The effect of non-western immigrants on sold house prices in municipalities in The Netherlands between 1998 and 2007

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Abstract

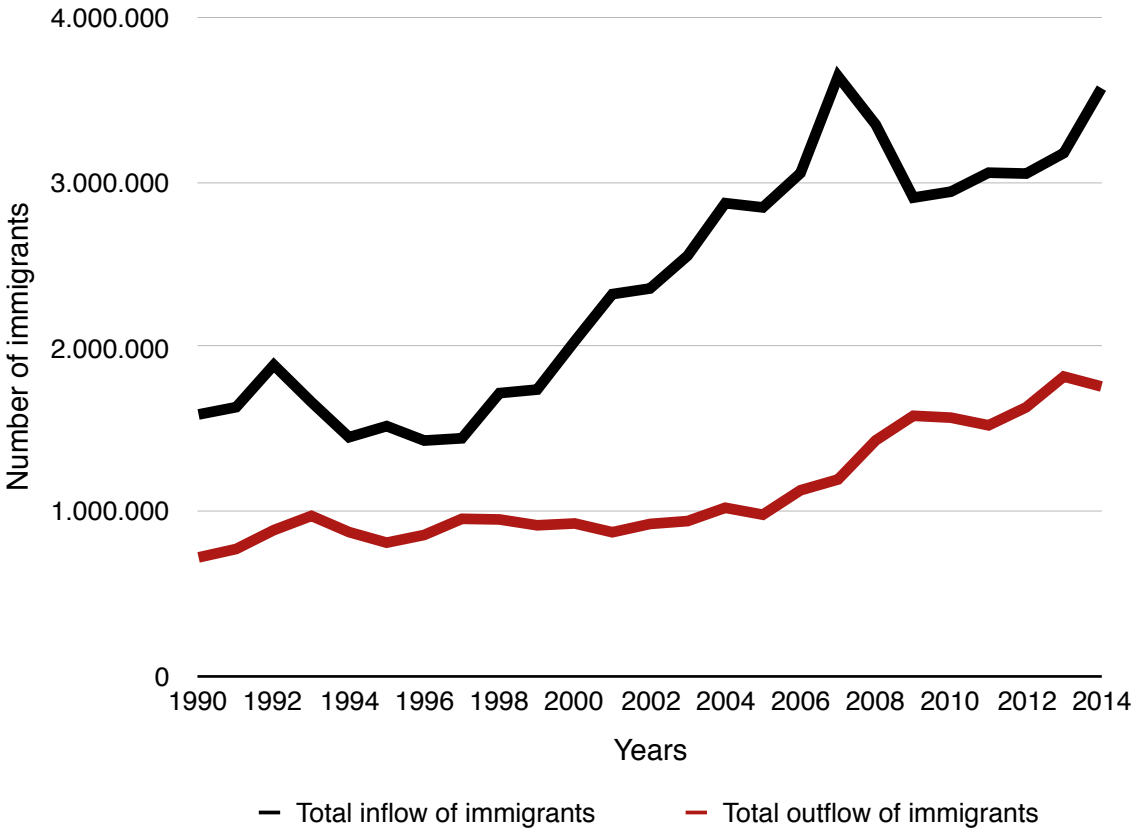
This paper empirically analyses the effect of non-western immigrants on sold house price in municipalities in The Netherlands. This paper finds that if the share of non-western immigrants increases with one percent, the average sold house price decreases with 1,73 percent of a standard deviation. Small significant effects are found for an increase in the share of non-western immigrants of one year and two years. This effect can partly be explained by the negative view many people tend to have towards immigrants. When using a fixed effect model, this paper finds that if the share of non-western immigrants increases with one percent, sold house prices decrease with almost four percent of a standard deviation. This is equal to a decrease of almost 3000 euros. No significant effects are found for increases in the share of non-western immigrants of one year and two years. One potential reason for the insignificance of these variables is the little variation within municipalities itself.

1. Introduction

Over the last few decades there has been an enormous rise in the number of immigrants who are coming to European countries. Figure 1 shows the total inflow of immigrants versus the total outflow of immigrants in 27 European countries between 1990 and 2014. As seen in Figure 1 the total inflow of immigrants has really started to increase since around 1996. Between 1996 and 2007, the total inflow of immigrants almost tripled. The total inflow reached a peak in 2007 with around 3.6 million immigrants coming to Europe. The recession led to a severe decline to 2009 and since then the total inflow has been rising quite steeply again. The total outflow of immigrants has been increasing slowly to 2005, after which it increased more steeply.

The total inflow of immigrants versus the total outflow of immigrants differed quite a lot between countries. For example, in Ireland, the total inflow of immigrants almost tripled between 2004 and 2007. In Spain, the total inflow of immigrants increased dramatically. Between 1999 and 2007, the total inflow of immigrants increased with an unbelievable 800 percent. This in contrast to

Figure 1: Total inflow versus total outflow of immigrants in Europe



Source: OECD: International Migration Database. The 26 countries are: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Austria, where the total inflow of immigrants decreased from 2004 to 2007. In the Netherlands, the share of non-western immigrants increased with around 36 percent between 1998 and 2007. Compared to some countries, this is not the most enormous increase. However, the total population in The Netherlands only increased with around 4 percent between 1998 to 2007. Thus, this still implies that the share of non-western immigrants has increased quite dramatically, even though it is smaller than other countries.

This large rise in the share of non-western immigrants could have had different consequences. For example, during the increase of non-western immigrants over the last decades, many right wing populist parties have been receiving more support. There are many studies who try to estimate the effect of non-western immigrants on the vote share right wing populist parties receive. For example, see Ivarsflaten (2008), Dustmann, Vasiljeva and Damm (2016) and Lahav (2004).

Furthermore, the increase in the share of non-western immigrants has also been associated with housing prices. During the last decades, house prices in The Netherlands have increased quite dramatically. Between 1998 and 2008, the average house prices have increased with little over hundred percent, from 124 thousand euros to 254 thousand euros (Dutch Central Bureau of Statistics). Meanwhile, in The Netherlands, the total inflation rate between 1998 and 2008 has only increased with 28 percent. This increase in house prices is similar compared to the United States, where house prices have increased with 104 percent between 1998 and 2007 (Freddie Mac CMHPI)[1]. As large as this increase might seem, some countries have seen an even more spectacular boom in house prices. In Spain, for example, did house prices increase by a stunning 175 percent between 1998 and 2008.

