the regressions (1), (2) and (3) again, but this time the education variable will be the number of high educated people as a percentage of the total labour force. The columns 4 to 6 of table 5 show the results of the regression. The impact of high educated people on the total unemployment rate is still significant, but the impact on the unemployment rate for high educated people becomes insignificant. This could indicate that there are unemployment problems among the 'middle-educated' people. The result is interesting, but this problem is beyond the scope of this paper. The education variable in column 6 is still insignificant, but that was to be expected and will be in line with theories that low educated people do not benefit from the high educated people in their region.

Table 5

Dependent variable:	***Total unemployment rate***	***Unemployment rate high educated***	***Unemployment rate low educated***	***Total unemployment rate***	***Unemployment rate high educated***	***Unemployment rate low educated***
Column	**1**	**2**	**3**	**4**	**5**	**6**
Constant factor (t-statistic)	4.5355*** (26.5554)	3.6520*** (7.3949)	7.2347*** (17.3800)	4.2983*** (51.5360)	2.9543*** (15.9466)	7.0458*** (48.0058)
Education level[16]	-0.1391** (-2.3292)	-0.3408* (-1.9068)	-0.1068 (-0.6798)			
Percentage high educated people[17]				-0.0081*** (-2.7456)	-0.0122 (-1.4909)	-0.0057 (-0.7400)
Investment	0.4157*** (5.1386)	0.9296* (1.7182)	0.5003* (2.3516)	0.4174*** (5.1656)	0.9397* (1.7361)	0.5019** (2.3608)
Customer Confidence	-0.0106*** (-2.9303)			-0.0107*** (-2.9391)		
R^2	0.9485	0.8371	0.8827	0.9486	0.8827	0.8827
Number of observations	3413	1443	3413	3413	3413	3413
Time dummies	Y	Y	Y	Y	Y	Y
Cross section dummies	Y	Y	Y	Y	Y	Y

** significant at the 10 percent level*
*** significant at the 5 percent level*
**** significant at the 1 percent level*

[16] Instead of using the weights 1, 2 and 3 respectively, I have chosen for 1, 3 and 6 to create a greater difference between the three groups to see if the impact of higher educated people will be bigger. The education variable is measured as follows:

$$\frac{Number\ of\ low\ educated * 1 + Number\ of\ middle\ educated * 3 + Number\ of\ high\ educated * 6}{Total\ number\ of\ educated\ people}$$

[17] Percentage of high educated people is calculated as follows:

$$\frac{number\ of\ HBO + number\ of\ WO}{secondary\ school + MBO + HBO} * 100$$

Besides the OLS regression with help of percentage high educated people as education measure, it is possible to also use this dependent variable in a two-stage least square regression. The regressions (4) and (5) have been done again with another dependent variable in stage 1, namely percentage high educated people. The results of the two-stage least squares regression are reported in table 6. As can be seen from the table, only the distance to a school that offers HAVO/VWO-education is significant in the first stage of the regression.

When we look at the second stage regression, it is striking to see that the impact of education on the total unemployment rate (column 2) is not significant anymore, while the values of both control variables are smaller than in the first regression. Since the education variable is not significant anymore, we could see that there are possible problems with the original (OLS) regression.

We still see a significant negative value (-0.28) for the impact of the education level on the unemployment rate for higher educated people and the impact has grown slightly. The expectation that higher educated people mostly benefit from their skills and spill-over effects are also visible with the help of this instrumental variable. The impact of investment and customer confidence are both insignificant in this regression, while they are significant in the OLS-regression.[18] Besides this, the value for investment has decreased.

Looking at the last column (4), we still see an insignificant impact of the education level on the unemployment rate for low educated people. The results in general do not change by using an instrumental variable, although the impact of the education level on the total unemployment rate becomes insignificant. This may indicate that the benefits for high educated people especially consist of their skills and that spill-over effects are less important.

E. Checking for other control variables

Another idea to test the robustness of the results is using other control variables. As could be seen in table 1, I have not captured three control variables *average income*, *offices* and *industry share,* since I wanted to take as many observations as possible. As this trade-off between the number of observations and the number of control variables is debatable, I also take another model into account. The results of this regression are reported in table 7 and these results are remarkable: the education variable is not significant in any model and this is something we need to take into account. Without further showing the same regressions for unemployment rate among low and high educated people, the results are comparable. The education variable is not significant at all.

