Student: Mitchel Sluis
Student number: s2591693
Supervisor: Dr. M. Beerkens
Master thesis (final version)
Date: 8 January 2021
Words: 11622

Mastering Public Performance Data:

Research on the influence of student surveys on student enrollment at universities in the Netherlands

ABSTRACT

In this paper, the influence of publicly available performance data on the improvement of the quality of master programmes in the Netherlands is researched. Using the theoretical framework of (quasi-)market competition, information provision/asymmetry, and choosing a provider, a theoretical argument will be crafted to explain how public performance data can improve the quality of an organization. Using fixed effects models on cross-sectional time-series panel data constructed by public data from the 'Nationale Studenten Enquête' and enrollment data from the VSNU this relationship will be researched to see whether students are responsive to study programmes with better evaluation scoring. The data shows that there is a significant effect between a better NSE score of a master programme and an increase in student enrollment. This effect ranges between 3.3% and 13.42%. However, with an R-squared between 0.001 and 0.006. Thus students are responsive to a better NSE score. This paper has both scientific and societal relevance because it contributes to the scientific debate on whether public performance data has the potential to increase the quality of an organization, and for policymakers, it is important to better understand how and if these information schemes work.

Introduction

In this paper, I will research how public performance data can possibly improve the quality of the service an organization provides.

Possibly one of the most important choices someone will make in their lifetime is which study he or she is going to do and at which university (Germeijs, and Verschueren 2006). Studying is an investment in oneself, but it can be quite expensive. In the US it ranges from $12k to the region of $50k per year (Top Universities 2019). Even in the Netherlands, it can amount to roughly €55k in total, including housing (RTL Nieuws 2019). A student is also investing in him or herself[1], time which also could be spent on working—and thus giving up income. Master students in the Netherlands spend on average 6 years to get their degree (CBS 2017). That is why it is important to make a good and well-informed decision when choosing a study programme. Especially in this time, when due to the COVID-19 crisis the options for students to gather information regarding their (follow-up) study are limited because in-person activities are canceled, online information sources become significantly more important.

There are multiple possibilities for students to make a well-informed decision about their future study, besides going to physical or online open days at the university. A possibility would be the use of higher education rankings conducted by, for example, Times Higher Education or QS Top Universities (Saisana, d'Hombres & Saltelli 2011). These rankings are composed of different indicators ranging from the ratio of international students and staff to domestic, and the citation impact (number of average citations per paper). However, these rankings are of course not full proof of quality and are heavily criticized (McGaghie & Thompson 2001; Altbach 2006; Harvey 2008; Tambi et al. 2008; Federkeil et al. 2012; Lynch 2015). Altbach (2006) argues that, for example, the number of citations of a paper of a faculty member of a particular university does not relate to the quality of the university directly. Furthermore, those rankings do not include the quality of teaching, also because there are no widely accepted standards for measuring this (ibid.). Federkeil et al. (2012) raised the issue that these rankings proclaim the quality of the institution as a whole, however, this does not reflect the performance of the different faculties inside the university.

In the Netherlands, there is also the National Student Survey (Nationale Studenten Enquete, NSE) which aspiring students can use. This survey is conducted by the organization Studiekeuze123. Every year it asks all the students enrolled at a higher educational institution in the Netherlands to fill in a questionnaire regarding the quality of their study. These results are combined and made available online (www.studiekeuze123.nl). The results range from the size of the classes to the quality of the teachers perceived by the students. Prospective students can use this information to improve their decision. The NSE is, however, criticized by the universities for applied sciences (Vunderink, De

[1] when she (or he) is mentioned in the text, he (or she) could also be used.

Zwart, and Scholthof 2020). There were objections about the questionnaire itself (are the right questions asked?) and also about the privacy of the survey (ibid.). Eventually, the minister of Education, Culture, and Science made the NSE mandatory for the entire higher education sector (Scienceguide 2019b). The minister argues that the rationale of this instrument is that it gives students the possibility to make a well-informed decision about their study and the information it provides can be used by the institutions for quality control (Van Engelshoven 2019). Furthermore, it is also used by the Ministry of Education to monitor student satisfaction (ibid.).