The possible causes which led to the increase in house prices are still not completely understood. Higher incomes, low interest rates, less regulation regarding mortgages, and more have influenced the housing boom. However, some studies also try to explain the increase in house prices by measuring the effect immigrants might have on house prices. For example, Akbari and Aydede (2012) find that immigrants have a positive significant effect on prices of privately owned dwellings in Canada. Gonzalez and Ortega (2013) support this finding by showing evidence of a positive significant causal effect of immigration on house prices in Spain. On the other hand, some studies find the opposite effect. For example, Sá (2015) finds that immigration has a negative significant effect on house prices in the UK.

[1] Derived from http://www.freddiemac.com/finance/cmhpi.

The increase in house prices could potentially be explained by the increase in the share of non-western immigrants. Of course, the basic economic theory goes as follows: more immigrants lead to more demand for houses and compared with an upward-sloping supply curve for houses this should lead to higher house prices. However, on the other hand, immigration is often being associated with negative thoughts, such as crime and less security. Furthermore, immigration could lead to native people leaving their municipality and decreasing the average wage or income which in turn could lead to a decrease in the housing demand. Accordingly, it is important to determine if immigrants have a positive or rather negative effect on house prices.

This paper will continue this research by empirically estimating the effect of non-western immigrants on the average sold house prices for houses in municipalities in The Netherlands between 1998 and 2007. Micro-level data will be derived from the Dutch Central Bureau of Statistics. The effect will be estimated by using both an ordinary least square regression as well as a fixed effect model.

The most important finding of this paper is a negative relationship between the share of non-western immigrants and the sold house prices. If the share of non-western immigrants increases with one percent, the average sold house price decreases with 1,73 percent of a standard deviation.[2] Even though this seems not quite that big, it is quite sizeable. If this estimate is accurate, this implies that in a municipality like Rotterdam, with a share of non-western immigrants of 36 percent, the average sold house price will be around 44 thousand euros lower than if there are no non-western immigrants at all. When using a fixed effect model, this paper finds that if the share of non-western immigrants increases with one percent, sold house prices decrease with almost four percent of a standard deviation.[3] This would mean that in a municipality like Rotterdam, the average sold house price decreases with around 136 percent of a standard deviation or almost hundred thousand euros. This is quite a sizeable effect and one should be careful to interpret this coefficient since it could be biased due to unobserved variables.

The remainder of this paper is as follows. Section 2 describes the theoretical framework and existing literature. Section 3 presents the data and descriptive statistics for the most important variables used in the analysis. Section 4 contains the methodology. Section 5 describes the results and Section 6 concludes.

[2] This is equal to approximately 1240 euros

[3] This is equal to approximately 3000 euros

2. Theoretical framework and existing literature

2.1 Theoretical framework

To estimate the effect of the share of non-western immigrants on sold house prices it is first necessary to discuss the general view people have towards immigrants. Immigration has been becoming a hot topic over the last decades. After understanding the view towards immigrants a little better, it might be easier to explain the effect of non-western immigrants on house prices and why this relationship works in that specific direction. It follows from a study on racism and xenophobia that between 11 percent and 14 percent of the population in European Communities was agitated by living together with people of other races or religions (Commission of the European Communities, Racism and Xenophobia, Eurobarometer Special, Brussels: pp. 6, 58-60). This bitterness against immigrants is hard to explain but there are some potential explanations that influence this negative opinion towards immigrants.

One reason is that there has been more and more concern about the share of non-western immigrants in western European countries. This large rise of the share of non-western immigrants has different consequences. First, a higher share of immigrants implies that it becomes harder for unemployed native people to find a job. Since most non-western immigrants have had only very few years of education (Capps, 2005), the low skilled native people are affected most by an increase in the amount of non-western immigrants. When these low skilled workers are not able to find a job they might blame the immigrants and this could lead to a more negative view towards immigrants. Furthermore, the increase in the share of non-western immigrants has often been associated with the rise of right wing populist parties. For example, Ivarsflaten (2008) finds that resentment towards immigrants has led to success of right wing populist parties.

Some papers find that the general view towards immigrants is different per municipality or area. For example, Dustmann, Vasiljeva and Damm (2016) find that in the top five percent urban municipalities in Denmark an increase of refugee allocation leads to a decrease in vote shares for parties with an anti-immigration agenda, which are considered as right wing populist parties. This in contrast to the most municipalities where an increase in the refugee allocation leads to an increase in the vote share for parties with an anti-immigration agenda. Thus, the view towards immigrants can significantly differ between municipalities. The authors do not find a specific explanation for this fact but it might be caused by the fact that the average education level of people in more urban municipalities is higher than the education level of people in more rural municipalities. And, many studies have found that people with higher education levels have a more positive view towards

immigrants and are thus less likely to vote for a right wing populist party. Scheve and Slaughter (2001) study the effect of education levels on opinion towards immigrants and find that low-skilled workers are more likely to have a more negative view on immigrants because they face more competition since immigrants are often low-skilled workers as well.

In the article by Dustmann et al. (2016), two contrasting theories are being discussed. On one hand, following the principles of contact theory, native people who are more in contact with immigrants react more positively towards an increase in the share of immigrants. This theory explains that communication with different ethnic groups helps to create a better understanding towards immigrants (Pettigrew 1998). However, it is often being discussed that an increase in the share of immigrants leads to a more negative opinion about immigrants. This attitude can be explained by Downs (1957), who states that these attitudes are mainly the effect of economic self-interests. Thus, native people consider the effect of an increase in the share of immigrants on their own interests, such as labour opportunities or potential income. In a previous paper by Dustmann and Preston (2005), they find that people who pay the largest taxes are more likely to consider immigrants more negatively. This relation is also found in a paper by Facchini and Mayda (2009) who conclude that the view towards immigrants is negatively related to income, when education has been controlled for. On the other hand, the group threat theory explains how competition between ethnic groups can lead to a more negative view on immigrants (Sidanius and Pratto, 1999). Following this theory, Lahav (2004) argues that when the share of immigrants in a population is already high, a further increase in the share of immigrants is considered a more serious threat. This can lead to a higher vote share for right wing populist parties.