Especially model 5 is important, since both control variables are significant in this model. The value for the control variable of investment (0.38) is approximately the same as in the original model (0.42), while the variable for industry share is significant positive. This positive sign was to be expected from my theory used: as the share of declining industries is greater in a particular region, the people working in these industries are more likely to become unemployed. An increase in declining industries will therefore have a positive impact on the unemployment rate.

[18] In the original regression with the unemployment rate for high (low) educated people, I did not take customer confidence into account. However, the values of the other variables almost do not change and the significance of the variables remains the same.

Table 6

Column	1	2	3	4
Stage	(1)	(2)	(2) [19]	(2) [20]
Dependent variable	Education level	Total unemployment rate	Unemployment rate high educated	Unemployment rate low educated
Percentage high educated people (t-statistic)		-0.1091 (-1.5733)	-0.2817* (-1.7748)	-0.1441 (-0.7509)
Constant factor	16.3096*** (22.9364)	5.8143*** (5.4932)	7.6898*** (2.7308)	8.8225*** (3.0123)
Investment	-1.5652*** (-2.9551)	0.2388* (1.8092)	0.2442 (0.3997)	0.2552 (0.6986)
Customer Confidence	-0.0039 (-0.1611)	-0.0095** (-2.5627)	-0.0033 (-0.3680)	-0.0157 (-1.5308)
Distance VMBO	-0.1481 (-1.1457)			
Distance HAVO/VWO	-0.1084* (-1.6810)			
R^2	0.9467	0.9552	0.8411	0.8877
Number of observations	2987	2987	1282	2987
Time dummies	Y	Y	Y	Y
Cross section dummies	Y	Y	Y	Y

** significant at the 10 percent level*
*** significant at the 5 percent level*
**** significant at the 1 percent level*

Table 7

Dependent variable:	*Total unemployment rate*				
Model	1	2	3	4	5
Constant factor (t-statistic)	4.1729*** (7.4416)	4.1830*** (7.6110)	3.9754*** (12.4321)	3.9825*** (12.4591)	3.7817*** (12.8216)
Education level	-0.1597 (-0.9811)	-0.1601 (-0.9841)	-0.1052 (-0.6560)	-0.1124 (-0.7018)	-0.1009 (-0.6305)
Investment	0.4006*** (4.6027)	0.4006*** (4.6039)	0.4112*** (4.7416)	0.4128*** (4.7615)	0.3811*** (4.5098)
Industry share	0.0534*** (9.0201)	0.0534*** (9.0307)	0.0529*** (8.9492)	0.0525*** (8.9110)	0.0507*** (8.7586)
Offices	-1.6178* (-1.6904)	-1.6202* (-1.6940)	-1.5899* (-1.6761)	-1.5408 (-1.6270)	
Population Growth	-0.0011 (-1.0235)	-0.0011 (-1.0245)	-0.0010 (-0.9351)		
Average Income	-0.0046 (-0.2554)	-0.0046 (-0.2578)			
Customer Confidence	-0.0004 (-0.0919)				
R^2	0.9590	0.9590	0.9589	0.9589	0.9589
Number of observations	2667	2667	2670	2670	2670
Time dummies	Y	Y	Y	Y	Y
Cross section dummies	Y	Y	Y	Y	Y

** significant at the 10 percent level*
*** significant at the 5 percent level*
**** significant at the 1 percent level*

[19] As described, it is important to see that the dependent variable in this regression is the unemployment rate among **high educated people** instead of the total unemployment rate.
[20] As described, it is important to see that the dependent variable in this regression is the unemployment rate among **low educated people** instead of the total unemployment rate.

F. Interpretation and limitations

In most regressions, there is a negative significant impact of education on the total unemployment rate. This is in line with the theories that high educated people have more skills, could accept a job below their educational level and easier find a job. Looking for the impact of education on the unemployment rate among high educated people, the variable is in most cases also significant, except when the dependent variable is the percentage high educated people, instead of the calculated average education variable. The impact is generally greater for higher education than for the total unemployment. This is also in line with the expectations, since high educated people benefit from possible spill-over effects, but do not suffer from potential displacement effects. In no regression, I find a significant impact of education on the unemployment rate among low educated people. The positive spill-over effects and negative displacements effects appear to be off-setting for low educated people.

