Understanding how house prices can be explained by highway accessibility

A case study of the province of Friesland, the Netherlands

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Colophon

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Image title page ***Highway Bridge Over Farmland*** **by Sebastian Surmiak, 2018**

Abstract

Existing literature varies in conclusions about the impact of accessibility on house prices. This paper aims to discuss what the impact of highway accessibility is on house prices, based on a case study in Friesland, a province in the north of the Netherlands. It does so by trying to answer the main research question: *How can house prices in the province of Friesland be explained by highway accessibility?* Data from the NVM provides data on properties and their transaction prices for 88.728 cases for the years 2004-2020. Using topographic maps and satellite images, infrastructure in Friesland has been studied as infrastructure has been developing over those past sixteen years. Results from the multilinear regression indicate that there is a positive linear relationship between house prices and the distance between properties and the nearest highway ramps in the province of Friesland. Results also indicate that living further away from the highway ramp, generates a higher house price than living closer to the highway ramp, although the impact seems limited.

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1 Introduction

House prices are influenced by a large variety of factors and, therefore, are complicated to understand. These factors range from physical attributes of the property or neigbhorhood, to personal preferences and externalities from outside, like roads. Accessibility is an example of a positive externality generated by the proximity of roads and can be defined as the ease of being able to reach a certain destination. Take, for example, highways. Living near a highway access lane provides persons the benefit of gaining a high accessibility level to regional and national markets (Tillema et al., 2012).

According to Statistics Netherlands (CBS), on average the Dutch citizen lives 1,8 kilometers away from a highway onramp (CBS, 2019a). In 2018, the total length of paved roads in the Netherlands was 139.691 km, of which just 8.991 km located in the province of Friesland. From this total, 7.782 km is appointed to Provincial roads and 5.340 km is appointed to national highways. In Friesland, 670 km of Provincial roads and 328 km of highways can be found (CBS, 2018a). In 2017, roughly 72 % of the total distance traveled by Dutch citizens has been done by car, of which 51 % as drivers and 21 % travelling as passenger (CBS, 2019b). Since the beginning of previous decade the amount of Dutch cars in use has been risen every year, except for 2013. In total, the number of cars in use has risen from 7.48 million in 2001 to 9.35 million in 2018 (CBS, 2019c). With the rising number of cars on the road, the traffic intensity in the Netherlands has also been rising slightly (CBS, 2018b).

An extensive amount of research has been performed on house prices and factors influencing house prices by various researchers, reaching various outcomes. However, according to Tillema et al. (2012), accessibility has not generated the same level of interest across all fields of study, and the exact influence of accessibility on household location behaviour is still relatively unclear. They argue that existing studies mainly focus on negative externalities caused by roads and its users, and, therefore, fail to take into account positive externalities, such as accesibility and travel-gains. Levkovich (2016), furthermore, argues that while researchers agree upon that roads carry with them positive and negative externalities, researchers do sometimes reach opposite conclusions. As existing literature seems to largely focus on negative externalities and housing prices and as the relationship between accessibility and house prices is not completely clear yet, the aim of this study is to find out what the impact of highway accessibility is on house prices, using a case study of the province of Friesland. The relevance of this study is highlighted by three main incentives. The first and foremost is the difference in research outcomes in existing literature. The second is that this study makes use of the most recent data on house prices in the Netherlands, consisting of a large housing transaction dataset from NVM reaching from 2004 until 2020. And the third is that a similar study has not been performed yet in the north of the Netherlands, making it an opportunity to capture the impact of accessibility in a province which consists of a varying landscape containing mix of cities, towns and the rural. Furthermore, outcomes of this research could be beneficial to investors and the construction industry as to where to construct new properties to generate the most profit or the highest house prices. The following research question is considered to come to conclusions: *How can house prices in the province of Friesland be explained by highway accessibility?*

Section two continues with discussing existing literature, where externalities are discussed and the different conclusions between various researches are presented. Section three discusses the data and methodology used in this research. In section four the multilinear regression results are presented. In section five we conclude that houses further away from the highway ramps generate higher house prices than houses closer to the highway ramps. Finally, in section six the discussion can be found, where we reflect on the research and provide future research ideas.

2 Literature

Researchers generally agree that positive and negative externalities, at different proximities to a road, exist. However, existing research outcomes differ to some extent, as sometimes opposite conclusions are reached (Levkovich et al., 2016). The following section discusses the existing literature and their varying research outcomes.

2.1 *Accessibility versus traffic externalities*

According to Henneberry (1998) the value and location of a property are strongly interrelated, with accessibility being a key aspect of location. Hennebery states that physical accessibility is determined by time and cost of travel to other locations and that it depends on the presence, efficiency, and effectiveness of transport modes. Tillema et al. (2012) add that especially those who live near a highway benefit from more accessibility gains, as long as there is at least a highway ramp nearby. House prices may shift upwards due to improved accessibility and, therefore, house prices seem to be negatively correlated to distance to the nearest highway access lane.

However, if there is an increase in traffic density and traffic noise adjacent to the new road, house prices may also reduce consequently (Levkovich et al., 2016). Hughes & Sirmans (1992) agree on this by saying that houses in streets with less traffic sell for a higher price than houses in streets with a lot of traffic. This does also work the other way around, as Ossokina and Verweij (2011) show in their study on the effects of reduced traffic density in the Hague. They argue that property values in the proximity of the new road have increased with the reduction in traffic density. This provides the evidence that homeowners negatively value traffic density, due to the negative externalities. Theebe (2004) argues that properties located along a road with heavy traffic are likely to sell for less than similar properties elsewhere, while it is likely that properties at very quiet locations might sell for a premium compared to other properties. Levkovich et al. (2016), furthermore, find that improved accessibility is valued positively, while noise and traffic intensity affect housing prices negatively. However, more interestingly, the positive value attributed to improved accessibility levels is larger than the negative values attributed to increased noise pollution and traffic intensity levels.

Positive effects of transportation are described by Smersh & Smith (2000). They argue that the impacts on land values reflect the role that transportation plays in the quality of life. Positive effects occur if transportation enhancements improve the accessibility of residents to their jobs, or other points of reference. Negative effects of transportation are also mentioned in this article, as negative effects on the quality of life occur when, for example, congestion occurs. Bateman et al. (2001) add that these undesirable effects are particularly important at the local level as they contribute to the reduction in the quality of the local environment. Furthermore, negative externalities relating to a road operate at a lower scale than accessibility (Tillema et al., 2012). This is reflected by the fact that people tend to live further away from major roads to reduce the nuisances caused by the road, but also means that accessibility benefits might reach a further distance than the negative externalities.

Sated preferences studies indicate that the strength of transport impedance on the housing location seems to be relatively small compared to a person's personal characteristics and property and neighborhood characteristics (Molin & Timmermans, 2003; Rouwendal & Meijer, 2001; Timmermans et al., 1996; Weisbrod et al., 1980; Tillema et al., 2012). Part of this can be explained by the changing urban areas over the last number of decades. The decentralization of economic activities and the development of the transportation networks have resulted in a homogeneous high accessibility level and a decrease in locational differences between places (Giuliano, 1989). Following these findings, the impact of accessibility on land values is limited compared to the physical

characteristics of a property and its neighboring environment (Adair et al., 2000; Henneberry, 1998).

2.2 Road-related negative externalities

Traffic noise is one of the main environmental problems in Europe, which is primarily caused by tire-pavement interactions and noise generated by vehicle engines. Traffic noise contributes to health problems, but also negatively impacts the economy by driving down real estate prices (Szczepańska et al., 2015; Papi & Halleman, 2004).

High noise levels, air pollution, community fragmentation, traffic intensity and barrier effects are examples of negative externalities which are common problems in neighborhoods which are allocated along highways (Tillema et al., 2012). Negative externalities may play a role in the decision where to locate in a neighborhood, and can make a home less comfortable to live in. If people value a location negatively, this may be reflected in a fall in property prices in that area (Bateman et al., 2001). However, this depends on the location of the residence and the adjacent road. One the one hand, residents living adjacent to a busy road suffer more from negative externalities. On the other hand, if they also live in the vicinity of a highway ramp, they benefit more than others from the accessibility to regional and national markets. The optimal location for a property is closely located to the highway ramp, but as far as possible from the highway itself. In that scenario, one has the advantage of accessibility benefits, and suffers less from the negative externalities from the highway or major road. This optimal location may, as a result, be reflected in higher property values (Tillema et al., 2012).

In their study on housing prices and traffic noise in the Polish city of Olsztyn, Szczepańska et al. (2015) find that noise pollution is an important determinant of real estate prices. Nelson (1982) found that in the US for each extra decibel generated by highway traffic an average reduction in housing value of 0.4 % occurred. For houses adjacent to a major highway, this reduction in housing value could rise to 8-10 %. This means that a house valued at $40.000 would sell for $36.000 to $36.800 if the property is located adjacent to a major highway, which corresponds with the discount of 8-10 %. One would, therefore, suspect that properties in the US sell for a lower price closer to a highway, and for a higher price further away from the highway. Nelson (1982) also finds evidence that highway noise does not lead to increased time on the market before being sold. Wilhelmsson (2000) found similar results in Europe. However, just as accessibility (Tillema et al., 2012), road-related nuisances seem to have a limited impact on house prices, compared to dwelling and neighborhood characteristics. Nijland et al. (2017), adds to this that noise levels or air quality rarely are reasons for moving away. Theebe (2004) finds less negative coefficients in his research when adding accessibility features such as distances to ramps and train stations into his models. However, he does find evidence that traffic noise has a significant impact on property prices. This may indicate that accessibility may have an impact on housing prices as well as it seems to counter the negative externalities. Andersson et al. (2009) finds in his research that road noise has a larger impact on property prices than railway noise. A possible cause for this is that road noise tends to be more continuous, while trains do not pass by continuously in general.

2.3 Personal preferences in housing

Several studies have found that besides the influence of these location-related characteristics and personal preferences, there is a relationship between commuting distance and location choices (Giuliano, 1989; Rouwendal & Rietveld, 1994; Ommeren et al., 1997,1999). This may imply that people who have to commute for their job, locate closer to a highway ramp to shorten their

commuting time. Commuting behavior is related to behavioral patterns in the housing and labor market. This has stimulated urban economists to presume that commuting costs are compensated by lower housing prices and economists to believe that commuting costs are compensated by higher wages (Ommeren et al., 1997).

Adair et al. (2000) state that buyers will, among these positive and negative externalities, consider many other things as well as, for example, distance to workplace, stores, or educational facilities. Potential buyers, furthermore, consider their own personal preferences and preferences in terms of housing and neighborhood characteristics, and this also influences their location preferences and residential satisfaction (Buys & Miller, 2012; Galster & Hesser, 1981; Lu, 1999; Morris et al, 1978; Tillema et al., 2012). Hughes & Sirmans (1992) add that, for example, living area has a significantly positive effect on the housing price. They also find that the age of the house has a negative effect on price. However, one should keep in mind that these findings may not be universal for each person. A person who values accessibility may prefer to locate near major roads. Also, with negative externalities personal characteristics and preferences come to play. Someone who is noise-sensitive will self-select themselves in a property further away from the source of the noise, while someone who is not easily bothered by noise might choose to live close to a highway ramp if they value regional and national accessibility. This does also apply to people with health issues. They might choose to live further away from a highway to omit air pollution (Wee, 2009). Corresponding with Levkovich et al. (2016), the literature review shows that different outcomes between various studies on housing prices and their relation to roads can be found among different studies. In the following section the data and methodology are discussed.