Some studies find that the view towards immigrants is mostly influenced by social and cultural values (see for example Rustenbach 2010; Manevska and Achterberg 2013). In a study by Card et al. (2012), the authors find that "social and cultural threats are two to five times as important in explaining the variation in immigration opinion as economic concerns." Thus, right wing populist parties can establish themselves as protectors of the country's social and cultural values and this could lead to an increase in vote share for these parties when the share of immigrants increases.

Overall, the view towards immigrants can be explained by various reasons and this view towards immigrants might help to explain the effect of the share of non-western immigrants on house prices. Immigration is often being associated with negative thoughts, such as crime and less security. Furthermore, immigration could lead to native people leaving their municipality and decreasing the average wage or income which in turn could lead to a decrease in the housing

demand. Since the general view towards an increase in the amount of non-western immigrants is mostly considered negatively, one might expect that house prices could therefore drop.

2.2 Existing literature

This paper is closely related to a few other papers estimating the effect of immigrants on house prices. For example, Akbari and Aydede (2012) find that in Canada house prices rose sharply compared to the increase in the per capita incomes. They also find that immigrants have a positive significant effect on prices of privately owned dwellings in Canada. Furthermore, they find that the effect of immigrants on house prices is positive and significant but has a very small effect. The maximum rise in house prices as a result of an increase in immigration is only around 0.10 percent. They find that this effect is only caused by immigrants who are already living ten years in the area. The results of this study can be interpreted in two ways. On one hand, the results imply that immigration does not lead to a disadvantage through rising house prices. However, on the other hand, it turns out that immigrants do not help in creating a capital gain for current home owners.

Gonzalez and Ortega (2013) support this finding by showing evidence of a significant causal effect of immigration on house prices in Spain. During the years 1998 till 2008, house prices in Spain increased by a stunning 175 percent. In these years, the total population of immigrants increased from almost half a million to five million. Hence, as one might expect, the authors show that there is quite a strong relationship between these two variables. Between 1998 and 2008, the average Spanish province received immigrants equal to 17 percent of the initial population. The authors conclude that over the whole decade this increase in population led to an increase of 52 percent in house prices. They state that immigration is accountable for 30 percent of the price increase.

Furthermore, Saiz (2007) finds that immigration causes an increase in housing values in US destination cities. He finds that an immigration inflow of one percent of the population of a city is correlated with an increase of one percent in housing rents and house prices.

Bourassa and Hendershott (1995) find that house prices in Australia are influenced by the growth rate in real wage income and the increase in population which is caused by immigration. They find that an increase of one percentage point in real wage income leads to an increase of almost two percentage points in house prices. And, they estimate that a one percent increase in population caused by immigration leads to an increase of almost five percent in house prices. However, most immigrants coming to Australia are richer people and are not non-western immigrants. Therefore, these results could differ quite much compared to the effect of immigrants

on house prices in European countries.

In contrast to these results, there are also studies who find a negative relationship between the share of immigrants and house prices. For example, Sá (2015) finds that immigration is negatively correlated with local house prices. Particularly, an increase in the share of immigrants of one percent in the initial local population leads to a decrease of almost two percent in house prices. He finds that an increase in immigration results in moving of native people. This changes the local wage distribution. He concludes that there is a positive correlation between local low earners and immigration. This results from the fact that in municipalities with a high share of immigrants the native people often have lower wages. This can be explained by the fact that immigration reduces wages for the native people at the lower end of the wage distribution. Furthermore, the native people who move as a result of an increase in the share of immigrants are often at the higher end of the wage distribution. After dividing local authorities according to education level, he finds that the negative effect of immigration on house prices is caused by municipalities in which the education level of immigrants is lower.

3. Data and descriptive statistics

All the data used in this paper is derived from the database Statline of the Dutch Central Bureau of Statistics. This database contains among other things micro-level data about individuals. The dependent variable in this paper is the average sold house price in a specific municipality in a specific year. In general, house prices in The Netherlands have been rising dramatically between 1998 and 2007. In 1998 the average price people received by selling their house was around 124 thousand euros. In 2007, the average house price had increased to 248 thousand euros. This meant that during these years house prices increased by little over hundred percent. In 2008, house prices still increased but when the crisis hit in 2008, house prices decreased dramatically. According to the Dutch Central Bureau of Statistics, the average price people received by selling their house in The Netherlands in 2016 is still lower than in 2008. The average sold house price differed gigantically between municipalities. The lowest average sold house price for houses is around 53 thousand euros while the highest average sold house price is around 803 thousand euros.[4] The average sold house price of all municipalities together is little over 210 thousand euros.

The main independent variable, which is the variable of interest, is the share of non-western immigrants per municipality. This is the smallest area of which data is available which should therefore help to get as close as possible to the real estimate of the effect of the share of non-western immigrants per municipality. The share is simply the amount of non-western immigrants divided by the total population in the municipality. The share of non-western immigrants is on average around 4,70 percent, but the share is quite different per municipality. In the municipality with the lowest share of non-western immigrants, the share is around 0,41 percent of the total population. This in contrast to the municipality with the highest share of non-western immigrants, with almost 36 percent of the total population. The effect of the share of non-western immigrants per municipality might therefore also be different per municipality.

An important variable to consider is the population density per squared kilometre. Often, immigrants settle in municipalities with a higher population density per squared kilometre. For example, Rotterdam, Amsterdam and The Hague all have quite a high population density per squared kilometre and the share of non-western immigrants in these municipalities is quite high as well. This might be caused by a correlation between these two variables. This could be explained by the fact that a higher population density per squared kilometre implies that there are more jobs. On

[4] See Appendix 1 for an overview of the descriptives of the variables

average, there are around 806 people per squared kilometre. The differences between municipalities with a high population density per squared kilometre and a low population density per squared kilometre are enormous. In the most rural municipality, there are only 42 people per squared kilometre. On the other hand, in the most urban municipality, there are around 6500 people per squared kilometre. Thus, to control for these differences the population density per squared kilometre will be taken into account.