However the results are not very robust, since the inclusion of some control variables influences the significance of the education variable. When I choose to maximize the number of observations, as in table 1, 2 and 3, the education variable is significant when looking for the total unemployment rate and the unemployment rate among high educated people. However, when creating a model with the 'most' significant control variables, as in table 7, the education variable is not significant at all. Looking for the control variables used, most variables have the expected sign: customer confidence has a negative impact on the unemployment rate, since one could expect that a higher customer confidence creates more spending and more jobs. Industry share has a positive impact, because of the higher probability of job loss. The control variable investment is positive, which is against the expectations. A possible reason for this could be that municipalities with a large labour force have, on average, a lower unemployment rate. When scaling the investment variable, by dividing the total amount of investment by the total labour force, the value of investment could be lower in municipalities with a lower unemployment rate. Besides this, it is also possible that there are investments done to replace workers for machines, causing a higher unemployment rate.

Besides the lack of robustness, there are some limitations of the results. There are possibilities for an endogeneity bias. With help of the instrumental variable 'distance to education' I have tried to overcome this problem, but the instrument used is not very strong at all. One possible explanation for this is the time period: the average distance to education has potential delayed effects on the education level. While I use a time period of ten years, this effect occurs possibly later than that.

Another important limitation is the possibility for working illegal: especially in the industries for lower educated people, many individuals are working illegal. Because these people are officially registered as unemployed, the results do not show a lower unemployment rate among low educated people. It is possible that more low educated people have a job because of spill-over effects, although we do not see this, because of the lack of official data. This may indicate that the spill-over effects are stronger than the displacement effect, without seeing this in the results. However, it could be questioned if municipalities try to attract high educated people to create more illegal work.

VI. Conclusion

The aim of this paper has been to empirically study the effect of education in a municipality on the unemployment rate. Different theories are discussed to look for the potential effects of the level of education of the workforce. High educated individuals have benefits from their education level, as they possess more skills, can accept a job below their educational level and have more skills to find a job. Besides this, high educated people could bring advantages with them: high educated people will mostly be consumers of home production services and consume more of these products. This will create jobs in these markets which can be filled by less educated people (Manning, 2004). On the other hand, higher educated people also cause disadvantages. When the number of jobs is limited, an increase in the number of high educated people will cause a displacement effect for the low educated people in a city or municipality (Thurow, 1976). This paper has studied (i) the impact of the education level on the total unemployment and (ii) which indirect effect will be stronger (i.e. the positive spill-over effects or the negative displacement effect) by looking at the unemployment rate for low educated and high educated people.

To empirically study the impact of education, data of the CBS is collected for all 393 municipalities in the Netherlands over the years 2003 – 2013. In line with the theory that high educated individuals have advantages, the regressions mostly show a significant negative impact of education on the total unemployment rate, while controlling for time and cross section fixed effects. However, the results are not very robust, as the choice of control variables influences the significance of the impact of education. When looking for the indirect effects of education, we see that the impact of education on the unemployment rate among high educated people is significant in most cases, while the impact on the unemployment rate among low educated people will never be significant. This indicates two things: because high educated people do not suffer from the displacement effect, but benefit from the spill-over effects, the impact of education on the unemployment rate among high educated people will be bigger for them. This is completely in line with the results. Besides this, since low educated people suffer from the displacement effect, we expect a smaller impact for them. This is also in line with the results. As the results are not significant, this means that the spill-over effects and displacement effect appear off-setting.

These results therefore do not support the claim that a higher-educated workforce improves the employment prospect for all workers: attracting high educated people to create jobs for the low educated citizens does not work. Although high educated people could create jobs, this does not mean a lower unemployment rate among low educated people. A potential reason for this is that people work below their education level and displace low educated people of the labour market.

Besides this, the results also do not show a negative effect of attracting high educated people for the unemployment of lower educated people. Important to see is that this study does not say that attracting higher educated people in itself is a bad idea, but it is not clear that there are positive effects for lower educated citizens with regard to the unemployment rate among low educated people.