3 Data and methodology

For this research, a quantitative approach has been used, supported by two sets of data which have been used to run a multilinear regression. The first dataset consists of highway ramps around the province of Friesland during five time periods determined by infrastructural changes and timespan of the housing data provided by the NVM. The second dataset consists of 88.728 property transactions from 2004 to 2020 from the Dutch Association of Real Estate Brokers and Real Estate Experts (NVM).

3.1 Research method

A multilinear regression has been chosen as most appropriate method for this research, as it is designed to explain the relationship between the dependent variable and numerous independent variables, which may also include dummy variables. Using the multilinear regression, this research seeks to answer the following research question: *How can house prices in the province of Friesland be explained by highway accessibility?* The null hypothesis used for statistical inference is that there is no relationship between house prices and the distance to the nearest highway ramps in Friesland.

3.2 Area of interest

This paper presents a case study on Friesland, a province in the north of the Netherlands. Friesland consists of a population of roughly 649.957 residents, spread over a region of 5.748,77 km2 (CBS, 2020). Figure 1 presents the national and regional road infrastructure of the Netherlands. The red lines represent the highways, whereas the orange lines represent the provincial roads (CBS, 2018). In the Netherlands, provincial roads can also be referred to as so-called N-roads, as their name begin with an N followed by a number. A similar system is in place for highways, which are also referred to as A-roads, as their name begins with an A followed by a number. In the left segment of figure 1, the area of interest can be seen, in which the roads considered in this study are marked green.

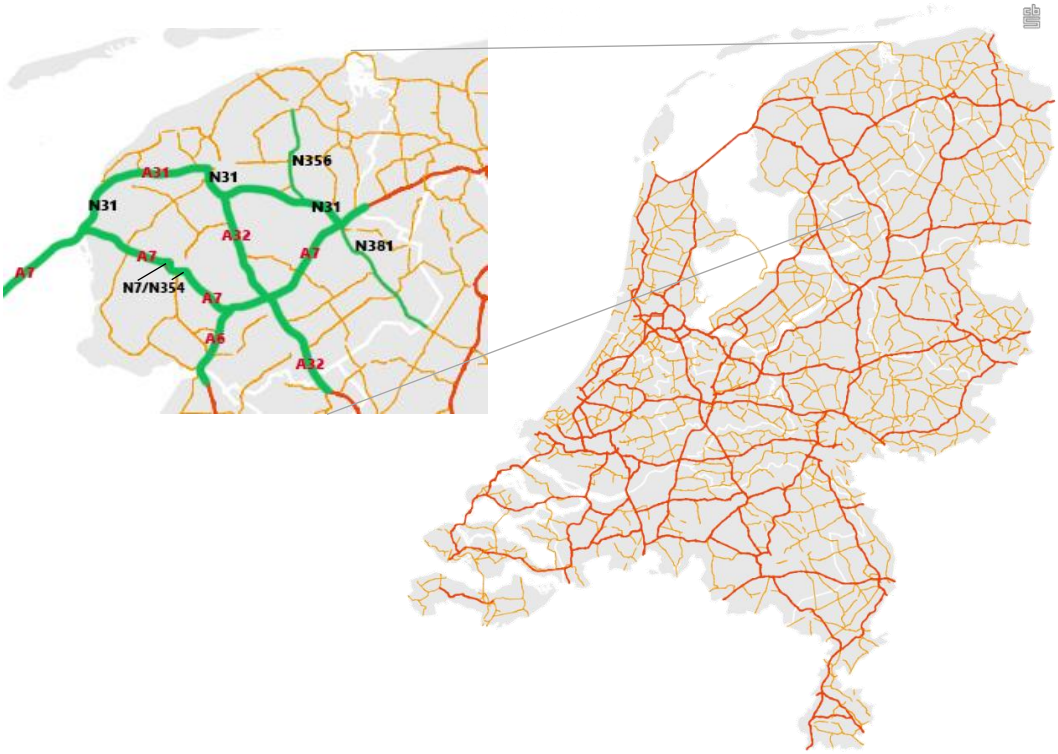

Figure 1 Roads considered in the study (left – in green) and the main traffic roads in the Netherlands (right – red=highways, orange=provincial roads) (source: CBS, 2019a)

The first dataset is a self-produced shapefile including the spatial patterns of highway ramps in Friesland over different periods of time. This dataset has been produced with the support of historical satellite images and topographical maps to match the time span of the housing transaction data (2004-2020). This has resulted in five different maps for different time periods (see appendix A), which have been determined by infrastructural projects throughout the province within this time span. Infrastructural developments in the province of Friesland have resulted in the construction of new roads, highway ramps, or changes in previously existing infrastructure, for which the use of updated maps is necessary in order to measure the correct distance between properties and the nearest highway ramp. Cotteleer & Peerlings (2011), Koster et al. (2010), and Yiu & Wong (2005) demonstrate that house prices may adjust before the completion of a project due to rational public expectations of the new highway (e.g. increased accessibility). Following this, the years in which infrastructural projects in our data have been finished have been used as beginning years for each period (see appendix A – Table A1). As one can see in Appendix A, in each map several ramps are located outside of the boundary of the province of Friesland. The reason for this is that this research is interested in the distance to the nearest highway ramp for properties within Friesland. This thus, for example, means that a property can lie in the province Friesland, while the nearest highway ramp for that property lies outside of the province.

3.3 Housing data and distance measurements

The second dataset consists of quantitative data from the Dutch Association of Real Estate Brokers and Real Estate Experts (NVM), which includes 88.728 property transactions of the province of Friesland during the period 2004 Q1 until 2020 Q1. A large variety of data is included in this dataset of which the most important for this research are address details, transaction price, transaction date, days on the market, number of rooms, living area in m2, volume in m3, year of construction, and the type of residence (see table 1).

The data from the NVM and on the highway ramps have been used to calculate distances between properties and the nearest highway ramps. In preparing the data for the distance calculations, the NVM data has been geocoded in ArcMap. This resulted in 82.273 addresses in the province of Friesland, as can be seen in Appendix B. Approximately 7.3 % of the data has been removed during this process either due to faulty geocoding, geocoding outside of the province of Friesland, or removing addresses on the Wadden Islands from the data. Four Wadden Islands belong to the province of Friesland. However, they have not been considered in this research as they do not have any direct accessibility to major road structures, while being relatively far away from the nearest highway ramps, resulting in outliers, which could influence the results. The data from Appendix B has been used to calculate the distances between properties and the nearest highway ramps. The transaction data has been split up into five periods, corresponding with the time periods of infrastructural changes in Appendix A, to ensure that the proper distances have been calculated for each transaction year, as some ramps were non-existent in, for example, 2004.

To prepare the data for the statistical analysis, the data has been analyzed using Excel and SPSS to further remove missing data, outliers and unrealistic values, such as number of rooms of a house equals zero, as they may represent missing data or typos. For each variable of the NVM dataset, careful analysis has been performed to decide whether outliers assigned by SPSS are realistic or unrealistic. As a result, the variable for distance between properties and the nearest highway ramps has been limited to 11,0 km to prevent that the results are driven by outliers. Table 1 presents the descriptive statistics for housing data and the distance measurements. The data cleaning procedure has resulted in a dataset of 67.716 transactions, which has been used to perform the multilinear regressions.

Table 1 Descriptive statistics for housing data and distance measurements

Variable	Mean	SD	Minimum	Maximum
Transaction Price (in Euro)	202.664	92.661	38.750	600.000
Ln. Transaction Price	0,91	0,03	0,79	1,00
Distance to nearest ramp in km	3,04	2,45	0,06	11,0
Days on the market	157	191	1	1094
Rooms	4,76	1,29	1	10
Living area in m2	119	37	9	300
Volume in m3	394	161	20	3000
Height in m	3,29	0,65	2	10
Construction Year	1967	33	1800	2020
Transaction Year	2013	5	2004	2020
N=67.716				

Figure 2 represents the location of the transactions included in the multilinear regressions, which means it only includes properties up to 11 km away from the highway ramps. One can see the location of towns and cities from the spatial pattern of the dots in figure 2. Each dot represents one transaction.

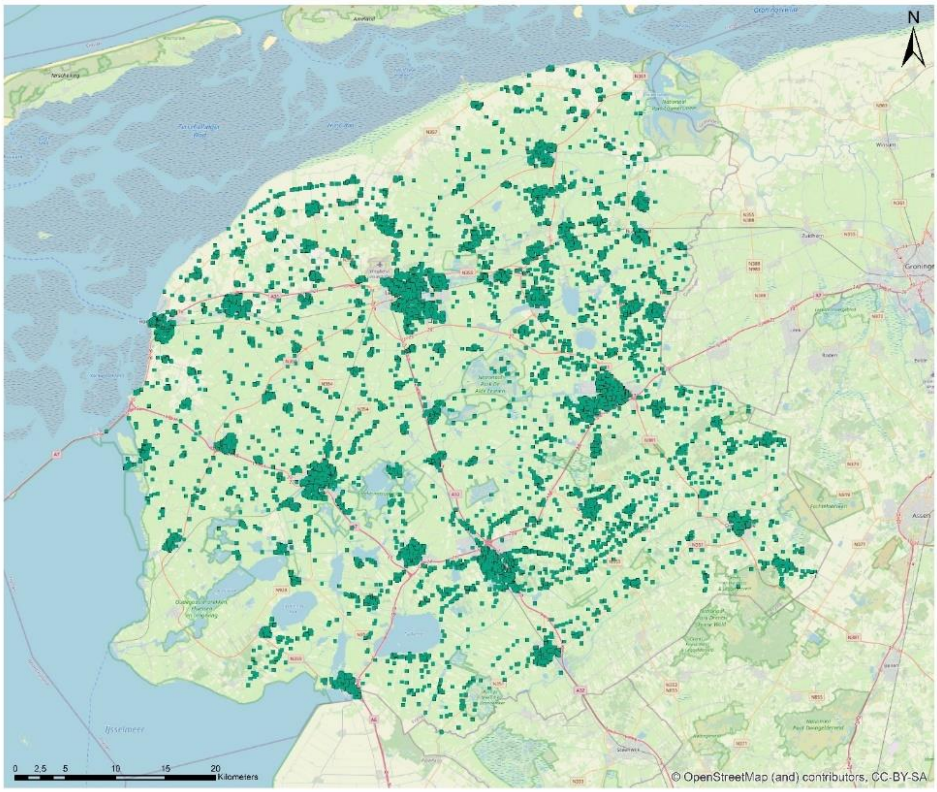

Figure 2 Properties up to 11 km from the nearest highway ramps from the NVM dataset (N=67.716) (Source: Esri, 2020)

3.4 Variable creation

Further preparation before performing the multilinear regression has consisted of transforming variables into different formats and creating dummy variables for the data. The dependent variable 'transaction price' has been transformed into 'log of the transaction price', and the distance to the nearest highway ramp in meters has been transformed into kilometers, for easier interpretation of the results. 'Volume in m3' has been divided by 'Living Area in m2' to calculate 'Height in m 'and prevent multicollinearity between volume and living area in the regressions. Dummy variables have been created for years of transaction, construction periods, type of residence, and PC4 codes (postcode areas). The large number of postcodes results in regressions consisting of 449 and 452

independent variables. Furthermore, dummy variables have been created for various distance categories, to check for discontinuity in the data, to see whether the results correspond with existing literature, and to broaden the scope of the research.

