The impact of distance deterrence on the choice of field of study in vocational education in the Netherlands*

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Abstract

We utilize a unique dataset of more than 15,500 first-year students in upper secondary vocational education of a particular region in the Netherlands, and estimate the impact of commuting distance on the choice of a field of study. Using logistic regression analysis we estimate the probability that students choose for a study in the field of engineering, economics or health & welfare. In general we find that our expectations with respect to the effect of distance deterrence on the choice of field of study come true. If the commuting distance to the nearest or the nearest-but-one school location offering a particular field of study increases then the probability that students choose for that field diminishes. As for the nearest-but-two school location offering a particular field of study, we find that commuting distance sometimes has a positive correlation with the choice for a field of study. This may imply that more remote school locations can be more attractive for students for reasons of quality of education or good accessibility by public transport. Moreover, we find that an increasing distance to a school location of one field of study may increase the probability to choose for another field of study. This result demonstrates that it is not just the distance to one particular school location that matters. We therefore conclude that the whole educational infrastructure within a region matters for the choice of a particular field of study.

JEL classification: I2, R1
Key words: Distance deterrence; study choice; vocational education; commuting

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1 Introduction

In this study we examine the effect of commuting distance on students' school and study choice. The students in our sample are first-year students attending intermediate vocational education in engineering, economics or health & welfare. The key question is to what extent students in vocational education take into account the distance from home to school when choosing for a particular field of study.

We use data of more than 15.500 first-year students that is provided by the big five intermediate vocational schools of a particular region in the South East of the Netherlands. The impact of several background characteristics and distance deterrence on the choice for a school location and field of study is estimated by means of logistic regression models. We argue that the student's choice for a school location and a particular field of study depends on commuting distances to the competing school locations nearby. Therefore we incorporate the commuting distances for each student to all secondary vocational school locations in the region offering engineering, economics or health & welfare.

The goal of this paper is to estimate the effect of distance on the choice of a field of study. We first analyze whether distance deterrence is indeed important for the choice of a school location for the students in our sample. Given that this is true, and given that school locations and the three fields of study are unevenly distributed in the region concerned, it can be expected that distance deterrence influences the choice for a field of study. Thus the second step in our analysis is examining the impact of distance deterrence on the choice for a particular field of study. Next to commuting distances we incorporate several other exogenous variables, i.e. gender, ethnicity, age, diploma previous study and field of previous study.

The remainder of this paper is structured as follows. First, we review the relevant literature on the influence of commuting distance on students' school choice and choice of field of study. Second, we discuss the dataset using the most important descriptive statistics. Subsequently, we present the empirical analyses and the main conclusions.

2 Review of literature

Empirical studies on the impact of distance on the choice of a field of study are scarce. Therefore we review studies in two different strands of literature. In the first subsection we discuss some studies that examined the choice of study. The second subsection discusses the decision to choose for a school location.

2.1 Choosing a field of study

Numerous factors may influence students' choice during the process of finding an interesting study (Vrontis et al., 2007). The final choice for a university may be influenced by e.g. the particular study the university offers, the institution's reputation, the campus atmosphere, the quality of the teaching staff, opinions of family, friends and acquaintances, job prospects and whether friends attend the same university (Soutar and Turner, 2002). The choice for a particular study in upper secondary vocational education after finishing secondary education (VMBO, lower secondary education, or HAVO, higher general secondary education) is also determined by students' preferences on these aspects.

Besides, some restrictions can play a part concerning study choice, like the study's level of difficulty, costs of study and the distance to school. These restrictions may have a negative impact on the study choice. According to economic theory, students (implicitly) ascribe either positive or negative values of all these aspects when choosing a study (e.g. Borghans, 1999; Borghans & De Steur, 1999). In economic theory study choice thus is a rational process that also involves students' ability to imagine the future consequences of their study choice.[1] The student will eventually choose for the study that yields the largest positive discrepancy between expected costs and benefits.

Bloemen & Dellaert (2000) find that the study choice of students of secondary education in the Netherlands is mainly based on how interesting they expect the study to be, and how they can be of help to other people or contribute to society in the profession that is associated with the particular study. Thus, intrinsic motivation seems to play an important role for explaining study choice. On the contrary, the costs for attending a certain study hardly affect the eventual choice. With respect to the study at hand, it is important that they find that a commuting distance of 30 kilometers between home and school barely influences study choice. If a student's commuting distance is 80 kilometers or more, this significantly affects his study choice. The effects for the intervening distances are not estimated. The study by Bloemen & Dellaert (2000) is based on stated preferences. In our study we will examine revealed preferences on how students' actual choice for a school depends on the dispersal of schools and the studies offered there. An additional advantage of the 'revealed preferences' utilized in our study is that the information on revealed preferences enable us to draw

1. This is closely aligned with students' perceptions, often discussed in psychological literature. Especially when information is scarce, perceptions and imago influence the choice process.

conclusions on the impact of commuting distances on study choice that are more precise than when using information on 'stated preferences'.