For further research, looking for a stronger instrumental variable is a good option: to overcome the possible endogeneity question, a strong(er) instrumental variable could be a good idea. Besides this, it is also a good idea to look for other (control) variables. Future research could possibly look at the reintegration projects different municipalities provide. Since CBS started a project in 2014 to keep track of the costs and data for this purpose, it was not possible to take this information into account in this study, but it could function as possible control variable or to help explaining the unemployment rate. Besides this, it is also an option to look at the different industries and the increase in the number of jobs compared to an increase in the number of high educated people. In this way, it is possible to look where the displacement effects occur and see which jobs will be created by an increase in the number of high educated people

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A. Appendix

Regions	Period	Number of citizens	Number of citizens per km²	km²
Aa en Hunze	**2015**	25203	91	278,88
Aalburg	**2015**	12922	256	53,17
Aalsmeer	**2015**	31077	1524	32,29
Aalten	**2015**	26904	279	97,05
Achtkarspelen	**2015**	27983	274	103,98
Alblasserdam	**2015**	19845	2262	10,06
Albrandswaard	**2015**	25148	1153	23,76
Alkmaar	**2015**	107106	969	117,35
Almelo	**2015**	72291	1074	69,41
Almere	**2015**	196932	1523	248,77
Alphen aan den Rijn	**2015**	107396	849	132,5

Alphen-Chaam	**2015**	9753	105	93,52
Ameland	**2015**	3590	61	268,5
Amersfoort	**2015**	152481	2427	63,86
Amstelveen	**2015**	87162	2104	44,08
Amsterdam	**2015**	821752	4954	219,49
Apeldoorn	**2015**	158099	465	341,15
Appingedam	**2015**	12011	505	24,58
Arnhem	**2015**	152293	1555	101,54
Assen	**2015**	67165	820	83,45
Asten	**2015**	16559	236	71,34
Baarle-Nassau	**2015**	6599	87	76,29
Baarn	**2015**	24406	751	33,01
Barendrecht	**2015**	47521	2387	21,73
Barneveld	**2015**	54703	311	176,66
Bedum	**2015**	10441	234	44,96
Beek (L.)	**2015**	16214	771	21,03
Beemster	**2015**	8903	126	72,07
Beesel	**2015**	13511	480	29,15
Bellingwedde	**2015**	9154	84	110,09
Bergeijk	**2015**	18209	180	101,75
Bergen (L.)	**2015**	13152	127	108,5
Bergen (NH.)	**2015**	30005	309	120,23
Bergen op Zoom	**2015**	66320	826	93,13
Berkelland	**2015**	44364	172	260,53
Bernheze	**2015**	29729	331	90,41
Best	**2015**	28737	838	35,1
Beuningen	**2015**	25282	579	47,09
Beverwijk	**2015**	40182	2194	20,09
het Bildt	**2015**	10592	115	116,48
De Bilt	**2015**	42169	636	67,13
Binnenmaas	**2015**	28656	413	75,57
Bladel	**2015**	19869	264	75,62
Blaricum	**2015**	9312	835	15,56
Bloemendaal	**2015**	22256	560	45,23
Bodegraven-Reeuwijk	**2015**	33208	438	88,64
Boekel	**2015**	10119	293	34,52
Ten Boer	**2015**	7452	164	45,73
Borger-Odoorn	**2015**	25502	93	277,89
Borne	**2015**	21992	846	26,16
Borsele	**2015**	22568	159	194,52
Boxmeer	**2015**	28342	254	113,84
Boxtel	**2015**	30337	476	64,85
Breda	**2015**	180937	1435	128,68
Brielle	**2015**	16467	597	31,14
Bronckhorst	**2015**	36726	130	286,42