Road-related externalities operate at different spatial scales. The impact of air and noise pollution is generally limited to 100 m from the road where it originates from (Tillema et al., 2012). According to Nelson (1982), traffic noise, especially from highways, fades away to background levels within roughly 1.000 feet of a highway (which is 304,8 m). Eliasson (2005) concludes that noise effects fade at a distance of 300-600 m from the road. Furthermore, Eliasson et al. (2002) find that short distances to roads and train station have a negative impact on house prices. However, these negative effects seem to reduce rapidly with increasing distance. Tillema et al. (2012) adds to this that houses a couple of hundred meters from a road have relatively lower housing prices due to the nuisances associated with the road. They also argue that as you move further away from the road, property prices initially rise, until they reach a maximum, where after they fall again due to the disadvantage of having to travel over longer distances. However, they also argue that this assumption may not be fully realistic nor measurable in developed countries where road infrastructure in general is sufficient.

Following the literature, five categories have been created for the distance variable, which can be found in table 2. Due to the low amount of cases within the first 100 m of the highway ramps (Tillema et al., 2012), the first variable has become 0 – 0,3 km instead of two variables for 0 – 0,1 km and 0,1 – 0,3 km. The second variable (0,3 – 0,6 km) follows Eliasson et al. (2002) as noise fades at a distance of 300-600 m. The third distance variable (0,6 – 1 km) is inspired by Levkovich et al. (2016), as they use a distance of 1 km for traffic intensity in a study on Dutch highways. The fourth and fifth variable are based on Leeuwarden, the capital of Friesland. Distance measurements from the two nearest highway ramps near the city of Leeuwarden show that the city's size is approximately 7,5 km. Therefore, the fourth variable has become 1 – 7,5 km, to make sure that the fifth variable (7,5 – 11 km) aims at capturing the non-urban areas as much as possible.

Table 2 Dummy variables for distance to nearest highway ramps

Dummy variable	Distance in km	Frequency
Distance 0 – 0,3 km	0,00 – 0,3	744
Distance 0,3 – 0,6 km	0,31 – 0,6	2.969
Distance 0,6 – 1 km	0,61 – 1,0	7.417
Distance 1 – 7,5 km	1,01 – 7,5	51.299
Distance 7,5 – 11 km	7,51 – 11,0	5.287
	Total	67.716

3.5 Concepts: House Prices, Highway Accessibility, and Highway Ramps

For the understanding of the results of this study it is important to define three central concepts, namely house prices, highway accessibility, and highway ramps. House prices, in this study, are defined as the transaction prices from the NVM data, which are given in Euros. Log of transaction prices have been used in the regressions as dependent variable. Highway accessibility, in this study, is represented by the proximity of a property to a highway onramp. Highway accessibility is the distance in kilometers between a property and the nearest highway ramp. Highway ramps, in this study, is defined as all dual carriageway ramps containing elevated junctions within the province of Friesland. Six primary justifications can be given for adding dual carriageways to this study, which can be found in Appendix C. In short, the dual carriageways added to this study are similar to highways and, therefore, suitable to include.

4 Results

In this section the results of the multilinear regressions are presented. Both regressions consist of the prepared housing transaction and highway ramp data, which includes 67.716 cases. Table 3 presents the results for the distance measurements of the whole dataset. Table 4 presents a similar regression, however, this time using categories for the distance measurements. To control for differences between properties, variables about property characteristics are included in the regressions. For the year of transaction, dummy variables are included, where the coefficients should be interpreted compared to the transaction year 2004. The four dummy variables for construction periods should be interpreted compared to the construction period 1991-2020. The remaining variables below the construction periods represent the dummy variables for the type of residence. These results should be interpreted compared to detached homes.

The results of the first multilinear regression are presented in table 3. The dependent variable is the 'log of transaction price', whereas the independent variable of interest is 'Distance to nearest ramp in km', which is the calculated distance between a property and the nearest highway ramp.

Table 3 Regression 1: multilinear regression results for all distance measurements

		Reg.	1		
Independent variable	β	Std. Err.	Independent variable	β	Std. Err.
Distance to nearest ramp in km	,071***	,000	Construction period <1901 (dummy)	-,105***	,000
Days on the market	-,020***	,000	Construction period 1901-1930 (dummy)	-,195***	,000
Number of rooms	,034***	,000	Construction period 1931-1960 (dummy)	-,179***	,000
Living area in m2	,483***	,000	Construction period 1961-1990 (dummy)	-,202***	,000
Height in m	,096***	,000	Semidetached house (dummy)	-,172***	,000
Transaction year 2005 (dummy)	,022***	,000	Downstairs + upstairs living (dummy)	-,020***	,003
Transaction year 2006 (dummy)	,040***	,000	Downstairs living (dummy)	-,078***	,001
Transaction year 2007 (dummy)	,056***	,000	Upstairs living (dummy)	-,085***	,001
Transaction year 2008 (dummy)	,054***	,000	Edge house (dummy)	-,077***	,001
Transaction year 2009 (dummy)	,032***	,000	Gallery apartment (dummy)	-,145***	,000
Transaction year 2010 (dummy)	,038***	,000	Linked-semidetached house (dummy)	-,040***	,001
Transaction year 2011 (dummy)	,022***	,000	Linked home (dummy)	-,083***	,000
Transaction year 2012 (dummy)	-,013***	,000	Semi-detached living (dummy)	-,067***	,000
Transaction year 2013 (dummy)	-,033***	,000	Corner house (dummy)	-,216***	,000
Transaction year 2014 (dummy)	-,030***	,000	Maisonnette (dummy)	-,075***	,001
Transaction year 2015 (dummy)	-,015***	,000	Penthouse (dummy)	-,002	,001
Transaction year 2016 (dummy)	,008**	,000	Portico flat (dummy)	-,087***	,000
Transaction year 2017 (dummy)	,049***	,000	Portico house (dummy)	-,011***	,002
Transaction year 2018 (dummy)	,092***	,000	Mezzanine (dummy)	-,001	,002
Transaction year 2019 (dummy)	,141***	,000	Terraced house (dummy)	-,361***	,000
Transaction year 2020 (dummy)	,072***	,001	Staggered house (dummy)	-,015***	,003
Constant	,852***	,001			
R Square	,780				

N=67.716. Significance levels: ***p<0.01. **p<0.05. *p<0.1.

Dependent variable: log of transaction price.

Note: PC4 dummy variables are not included in table 3 and 4, due to the size (N=407)[1]. Reference categories: Transaction year 2004 (dummy), Construction period 1991-2020 (dummy), Detached home (dummy), PC4=9202 (dummy).

[1] Regression results for the PC dummy variables can be found in Appendix D.

The model in table 3 has a significance level of ,000 and R Square of ,780. The ANOVA has a significance level of ,000, indicating that the means of two or more independent variables are not equal. The variable for the distance between properties and the nearest highway ramps in kilometers has a significance level of ,000 and a standard coefficient of ,071, which implies that house prices rise the further we move away from the highway ramps. The results indicate that there is a positive linear relationship between (ln) house prices and the distance between properties and the nearest highway ramps. However, this impact seems limited compared to, for example, the living area in m2, which corresponds with existing literature (e.g. Hughes & Sirmans, 1992). Reasons for the positive coefficients for the distance to the nearest highway ramp in km can be found in the literature, as researchers suggest that negative externalities are higher near major roads. Furthermore, properties near roads have a higher chance on discounts, while similar properties in quiet places can sometimes generate premiums. These negative externalities near major roads often are noise and air pollution (Theebe, 2004; Szczepanska et al., 2015; Nelson, 1982; Bateman et al., 2001; Papi & Halleman, 2004). Furthermore, Tillema et al. (2012) argue that accessibility in developed countries nowadays is sufficient and Giuliano (1989) argues that the decentralization of economic activities and the development of the transportation networks have resulted in a homogeneous high accessibility level and a decrease in locational differences between places. One might argue that due to proper infrastructure, causing this sufficient accessibility, persons move further away from major roads to prevent having to deal with the negative externalities. Accessibility, namely, operates on a larger spatial scale than negative externalities.

The second model is presented in table 4, where 'Distance to nearest ramp in km' has been replaced by dummy variables for distance categories to account for discontinuity in the data. One should interpret the results of the four distance categories compared to the distance category furthest away from the highway ramps 'Distance 7,5 – 11,0km'. The model has a significance level of ,000 and R Square of ,780. The ANOVA has a significance level of ,000. The results indicate that, compared to the reference category, house prices are lower in all other distance categories. Furthermore, results indicate that discontinuity is present in the data, as the coefficients decrease and increase between the variables (compared to the reference category). This discontinuity may be the result of the spatial structure of the province, as it consists of many small to medium sized towns and rural areas around them. Not all those towns lie directly next to a highway ramp, attributing to this discontinuity. However, the results from table 3 correspond with the results from table 4 in indicating that the distance category furthest away from the highway ramps generates the highest house prices. In Table 3 this is represented by a positive coefficient, indicating that the further away one moves from the highway ramp the higher the generated house prices are. In table 4 this is represented by the negative coefficient for all distance categories included in the regression, indicating that the category furthest away from the highway ramps, 7,5-11,0km, generates the highest house prices. Rising house prices are found for the distance between 0,6 and 11 km.

Possible explanations for the most optimistic coefficient for the 0,3 – 0,6 km distance are that noise levels fade away to background level within roughly 300 to 600 meters (Nelson, 1982; Eliasson, 2005). This means that the distance is far enough for negative externalities, like noise and air pollution, to fade away, while accessibility also remains sufficient. The slightly lower coefficient for the 0 – 0,3 km distance can be explained by the fact that noise and air pollution usually operates at a distance of a couple of hundred meters from a major road and, therefore, overrules the accessibility benefits (Tillema et al., 2012). The 0,6 – 1,0 km distance shows the least optimistic coefficient. Possible reasons for this may be that those properties are still influenced by negative externalities, like traffic intensity, from a nearby road or busy street other than the highway, while accessibility levels have also decreased to a certain extent (Levkovich et al., 2016). In their research, Tillema et al.