2.2 Choosing a school location

Most research focuses on higher education to estimate the effect of distance deterrence on the decision to choose for a particular university. In an empirical study Frenette (2006) examines the influence of distance on university participation in Canada. He distinguishes three groups of students who lived on a distance of respectively 0-40, 40-80 or more than 80 kilometers away from the nearest university during high school. Frenette finds that the probability of attending university is considerably smaller for students living further away from the nearest university (i.e. out of commuting distance) than for students living within commuting distance. If students live more than 40 kilometers away from a university, the probability that they choose for an academic study soon after leaving high school decreases by 25% compared to students living within a range of 40 kilometers. Students living on a distance of more than 80 kilometers are only 68% as likely to attend an academic study as students living within 40 kilometers. Frenette suggests this is possibly due to costs advantages of students living within commuting distance, since latter group can stay at their parents' home and thus does not have additional living and moving expenses. Moreover, especially students from poorer families are limited in the freedom of study choice as distance to school increases. Latter group has more problems paying these additional costs.

According to Sá et al. (2004) geographical dispersal of study locations affects students' study choice process considerably, i.e. students may be influenced by the distance between home and school when deciding which field of study they will attend. The results in their study vary for each model, but distance always has a significant negative effect on the choice for attending university. In general, empirical studies demonstrate a negative relationship between distance and choice for a particular school location (DesJardins et al., 1999; Sá et al., 2004).

In a US study Leppel (1993) also finds that students choose less often for attending a school when the distance between home and school increases. Leppel comes up with five possible explanations for the negative influence of distance. First, Leppel asserts that it is harder for students to obtain genuine information about a school when distance increases. Since internet usage has risen sharply and because of the smaller geographical distances in The Netherlands, this explanation is less valid for The Netherlands. Second, costs will

increase with increasing distance increases. Moreover, Leppel states that the number of alternative schools will increase for students who consider attending a more distant school. This decreases the probability of choosing that particular school. A fourth reason for explaining the negative effect of distance is grounded in psychological costs. Students may feel more uncomfortable at unfamiliar distant locations than at locations close to home. A final explanation for the negative effect of distance on school choice is that students are inclined to choose for the same school as their friends and this school is usually located close to home.

The empirical study of Leppel (1993) examines the choice behavior of students enrolled at Widener University, situated in Delaware County, Pennsylvania (US). Distance between a student's home and university is classified into respectively less than 10 miles, 10-25 miles, 25-50 miles, 50-100 miles and more than 100 miles. Students living within a radius of 10 miles are most likely to choose for attending that university. Compared to former group, students living on a distance of respectively 10-25 or 25-50 miles are less likely to choose for this university. Students of latter groups choose for this university more often than do students who live even further away. Interestingly, students living on a distance of 50-100 miles from the university do not choose significantly more often for this university than students living more than 100 miles away. Thus as from a certain distance, the negative influence of distance on students' migration decision seems to diminish.

The aforementioned literature generally neglects the fact that students have the opportunity to choose for other competing schools, located in the surrounding area of a school. These so-called 'intervening opportunities' act as possible alternatives and can influence students' school choice considerably. According to Stouffer (1940) the number of migrants over a given distance is directly proportional to the number of opportunities at the destination place, and inversely proportional to the number of opportunities situated between the place of origin and the place of destination. This paper accounts for competing choice opportunities and hence the empirical analyses in the paper contribute to the existing literature.

3 Description of region and data

We have data for 31 school locations in the South East area of the Netherlands. The dataset contains administrative records provided by the big five intermediate vocational schools

(ROC's) that have their main location in one of the four NUTS3-regions (Corop-regions) in this area. Figure 1 shows the five NUTS3-regions in the area and the municipalities where the five main locations and 26 branches are situated, with the municipality of Eindhoven as the largest city. The fifth and most southern region has only been included for showing the branch (in the municipality of Sittard-Geleen) belonging to the main school location in the adjacent NUTS3-region (in the municipality of Roermond). The dataset involves more than 15.500 first-year students registered in secondary vocational education in spring 2005 (school year 2004-2005). Although not all first-year students in secondary vocational education living in the region were observed, we have a fairly good coverage of these students in the region.

An advantage of the study at hand is that our sample comprises only new first-year students who attended secondary vocational education (MBO) and were incoming from lower secondary education (VMBO) or higher general secondary education (HAVO). Most of these students were below 20 years old and still lived at the home of their parents.[2] Therefore, these students do not have to move to another city, as often is the case for students in higher education, but can commute between home and school. Using Google Maps we calculated the travel distances (by car in km.) to the 31 school locations for all students.