Brummen	**2015**	20983	250	85,01
Brunssum	**2015**	28656	1666	17,34
Bunnik	**2015**	14662	396	37,57
Bunschoten	**2015**	20647	678	34,81
Buren	**2015**	26117	195	142,92
Bussum	**2015**	32870	4066	8,15
Capelle aan den IJssel	**2015**	66478	4676	15,4
Castricum	**2015**	34361	694	60,4
Coevorden	**2015**	35535	120	299,69
Cranendonck	**2015**	20542	269	78,05
Cromstrijen	**2015**	12784	235	70,33
Cuijk	**2015**	24649	481	57,07
Culemborg	**2015**	27560	937	31,14
Dalfsen	**2015**	27677	168	166,52
Dantumadiel	**2015**	19059	223	87,53
Delft	**2015**	101030	4425	24,06
Delfzijl	**2015**	25409	191	227,5
Deurne	**2015**	31765	272	118,36
Deventer	**2015**	98540	751	134,33
Diemen	**2015**	26666	2224	14,04
Dinkelland	**2015**	25928	148	176,83
Doesburg	**2015**	11355	982	12,96
Doetinchem	**2015**	56484	714	79,66
Dongen	**2015**	25395	867	29,74
Dongeradeel	**2015**	23983	144	266,92
Dordrecht	**2015**	118899	1508	99,47
Drechterland	**2015**	19294	327	80,59
Drimmelen	**2015**	26703	278	119,43
Dronten	**2015**	40363	121	423,89
Druten	**2015**	18294	485	42,46
Duiven	**2015**	25548	753	35,19
Echt-Susteren	**2015**	31947	310	104,62
Edam-Volendam	**2015**	29087	1785	24,78
Ede	**2015**	111575	351	318,62
Eemnes	**2015**	8807	284	33,7
Eemsmond	**2015**	15770	83	543,35
Eersel	**2015**	18347	222	83,33
Eijsden-Margraten	**2015**	24967	322	78,41
Eindhoven	**2015**	223209	2546	88,87
Elburg	**2015**	22843	358	65,91
Emmen	**2015**	107775	321	346,26
Enkhuizen	**2015**	18345	1446	116,25
Enschede	**2015**	158553	1125	142,72
Epe	**2015**	32214	206	157,37
Ermelo	**2015**	26190	306	87,33

Etten-Leur	**2015**	42503	768	55,92
Ferwerderadiel	**2015**	8738	89	133,18
Franekeradeel	**2015**	20328	198	109,17
De Friese Meren	**2015**	51213	146	549,1
Geertruidenberg	**2015**	21574	810	29,64
Geldermalsen	**2015**	26323	264	101,73
Geldrop-Mierlo	**2015**	38879	1254	31,39
Gemert-Bakel	**2015**	29513	241	123,34
Gennep	**2015**	17280	363	50,42
Giessenlanden	**2015**	14464	227	65,11
Gilze en Rijen	**2015**	26065	398	65,66
Goeree-Overflakkee	**2015**	48206	185	422,35
Goes	**2015**	37153	401	101,92
Goirle	**2015**	23014	547	42,35
Gorinchem	**2015**	35338	1872	21,93
Gouda	**2015**	71105	4222	18,11
Grave	**2015**	12840	472	28,03
's-Gravenhage (gemeente)	**2015**	514861	6289	98,13
Groesbeek	**2015**	34258	396	93,31
Groningen (gemeente)	**2015**	200336	2559	83,75
Grootegast	**2015**	12123	140	87,74
Gulpen-Wittem	**2015**	14497	198	73,36
Haaksbergen	**2015**	24307	232	105,5
Haaren	**2015**	13523	234	58,56
Haarlem	**2015**	156645	5360	32,09
Haarlemmerliede en Spaarnwoude	**2015**	5574	289	21,19
Haarlemmermeer	**2015**	144152	807	185,13
Halderberge	**2015**	29484	396	75,21
Hardenberg	**2015**	59577	191	317,15
Harderwijk	**2015**	45776	1185	48,27
Hardinxveld-Giessendam	**2015**	17802	1052	19,35
Haren	**2015**	18924	416	50,73
Harlingen	**2015**	15779	632	387,67
Hattem	**2015**	11821	512	24,16
Heemskerk	**2015**	39138	1438	31,68
Heemstede	**2015**	26480	2874	9,64
Heerde	**2015**	18512	235	80,42
Heerenveen	**2015**	50141	264	198,16
Heerhugowaard	**2015**	53554	1397	39,99
Heerlen	**2015**	87500	1946	45,53
Heeze-Leende	**2015**	15477	149	105,04
Heiloo	**2015**	22553	1205	19,01
Den Helder	**2015**	56483	1253	178,8
Hellendoorn	**2015**	35622	258	138,99