(2012) argue that house prices may shift upwards due to improved accessibility and, therefore, house prices seem to be negatively correlated to distance to the nearest highway access lane. However, results from table 3 and 4 indicate that this is the opposite for the province of Friesland. Results correspond with researchers like Theebe (2004) and Ossokina & Verweij (2011), as they argue that higher traffic intensity results in a negative impact on property values, which is the case in areas near highway ramps and major roads. Results indicate that lower house prices are indeed found near highway ramps.

Table 4 Regression 2: multilinear regression including dummy variables for distances

		Reg.	2		
Independent variable	β	Std. Err.	Independent variable	β	Std. Err.
Distance 0 – 0,3 km (dummy)	-,017***	,001	Construction period <1901 (dummy)	,105***	,001
Distance 0,3 – 0,6 km (dummy)	-,010**	,001	Construction period 1901-1930 (dummy)	-,195***	,000
Distance 0,6 – 1 km (dummy)	-,028***	,001	Construction period 1931-1960 (dummy)	-,180***	,000
Distance 1 – 7,5 km (dummy)	-,016**	,001	Construction period 1961-1990 (dummy)	-,202***	,000
Days on the market	-,020***	,000	Semidetached house (dummy)	-,172***	,000
Number of Rooms	,034***	,000	Downstairs + upstairs living (dummy)	-,020***	,003
Living area in m2	,482***	,000	Downstairs living (dummy)	-,078***	,001
Height in m	,096***	,000	Upstairs living (dummy)	-,086***	,001
Transaction year 2005 (dummy)	,022***	,000	Edge house (dummy)	-,077***	,001
Transaction year 2006 (dummy)	,040***	,000	Gallery apartment (dummy)	-,143***	,000
Transaction year 2007 (dummy)	,056***	,000	Linked-semidetached house (dummy)	-,040***	,001
Transaction year 2008 (dummy)	,054***	,000	Linked home (dummy)	-,083***	,000
Transaction year 2009 (dummy)	,032***	,000	Semi-detached living (dummy)	-,068***	,000
Transaction year 2010 (dummy)	,038***	,000	Corner house (dummy)	-,217***	,000
Transaction year 2011 (dummy)	,022***	,000	Maisonnette (dummy)	-,075***	,001
Transaction year 2012 (dummy)	-,013***	,000	Penthouse (dummy)	-,001	,001
Transaction year 2013 (dummy)	-,033***	,000	Portico flat (dummy)	-,087***	,000
Transaction year 2014 (dummy)	-,030***	,000	Portico house (dummy)	-,010***	,002
Transaction year 2015 (dummy)	-,016***	,000	Mezzanine (dummy)	-,000	,002
Transaction year 2016 (dummy)	,006**	,000	Terraced house (dummy)	-,361***	,000
Transaction year 2017 (dummy)	,047***	,000	Staggered house (dummy)	-,014***	,003
Transaction year 2018 (dummy)	,091***	,000			
Transaction year 2019 (dummy)	,140***	,000			
Transaction year 2020 (dummy)	,071***	,001			
Constant	,855***	,001			
R Square	,780				

N=67.716 Significance levels: ***p<0.01. **p<0.05. *p<0.1.

Dependent variable: log of transaction price.

Reference categories: Distance 7,5 – 11,0km (dummy), Transaction year 2004 (dummy), Construction period 1991-2020 (dummy), Detached home (dummy), PC4=9202 (dummy).

The results of the two models indicate that houses further away from the highway ramps generate higher prices. This is the case for at least the distance between 0,6 and 11 km, as results indicate that house prices rise when moving further away starting from 0,6 – 1 km up to 7,5 – 11 km. Below 0,6 - 1 km, discontinuity in the data is found. However, coefficients for all distance categories in table 4 are lower compared to the reference category 'Distance 7,5 – 11 km', indicating that indeed living further away from the highway ramp generates a higher house price, which is also supported by the regression results in table 3.

5 Conclusion

Existing literature on house prices and influencing externalities differ in outcomes and conclusions. Roads come with positive externalities, like accessibility, and negative externalities, like noise and air pollution. However, these positive and negative externalities have less impact on house prices than physical property and neighborhood characteristics (Wilhelmsson, 2000; Tillema et al., 2012; Adair et al., 2000; Henneberry, 1998). Furthermore, personal preferences and self-selection play a role in the choice of a new house (Wee, 2009).

Results indicate that, in the province of Friesland, there is a positive linear relationship between house prices and the distance between properties and the nearest highway ramps. Properties further away from the highway ramps generate higher house prices, although the impact is limited, shown by low coefficients in both regressions (compared to, for example, living area). What has become clear from using distance categories based on the literature in the second regression (Tillema et al., 2012; Nelson, 1982; Eliasson, 2005; Eliasson et al., 2002; Levkovich et al., 2016), is that properties located on a distance of 7,5 – 11 km from a highways ramps generate higher house prices than properties located on a distance of 0 – 7,5 km from highway ramps. Discontinuity can be found in the data, as the coefficients increase and decrease between the distance categories for 0 – 0,3 km, 0,3 – 0,6 km, and 0,6 – 1 km. However, from 0,6 km up to 11 km, the coefficients keep increasing, corresponding with the results from the first regression, where house prices increase on a further distance away from highway ramps. Various explanations can be given for these results found. Close to the highway ramp, negative externalities like noise pollution, air pollution and traffic intensity may outweigh accessibility benefits. However, those negative externalities, fade away at a distance of 0,3 to 0,6 kilometers (Nelson, 1982; Eliasson, 2005; Tillema et al., 2012). Furthermore, the fading negative externalities make room for accessibility benefits to outweigh them, as accessibility operates on a larger spatial scale than the negative externalities and because the development of the transportation networks have resulted in a homogeneous high accessibility level and a decrease in locational differences between places (Tillema et al., 2012; Giuliano, 1989). Existing literature has also shown that properties located along roads with high traffic intensities might sell for a discount, while similar properties at quiet locations might even sell for a premium, corresponding with the positive coefficient for the distance to the highway ramps (Theebe, 2004). Friesland has a varying landscape of larger cores, many smaller towns, and rural areas, it thus may be that the quiet rural areas indeed generate higher house prices. The least optimistic coefficient has been found for the distance category 0,6 – 1 km. Possible reasons for this may be that those properties are still influenced by negative externalities, like traffic intensity, from a nearby road or busy street while accessibility levels have also decreased to a certain extent (Levkovich et al., 2016). However, more intensive research into different distance categories is needed to understand all the influencing factors causing these results.

6 Discussion

Due to the large dataset from the NVM for the period 2004-2020, many cases (N=67.716) have been included in the multilinear regressions. As a result of the large sample size and the removal of outliers to prevent results being driven by outliers, results become more trustworthy. However, careful interpretation of the results is necessary, as the results may not apply to any area. The study has been carried out in the province of Friesland, which is considered as a rural province. This implies that results could apply to similar provinces (e.g. in the Netherlands). However, more studies in different settings and countries should be considered in the future to generate a deeper understanding of the impact of accessibility on house prices.

The distance between properties and the nearest highway ramps have been calculated in straight distances. Better and more realistic results would be obtained if distances would be calculated over the roads, as it prevents distances being shorter than they are in reality and properties being matched to false nearest highway ramps.

Future research could focus more specifically on accessibility impacts on various distances and the influence of highway accessibility on commercial properties, as they tend to locate close to major routes. Furthermore, more intensive research into the combination distance, housing prices and externalities would be beneficial in understanding how those are related and if it could explain discontinuity in the data. Such results could be beneficial for planners, investors, or the construction industry as to in which location new properties should be constructed.

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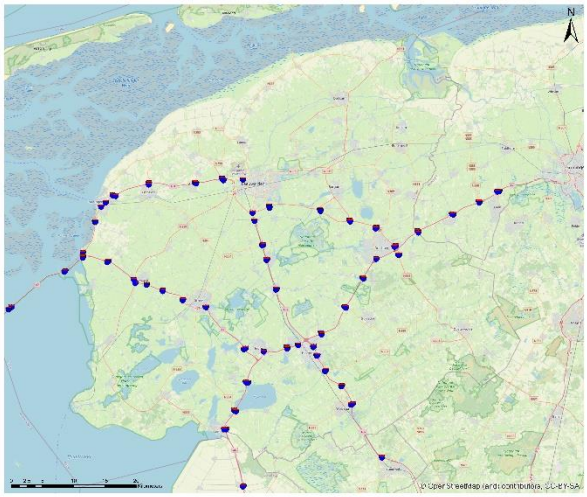
Appendix A Infrastructural changes on Frisian roads included in the research

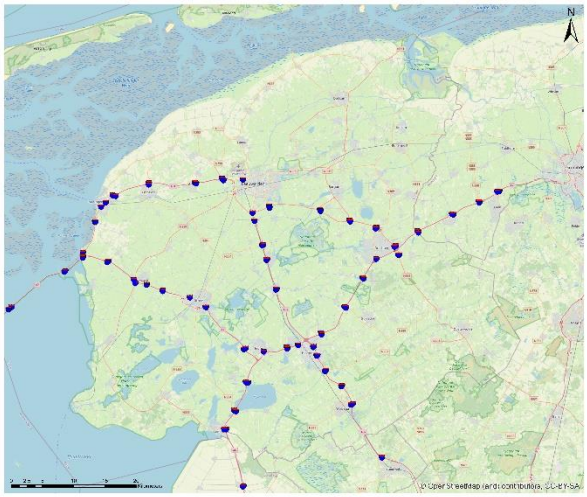
Maps showing the locations of highway ramps for the different time periods found in Table B1

1: 2004-2007 – Topographic map 2004
(Source: Esri Nederland, 2019a)



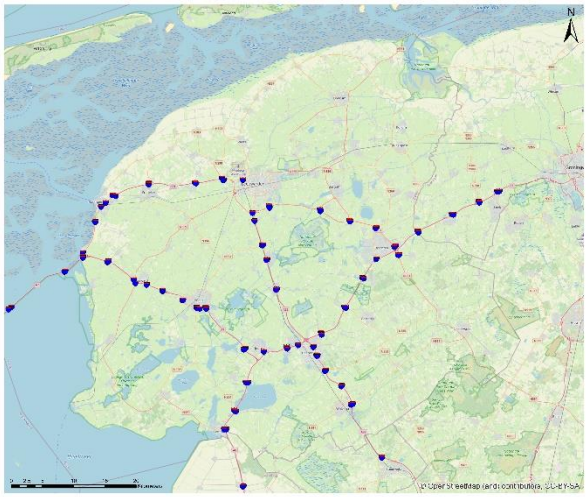
2: 2004-2007 – Shown on current situation
(Source: Esri, 2020)

3: 2008-2010 – Topographic map 2009
(Source: Esri Nederland, 2019b)