We distinguish between engineering, economics or health & welfare. A single school location can offer one or more fields of study. At five out of the 31 school locations all three fields of study are offered. Nine school locations offer only engineering, two school locations offer only economics and five school locations offer only health & welfare. Five school locations offer both engineering and health & welfare, and five school locations offer both economics and health & welfare. None of the school locations offer both engineering and health & welfare. In total there are 19 school locations offering engineering, 17 school location offering economics and 15 school locations offering health & welfare.

Insert Figure 1 about here

Table 1 presents the statistics concerning distance between home and school of first-year students attending intermediate vocational education. On average, students in this sample live approximately 19 kilometers away from the school they attend. Students in the field of engineering commute on average the longest distance to school (20.4 km), followed by economics (19.7 km) and health & welfare (17.7 km).

Insert Table 1 about here

2. The reference ages are 12-16 and 12-17 years old for VMBO and HAVO, respectively.

Figure 2 indicates the choice for a school location of students, ranging from school location no. 1 (closest to home) to school location no. 31 (most remote). The figure shows that most students in our sample choose for the school which is closest to their home address (23%). Three quarters of all students choose for one of the five schools that is located most nearby home. The figure suggests a negative impact of distance on school location choice.

Insert Figure 2 about here

Figure 3 differentiates the commuting distances of students with respect to the three fields of study. It is striking that engineering students, as opposed to economics and health & welfare students, primarily choose for the nearest but one instead of the nearest location. This implies that students in technical education in the particular region often have the opportunity to choose for a school location closer by, but don't do that because they cannot attend technical courses at the nearest school location. However, in general Figure 3 seems to point at a negative relationship between distance and school choice, regardless of the field of study.

Insert Figure 3 about here

In Figure 4 we go one step further and examine students' school location choice for only the subsamples of schools offers engineering, economics or health & welfare respectively. Thus, we examine the number of engineering students choosing for the nearest school offering engineering (ranked no. 1), the number of engineering students choosing for the nearest but one (ranked no. 2), until the number of engineering students choosing for the most distant school offering engineering (ranked no. 19). Similar distributions are presented for the seventeen schools offering economics and the fifteen schools offering health & welfare. The results are presented in Figure 4. Of all engineering students, 35% goes to the nearest school offering engineering. Similarly, we see that approximately 45% of all health & welfare students choose for the most nearby school location offering a study in the field of health & welfare and 40% of the economics students choose for the most nearby school offering a study in the field of economics.

Insert Figure 4 about here

4 Empirical results

This section presents the estimation results on the effect of distance on the choice of a field of study. The first subsection discusses the results on the impact of distance deterrence on the choice of a school location. The second subsection presents the results of the impact of distance deterrence on the choice for a particular field of study.

4.1 Impact of distance deterrence on the choice for a school location

We estimate the choice for a particular school by means of binary logistic regression. In this study the more than 15,500 students can choose between 31 different school locations in the region. Therefore we estimate 31 binary logistic regressions, all indicating the probability that a student chooses for a specific school relative to the probability that he chooses for one of the other schools. The focus is on the deterrent effect of distance, i.e. to what extent does distance from home to a school location has a negative effect on the choice for that location? In this model we incorporate a variable for the linear commuting distance (kilometers) between home and school location as well as a variable indicating the squared distance between home and school location. On top of these distance variables we make use of the aforementioned control variables. In addition several interactions are incorporated into our model: distance*female, distance²*female, distance*immigrant and distance²*immigrant. These interaction terms are included to control for different distance deterrence effects for females and immigrants.

We estimated the probability that a student with similar background features chooses for each of the 31 schools in our sample. As we are primarily interested in the explanatory role of commuting distance, we only present the effect of distance ('distance' and 'distance²') on the choice for all 31 schools in Table 2. The results are obtained by estimating 31 separate binary logistic regressions, alike the model described above. The column '5 km' denotes how a student who has to commuting five kilometers from home to school, is influenced by distance during the choice process for that school. Similarly, we present the influence of distance for students living respectively 10, 20, 50 and 100 kilometers from school.[3]

As an example to illustrate how the values in Table 2 are computed we refer to school location 18. The total distance effect for students who have to commuting 5 kilometers to

3. Insignificant distance effects are not presented in the table.

school location 18 is −0.834. The total effect of distance can be calculated by multiplying the B-coefficient of linear distance to location 18 by the commuting distance to location 18 (−0.1719*5) and adding the effect of squared distance (0.00102*5²). As expected, we find that distance has a negative effect on the choice for a school. The further away a student lives from school, the less likely it will be that he attends that school. This effect is generally referred to as the 'distance deterrence' effect.

Insert Table 2 about here

4.2 Impact of distance deterrence on the choice of a field of study

So far, empirical analyses indicate the existence of a distance deterrence effect regarding students' school location choice. The further away students live from a school location, the less likely they are to choose for that location. Since students' study choice may be based on differences between fields of study regarding the commuting distances to different school locations, we examine how distance may affect study choice. The commuting distances are different since school locations differ in the fields of study they offer. Using three separate binary logistic regression models, we estimate the probability that students choose for a field of study (engineering, economics and health & welfare). Table 3 presents the results of these binary logistic regressions. We incorporate explanatory variables for the linear distance to the three nearest schools offering respectively engineering, economics and health & welfare.[4] Next to that, several other exogenous variables are incorporated into the model to control for the background characteristics of students.