Next to the population density, the housing density will also be taken into account when running the analysis. This variable describes how many houses there are per squared kilometre. In more urban municipalities, there are often more houses per squared kilometre than in more rural municipalities. On average, there are around 335 houses per squared kilometre. While the municipality with the lowest housing density only has 18 houses per squared kilometre, the municipality with the highest housing density has 3177 houses per squared kilometre. And since immigrants often settle in more urban municipalities, the effect of immigrants on house prices could be different between municipalities.

Another important variable which could be correlated with house prices and the share of non-western immigrants is the average disposable income per municipality. This variable contains the average disposable income for people who receive income 52 weeks of the year. All the municipalities combined, the average disposable income is around 17 thousand euros. The lowest average disposable income in a municipality is around 13 thousand euros, while the highest average disposable income is around 36 thousand euros. A higher disposable income in a municipality is expected to be highly positively correlated with higher house prices and vice versa. Also, it could be the case that the share of non-western immigrants is negatively correlated with disposable income. This can be explained by the fact that non-western immigrants who are coming to European countries often have received only very little years of education (Capps, 2005). And, even though it is not necessarily the case that people with low education levels have a lower disposable income, education level can be used as a proxy for income (Arrow, 1973). Thus, a higher share of non-western immigrants implies that there are in general more people with a lower level of education which in turn implies that the average disposable income could be lower.

Furthermore, the variable social assistance is also used in the analysis. This variable describes how many people in a specific municipality have a right to receive social assistance, because they are not able to work anymore or are not able to find a job. Since immigrants often receive only very little years of education, they are not always able to find a job. Therefore, it could be likely that in municipalities with a higher share of immigrants more people have a right to

receive social assistance. On average, little over one percent of the population has a right to receive social assistance. In the municipality with the lowest percentage of social assistance only very little over zero percent has a right to receive social assistance. This in contrast to the municipality with the highest percentage of social assistance, where around 23 percent of the municipality has a right to receive social assistance. The variable will be used as a ratio of the people who have a right to receive social assistance divided by the total population in that specific municipality.

Next, a variable containing people who are moving out of the municipality to another municipality will also be taken into account. As seen previously, immigration is often associated with negative thoughts and might therefore lead to people leaving the municipality. This influences the house prices since there will be less demand for houses in municipalities where many people are leaving. On average, almost four percent of the population moved out of the municipality. The municipality with the lowest percentage of people moving out of the municipality saw little less than one percent leaving the municipality. The municipality with the highest percentage of people moving out of the municipality saw around eight percent leaving the municipality. The percentage of people moving out is simply the ratio of peopling moving out divided by the total population.

Finally, the average age will be taken into account as control variable. The average age differs more than one might expect. The average age of all municipalities combined is almost 39 years old. In the youngest municipality the average age is only 28 years. In the oldest municipality, the average age is around 47 years.

Figure 2 and Figure 3 show the trends of sold house prices during the time span in this paper. Figure 2 describes the difference in sold house prices between municipalities with a (relatively) low share of non-western immigrants and municipalities with a (relatively) high share of non-western immigrants. Municipalities with a share of non-western immigrants less than 2.5 percent are considered as municipalities with a low share of non-western immigrants. Municipalities with a share of non-western immigrants higher than ten percent are considered as municipalities with a high share of non-western immigrants. As Figure 2 tells us, the trend is more or less the same. Sold house prices in municipalities with a low share of non-western immigrants tend to change more frequently compared to municipalities with a higher share of non-western immigrants. Overall, sold house prices are significantly lower in municipalities with a higher share of non-western immigrants. This seems to confirm the results found in this paper, which state that there is a negative relationship between the share of non-western immigrants and sold house prices.

Figure 2: Difference in sold house prices between municipalities with low and high share of non-western immigrants

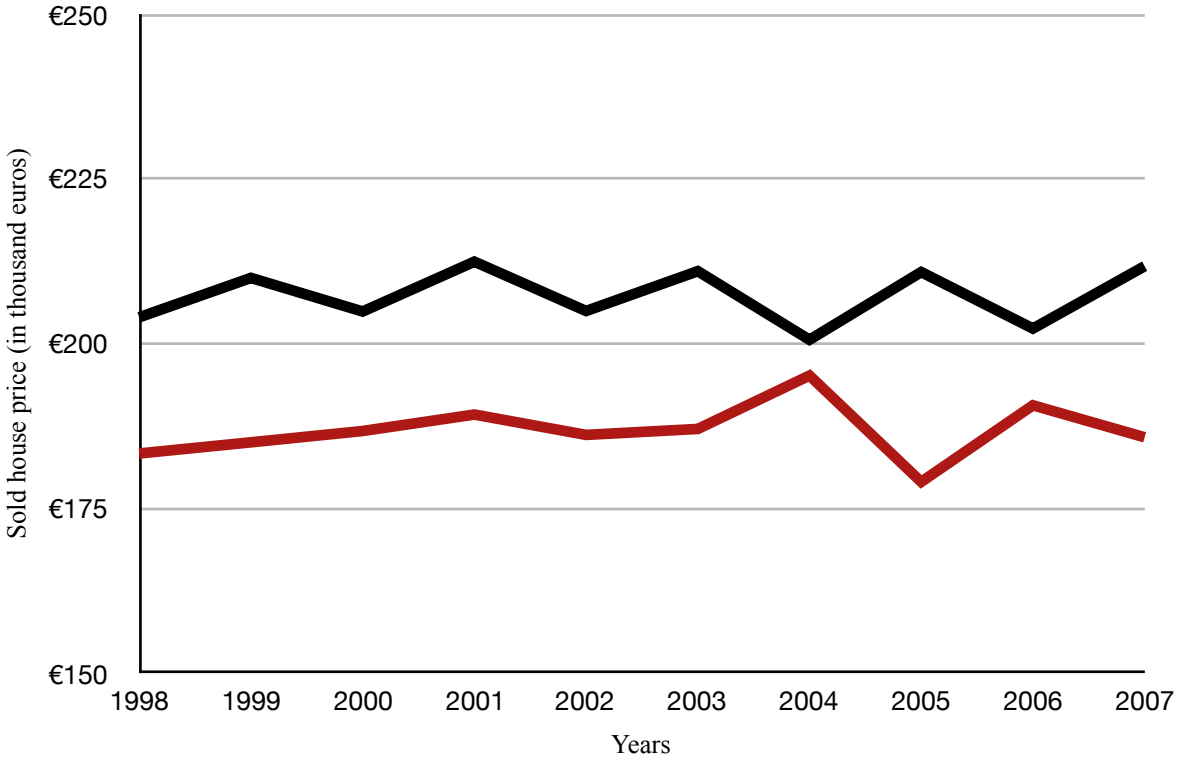


Figure 3: Difference in sold house prices between municipalities with low and high share of new non-western immigrants in the last two years