Hellevoetsluis	**2015**	38882	1232	46,27
Helmond	**2015**	89718	1686	54,75
Hendrik-Ido-Ambacht	**2015**	29156	2750	11,9
Hengelo (O.)	**2015**	81059	1331	61,83
's-Hertogenbosch	**2015**	150889	1364	118,07
Heumen	**2015**	16383	411	41,54
Heusden	**2015**	43132	547	81,22
Hillegom	**2015**	21101	1635	13,47
Hilvarenbeek	**2015**	15042	158	96,51
Hilversum	**2015**	87161	1911	46,35
Hof van Twente	**2015**	34917	164	215,41
Hollands Kroon	**2015**	47546	133	662,2
Hoogeveen	**2015**	54860	430	129,25
Hoogezand-Sappemeer	**2015**	34334	515	72,99
Hoorn	**2015**	71880	3530	53,46
Horst aan de Maas	**2015**	41661	221	191,92
Houten	**2015**	48637	882	58,99
Huizen	**2015**	41315	2614	23,32
Hulst	**2015**	27360	136	251,82
IJsselstein	**2015**	34061	1614	21,68
Kaag en Braassem	**2015**	25844	408	72,24
Kampen	**2015**	51432	362	161,79
Kapelle	**2015**	12545	338	49,63
Katwijk	**2015**	63633	2593	31,15
Kerkrade	**2015**	46524	2122	22,15
Koggenland	**2015**	22426	279	84,08
Kollumerland en Nieuwkruisland	**2015**	12835	117	116,35
Korendijk	**2015**	10778	141	100,47
Krimpen aan den IJssel	**2015**	28970	3773	8,95
Krimpenerwaard	**2015**	54208	362	161,31
Laarbeek	**2015**	21913	396	56,17
Landerd	**2015**	15290	217	70,71
Landgraaf	**2015**	37456	1524	24,67
Landsmeer	**2015**	10823	480	26,5
Langedijk	**2015**	27287	1138	27,03
Lansingerland	**2015**	58133	1071	56,37
Laren (NH.)	**2015**	10857	875	12,41
Leek	**2015**	19478	308	64,28
Leerdam	**2015**	20568	609	34,42
Leeuwarden	**2015**	107691	697	170,23
Leeuwarderadeel	**2015**	10221	250	41,46
Leiden	**2015**	121562	5542	23,27
Leiderdorp	**2015**	26853	2325	12,28
Leidschendam-Voorburg	**2015**	73979	2264	35,62
Lelystad	**2015**	76418	331	765,45

Leudal	**2015**	36244	223	164,91
Leusden	**2015**	29062	496	58,89
Lingewaal	**2015**	11079	220	54,49
Lingewaard	**2015**	45788	737	69,14
Lisse	**2015**	22539	1436	16,05
Littenseradiel	**2015**	10879	83	132,64
Lochem	**2015**	33244	156	215,94
Loon op Zand	**2015**	22960	458	50,71
Lopik	**2015**	14099	186	78,98
Loppersum	**2015**	10140	91	111,99
Losser	**2015**	22467	227	99,62
Maasdriel	**2015**	24185	366	75,46
Maasgouw	**2015**	23766	519	58,12
Maassluis	**2015**	32201	3792	10,12
Maastricht	**2015**	122397	2158	60,13
De Marne	**2015**	10157	60	240,33
Marum	**2015**	10311	160	64,89
Medemblik	**2015**	43604	359	257,56
Meerssen	**2015**	19063	704	27,7
Menameradiel	**2015**	13612	198	70,03
Menterwolde	**2015**	12197	152	81,62
Meppel	**2015**	32799	590	57,03
Middelburg (Z.)	**2015**	47613	982	53,04
Midden-Delfland	**2015**	18709	395	49,38
Midden-Drenthe	**2015**	33284	98	345,87
Mill en Sint Hubert	**2015**	10831	207	53,17
Moerdijk	**2015**	36816	231	184,03
Molenwaard	**2015**	28993	245	126,48
Montferland	**2015**	35150	333	106,64
Montfoort	**2015**	13672	363	38,2
Mook en Middelaar	**2015**	7762	446	18,81
Muiden	**2015**	6249	432	36,49
Naarden	**2015**	17209	804	32,9
Neder-Betuwe	**2015**	22728	379	67,46
Nederweert	**2015**	16776	168	101,78
Neerijnen	**2015**	12038	182	72,9
Nieuwegein	**2015**	61264	2592	25,65
Nieuwkoop	**2015**	27114	344	91,16
Nijkerk	**2015**	40870	589	72,04
Nijmegen	**2015**	170681	3183	57,6
Nissewaard	**2015**	85121	1020	98,73
Noord-Beveland	**2015**	7433	87	121,51
Noordenveld	**2015**	31137	155	205,32
Noordoostpolder	**2015**	46479	101	595,42
Noordwijk	**2015**	25604	721	51,52