Engineering

If students live further away from the nearest school offering engineering, they are significantly less likely to choose for an engineering study (B = −0.020). The variable distance engineering 2−1 shows the effect of the difference in distance between the nearest school location offering engineering and the nearest-but-one school location offering engineering. This variable is computed in order to avoid problems concerning

4. For every field of study we incorporate variables for the three schools that are located most nearby, since analyses showed that the 10% threshold of students choosing for a school is after the third school. This is valid for each field of study as appears from figure 3. Moreover, analyses show that from the third location, distance is not a decisive explanatory variable for explaining the choice for a field of study anymore.

multicollinearity when the distances to both the nearest and the nearest-but-one school locations are used.[5] If the difference in distance between the nearest and the nearest-but-one school location offering engineering increases, the probability of choosing engineering will decrease significantly (B = −0.030). Surprisingly, the probability of choosing for engineering increases significantly if distance between the nearest-but-one school and the nearest-but-two school offering engineering increases (B = 0.017). Here, most probably other unobserved variables play a part. Possible reasons for preferring the more remote location could be that the latter school offers better education or facilities, offers a particular specialization within engineering, or is better accessible through public transport.

Moreover, we examine whether the distance to school locations offering economics impacts the choice for an engineering study. Students tend to choose significantly less often for engineering if distance between the nearest-but-one and the nearest-but-two school offering economics increases (B = −0.022). This is in accordance with our expectations. The only other distance effect that significantly influences the choice for an engineering study is that of the difference in distance between the nearest and the nearest-but-one school offering health & welfare. This effect is significantly positive (B = 0.014), i.e. students are more likely to choose for engineering if distance between those two schools offering health & welfare increases.

In accordance with expectations, females and immigrants are significantly less likely to choose for an engineering study. Older students choose more often for engineering, yet this effect is non-linear. Students who left their previous study without a diploma tend to choose for engineering more often. Finally, it can be concluded that students whose previous study was in the field of engineering choose most often for an intermediate vocational education study in the field of engineering as well. Students who previously attended an agriculture study are more likely to choose for engineering than students who attended a general study, whereas students who previously attended a study in the field of economics or health & welfare are least likely to choose for engineering.

Economics

The probability that students choose for an economics study is significantly negatively influenced by the distance between a student's home and the nearest school location offering

5. The distances to the nearest and the nearest-but-one school locations are strongly correlated.

economics (B = −0.038). Both other variables for the distance to the nearest economics school locations are insignificant.

If distance to the nearest school location offering engineering increases, this will increase the probability that students choose for economics (B = 0.018). The probability of choosing economics is also significantly influenced by the distance to the nearest-but-one location offering engineering (B = 0.020), i.e. if distance to this location increases, students are more likely to choose for a study in the field of economics. Next to that, we find that with increasing distance to the nearest school location offering health & welfare students choose significantly more often for economics (B = 0.030).

Moreover, we find that females generally choose less often for economics. Compared to natives, immigrants choose relatively often for a study in the field of economics. Generally young students are more likely to choose for economics. Students with a diploma in the field of economics in lower secondary education, have a higher probability of choosing for the same field of study in intermediate vocational education. Students with a diploma in the field of engineering in lower secondary education are least likely to choose for an economics study afterwards.

Health & welfare

The probability that students choose for health & welfare decreases significantly if distance between home and the nearest school location offering health & welfare increases (B = −0.047). Also the distance to the health & welfare school location that is located nearest-but-one has a significant impact on students' choice of study. If this location is situated further away, the probability that students choose for health & welfare decreases (B = −0.021).

If the nearest-but-two school offering engineering is located further away, students choose less often for a health & welfare study (B = −0.019), which is not obvious. Here the specific peculiarities of more remote school locations may come into play. These locations are clearly not chosen for being near, but for some attractive features like good education and good accessibility by public transport. In line with our expectations, an increasing distance to the nearest school offering economics has a significantly positive effect on the choice for health & welfare (B = 0.043). This also holds for the distance to the nearest-but-two school location offering economics (B = 0.014).

The probability that female students choose for health & welfare is considerably higher than for male students. Compared to natives, immigrants choose significantly less

often for health & welfare. Students who left their previous study without a diploma are less likely to choose for health & welfare. Not surprisingly, students who previously followed a health & welfare study usually choose for a health & welfare study in intermediate vocational education as well. Students who previously followed an engineering or economics study are least likely to choose for health & welfare.