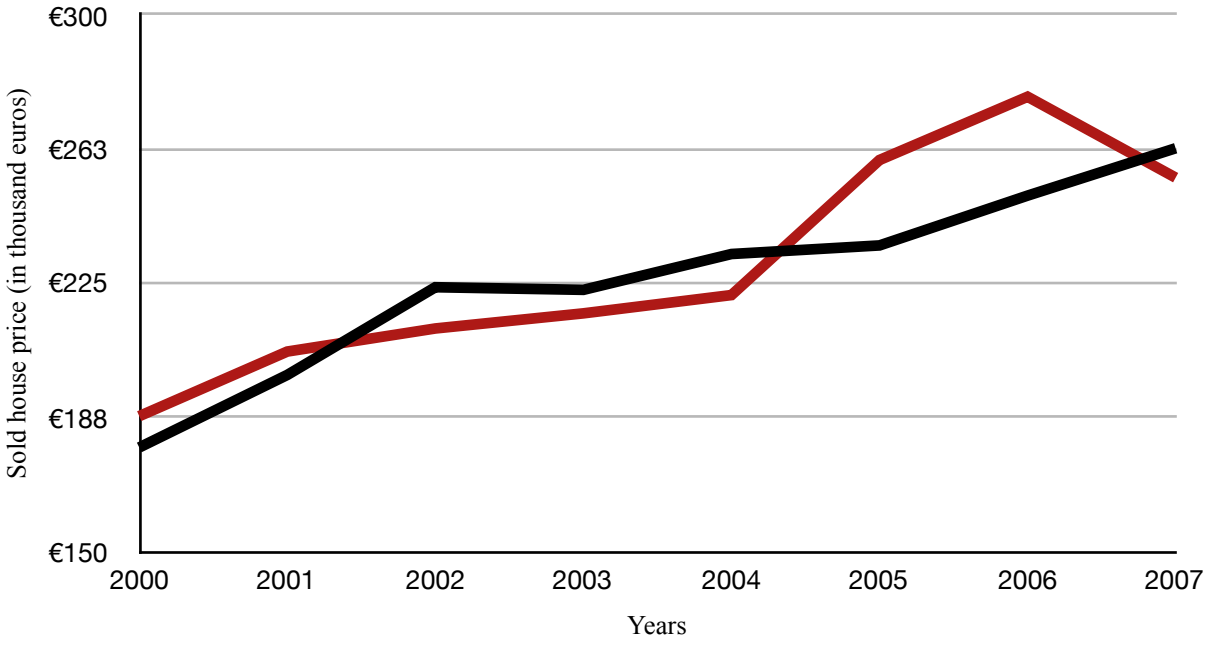


Figure 3 describes the difference in sold house prices between municipalities with a low share of new non-western immigrants during the last two years and municipalities with a high share of new non-western immigrants during the last two years. Municipalities where the share of non-western immigrants has increased with less than five percent during the last two years (note that this means that municipalities with a decrease in the share of non-western immigrants are also included) are considered as municipalities with a low share of new non-western immigrants. Municipalities where the share of non-western immigrants has increased with more than fifteen percent during the last two years are considered as municipalities with a high share of new non-western immigrants. As Figure 3 shows, sold house prices do not differ quite much between the two types of municipalities. Sold house prices increase quite significantly for both types of municipalities between 2000 and 2007, but sold house prices in municipalities with a high share of new non-western immigrants are not significantly lower compared to sold house prices in municipalities with a low share of new non-western immigrants. However, even though this paper finds a significant negative effect of the share of new non-western immigrants on sold house prices, the coefficient is small compared to the coefficient of the current share of non-western immigrants. This might be the reason why the difference between the two types of municipalities in Figure 3 is smaller than in Figure 2.

4. Methodology

One substantial problem is the fact that municipalities changed quite a lot during the last decades. Some municipalities ceased existing while others just started existing or participated in a fusion. This means that there is a lot of missing data for some municipalities. To control for this effect, all municipalities of whom there is no data of all the variables are deleted from the data set. Thus, in this data set, there are only municipalities who existed during the years 1998 to 2007 and who all have complete data for all the variables. This should help to minimise the different variation between municipalities which might lead to incorrect and imprecise estimates of the coefficients.

Furthermore, it is important to address that it might not be the case that an increase in the share of non-western immigrants in year Y directly leads to an increase or decrease in house prices in year Y. There could be a lag between an increase in immigrants and house prices. In the paper estimating the effects of immigration on house prices in Canada, Akbari (2008) uses the share of immigrants, but also the share of new immigrants in the last five years divided by the total amount of immigrants as well as the share of new immigrants in the last year divided by the total amount of immigrants. It could be the case that these shares have a more significant influence on house prices than just the share of total immigrants. In this paper, there are three variables for the share of non-western immigrants. The current ratio, which is the total amount of non-western immigrants in year Y divided by the total population in year Y. Second, the increase of non-western immigrants during the last year, thus the percentage increase of non-western immigrants of year Y and Y-1. On average, the ratio of non-western immigrants increased with around four percent. The lowest increase (highest decreases) was around -73 percent. The highest increase was 216 percent. Third, the increase of non-western immigrants during the last two years, thus the percentage increase of non-western immigrants of year Y and Y-2. On average, the ratio of non-western immigrants increased with little over nine percent. The lowest increase (highest decrease) was around -72 percent. The highest increase was 294 percent. Using these two lagged variables might lead to a different effect compared to only the current ratio.