For this paper, I will investigate whether publicly available performance data can lead to the improvement of the quality of the service an organization provides. To illustrate this causal mechanism, and to check whether this can also the case for the universities in the Netherlands, I will use the public data from the NSE and enrollment data to discover if students are responsive to these kinds of information sources. For this, I will first use scientific literature to explain how publicly available performance information can improve the quality of organizations. Hereafter I will use quantitative measures to find out if and to what extent a better evaluation score can lead to an increase in student enrollment. I will use the NSE benchmark dataset provided by Studiekeuze 123 and the enrollment data from the Association of Universities in the Netherlands (VSNU). Using the CROHO (Centraal Register Opleidingen Hoger Onderwijs) labels, I will be able to merge the two datasets. The NSE will be used because it gives the most balanced picture of all the universities comparatively. After all, the same question is asked across the board. Also, for this paper, I will focus on master programmes from 2010 until 2019. Lastly, I will research whether students are responsive to a better scoring study programme on career/labor market orientation programmes provided by the universities and if this leads to an increase in student enrollment.

This research has both societal and scientific relevance. From a societal perspective, and especially from a policy perspective, it is important to know how and whether the publication of performance information of organizations works in the field and if it contributes to the improvement of the quality of those organizations. Furthermore, the Dutch government holds these information provision schemes, in the form of the NSE, in high regards to ensure students have the ability to make a well-informed decision regarding their study choice (Scienceguide 2019b). Also, the government, as a financier of the educational system, benefits from the improvement of the quality and efficiency of the higher education sector. Lastly, for the students, it is important to know whether this performance information is being used by the universities to improve the quality of education.

From a scientific perspective, this research is also relevant because the literature about choosing a service provider is mainly focused on the health care sector. For this study, I will use that framework in the setting of the higher education sector in the Netherlands. Also, the scientific literature is ambiguous about the effectiveness of the publication of performance information about organizations and if it can improve the quality of the provided service (Shekelle, Lim, Mattke & Damberg 2008: 6;

Harris & Buntin 2008: 11). Regarding the higher education sector in the Netherlands, Van Nierop, Verhoef, & Franses (2008) observe that a better (public) evaluation score will not lead to an increase in the market share of a study programme or university. My study will contribute to this debate because it will use data from multiple years and will use the total dataset of the NSE, data which was not available in 2008. Also, the study of Van Nierop et al. was conducted more than a decade ago. It is important to research whether these effects are still here or not in the decade since 2008. Lastly, I will also contribute to the debate because I will look at the influence of labor market orientation programmes on the market share of study programmes.

This paper finds that there is a relationship between an increase in the evaluation score of a study programme and an increase (in the market share) of enrolled students. This effect ranges between 3.3% and 13.42%. However, with an R-squared between 0.001 and 0.006. Thus, students are responsive to a better NSE score. There is no effect measurable between a better result on career/ labor market orientation programmes and an increase in student enrollment. Also, the effects of study programmes with 100% market share (no competition)—i.e. CROHO accredited study programmes which are only offered at one university, can heavily influence the results. This is important to note for further research regarding this topic.

In this paper, I will first explain the concepts I will be using for my research: (quasi)-markets, information asymmetry/provision, and choosing a service provider. Secondly, I will elaborate on the methodology, my independent and dependent variables, and how the dataset is constructed out of the NSE benchmark dataset and enrollment data provided by the VSNU. Thirdly, I will analyze the data using fixed effects models and show that there is a (small) significant effect between the NSE score and an increase in student enrollment. However, there is no effect between labor market satisfaction programmes and an increase in student enrollment. Lastly, I will conclude with a discussion about the possible explanations of the results, suggest possible follow-up research, and will try to explain how my research relates to the increased globalization in our education and the rise of other forms of education besides the physical university.

Theoretical framework

To build my theoretical argument, I will use the concepts (quasi-)markets, information asymmetry/ provision, and, finally, of choosing a service provider. In my theoretical argument, I will first explain what the role of the government can be in steering markets that provide public services. The government can use schemes to mitigate the information asymmetry which can occur in these markets. Following this, I will dive deeper into how consumers can make decisions in these markets and how information provisions schemes can assist consumers in making these decisions. I will also discuss how competition between organizations for the same consumer, and with the availability of

public performance data, can improve the quality of the services those organizations provide. Lastly, I will analyze information schemes themselves and how consumers respond to them. Hereafter, I will present my hypotheses that students are most likely responsive to study programmes with a better evaluation score and this will be visible by an increase in student enrollment.