Noordwijkerhout	**2015**	16063	711	23,42
Nuenen, Gerwen en Nederwetten	**2015**	22620	671	33,94
Nunspeet	**2015**	26744	208	129,53
Nuth	**2015**	15495	468	33,13
Oegstgeest	**2015**	22997	3151	7,97
Oirschot	**2015**	18079	178	102,84
Oisterwijk	**2015**	25732	403	65,13
Oldambt	**2015**	38420	169	295,96
Oldebroek	**2015**	23001	236	98,84
Oldenzaal	**2015**	32120	1490	21,95
Olst-Wijhe	**2015**	17839	156	118,37
Ommen	**2015**	17341	96	182,01
Onderbanken	**2015**	7866	372	21,24
Oost Gelre	**2015**	29533	269	110,12
Oosterhout	**2015**	53793	753	73,09
Ooststellingwerf	**2015**	25617	114	226,11
Oostzaan	**2015**	9187	796	16,08
Opmeer	**2015**	11301	272	41,94
Opsterland	**2015**	29859	133	227,64
Oss	**2015**	89799	550	170,93
Oud-Beijerland	**2015**	23702	1265	19,61
Oude IJsselstreek	**2015**	39558	290	137,95
Ouder-Amstel	**2015**	13289	551	25,78
Oudewater	**2015**	9924	254	40,1
Overbetuwe	**2015**	46833	429	115,08
Papendrecht	**2015**	32188	3424	10,79
Peel en Maas	**2015**	43448	273	161,35
Pekela	**2015**	12678	258	50,2
Pijnacker-Nootdorp	**2015**	51203	1371	38,62
Purmerend	**2015**	79611	3428	24,56
Putten	**2015**	24377	286	87,5
Raalte	**2015**	36603	214	172,29
Reimerswaal	**2015**	22058	216	242,42
Renkum	**2015**	31408	683	47,23
Renswoude	**2015**	4976	270	18,51
Reusel-De Mierden	**2015**	12774	164	78,66
Rheden	**2015**	43625	534	84,35
Rhenen	**2015**	19308	459	43,76
Ridderkerk	**2015**	45149	1904	25,26
Rijnwaarden	**2015**	10912	275	48,11
Rijssen-Holten	**2015**	37830	402	94,38
Rijswijk (ZH.)	**2015**	48216	3431	14,49
Roerdalen	**2015**	20699	235	88,79
Roermond	**2015**	57005	937	71,05
De Ronde Venen	**2015**	42588	425	116,98

Roosendaal	**2015**	76874	722	107,16
Rotterdam	**2015**	623652	2986	324,16
Rozendaal	**2015**	1509	54	27,92
Rucphen	**2015**	22233	345	64,48
Schagen	**2015**	46137	275	187,28
Scherpenzeel	**2015**	9522	691	13,81
Schiedam	**2015**	76869	4270	19,86
Schiermonnikoog	**2015**	926	25	199,07
Schijndel	**2015**	23543	567	41,66
Schinnen	**2015**	12992	540	24,12
Schouwen-Duiveland	**2015**	33821	147	488,21
Simpelveld	**2015**	10844	676	16,03
Sint Anthonis	**2015**	11612	117	99,76
Sint-Michielsgestel	**2015**	28395	486	59,34
Sint-Oedenrode	**2015**	17937	278	64,94
Sittard-Geleen	**2015**	93724	1186	80,58
Sliedrecht	**2015**	24758	1929	14,01
Slochteren	**2015**	15583	103	158,87
Sluis	**2015**	23747	85	307,16
Smallingerland	**2015**	55635	473	126,17
Soest	**2015**	45454	983	46,43
Someren	**2015**	18695	233	81,5
Son en Breugel	**2015**	16344	630	26,51
Stadskanaal	**2015**	32610	277	119,94
Staphorst	**2015**	16421	122	135,69
Stede Broec	**2015**	21498	1478	16,37
Steenbergen	**2015**	23638	161	159,14
Steenwijkerland	**2015**	43219	149	321,59
Stein (L.)	**2015**	25134	1183	22,8
Stichtse Vecht	**2015**	63943	662	106,82
Strijen	**2015**	8716	173	57,7
Súdwest-Fryslân	**2015**	84164	185	838,71
Terneuzen	**2015**	54577	218	317,76
Terschelling	**2015**	4827	58	673,99
Texel	**2015**	13581	84	463,16
Teylingen	**2015**	35646	1249	33,49
Tholen	**2015**	25440	173	254
Tiel	**2015**	41590	1262	35,51
Tilburg	**2015**	211648	1805	119,15
Tubbergen	**2015**	21142	144	147,44
Twenterand	**2015**	33874	319	108,14
Tynaarlo	**2015**	32570	227	147,7
Tytsjerksteradiel	**2015**	31957	214	161,41
Uden	**2015**	41089	613	67,53
Uitgeest	**2015**	13291	694	22,29