The same story holds for the average disposable income. If your income increases in year Y, you are probably not directly going to buy a new house in year Y. First, you might save for a few years before buying a new house. Therefore, there are also three variables for the average disposable income. The current disposable income in year Y. Then, the percent increase in disposable income of year Y and Y-1. The average increase in disposable income was around three percent. The lowest increase (highest decrease) was around minus nine percent. The highest

increase was around 23 percent. Lastly, the percentage increase in disposable income in year Y and Y-2. On average, the disposable income increased with six percent. The lowest increase (highest decrease) was around minus eleven percent. The highest increase was around 23 percent.

To estimate the effect of the share of non-western immigrants on house prices three different ordinary least square regressions will be used. These regressions will provide coefficients for all variables taken into account. The first regression looks as follows:

$$\mathbf{AverageSoldHousePrice}_{it} = \alpha_{it} + \beta 1 * \mathbf{PctNWI}_{it} + \beta 2 * \mathbf{PopulationDensity}_{yit} + \beta 3 * \mathbf{HousingDensity}_{yit} + \beta 4 * \mathbf{SpInc}_{it} + \beta 5 * \mathbf{PctSpInc1}_{it} + \beta 6 * \mathbf{PctSpInc2}_{it} + \beta 7 * \mathbf{AverageAge}_{it} + \beta 8 * \mathbf{PctSocAss}_{it} + \beta 9 * \mathbf{PctLeave}_{it} + \beta 10 \mathbf{T}_{it} + \varepsilon_{it}$$

where AverageSoldHousePrice is het average sold house price, α is a constant, PctNWI is the percentage share of non-western immigrants in a municipality, PopulationDensity is the population density per squared kilometre, HouseDens is the housing density per squared kilometre, SpInc is the average disposable income, PctSpInc1 is the percentage increase in disposable income during the last year, PctSpInc2 is the percentage increase in disposable income during the last two years, AverageAge is the average age, PctSocAss is the percentage share of people who receive social assistance in a municipality, PctLeave is the percentage share of people who are moving out of their municipality, T is a time trend and i and t stand for municipality and year respectively.

The second ordinary least square regression measures the effect of the share of new non-western immigrants during the last year on sold house prices. The regression looks as follows:

$$\mathbf{AverageSoldHousePrice}_{it} = \alpha_{it} + \beta 1 * \mathbf{PctNWI1}_{it} + \beta 2 * \mathbf{PopulationDensity}_{yit} + \beta 3 * \mathbf{HousingDensity}_{yit} + \beta 4 * \mathbf{SpInc}_{it} + \beta 5 * \mathbf{PctSpInc1}_{it} + \beta 6 * \mathbf{PctSpInc2}_{it} + \beta 7 * \mathbf{AverageAge}_{it} + \beta 8 * \mathbf{PctSocAss}_{it} + \beta 9 * \mathbf{PctLeave}_{it} + \beta 10 \mathbf{T}_{it} + \varepsilon_{it}$$

where PctNWI1 is the increase in the share of non-western immigrants in the last year. The rest is exactly like the first regression.

The third ordinary least square regression measures the effect of the share of new non-western immigrants during the last two years on sold house prices. The regression looks as follows:

$$\mathbf{AverageSoldHousePrice}_{it} = \alpha_{it} + \beta 1*\mathbf{PctNWI2}_{it} + \beta 2*\mathbf{PopulationDensity}_{it} + \beta 3*\mathbf{HousingDensity}_{it} + \beta 4*\mathbf{SpInc}_{it} + \beta 5*\mathbf{PctSpInc1}_{it} + \beta 6*\mathbf{PctSpInc2}_{it} + \beta 7*\mathbf{AverageAge}_{it} + \beta 8*\mathbf{PctSocAss}_{it} + \beta 9*\mathbf{PctLeave}_{it} + \beta 10\mathbf{T}_{it} + \varepsilon_{it}$$

where PctNWI2 is the increase in the share of non-western immigrants in the last two years. The rest is exactly like the first regression. Another regression with the difference in shares of non-western immigrants was used to see if changes in the share of non-western immigrants impact sold house prices but this regression did not yield any results worth discussing.

Furthermore, a fixed effect model will be used to see if this model will yield different results compared to the normal ordinary least squares panel data regression. Fixed effects are used when you are interested in analysing the influence of different variables which are not constant over time. They analyse how predictor variables might influence the outcome within bodies such as countries or in this case municipalities. In this paper, all municipalities have their own characteristics which could influence the predictor variables. So, a fixed effect model can be useful when there are concerns that individual characteristics, such as gender, which do not really change over time, can impact predictor variables. By using a fixed effect model these time-invariant characteristics are removed which helps to estimate the real effect of the predictor variables on the dependent variable. However, if the independent variables vary greatly between the municipalities but have little variation within the municipalities itself, the coefficients the fixed effect model provides can be not as accurate and precise as one might want. Even though this could be the case given the data in this paper, it is still interesting to run the fixed effect model and compare the results with the normal ordinary least square panel data regression. As with the ordinary least square regressions, there will be three fixed effect model regressions used to estimate the effects. The three fixed effect model regressions are almost the same as the ordinary least square regressions, except for the fact that there is another term, Vi, which describes the fixed effects. The regression looks as follows:

$$\mathbf{AverageSoldHousePrice}_{it} = \alpha_{it} + \beta 1*\mathbf{PctNWI}_{it} + \beta 2*\mathbf{PopulationDensity}_{it} + \beta 3*\mathbf{HousingDensity}_{it} + \beta 4*\mathbf{SpInc}_{it} + \beta 5*\mathbf{PctSpInc1}_{it} + \beta 6*\mathbf{PctSpInc2}_{it} + \beta 7*\mathbf{AverageAge}_{it} + \beta 8*\mathbf{PctSocAss}_{it} + \beta 9*\mathbf{PctLeave}_{it} + \beta 10\mathbf{T}_{it} + \mathbf{V}_{i} + \varepsilon_{it}$$

where PctNWI is replaced by PctNWI1 and PctNWI2 in the second and third regression respectively.