Next to the three independent binary logistic regressions we also conducted a multinomial logistic regression, for which the results are very similar. Therefore we extended the former analysis by incorporating interactions between distance and gender as well as distance and ethnic background. Thus, we examine whether distance influences study choice in a different way for females and immigrants. Table 4 presents the effects of the explanatory variables on the choice of a field of study by means of multinomial logistic regression. The choice for an economics field of study is the reference category.

The effect of the distance to the nearest school location offering engineering on the choice for an engineering study is negative but insignificant. The interaction term 'female*distance engineering 1' has a significantly negative influence on the choice for an engineering study (B = −0.081). Thus, if distance increases to the nearest school location offering engineering, females are significantly more deterred by distance than males. The probability of choosing a study in the field of engineering will decrease if the nearest-but-one school location offering engineering is located further away (B = −0.022). With increasing distance to the nearest-but-one location offering engineering, immigrants are even more deterred by distance than natives concerning the choice for engineering (B = −0.115). The significantly positive effect for increasing distance to the nearest-but-two school location offering engineering on the choice for engineering (B = 0.016), suggests that the distance to the nearest-but-two school location offering engineering is not decisive anymore for the choice for an engineering study. Here, probably other unobserved variables on location characteristics play a part. On the contrary, for immigrants the location of the nearest-but-two school offering engineering still affects the choice for engineering somewhat (B = −0.028).

Next to that, it appears that distance to the nearest school offering economics has no significant effect on the choice for engineering. However, if this distance increases, females choose significantly more often for engineering than males (B = 0.124). Increasing distance to the nearest-but-one school offering economics has a negative but insignificant effect on the choice for engineering. If females live further away from the nearest-but-one school location offering economics, they are significantly more likely to choose for engineering (B = 0.066). We find an opposite effect of the distance to the nearest-but-two school location on the choice

for engineering (B = −0.025), i.e. in this case unobserved variables on location characteristics seem to influence the choice for engineering more than distance. If distance to the nearest-but-two school location offering economics increases, females choose more often for engineering than males B = 0.033).

Similarly, we examine the influence of distance from home to school on the choice for a health & welfare study. The larger the distance to the nearest school location offering health & welfare, the less likely students are to choose for a health & welfare study (B = −0.067). Moreover, it can be concluded that if the nearest-but-one school offering health & welfare is located further away from home, students are significantly less likely to choose for a health & welfare study (B = −0.030).

With increasing distance to the nearest school location offering a study in the field of economics, students become significantly more likely to choose for health & welfare (B = 0.067). If students live further away from the nearest-but-two school location offering economics, they are significantly more likely to choose for health & welfare (B = 0.021). However, for females this distance effect is almost zero (0.021−0.019).

5 Conclusions

In this paper we first demonstrate that students in intermediate vocational education choose less often for a particular school location if the distance between home and the school location increases. This is congruent with earlier findings in the economic literature, indicating the existence of a distance deterrence effect.

We extend prior research by examining the impact of distance deterrence on the choice for a particular field of study. To estimate the impact of the educational infrastructure in upper secondary vocational education for a particular region in the Netherlands we use a unique dataset of more than 15,500 first-year students. We examine the impact of distance deterrence on the choice of field of study, given that schools and the three fields of study are unevenly distributed in the region concerned. Using three separate binary logistic regressions as well as multinomial regression analyses, we estimate the probability that students choose for a study in the field of engineering, economics or health & welfare.

In general we find that our expectations on the effect of distance deterrence on the choice of field of study come true. If the commuting distance to the nearest school location offering a particular field of study (engineering, economics, health & welfare) increases then

the probability that students choose for that field diminishes. This also holds for the distance to the nearest-but-one school offering a particular field of study. As for the nearest-but-two school location offering a particular field, unobserved explanatory variables tend to play a part, since distance to the particular location sometimes has a positive correlation with the choice for that field. Probably more remote school locations can be attractive for students for reasons of quality of education or good accessibility by public transport.

Moreover, an increasing distance to a school location of one field of study may increase the probability to choose for another field of study. This result is interesting since it demonstrates that it is not just the commuting distance to one particular school location that matters. What matters for the choice of a field of study is the whole educational infrastructure within a region. Substitution between school locations for reasons of distance deterrence may be important for the choice of a field of study by students, in particular when not all fields are offered at all locations. It may be useful for policy makers to be aware of substitution effects between school locations when building or developing the infrastructure for vocational education in a region.