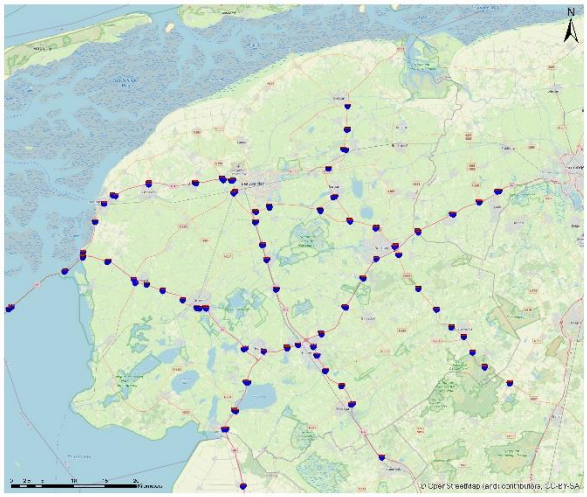
4: 2008-2010 – Shown on current situation
(Source: Esri, 2020)

5: 2011-2014 – Topographic map 2011
(Source: Esri Nederland, 2019c)

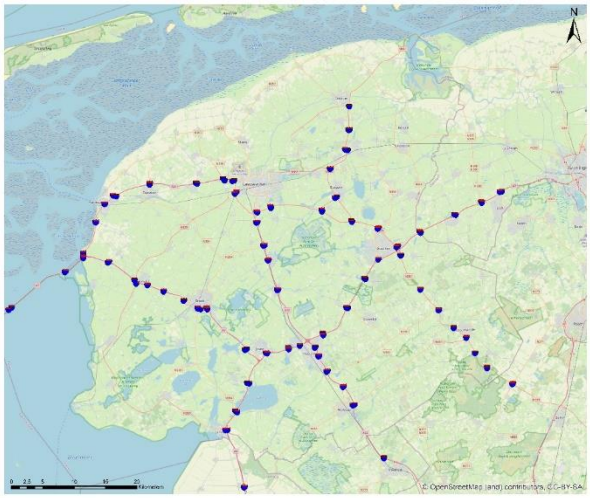


6: 2011-2014 – Shown on current situation
(Source: Esri, 2020)

7: 2015-2017 – Topographic map 2016 (Source: Esri Nederland, 2019d)



8: 2015-2017 – Shown on current situation (Source: Esri, 2020)



9: 2018-2020 – Indication of current situation (Source: Esri, 2020)

Table A1 Periods of dual carriageway infrastructure in Friesland (Source: Kadaster, 2020)

	Period	Finished projects
1 - 2	2004-2007	(old situation)
2 - 3	2008-2010	A7: Sneek-West new ramps
5 - 6	2011-2014	A7-N354-N7: ring road Sneek completed, containing new ramps
7 - 8	2015-2017	N31: ring road Leeuwarden completed N356: Centrale As completed N381: Partly converted to dual carriageway, plus all junctions elevated
9	2018-2020	A6/A7: junction Joure completed (removal of highway roundabout) (current situation)

Appendix B NVM dataset before data cleaning

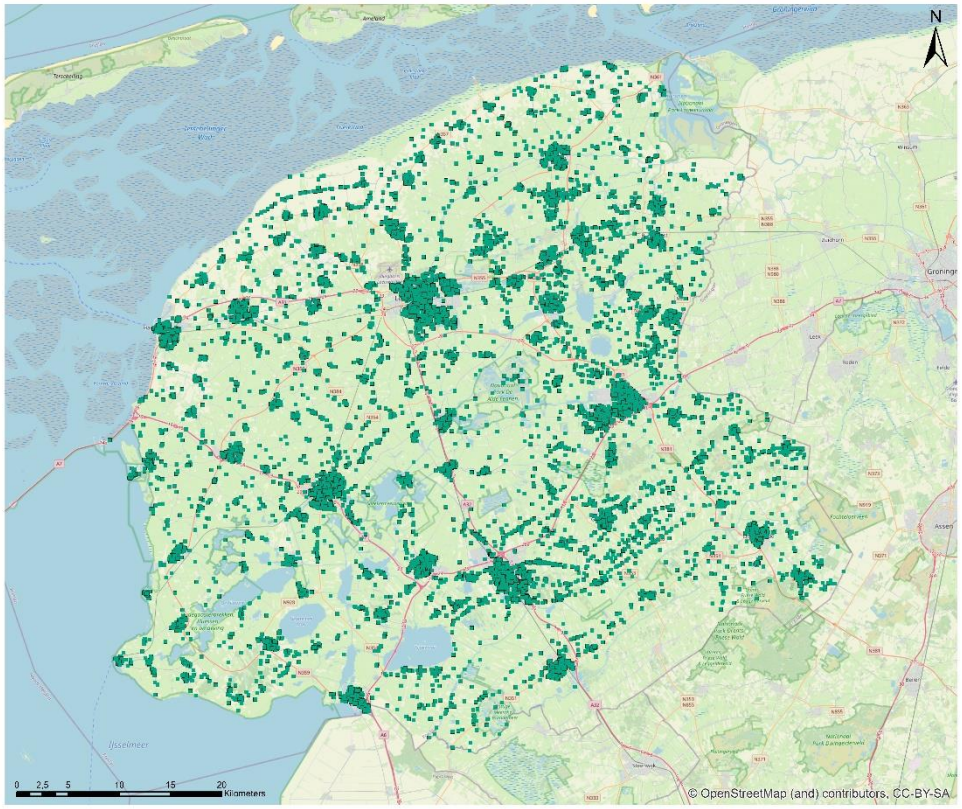


Figure B1 Geocoded addresses from the NVM dataset (N=82.273) (Source: Esri, 2020)
Note: excluding Wadden Islands, addresses outside of the province boundaries and faulty geocoding.

Appendix C Including dual carriageways to the sample

Looking at the figure 1, two N-roads have been added to the national highways (colored in red on the right) in Friesland: the N381 between Drachten and Appelscha (colored in orange on the right), connected to the A7 and the N356 between Nijega and Dokkum, connected to the N31, which is defined as *Rijksweg* (national highway) and connects the A7 and A32 with each other and the A31. The N381 has 4 lanes from Drachten until Donkerbroek, and then proceeds with 2 lanes until the border of the province. However, the whole road is taken into the sample as the N381 has elevated junctions over the whole trajectory. There are six primary reasons for not including highways exclusively, but adding the two dual carriageways:

1. The N31 is a dual carriageway but has been given the status of ''Rijksweg'' instead of ''Provinciale weg'' (or national highway instead of provincial road). The difference between the N31 and the N381 & N356 is that the N31 has been given the status of a national highway, and the N381 & N356 have been given the status of provincial road. However, the roads have the same layout by large.

2. Same speed limit on A-roads as N-roads (100 km/h). Since March 16th, 2020, the speed limit on all highways in the Netherlands decreased from 130 km/h to 100 km/h (between 6-19h). All remaining dual carriageways (N-roads) in Friesland were already 100 km/h (and sometimes 80km/h) before this, making them almost equal to the highways during most of the day.

3. Added N-roads are 2 by 2 lanes, just like highways. Highways in Friesland and most of the country consist of 2 lanes (and sometimes more on busy parts) plus an emergency lane. The added N-roads also have 2 by 2 lanes but usually no emergency lane. However, cars are not allowed on the emergency lane, making these N-roads equal to A-roads in practice.

4. The N381 and N356 have ramps for merging onto and exiting the dual carriageways. Highways in the Netherlands have ramps in order to merge onto the road or exit the road. This means that there are no junctions on the same surface (those are near, below, or elevated above the road). The N381 and N356 are the only N-roads, which are not 'Rijkswegen', that also have these ramps on the sections included in the research. This makes these two roads similar to highways. Other N-roads in Friesland usually have junctions or roundabouts directly connected to 1 by 1 lanes expressways and, therefore, are no taken into consideration in this study.

5. No traffic lights can be found on the sections of the N381 and N356 included in this research. This is another important aspect when it comes to similarity to highways, as other N-roads in the province sometimes have traffic lights, even though the speed limit are 100 km/h, preventing a fast and smooth journey.

6. The N381 and N356 are directly connected to Rijkswegen, making it unnecessary to switch to different road types before entering the highways. One exception is the N31, which is also an N-road. However, this road is defined as Rijksweg (national highway), and is also directly connected to the A31, A32 and A7.

Appendix D Combined regression results for the dummy variables of PC4 codes

Table D1 Regression results for the PC4 codes dummy variables (N=67.716)

Independent variables	Reg.1	Reg. 1	Reg. 1	Reg. 2	Reg. 2	Reg. 2
Dummy variables PC4 (Postcode areas)	Std. Err.	β	Sig.	Std. Err.	β	Sig.
PC4_Recode=8401	0,001	0,021	0,000	0,001	0,030	0,000
PC4_Recode=8403	0,002	0,008	0,000	0,002	0,010	0,000
PC4_Recode=8404	0,001	0,011	0,000	0,001	0,013	0,000
PC4_Recode=8405	0,002	0,008	0,000	0,002	0,008	0,000
PC4_Recode=8406	0,001	0,009	0,000	0,001	0,008	0,000
PC4_Recode=8407	0,002	0,016	0,000	0,002	0,016	0,000
PC4_Recode=8408	0,001	0,010	0,000	0,001	0,014	0,000
PC4_Recode=8409	0,002	0,003	0,071	0,002	0,007	0,000
PC4_Recode=8411	0,001	0,005	0,030	0,001	0,015	0,000
PC4_Recode=8412	0,002	0,014	0,000	0,002	0,019	0,000
PC4_Recode=8413	0,002	0,016	0,000	0,002	0,020	0,000
PC4_Recode=8414	0,001	0,010	0,000	0,001	0,016	0,000
PC4_Recode=8415	0,002	0,006	0,003	0,002	0,009	0,000
PC4_Recode=8421	0,001	0,004	0,043	0,001	0,014	0,000
PC4_Recode=8422	0,004	0,002	0,235	0,004	0,004	0,031
PC4_Recode=8423	0,002	0,007	0,000	0,002	0,008	0,000
PC4_Recode=8424	0,003	0,003	0,136	0,003	0,004	0,017
PC4_Recode=8425	0,004	0,003	0,086	0,004	0,003	0,114
PC4_Recode=8426	0,001	0,005	0,018	0,001	0,005	0,006
PC4_Recode=8427	0,004	0,004	0,041	0,004	0,005	0,008
PC4_Recode=8428	0,006	0,007	0,000	0,006	0,007	0,000
PC4_Recode=8431	0,001	0,001	0,509	0,001	0,001	0,701
PC4_Recode=8432	0,003	0,001	0,658	0,003	0,003	0,098
PC4_Recode=8433	0,001	-0,001	0,726	0,001	0,013	0,000
PC4_Recode=8434	0,002	0,000	0,949	0,002	0,006	0,001
PC4_Recode=8435	0,001	0,006	0,001	0,001	0,011	0,000
PC4_Recode=8441	0,001	0,040	0,000	0,001	0,040	0,000
PC4_Recode=8442	0,001	0,040	0,000	0,001	0,040	0,000
PC4_Recode=8443	0,001	0,025	0,000	0,001	0,025	0,000
PC4_Recode=8444	0,003	0,023	0,000	0,003	0,023	0,000
PC4_Recode=8445	0,001	0,039	0,000	0,001	0,038	0,000
PC4_Recode=8446	0,001	0,040	0,000	0,001	0,038	0,000
PC4_Recode=8447	0,001	0,039	0,000	0,001	0,038	0,000
PC4_Recode=8448	0,001	0,042	0,000	0,001	0,043	0,000
PC4_Recode=8449	0,004	0,009	0,000	0,004	0,009	0,000
PC4_Recode=8451	0,001	0,013	0,000	0,001	0,013	0,000
PC4_Recode=8452	0,006	0,007	0,000	0,006	0,008	0,000
PC4_Recode=8453	0,001	0,038	0,000	0,001	0,038	0,000
PC4_Recode=8454	0,002	0,018	0,000	0,002	0,018	0,000
PC4_Recode=8455	0,002	0,015	0,000	0,002	0,016	0,000
PC4_Recode=8456	0,001	0,013	0,000	0,001	0,013	0,000
PC4_Recode=8457	0,004	0,011	0,000	0,004	0,011	0,000