5. Results

Table 1: OLS-estimates of the effect of shares of immigrants on sold house prices.

VARIABLES	AverageSoldHousePrice
PercentageShareNonWesternImmigrants	-124.2***
	(11.29)
PopulationDensity	-0.0257***
	(0.0040)
HousingDensity	0.0387***
	(0.00895)
DisposableIncome	27.21***
	(0.945)
OneYearIncreaseInPercentageDisposableIncome	-162.1
	(123.3)
TwoYearIncreaseInPercentageDisposableIncome	-37.90
	(93.77)
AverageAge	0.508*
	(0.281)
PercentageSocialAssistance	-86.49**
	(42.88)
PercentagePopulationLeftMunicipality	-756.8***
	(117.5)
Time trend t	-1.563
	(1.023)
Constant	-237.3***
	(21.76)
Observations	3,136
R-squared	0.742
Number of municipalities	392

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

Table 2: OLS-estimates of the effect of an increase in the share of non-western immigrants of one year on sold house prices

VARIABLES	AverageSoldHousePrice
PercentageShareNonWesternImmigrants1	-13.86**
	(6,840)
PopulationDensity	-0.0124***
	(0.00469)
HousingDensity	0.00550
	(0.0110)
DisposableIncome	27.83***
	(0.950)
OneYearIncreaseInPercentageDisposableIncome	-123.9
	(126.1)
TwoYearIncreaseInPercentageDisposableIncome	-71.91
	(95.85)
AverageAge	1.104***
	(0.226)
PercentageSocialAssistance	-179.3***
	(38.56)
PercentagePopulationLeftMunicipality	-757.8***
	(115.4)
Time trend t	-1.841*
	(1.015)
Constant	-258.0***
	(20.05)
Observations	3,136
R-squared	0.740
Number of municipalities	392

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

Table 3: OLS-estimates of the effect of an increase in the share of non-western immigrants of two years on sold house prices

VARIABLES	AverageSoldHousePrice
PercentageShareNonWesternImmigrants2	-9.877**
	(4.309)
PopulationDensity	-0.0149***
	(0.00471)
HousingDensity	0.00543
	(0.0110)
DisposableIncome	27.82***
	(0.851)
OneYearIncreaseInPercentageDisposableIncome	-127.9
	(119.3)
TwoYearIncreaseInPercentageDisposableIncome	-70.42
	(95.50)
AverageAge	1.090***
	(0.223)
PercentageSocialAssistance	-182.5***
	(37.8)
PercentagePopulationLeftMunicipality	-746.5***
	(109.9)
Time trend t	-1.910*
	(1.015)
Constant	-256.9***
	(20.13)
Observations	3,136
R-squared	0.737
Number of municipalities	392

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

Table 4: Fixed effect model estimates of the share of non-western immigrants on sold house prices

VARIABLES	AverageSoldHousePrice
PercentageShareNonWesternImmigrants	-273.3***
	(64.29)
PopulationDensity	-0.0550***
	(0.0172)
HousingDensity	-0.113***
	(0.0394)
DisposableIncome	10.40***
	(0.647)
OneYearIncreaseInPercentageDisposableIncome	-63.10***
	(13.68)
TwoYearIncreaseInPercentageDisposableIncome	-13.11
	(11.36)
AverageAge	-2.664**
	(1.140)
PercentageSocialAssistance	-57.13
	(105.5)
PercentagePopulationLeftMunicipality	-460.8***
	(77.92)
Time trend t	6.779***
	(0.436)
Constant	99.44**
	(46.73)
Observations	3,136
R-squared	0.789
Number of municipalities	392

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

Table 5: Fixed effect model estimates of the effect of an increase in non-western immigrants of one year on sold house prices

VARIABLES	AverageSoldHousePrice
PercentageShareNonWesternImmigrants1	0.754
	(2.273)
PopulationDensity	-0.0644***
	(0.0172)
HousingDensity	-0.148***
	(0.0387)
DisposableIncome	10.33***
	(0.650)
OneYearIncreaseInPercentageDisposableIncome	-61.11***
	(13.71)
TwoYearIncreaseInPercentageDisposableIncome	-10.21
	(11.37)
AverageAge	-0.714
	(1.053)
PercentageSocialAssistance	-29.14
	(105.7)
PercentagePopulationLeftMunicipality	-391.9***
	(77.01)
Time trend t	6.174***
	(0.413)
Constant	20.93
	(43.23)
Observations	3,136
R-squared	0.787
Number of municipalities	392

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

Table 6: Fixed effect model estimates of the effect of an increase in non-western immigrants of two years on sold house prices

VARIABLES	AverageSoldHousePrice
PercentageShareNonWesternImmigrants2	-0.347
	(1.468)
PopulationDensity	-0.0640***
	(0.0172)
HousingDensity	-0.147***
	(0.0387)
DisposableIncome	10.35***
	(0.651)
OneYearIncreaseInPercentageDisposableIncome	-61.27***
	(13.73)
TwoYearIncreaseInPercentageDisposableIncome	-10.09
	(11.38)
AverageAge	-0.765
	(1.055)
PercentageSocialAssistance	-30.24
	(105.7)
PercentagePopulationLeftMunicipality	397.2***
	(77.47)
Time trend t	6.157***
	(0.414)
Constant	22.58
	(43.28)
Observations	3,136
R-squared	0.787
Number of municipalities	392

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

Table 1 reports the output of the effect of the share of non-western immigrants on sold house prices. There is a negative significant effect for β1, the share of non-western immigrants. It implies that if the share of non-western immigrants of a municipality increases with one percent, the average sold house price decreases with 1,73 percent of a standard deviation (or around 1240 euros). This finding is in contrast with most existing literature. As discussed earlier, most papers find a positive relationship between the share of non-western immigrants and house prices. However, this finding is in accordance with Sá (2015) who finds a negative relationship between immigrants and house prices. To interpret this coefficient, it means that in the municipality with the highest share of non-western immigrants (Rotterdam, almost 36 percent), the average sold house price decreases with almost 62 percent of a standard deviation (or around 44 thousand euros). This is a quite noticeable effect. The average share of non-western immigrants of all municipalities combined is around 4,70 percent, which means that the average sold house price decreases with almost 6000 euros.