Uithoorn	**2015**	28731	1575	19,42
Urk	**2015**	19705	1712	109,91
Utrecht (gemeente)	**2015**	334176	3545	99,21
Utrechtse Heuvelrug	**2015**	48183	364	134,09
Vaals	**2015**	9694	406	23,9
Valkenburg aan de Geul	**2015**	16618	452	36,92
Valkenswaard	**2015**	30234	551	56,5
Veendam	**2015**	27695	364	78,68
Veenendaal	**2015**	63440	3253	19,72
Veere	**2015**	21926	165	206,62
Veghel	**2015**	37754	483	78,92
Veldhoven	**2015**	44166	1392	31,93
Velsen	**2015**	67166	1500	63,17
Venlo	**2015**	100536	806	128,99
Venray	**2015**	43202	264	165
Vianen	**2015**	19632	500	42,39
Vlaardingen	**2015**	71645	3031	26,69
Vlagtwedde	**2015**	16212	97	170,56
Vlieland	**2015**	1103	31	315,8
Vlissingen	**2015**	44485	1301	344,84
Voerendaal	**2015**	12397	393	31,52
Voorschoten	**2015**	25150	2254	11,56
Voorst	**2015**	23913	194	126,47
Vught	**2015**	25853	772	34,44
Waalre	**2015**	16874	754	22,66
Waalwijk	**2015**	46713	723	67,65
Waddinxveen	**2015**	25657	917	29,4
Wageningen	**2015**	37786	1240	32,36
Wassenaar	**2015**	25731	505	62,4
Waterland	**2015**	17143	329	115,66
Weert	**2015**	48914	468	105,54
Weesp	**2015**	18348	895	21,83
Werkendam	**2015**	26452	253	121,76
West Maas en Waal	**2015**	18570	240	85,21
Westerveld	**2015**	19085	69	282,74
Westervoort	**2015**	14992	2137	7,84
Westland	**2015**	104302	1311	90,74
Weststellingwerf	**2015**	25525	116	228,45
Westvoorne	**2015**	14083	265	97,48
Wierden	**2015**	23874	252	95,39
Wijchen	**2015**	40886	617	69,56
Wijdemeren	**2015**	23176	484	76,36
Wijk bij Duurstede	**2015**	23222	488	50,25
Winsum	**2015**	13774	136	102,53
Winterswijk	**2015**	28977	210	138,82

Woensdrecht	**2015**	21644	236	91,97
Woerden	**2015**	50631	567	92,92
De Wolden	**2015**	23661	105	226,35
Wormerland	**2015**	15740	407	45,18
Woudenberg	**2015**	12487	342	36,82
Woudrichem	**2015**	14388	292	51,7
Zaanstad	**2015**	151418	2048	83,24
Zaltbommel	**2015**	27358	344	89,04
Zandvoort	**2015**	16692	520	43,97
Zederik	**2015**	13717	186	76,5
Zeevang	**2015**	6306	166	55,21
Zeewolde	**2015**	21894	88	268,86
Zeist	**2015**	61641	1271	48,65
Zevenaar	**2015**	32265	606	58
Zoetermeer	**2015**	124025	3592	37,05
Zoeterwoude	**2015**	8114	382	21,96
Zuidhorn	**2015**	18733	149	128,37
Zuidplas	**2015**	40771	683	64,05
Zundert	**2015**	21363	177	121,21
Zutphen	**2015**	46849	1143	42,93
Zwartewaterland	**2015**	22166	268	87,86
Zwijndrecht	**2015**	44501	2188	22,77
Zwolle	**2015**	123861	1113	119,36