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Figures and tables

Figure 1
Municipalities with at least one school location in engineering, economics or health & welfare for five NUTS3-regions in the South East of the Netherlands

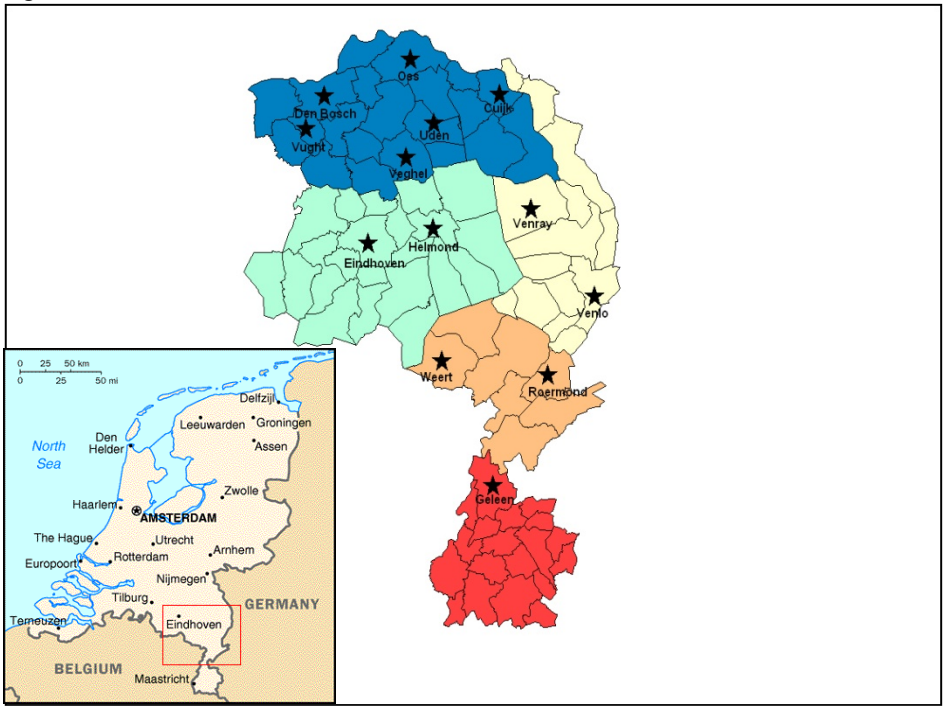

Figure 2
Distribution of students' school choice, ranging from location no. 1 (closest to home) to location no. 31 (most remote)

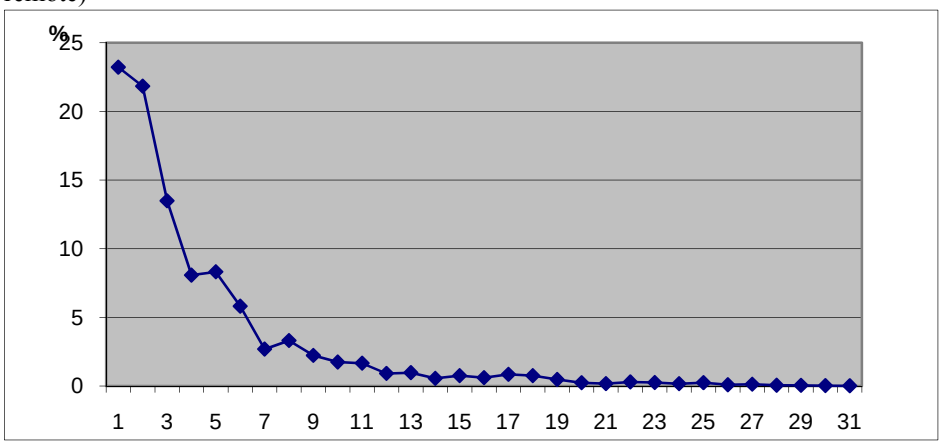

Figure 3
Distribution of students' school choice by field of study, ranging from location no. 1 (closest to home) to location no. 31 (most remote)

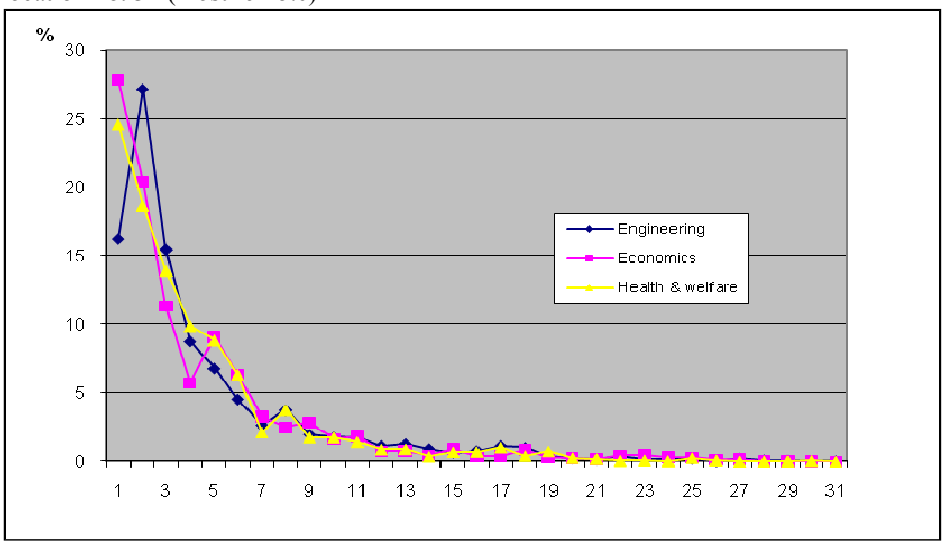

Figure 4
Distribution of students' school choice given that a school offers respectively engineering, economics or health & welfare, ranging from location no. 1 (most nearby) to location no. 19 (most remote)