Table 2 states the output of the effect of an increase in the share of non-western immigrants of one year on sold house prices. The coefficient is slightly less significant compared to the coefficient found in table 1, and only significant at a confidence level of 95%. However, the size of the coefficient has hugely changed and is now only little more than a tenth of the coefficient in table 1. If the increase in the share of new non-western immigrants of one year increases with one percent, the average sold house price only decreases with around 0.2 percent of a standard deviation. This is equal to a decrease of around 138 euros. Thus, it seems that the change in the share of non-western immigrants does not really noticeably impact sold house prices.

Table 3 describes the output of the effect of an increase in the share of non-western immigrants of two years on sold house prices. The coefficient is, like the coefficient in table 2, significant at a confidence level of 95%. Again, the size of the coefficient has decreased, albeit only a little this time. If the increase in the share of new non-western immigrants of two years increases with one percent, the average sold house price decreases with around 0.14 percent of a standard deviation. Again, it seems as if a change in the share of non-western immigrants does almost not at all impact sold house prices.

However, the small size of the coefficients of an increase in the share of non-western immigrants can be explained. Even though there is considerable variation in the share of non-western immigrants between different municipalities, the variation within municipalities is not really noticeable. Often, the largest increase (or decrease) in the share of non-western immigrants in a municipality is around one percent, if it is not smaller. So, little variation within municipalities

itself might explain why the coefficients of the share of non-western immigrants with lags are so small compared to the normal share of non-western immigrants.

It is now interesting to see how the results hold when using a fixed effect model. A fixed effect model can be used when you are interested in analysing the influence of different variables which are not constant over time. In this paper, the main variable of interest, the share of non-western immigrants, varies over time and therefore the results might be different when using a fixed effect model. Table 4 contains the output of the effect of the share of non-western immigrants on sold house prices. The coefficient is significant at a confidence level of 99% and more than twice as large as the effect found by using an ordinary least square regression. The fixed effect model finds that if the share of non-western immigrants increases with one percent sold house prices decrease with almost four percent of a standard deviation. This is equal to a decrease of almost 3000 euros. This would mean that in a municipality with a high share of non-western immigrants, like Rotterdam, the average sold house price decreases with around 136 percent of a standard deviation or almost hundred thousand euros. This is quite a sizeable effect and one should be careful to interpret this coefficient since it can always be biased due to unobserved variables.

Table 5 and table 6 describe the fixed effect model estimates of an increase in the share of non-western immigrants of one and two years respectively. Both coefficients are small and not significant. Like the ordinary least square regressions, the change in the share of non-western immigrants does not really seem to affect sold house prices. Be that as it may, this can be explained. The disadvantage of a fixed effect model is that if there is little variation within the municipalities itself, no matter how large the variation is between municipalities, the fixed effect model provides not the most precise estimates. In this case, there is large variation in the share of non-western immigrants between different municipalities (from almost zero percent till around 36 percent), while the variation in the share of non-western immigrants within municipalities is not really noticeable. Thus, this might be the reason why the increases in the share of non-western immigrants are not significant when using a fixed effect model.

6. Conclusion

The aim of this paper was to empirically analyse the effect of non-western immigrants on sold house prices in The Netherlands. This study finds that if the share of non-western immigrants increases with one percent, the average sold house price decreases with 1,73 percent of a standard deviation, which is equal to approximately 1240 euros. This means that if there were two municipalities like Rotterdam, equal in all aspects, except that one Rotterdam would have the real share of non-western immigrants (around 36 percent), and the other Rotterdam would have no immigrants, the sold house prices would be around 44 thousand euros lower in Rotterdam with the real share of non-western immigrants.

When using a fixed effect model, this paper finds that if the share of non-western immigrants increases with one percent, sold house prices decrease with almost four percent of a standard deviation. This would mean that in a municipality like Rotterdam, the average sold house price decreases with around 136 percent of a standard deviation or almost hundred thousand euros. This is quite a sizeable effect and one should always be careful to interpret this coefficient since it could be biased due to unobserved variables.

The most important finding in this paper about the negative influence of non-western immigrants is in contrast with most of the current existing literature. Often, a positive relationship between the share of non-western immigrants and house prices have been found. The negative coefficient in this paper could possibly be explained by the negative view people have towards immigrants. Naturally, stones which are used to build houses are not suddenly going to decrease in value when the share of non-western immigrants increase. However, the negative view people have towards non-western immigrants combined with an increase in the share of non-western immigrants could lead to the decrease in house prices. Thus, perhaps if the view towards non-western immigrants changes in the upcoming years, the effect might not be as significant or even the other way around.

The findings in this paper could possibly be useful to policy makers. Of course, the estimate in this paper should be interpreted with caution since homogeneity, in the form of unobserved variables, could cause this estimate to be biased. In future research, this could be solved by using an instrumental variable to solve the endogeneity problem. However, it is quite hard to find the right instrumental variable concerning this research. Nonetheless, the results might help the government to understand one of the different reasons when sold house prices are decreasing.

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Appendix 1: overview variables

Variables	Mean	Std. Dev.	Min	Max	Obs.
Average sold house price (in thousand euros)	211,55	71,92	53,153	803,41	3,920
Percentage non-western immigrants	4,70%	0,04	0,41%	35,72%	3,920
Percentage non-western immigrants 1 year lag	4,45%	0,12	-73,17%	216,39%	3,528
Percentage non-western immigrants 2 year lag	9,11%	0,19	-72,63%	294,44%	3,136
Population density (per squared kilometre)	806,55	956,55	42,00	6522,00	3,920
Housing density (per squared kilometre)	335,76	424,23	18,00	3177,00	3,920
Disposable income (in thousand euros)	17,57	2,33	12,80	36,20	3,920
Percentage increase disposable income 1 year	3,21%	0,03	-9,09%	23,44%	3,528
Percentage increase disposable income 2 years	6,04%	0,04	-11,56%	22,92%	3,136
Average age	38,87	2,01	28,21	47,17	3,920
Percentage social assistance	1,32%	0,01	0,00%	23,67%	3,920
Percentage population left municipality	3,85%	0,01	0,80%	8,47%	3,920