PC4_Recode=8458	0,002	0,011	0,000	0,002	0,011	0,000
PC4_Recode=8459	0,002	0,006	0,000	0,002	0,006	0,000
PC4_Recode=8461	0,002	0,013	0,000	0,002	0,014	0,000
PC4_Recode=8462	0,005	0,007	0,000	0,005	0,007	0,000
PC4_Recode=8463	0,002	0,014	0,000	0,002	0,016	0,000
PC4_Recode=8464	0,001	0,011	0,000	0,001	0,013	0,000
PC4_Recode=8465	0,001	0,026	0,000	0,001	0,026	0,000
PC4_Recode=8466	0,005	0,005	0,003	0,005	0,006	0,002
PC4_Recode=8467	0,003	0,008	0,000	0,003	0,009	0,000
PC4_Recode=8468	0,002	0,009	0,000	0,002	0,010	0,000
PC4_Recode=8469	0,003	0,007	0,000	0,003	0,008	0,000
PC4_Recode=8471	0,001	0,027	0,000	0,001	0,027	0,000
PC4_Recode=8472	0,001	0,014	0,000	0,001	0,014	0,000
PC4_Recode=8474	0,002	0,013	0,000	0,002	0,013	0,000
PC4_Recode=8475	0,003	0,010	0,000	0,003	0,012	0,000
PC4_Recode=8476	0,004	0,001	0,767	0,004	0,001	0,729
PC4_Recode=8477	0,006	0,009	0,000	0,006	0,009	0,000
PC4_Recode=8478	0,005	0,004	0,025	0,005	0,005	0,011
PC4_Recode=8479	0,005	0,004	0,038	0,005	0,005	0,007
PC4_Recode=8481	0,006	0,007	0,000	0,006	0,009	0,000
PC4_Recode=8482	0,004	0,006	0,001	0,004	0,009	0,000
PC4_Recode=8483	0,003	-0,003	0,099	0,003	0,001	0,586
PC4_Recode=8484	0,004	0,006	0,000	0,004	0,009	0,000
PC4_Recode=8485	0,002	0,001	0,540	0,002	0,006	0,003
PC4_Recode=8486	0,005	0,002	0,378	0,005	0,003	0,104
PC4_Recode=8487	0,005	0,006	0,001	0,005	0,006	0,001
PC4_Recode=8488	0,006	0,007	0,000	0,006	0,007	0,000
PC4_Recode=8489	0,008	0,004	0,044	0,008	0,005	0,009
PC4_Recode=8491	0,001	0,020	0,000	0,001	0,020	0,000
PC4_Recode=8493	0,001	0,037	0,000	0,001	0,041	0,000
PC4_Recode=8494	0,001	0,023	0,000	0,001	0,023	0,000
PC4_Recode=8495	0,001	-0,002	0,341	0,001	0,000	0,848
PC4_Recode=8497	0,009	0,003	0,142	0,009	0,003	0,074
PC4_Recode=8501	0,001	0,069	0,000	0,001	0,068	0,000
PC4_Recode=8502	0,001	0,047	0,000	0,001	0,046	0,000
PC4_Recode=8505	0,006	0,010	0,000	0,006	0,010	0,000
PC4_Recode=8506	0,002	0,012	0,000	0,002	0,012	0,000
PC4_Recode=8507	0,002	-0,041	0,000	0,002	-0,040	0,000
PC4_Recode=8508	0,003	0,004	0,045	0,002	0,006	0,001
PC4_Recode=8511	0,002	0,014	0,000	0,002	0,017	0,000
PC4_Recode=8512	0,005	0,006	0,002	0,005	0,006	0,002
PC4_Recode=8513	0,002	0,004	0,044	0,002	0,004	0,032
PC4_Recode=8514	0,008	0,003	0,165	0,008	0,003	0,138
PC4_Recode=8515	0,015	0,003	0,090	0,015	0,003	0,084
PC4_Recode=8516	0,007	0,005	0,003	0,007	0,005	0,003
PC4_Recode=8517	0,002	0,012	0,000	0,002	0,012	0,000
PC4_Recode=8521	0,001	0,015	0,000	0,001	0,016	0,000
PC4_Recode=8522	0,004	0,001	0,478	0,004	0,003	0,132

PC4_Recode=8523	0,002	0,008	0,000	0,002	0,010	0,000
PC4_Recode=8524	0,011	0,014	0,000	0,011	0,014	0,000
PC4_Recode=8525	0,001	0,030	0,000	0,001	0,031	0,000
PC4_Recode=8526	0,002	0,023	0,000	0,002	0,023	0,000
PC4_Recode=8527	0,015	0,005	0,002	0,015	0,006	0,002
PC4_Recode=8529	0,011	0,004	0,016	0,011	0,005	0,004
PC4_Recode=8531	0,001	0,064	0,000	0,001	0,064	0,000
PC4_Recode=8532	0,001	0,044	0,000	0,001	0,044	0,000
PC4_Recode=8535	0,004	0,004	0,029	0,004	0,004	0,026
PC4_Recode=8536	0,002	0,005	0,012	0,002	0,005	0,014
PC4_Recode=8537	0,002	0,006	0,001	0,002	0,007	0,000
PC4_Recode=8538	0,002	0,004	0,024	0,002	0,006	0,001
PC4_Recode=8539	0,001	0,004	0,046	0,001	0,008	0,000
PC4_Recode=8541	0,005	0,003	0,168	0,005	0,003	0,081
PC4_Recode=8542	0,004	0,004	0,050	0,004	0,005	0,005
PC4_Recode=8551	0,001	0,000	0,856	0,001	0,009	0,000
PC4_Recode=8553	0,002	0,041	0,000	0,002	0,047	0,000
PC4_Recode=8554	0,009	0,005	0,012	0,009	0,006	0,002
PC4_Recode=8556	0,002	0,000	0,824	0,002	0,005	0,015
PC4_Recode=8561	0,001	0,013	0,000	0,001	0,027	0,000
PC4_Recode=8563	0,002	0,016	0,000	0,002	0,020	0,000
PC4_Recode=8564	0,008	0,004	0,034	0,008	0,005	0,003
PC4_Recode=8565	0,002	0,007	0,000	0,002	0,011	0,000
PC4_Recode=8566	0,002	0,010	0,000	0,002	0,016	0,000
PC4_Recode=8601	0,001	0,063	0,000	0,001	0,062	0,000
PC4_Recode=8602	0,001	0,045	0,000	0,001	0,044	0,000
PC4_Recode=8603	0,001	0,081	0,000	0,001	0,081	0,000
PC4_Recode=8604	0,001	0,065	0,000	0,001	0,065	0,000
PC4_Recode=8605	0,001	0,059	0,000	0,001	0,058	0,000
PC4_Recode=8606	0,001	0,035	0,000	0,001	0,036	0,000
PC4_Recode=8607	0,001	0,076	0,000	0,001	0,076	0,000
PC4_Recode=8608	0,001	0,037	0,000	0,001	0,036	0,000
PC4_Recode=8611	0,002	0,006	0,001	0,002	0,011	0,000
PC4_Recode=8613	0,011	0,009	0,000	0,011	0,010	0,000
PC4_Recode=8614	0,002	0,008	0,000	0,002	0,012	0,000
PC4_Recode=8615	0,002	0,002	0,221	0,002	0,003	0,062
PC4_Recode=8616	0,005	0,003	0,081	0,005	0,004	0,040
PC4_Recode=8617	0,003	0,004	0,021	0,003	0,005	0,010
PC4_Recode=8618	0,002	0,013	0,000	0,002	0,013	0,000
PC4_Recode=8621	0,001	0,023	0,000	0,001	0,032	0,000
PC4_Recode=8622	0,002	0,003	0,072	0,002	0,006	0,001
PC4_Recode=8623	0,003	0,006	0,001	0,003	0,007	0,000
PC4_Recode=8624	0,002	0,040	0,000	0,002	0,041	0,000
PC4_Recode=8625	0,002	0,020	0,000	0,002	0,019	0,000
PC4_Recode=8626	0,003	0,014	0,000	0,003	0,014	0,000
PC4_Recode=8627	0,002	0,002	0,304	0,002	0,004	0,043
PC4_Recode=8628	0,004	0,010	0,000	0,004	0,010	0,000
PC4_Recode=8629	0,001	0,021	0,000	0,001	0,024	0,000