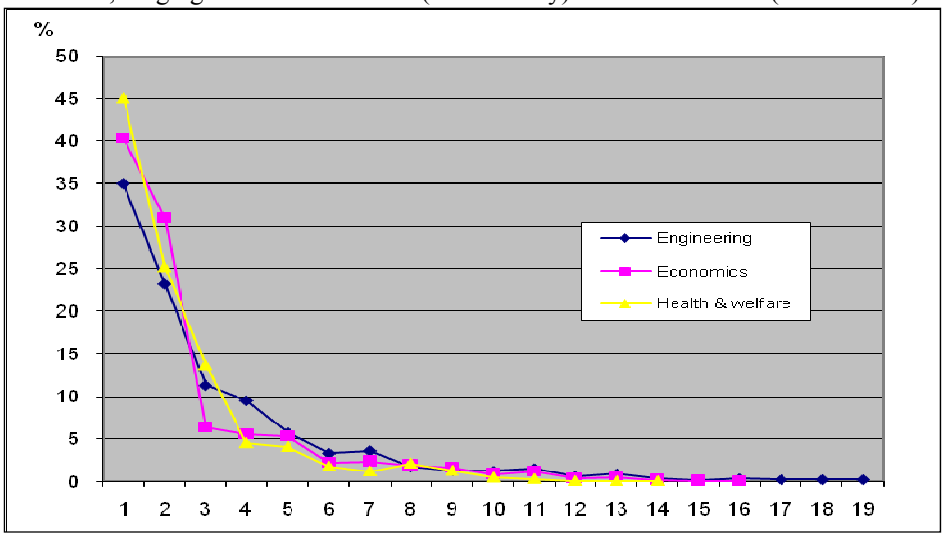

Table 1
Mean distance between home and school location for various groups, 2005

	Share (%)	Mean distance (km)	S.D. (km)
Total	100	19.2	21.3
Field of study			
Engineering	29.9	20.4	18.9
Economics	35.6	19.7	26.0
Health & welfare	34.5	17.7	17.5
Gender			
Male	53.5	20.3	23.4
Female	46.5	18.0	18.5
Ethnicity			
Native	90.1	19.6	21.3
Immigrant	9.9	15.7	21.1
Gender*ethnicity			
Male*native	48.3	20.6	23.5
Female*native	41.7	18.4	18.4
Male*immigrant	5.1	17.0	22.7
Female*immigrant	4.8	14.4	19.2
Age			
15-20	68.9	17.0	15.6
20-25	21.3	20.6	23.3
25-30	2.6	32.5	39.2
30-35	1.5	29.0	40.1
>=35	5.8	32.0	39.0
Diploma previous study	77.6	18.1	17.9
No diploma previous study	22.4	22.2	28.4
Field of previous study			
General	46.4	21.2	24.8
Engineering	20.3	18.4	16.2
Economics	12.6	15.4	17.1
Health & welfare	18.2	17.0	15.7
Agriculture	2.5	18.0	17.9

Table 2
The marginal effect of commuting distance on the choice for a school location

No. of School location	5 km	10 km	20 km	50 km	100 km
1	n.s.				
2	-0.348	-0.695	-1.390	-3.475	-6.950
3	n.s.				
4	-1.142	-2.251	-4.368	-9.915	-16.480
5	-1.089	-2.136	-4.106	-9.020	-13.890
6	-0.478	-0.939	-1.812	-4.035	-6.420
7	n.s.				
8	-0.154	-0.354	-0.894	-3.630	-11.910
9	-0.674	-1.348	-2.696	-6.740	-13.480
10	n.s.				
11	-0.669	-1.337	-2.674	-6.685	-13.370
12	-0.195	-0.405	-0.872	-2.645	-6.840
13	-0.137	-0.266	-0.500	-1.010	-1.220
14	-0.816	-1.599	-3.068	-6.695	-10.140
15	n.s.				
16	-0.496	-0.975	-1.884	-4.215	-6.780
17	n.s.				
18	-0.834	-1.617	-3.030	-6.045	-6.990
19	-0.452	-0.903	-1.806	-4.515	-9.030
20	-0.484	-0.948	-1.820	-3.980	-6.060
21	-1.155	-2.279	-4.436	-10.175	-17.300
22	n.s.				
23	-0.453	-0.905	-1.810	-4.525	-9.050
24	n.s.				
25	-0.347	-0.693	-1.386	-3.465	-6.930
26	-0.378	-0.739	-1.414	-3.055	-4.510
27	n.s.				
28	n.s.				
29	-0.451	-0.886	-1.708	-3.790	-5.980
30	n.s.				
31	-0.511	-1.022	-2.044	-5.110	-10.220