From 1980 onwards, the recurring theme within the realm of public policy is New Public Management (Hood 1991). Some of the main assumptions of this theorem are 'measures of performance, greater emphasis on output control, and greater competition to name a few (ibid.). These reforms were all implemented with the idea of making the public sector more efficient. In this time the role of the public sector changed significantly, from provider to regulator of markets (Agasisti and Catalano 2006: 245). The governance model of the higher education sector also was impacted by these reforms, 'aimed at improving the efficiency of the public sector and focusing on the quality of the services' (ibid.).

The higher education of quasi-markets

In many countries, sectors as education and health care are funded solely by the government. However, some countries have quasi-markets, where, for example, service providers are competing with each other for government funds (Le Grand 1991: 80). These were introduced following the reforms from the '80s onwards. In these quasi-markets, organizations compete with each other in a market that is (completely) funded by the government. The citizens or 'users/consumers' can choose between organizations competing with each other. In quasi-markets, as opposed to state-monopolies, the users' sense of well-being, autonomy, and freedom can be promoted (ibid.). In the higher education sector in the Netherlands, the above-mentioned shift in governance is visible (De Boer, Enders, and Leisyte 2007: 27). Following this, the focus of the system's coordination was directed to the universities (ibid.). There are multiple reasons why this shift occurred. Le Grand (1995) argues that this is caused by the scale of government and reduced spending. Due to the creation of markets within this sector, and other public-sectors, the governments can use regulation to guide them to where the government sees fit.

Providing information to mitigate information asymmetry?

In general, (ideal) markets and quasi-markets function in the same way (Le Grand 1991: 80). Information asymmetry is one of the most important problems keeping markets, and quasi-markets, from achieving perfect competition between the organizations involved, and thus hampering efficiency (Le Grand 1991: 86; Barr 2012: 54). Due to the global expansion of access to higher education, the demand for information about (academic) quality has lead to the creation of ranking schemes as the ones mentioned in the introduction (Dill & Soo 2005). Also, the decision of a student about which

study he or she wants to follow and at which university is rare and very important (idem: 495). In other words, the student does not make this decision often in his/her life, it is very expensive, and it can have great consequences for their future. This is why information asymmetry plays an even greater role in the higher education sector. A student can only really tell if he or she is satisfied with his/her decision to choose a particular study at a university after the student receives its degree. Agasiti & Catalano (2006: 247) call it an "experience good" from which the consumer only knows if it made a well-informed and good decision long after consumption. Following this, it is important that enough and adequate information is gathered for the 'user' to reduce the information asymmetry. The government can intervene to mitigate the information asymmetry by, for example, making these kinds of schemes mandatory or by creating organizations that can monitor (the availability of) this information. Looking at the case of the Netherlands, this gives an interesting relationship between universities and their students. Because the budgets of the universities are mostly based on the number of students enrolled (also on the numbers of first-year students, number of diplomas etcetera), this gives the universities an economic incentive to compete with their counterparts for the biggest market share in student enrollment. To conclude, for a quasi-market to flourish, there must be enough adequate information available about the quality of the services organizations provide to combat the information asymmetry which can withhold consumers from making a well-informed decision, and thus hampering the improvement of the quality of organizations involved.

How can students choose a provider?

Students choosing which university to enroll at has similarities with patients or consumers choosing a health care provider. The health care sector has gone through a comparable policy reform—governments have tried to insert (quasi-) markets to have providers compete with each other (Maynard 1991). In this section, I will discuss the theory of choosing a health care provider. I will use this theory as a base for my argument on how students can use publicly available performance information to make a well-informed decision about their education. The theory on choosing a health care provider, and how it can improve the quality of the organization providing the service, can be used in the higher education sector as well. The patients become students, physicians become teachers, and hospitals become universities. In the quasi-market setting we discussed earlier, the same competition and information asymmetry play a role in both the health care sector as the higher education sector. When explaining the scientific literature about choosing a health care provider, I have focussed on aspects that are also relevant for the higher education sector. Thus, most of the time, I will not pay a lot of attention to aspects that are specific to the health care sector.