PC4_Recode=8631	0,015	0,003	0,103	0,015	0,003	0,095
PC4_Recode=8632	0,006	0,000	0,911	0,006	0,000	0,980
PC4_Recode=8633	0,002	0,021	0,000	0,002	0,020	0,000
PC4_Recode=8635	0,003	0,001	0,703	0,003	0,004	0,026
PC4_Recode=8636	0,004	0,001	0,451	0,004	0,004	0,053
PC4_Recode=8637	0,003	-0,006	0,001	0,003	-0,003	0,118
PC4_Recode=8641	0,004	-0,004	0,037	0,004	-0,002	0,297
PC4_Recode=8642	0,008	0,003	0,068	0,008	0,004	0,019
PC4_Recode=8644	0,004	-0,003	0,169	0,004	0,000	0,914
PC4_Recode=8647	0,003	0,002	0,322	0,003	0,004	0,032
PC4_Recode=8651	0,001	0,035	0,000	0,001	0,036	0,000
PC4_Recode=8658	0,006	0,007	0,000	0,006	0,007	0,000
PC4_Recode=8701	0,001	0,020	0,000	0,001	0,020	0,000
PC4_Recode=8702	0,001	0,023	0,000	0,001	0,023	0,000
PC4_Recode=8711	0,001	0,011	0,000	0,001	0,026	0,000
PC4_Recode=8724	0,015	0,008	0,000	0,015	0,008	0,000
PC4_Recode=8731	0,001	0,005	0,026	0,001	0,011	0,000
PC4_Recode=8732	0,003	-0,001	0,591	0,003	0,002	0,338
PC4_Recode=8733	0,009	-0,002	0,323	0,009	-0,001	0,660
PC4_Recode=8734	0,002	-0,002	0,298	0,002	0,003	0,137
PC4_Recode=8735	0,003	-0,004	0,024	0,003	-0,001	0,550
PC4_Recode=8736	0,005	0,002	0,359	0,005	0,003	0,145
PC4_Recode=8737	0,008	-0,005	0,004	0,008	-0,005	0,009
PC4_Recode=8741	0,008	0,003	0,141	0,008	0,003	0,138
PC4_Recode=8742	0,003	-0,002	0,279	0,003	-0,001	0,575
PC4_Recode=8743	0,009	-0,001	0,545	0,009	-0,001	0,589
PC4_Recode=8744	0,005	0,000	0,953	0,005	0,000	0,997
PC4_Recode=8745	0,006	0,002	0,394	0,006	0,002	0,401
PC4_Recode=8746	0,004	0,001	0,531	0,004	0,001	0,492
PC4_Recode=8747	0,004	-0,001	0,645	0,004	-0,001	0,593
PC4_Recode=8748	0,001	-0,005	0,004	0,001	-0,005	0,005
PC4_Recode=8749	0,002	-0,014	0,000	0,002	-0,014	0,000
PC4_Recode=8751	0,003	-0,008	0,000	0,003	-0,009	0,000
PC4_Recode=8752	0,011	0,001	0,505	0,011	0,001	0,567
PC4_Recode=8753	0,004	0,008	0,000	0,004	0,008	0,000
PC4_Recode=8754	0,001	0,020	0,000	0,001	0,025	0,000
PC4_Recode=8755	0,004	0,003	0,127	0,004	0,004	0,028
PC4_Recode=8756	0,005	0,001	0,453	0,005	0,003	0,138
PC4_Recode=8757	0,003	-0,003	0,123	0,003	0,000	0,851
PC4_Recode=8758	0,015	0,002	0,184	0,015	0,003	0,143
PC4_Recode=8759	0,003	-0,003	0,155	0,003	-0,002	0,267
PC4_Recode=8761	0,004	-0,005	0,004	0,004	-0,003	0,067
PC4_Recode=8762	0,009	-0,001	0,745	0,009	0,000	0,953
PC4_Recode=8763	0,002	-0,004	0,034	0,002	-0,002	0,355
PC4_Recode=8764	0,006	0,001	0,654	0,006	0,001	0,456
PC4_Recode=8765	0,003	-0,004	0,027	0,003	-0,004	0,026
PC4_Recode=8771	0,002	0,007	0,000	0,002	0,008	0,000
PC4_Recode=8772	0,015	0,002	0,231	0,015	0,002	0,231

PC4_Recode=8773	0,002	0,006	0,001	0,002	0,006	0,002
PC4_Recode=8774	0,006	0,001	0,495	0,006	0,001	0,524
PC4_Recode=8801	0,001	0,006	0,007	0,001	0,005	0,029
PC4_Recode=8802	0,001	0,014	0,000	0,001	0,013	0,000
PC4_Recode=8804	0,002	-0,011	0,000	0,002	-0,008	0,000
PC4_Recode=8805	0,004	0,001	0,665	0,004	0,002	0,372
PC4_Recode=8806	0,002	-0,005	0,014	0,002	-0,003	0,101
PC4_Recode=8807	0,003	0,001	0,479	0,003	0,001	0,450
PC4_Recode=8808	0,003	-0,010	0,000	0,003	-0,010	0,000
PC4_Recode=8809	0,008	0,003	0,153	0,008	0,003	0,154
PC4_Recode=8811	0,003	-0,007	0,000	0,003	-0,006	0,002
PC4_Recode=8812	0,003	-0,006	0,001	0,003	-0,005	0,003
PC4_Recode=8813	0,005	0,005	0,008	0,005	0,005	0,008
PC4_Recode=8814	0,005	-0,001	0,450	0,005	-0,001	0,626
PC4_Recode=8816	0,008	0,003	0,057	0,008	0,003	0,054
PC4_Recode=8821	0,002	-0,008	0,000	0,002	-0,008	0,000
PC4_Recode=8822	0,002	-0,009	0,000	0,002	-0,006	0,001
PC4_Recode=8823	0,004	-0,011	0,000	0,004	-0,009	0,000
PC4_Recode=8831	0,002	-0,003	0,159	0,002	0,001	0,509
PC4_Recode=8832	0,005	0,002	0,248	0,005	0,003	0,111
PC4_Recode=8834	0,005	-0,005	0,013	0,005	-0,003	0,096
PC4_Recode=8835	0,003	0,000	0,859	0,003	0,003	0,059
PC4_Recode=8841	0,005	0,000	0,948	0,005	0,001	0,733
PC4_Recode=8842	0,003	-0,001	0,469	0,003	0,001	0,716
PC4_Recode=8843	0,003	-0,005	0,006	0,003	-0,002	0,270
PC4_Recode=8844	0,008	0,005	0,003	0,008	0,007	0,000
PC4_Recode=8845	0,006	0,002	0,320	0,006	0,003	0,126
PC4_Recode=8851	0,001	-0,030	0,000	0,001	-0,028	0,000
PC4_Recode=8852	0,005	-0,001	0,466	0,005	0,000	0,998
PC4_Recode=8854	0,002	-0,014	0,000	0,002	-0,012	0,000
PC4_Recode=8855	0,002	-0,012	0,000	0,002	-0,010	0,000
PC4_Recode=8856	0,005	-0,001	0,410	0,005	-0,001	0,595
PC4_Recode=8857	0,003	-0,004	0,045	0,003	-0,004	0,025
PC4_Recode=8861	0,001	0,057	0,000	0,001	0,057	0,000
PC4_Recode=8862	0,001	0,031	0,000	0,001	0,031	0,000
PC4_Recode=8871	0,011	0,002	0,200	0,011	0,002	0,185
PC4_Recode=8872	0,002	0,007	0,000	0,002	0,007	0,000
PC4_Recode=8911	0,001	0,051	0,000	0,001	0,052	0,000
PC4_Recode=8913	0,001	0,068	0,000	0,001	0,069	0,000
PC4_Recode=8914	0,002	0,024	0,000	0,002	0,023	0,000
PC4_Recode=8915	0,001	0,029	0,000	0,001	0,028	0,000
PC4_Recode=8916	0,001	0,051	0,000	0,001	0,052	0,000
PC4_Recode=8917	0,001	0,061	0,000	0,001	0,062	0,000
PC4_Recode=8918	0,001	-0,004	0,077	0,001	-0,002	0,227
PC4_Recode=8919	0,002	0,012	0,000	0,002	0,013	0,000
PC4_Recode=8921	0,001	0,018	0,000	0,001	0,023	0,000
PC4_Recode=8922	0,001	0,010	0,000	0,001	0,013	0,000
PC4_Recode=8923	0,001	0,004	0,052	0,001	0,007	0,001

PC4_Recode=8924	0,001	-0,012	0,000	0,001	-0,009	0,000
PC4_Recode=8925	0,001	0,040	0,000	0,001	0,047	0,000
PC4_Recode=8926	0,001	0,012	0,000	0,001	0,023	0,000
PC4_Recode=8927	0,001	0,012	0,000	0,001	0,017	0,000
PC4_Recode=8931	0,001	0,003	0,161	0,001	0,004	0,091
PC4_Recode=8932	0,001	0,043	0,000	0,001	0,045	0,000
PC4_Recode=8933	0,001	0,019	0,000	0,001	0,022	0,000
PC4_Recode=8934	0,001	0,024	0,000	0,001	0,026	0,000
PC4_Recode=8935	0,001	0,037	0,000	0,001	0,039	0,000
PC4_Recode=8936	0,003	-0,002	0,181	0,003	-0,002	0,288
PC4_Recode=8938	0,006	0,005	0,004	0,006	0,005	0,003
PC4_Recode=8939	0,001	0,051	0,000	0,001	0,050	0,000
PC4_Recode=8941	0,001	0,026	0,000	0,001	0,027	0,000
PC4_Recode=9001	0,001	0,038	0,000	0,001	0,037	0,000
PC4_Recode=9003	0,002	0,000	0,855	0,002	0,002	0,412
PC4_Recode=9005	0,001	0,010	0,000	0,001	0,010	0,000
PC4_Recode=9006	0,015	0,002	0,347	0,015	0,002	0,338
PC4_Recode=9007	0,008	0,004	0,032	0,008	0,004	0,035
PC4_Recode=9008	0,002	0,004	0,037	0,002	0,004	0,043
PC4_Recode=9009	0,009	0,003	0,061	0,009	0,003	0,066
PC4_Recode=9011	0,001	0,003	0,172	0,001	0,003	0,094
PC4_Recode=9012	0,002	0,001	0,659	0,002	0,002	0,187
PC4_Recode=9013	0,003	-0,004	0,052	0,003	-0,002	0,249
PC4_Recode=9014	0,003	0,000	0,876	0,003	0,002	0,214
PC4_Recode=9021	0,003	-0,004	0,035	0,003	-0,002	0,372
PC4_Recode=9022	0,001	0,004	0,047	0,001	0,008	0,000
PC4_Recode=9023	0,003	-0,005	0,009	0,003	-0,003	0,085
PC4_Recode=9024	0,003	-0,002	0,258	0,003	-0,001	0,541
PC4_Recode=9025	0,005	0,005	0,013	0,005	0,005	0,007
PC4_Recode=9026	0,004	0,008	0,000	0,004	0,008	0,000
PC4_Recode=9027	0,003	-0,004	0,016	0,003	-0,003	0,078
PC4_Recode=9031	0,003	-0,002	0,211	0,003	-0,002	0,255
PC4_Recode=9032	0,007	0,000	0,863	0,007	0,000	0,926
PC4_Recode=9033	0,002	0,008	0,000	0,002	0,007	0,000
PC4_Recode=9034	0,002	0,006	0,002	0,002	0,006	0,003
PC4_Recode=9035	0,001	0,014	0,000	0,001	0,014	0,000
PC4_Recode=9036	0,001	0,001	0,573	0,001	0,000	0,866
PC4_Recode=9037	0,006	0,005	0,003	0,006	0,006	0,002
PC4_Recode=9038	0,003	0,000	0,982	0,003	0,000	0,974
PC4_Recode=9041	0,001	-0,010	0,000	0,001	-0,007	0,001
PC4_Recode=9043	0,005	-0,004	0,048	0,005	-0,002	0,185
PC4_Recode=9044	0,002	-0,002	0,388	0,002	0,000	0,799
PC4_Recode=9045	0,002	-0,003	0,138	0,002	-0,002	0,370
PC4_Recode=9047	0,002	-0,018	0,000	0,001	-0,013	0,000
PC4_Recode=9051	0,001	0,009	0,000	0,001	0,022	0,000
PC4_Recode=9053	0,003	0,001	0,633	0,003	0,003	0,068
PC4_Recode=9054	0,002	-0,013	0,000	0,002	-0,009	0,000
PC4_Recode=9055	0,002	-0,001	0,697	0,002	0,003	0,153