Table 3
Independent binary logistic regressions on the choice for the three fields of study

	Engineering vs. non-engineering		Economics vs. non-economics		Health & welfare vs. non-health & welfare	
	B		B		B	
Intercept	-1.967	***	0.494	*	-1.541	***
Distance engineering 1	-0.020	**	0.018	**	-0.003	
Distance engineering 2-1	-0.030	***	0.020	***	-0.005	
Distance engineering 3-2	0.017	***	0.001		-0.019	***
Distance economics 1	0.011		-0.038	***	0.043	***
Distance economics 2-1	-0.013		-0.006		0.016	
Distance economics 3-2	-0.022	***	0.005		0.014	***
Distance health & welfare 1	0.001		0.030	***	-0.047	***
Distance health & welfare 2-1	0.014	***	0.004		-0.021	***
Distance health & welfare 3-2	-0.006		0.003		0.001	
Female	-2.619	***	-0.604	***	2.459	***
Immigrant	-0.450	***	0.825	***	-0.921	***
Age	0.135	***	-0.058	***	-0.025	
Age²	-0.002	***	0.001		0.001	**
No diploma previous study	0.353	***	-0.052		-0.246	***
Field of previous study						
General (ref.)						
Agriculture	0.375	***	-0.217	*	-0.023	
Engineering	1.899	***	-1.552	***	-1.524	***
Economics	-1.440	***	1.403	***	-1.057	***
Health & welfare	-1.298	***	-0.849	***	1.203	***
N	15,330		15,330		15,330	
Nagelkerke R^2	0.554		0.230		0.532	
Log likelihood	11,069		17,149		12,330	

Significance: ***=p<0.01; **=p<0.05; *=p<0.10

Table 4 Multinomial logistic regression for the probability that students choose for a particular field of study

	Engineering			Health & welfare		
	B		S.E.	B		S.E.
Intercept	-1.602	***	0.379	-1.428	***	0.368
Distance engineering 1	-0.015		0.011	-0.006		0.018
Female*distance engineering 1	-0.081	***	0.028	-0.003		0.021
Immigrant*distance engineering 1	0.020		0.037	-0.042		0.034
Distance engineering 2-1	-0.022	**	0.010	0.011		0.015
Female*distance engineering 2-1	0.028		0.024	-0.020		0.017
Immigrant*distance engineering 2-1	-0.115	***	0.031	-0.046	*	0.024
Distance engineering 3-2	0.016	***	0.004	-0.028	***	0.007
Female*distance engineering 3-2	-0.003		0.011	0.021	***	0.008
Immigrant*distance engineering 3-2	-0.028	**	0.013	-0.025	**	0.012
Distance economics 1	0.013		0.014	0.067	***	0.022
Female*distance economics 1	0.124	***	0.035	-0.021		0.027
Immigrant*distance economics 1	-0.010		0.049	0.044		0.045
Distance economics 2-1	-0.013		0.012	0.026		0.020
Female*distance economics 2-1	0.066	**	0.030	-0.014		0.023
Immigrant*distance economics 2-1	-0.021		0.043	0.022		0.039
Distance economics 3-2	-0.025	***	0.005	0.021	***	0.008
Female*distance economics 3-2	0.033	**	0.014	-0.019	*	0.010
Immigrant*distance economics 3-2	0.026		0.018	0.018		0.017
Distance health & welfare 1	-0.008		0.006	-0.067	***	0.010
Female*distance health & welfare 1	-0.026	*	0.015	0.017		0.012
Immigrant*distance health & welfare 1	-0.006		0.022	0.002		0.022
Distance health & welfare 2-1	0.005		0.005	-0.030	***	0.007
Female*distance health & welfare 2-1	-0.002		0.012	0.014		0.009
Immigrant*distance health & welfare 2-1	0.021		0.013	0.012		0.012
Distance health & welfare 3-2	-0.002		0.006	0.001		0.009
Female*distance health & welfare 3-2	-0.022		0.015	0.000		0.011
Immigrant*distance health & welfare 3-2	-0.014		0.017	-0.004		0.016
N	15,330					
Nagelkerke R^2	0.597					
Log likelihood	18,559					

Significance: ***=p<0.01; **=p<0.05; *=p<0.10
Reference category: the choice for economics
Notes:
- 1=the nearest school offering engineering/ economics/ health & welfare; 2=the nearest-but-one school offering engineering/ economics/ health & welfare; 3=the nearest-but-two school offering engineering/ economics/ health & welfare.
- We also control for gender, ethnic background, age, age², diploma previous study and field of previous study. Since the effects of these control variables are very similar to those presented in table 3, table 4 only presents the distance effects.