PC4_Recode=9056	0,003	0,002	0,301	0,003	0,004	0,054
PC4_Recode=9057	0,003	0,001	0,475	0,003	0,002	0,240
PC4_Recode=9061	0,001	0,006	0,005	0,001	0,015	0,000
PC4_Recode=9062	0,001	0,005	0,016	0,001	0,014	0,000
PC4_Recode=9063	0,002	0,006	0,002	0,002	0,010	0,000
PC4_Recode=9064	0,003	0,001	0,749	0,003	0,005	0,011
PC4_Recode=9067	0,005	0,007	0,000	0,005	0,008	0,000
PC4_Recode=9071	0,004	-0,011	0,000	0,004	-0,009	0,000
PC4_Recode=9072	0,004	-0,013	0,000	0,004	-0,010	0,000
PC4_Recode=9074	0,002	-0,002	0,302	0,002	0,004	0,054
PC4_Recode=9075	0,003	-0,016	0,000	0,003	-0,013	0,000
PC4_Recode=9076	0,001	-0,015	0,000	0,001	-0,006	0,004
PC4_Recode=9077	0,002	-0,016	0,000	0,002	-0,012	0,000
PC4_Recode=9078	0,002	-0,016	0,000	0,002	-0,010	0,000
PC4_Recode=9079	0,002	-0,026	0,000	0,002	-0,020	0,000
PC4_Recode=9081	0,002	0,012	0,000	0,002	0,014	0,000
PC4_Recode=9082	0,015	0,001	0,689	0,015	0,001	0,561
PC4_Recode=9083	0,004	0,008	0,000	0,004	0,009	0,000
PC4_Recode=9084	0,001	0,037	0,000	0,001	0,036	0,000
PC4_Recode=9085	0,011	0,004	0,018	0,011	0,004	0,020
PC4_Recode=9086	0,003	0,011	0,000	0,003	0,010	0,000
PC4_Recode=9087	0,009	0,005	0,003	0,009	0,005	0,003
PC4_Recode=9088	0,002	0,004	0,037	0,002	0,004	0,054
PC4_Recode=9089	0,002	-0,002	0,402	0,002	-0,002	0,265
PC4_Recode=9091	0,003	0,002	0,277	0,003	0,004	0,014
PC4_Recode=9101	0,001	0,021	0,000	0,001	0,021	0,000
PC4_Recode=9102	0,002	0,012	0,000	0,002	0,013	0,000
PC4_Recode=9103	0,001	0,015	0,000	0,001	0,014	0,000
PC4_Recode=9104	0,001	0,009	0,000	0,001	0,009	0,000
PC4_Recode=9105	0,003	-0,002	0,177	0,003	0,000	0,800
PC4_Recode=9107	0,008	-0,001	0,595	0,008	0,000	0,947
PC4_Recode=9108	0,003	0,000	0,882	0,003	-0,001	0,775
PC4_Recode=9109	0,006	0,007	0,000	0,006	0,007	0,000
PC4_Recode=9111	0,004	-0,008	0,000	0,004	-0,005	0,007
PC4_Recode=9112	0,003	-0,008	0,000	0,003	-0,003	0,063
PC4_Recode=9113	0,003	0,004	0,019	0,003	0,004	0,023
PC4_Recode=9114	0,002	-0,004	0,016	0,002	-0,004	0,028
PC4_Recode=9122	0,011	-0,001	0,429	0,011	-0,001	0,547
PC4_Recode=9123	0,003	-0,015	0,000	0,003	-0,012	0,000
PC4_Recode=9124	0,015	0,002	0,343	0,015	0,002	0,240
PC4_Recode=9125	0,006	-0,005	0,008	0,006	-0,004	0,014
PC4_Recode=9131	0,002	-0,016	0,000	0,002	-0,013	0,000
PC4_Recode=9132	0,002	-0,021	0,000	0,002	-0,018	0,000
PC4_Recode=9133	0,002	-0,017	0,000	0,002	-0,012	0,000
PC4_Recode=9134	0,004	-0,016	0,000	0,004	-0,013	0,000
PC4_Recode=9135	0,004	-0,011	0,000	0,004	-0,009	0,000
PC4_Recode=9136	0,006	-0,005	0,008	0,006	-0,003	0,122
PC4_Recode=9137	0,003	-0,009	0,000	0,003	-0,006	0,001

PC4_Recode=9138	0,003	-0,013	0,000	0,003	-0,011	0,000
PC4_Recode=9141	0,003	-0,017	0,000	0,003	-0,014	0,000
PC4_Recode=9143	0,003	-0,020	0,000	0,003	-0,017	0,000
PC4_Recode=9144	0,005	-0,003	0,095	0,005	-0,002	0,405
PC4_Recode=9145	0,002	-0,021	0,000	0,002	-0,016	0,000
PC4_Recode=9146	0,011	0,002	0,384	0,011	0,002	0,228
PC4_Recode=9147	0,003	-0,017	0,000	0,003	-0,014	0,000
PC4_Recode=9151	0,002	-0,034	0,000	0,002	-0,028	0,000
PC4_Recode=9152	0,015	0,001	0,564	0,015	0,002	0,366
PC4_Recode=9153	0,003	-0,017	0,000	0,003	-0,014	0,000
PC4_Recode=9154	0,011	-0,002	0,222	0,011	-0,002	0,405
PC4_Recode=9155	0,004	-0,005	0,013	0,004	-0,003	0,085
PC4_Recode=9156	0,007	0,000	0,899	0,007	0,000	0,794
PC4_Recode=9171	0,009	-0,004	0,050	0,009	-0,002	0,236
PC4_Recode=9174	0,006	-0,007	0,000	0,006	-0,005	0,003
PC4_Recode=9175	0,007	-0,006	0,001	0,007	-0,005	0,013
PC4_Recode=9176	0,008	-0,001	0,774	0,008	0,001	0,728
PC4_Recode=9177	0,011	-0,004	0,027	0,011	-0,003	0,097
PC4_Recode=9178	0,006	-0,001	0,653	0,006	0,001	0,465
PC4_Recode=9201	0,001	0,027	0,000	0,001	0,027	0,000
PC4_Recode=9203	0,001	0,048	0,000	0,001	0,047	0,000
PC4_Recode=9204	0,001	0,042	0,000	0,001	0,042	0,000
PC4_Recode=9205	0,001	0,014	0,000	0,001	0,014	0,000
PC4_Recode=9206	0,004	-0,004	0,035	0,004	-0,004	0,040
PC4_Recode=9207	0,001	0,037	0,000	0,001	0,036	0,000
PC4_Recode=9211	0,003	0,017	0,000	0,003	0,017	0,000
PC4_Recode=9212	0,001	0,016	0,000	0,001	0,017	0,000
PC4_Recode=9213	0,002	0,024	0,000	0,002	0,025	0,000
PC4_Recode=9214	0,009	0,008	0,000	0,009	0,009	0,000
PC4_Recode=9215	0,003	0,003	0,150	0,003	0,005	0,004
PC4_Recode=9216	0,001	0,013	0,000	0,001	0,014	0,000
PC4_Recode=9217	0,002	0,008	0,000	0,002	0,008	0,000
PC4_Recode=9218	0,001	0,017	0,000	0,001	0,016	0,000
PC4_Recode=9219	0,003	0,009	0,000	0,003	0,009	0,000
PC4_Recode=9221	0,001	0,012	0,000	0,001	0,012	0,000
PC4_Recode=9222	0,002	0,016	0,000	0,002	0,016	0,000
PC4_Recode=9223	0,002	0,008	0,000	0,002	0,010	0,000
PC4_Recode=9231	0,001	0,023	0,000	0,001	0,033	0,000
PC4_Recode=9233	0,001	0,012	0,000	0,001	0,015	0,000
PC4_Recode=9241	0,001	0,011	0,000	0,001	0,016	0,000
PC4_Recode=9243	0,001	0,010	0,000	0,001	0,019	0,000
PC4_Recode=9244	0,001	0,048	0,000	0,001	0,047	0,000
PC4_Recode=9245	0,001	0,007	0,000	0,001	0,009	0,000
PC4_Recode=9246	0,015	0,002	0,326	0,015	0,002	0,306
PC4_Recode=9247	0,001	0,029	0,000	0,001	0,029	0,000
PC4_Recode=9248	0,002	0,014	0,000	0,002	0,017	0,000
PC4_Recode=9249	0,001	0,009	0,000	0,001	0,009	0,000
PC4_Recode=9251	0,001	0,045	0,000	0,001	0,050	0,000

PC4_Recode=9254	0,001	0,017	0,000	0,001	0,024	0,000
PC4_Recode=9255	0,001	0,011	0,000	0,001	0,016	0,000
PC4_Recode=9256	0,002	0,007	0,000	0,002	0,010	0,000
PC4_Recode=9257	0,001	0,004	0,062	0,001	0,009	0,000
PC4_Recode=9258	0,002	0,003	0,122	0,002	0,007	0,000
PC4_Recode=9261	0,001	0,009	0,000	0,001	0,012	0,000
PC4_Recode=9262	0,001	0,012	0,000	0,001	0,013	0,000
PC4_Recode=9263	0,001	0,012	0,000	0,001	0,011	0,000
PC4_Recode=9264	0,002	0,006	0,003	0,002	0,007	0,000
PC4_Recode=9265	0,002	0,005	0,005	0,002	0,006	0,002
PC4_Recode=9269	0,001	0,011	0,000	0,001	0,017	0,000
PC4_Recode=9271	0,001	0,001	0,488	0,001	0,002	0,340
PC4_Recode=9281	0,001	-0,001	0,596	0,001	0,007	0,000
PC4_Recode=9283	0,002	-0,004	0,024	0,002	0,001	0,601
PC4_Recode=9284	0,002	-0,006	0,003	0,002	0,002	0,424
PC4_Recode=9285	0,001	-0,005	0,050	0,001	0,006	0,014
PC4_Recode=9286	0,002	-0,010	0,000	0,002	-0,005	0,015
PC4_Recode=9287	0,001	-0,008	0,000	0,001	-0,003	0,154
PC4_Recode=9288	0,001	-0,008	0,000	0,001	-0,001	0,694
PC4_Recode=9289	0,002	-0,006	0,006	0,001	0,001	0,784
PC4_Recode=9291	0,001	-0,010	0,000	0,001	-0,001	0,589
PC4_Recode=9293	0,007	-0,005	0,010	0,007	-0,003	0,120
PC4_Recode=9294	0,003	-0,005	0,005	0,003	-0,002	0,215
PC4_Recode=9295	0,004	-0,002	0,301	0,004	-0,001	0,695
PC4_Recode=9296	0,005	0,001	0,491	0,005	0,002	0,225
PC4_Recode=9298	0,002	-0,003	0,069	0,002	-0,001	0,653
PC4_Recode=9299	0,003	-0,001	0,652	0,003	0,000	0,992
PC4_Recode=9871	0,004	-0,009	0,000	0,004	-0,006	0,002
PC4_Recode=9872	0,005	0,003	0,145	0,005	0,005	0,009
PC4_Recode=9873	0,002	-0,015	0,000	0,002	-0,008	0,000
Constant	0,001		0,000	0,001		0,000
R Square	0,780			0,780		

Dependent variable: log of transaction price N=67.716

Reference category: *PC4_Recode=9202 (dummy)*