In the literature about choosing a health care provider, there has been an emerging interest in recent years about the role consumers can play as 'agents of change' to improve the quality of health care and containing costs (Harris & Buntin 2008). The increased attention for this topic is also due to

the upcoming 'consumerism', the increased use of the internet, and patient-centered care (Ranerup, Norén & Sparud-Lundin 2012: 342; Reibling & Wendt 2012; Doering & Maarse 2015: 2174). Proponents of greater consumer engagement argue that consumers, who are aware of the quality and cost of providers, will choose high quality and cost-efficient providers (Harris & Buntin 2008: 1). And, following this, if more consumers choose their providers in this way, then the incentive for the provider to increase to quality of their services will increase (Harris & Buntin 2008: 1). The reason that decision-making schemes like choosing a provider are introduced is that it can lead to efficiency gains in the organizations which provide the services and increase the quality of it (Kim, Bae & Lee 2017: 1934).

An important component of choosing a provider framework is the concept of calculation (Ranerup, Norén & Sparud-Lundin 2012: 343). This concept focuses on the more economical perspective on how consumers make well-founded 'calculated' decisions. The sources of the economic calculation can be something mundane as material devices, for example, a weighing scale in the supermarket. However, the more abstract tools such as online, web-based applications that offer data on a certain topic are of *"critical importance in helping individuals to act as calculating consumer"* (Ranerup, Norén & Sparud-Lundin 2012: 343).

Making the performance results of organizations publicly available can ensure that the administrators, who are keen on (keeping) their good public appearance and increasing their market share, will try to improve the quality and efficiency of their organization. Especially in the underperforming areas which can be identified by performance results (Shekelle, Lim, Mattke & Damberg 2008). In other words, publicly available performance results can improve the performance in two ways: *selection* and *change*. The selection mechanism ensures that consumers can select service providers of (a higher) quality. The change mechanism helps organizations to locate and improve the above mentioned underperforming areas (Doering & Maarse 2015: 2175). However, these mechanisms only work if there are (a) enough providers to choose from—in the case of the health care provider, enough hospitals, (b) publicly available quality information, and lastly, (c) consumers willing to travel (further) for better quality (Doering & Maarse 2015: 2175). In the case of choosing a health care provider in the Netherlands, evidence has shown that patients are willing to ignore the nearest hospital and travel further for (possibly) better quality (Doering & Maarse 2015: 2175).

Consumers have an abundance of information at their disposal about health care providers, however, they do not always play an active and well-informed role in deciding their health care provider (Harris & Buntin 2008: 1). The decision-making process in choosing a health care provider can also be fairly complex because the consumers do not use all the information which is provided or they do not have enough information to begin with (Ranstad, Midlöv & Halling 2014: 99). Policy-makers can pursue different techniques to increase the overall effectiveness of consumers' choices on

health care providers. For example, ensuring that there is enough and adequate comparative information on cost and quality available (ibid.).

For informed decision-making, consumers need objective and publicly available quality information (Doering & Maarse 2015: 2175). Qualitative research shows that consumers are strongly interested in public information on provider quality (Harris & Buntin 2008: 9). The scientific literature also shows that independent evaluations or report card ratings can contribute to 50% of the self-reported use of consumers (ibid.). However, the most trusted sources of information for consumers on provider quality are personal relationships, for example, friends and family (Harris & Buntin 2008: 3). In order to improve the consumers' ability the make a well-informed decision using publicly available information, and thus ultimately the provided service, the public data needs to be easily obtainable, accurate, and understandable (Harris & Buntin 2008: 6; Ranerup, Norén, & Sparud-Lundin 2012: 342). Furthermore, it is important to ensure the consumers are aware of public information. Lastly, socio-demographic factors can also influence the awareness of publicly available information for consumers. Highly educated consumers are more likely to use public information (Harris & Buntin 2008: 7).

The design of the (online) information-providing application is important because the scientific literature shows that this can affect how consumers interpret the information and make decisions (Fasolo, Reutskaja, Dixon & Boyce 2010). Using focus groups, Fasolo et al. (2010: 347) found that, for example, when viewing a comparison between different hospitals side-by-side, the participants realized that no hospital can have top results across the board. Also, the presentation of conflicting indicators made the participants think about trade-offs (ibid.). Most of the participants, especially when they experienced information overload, tried to combine indicators and this suggests that an overall assessment of how well a hospital is performing could be useful. In the case of missing data ('data not available'), all the participants evaluated these indicators negatively (idem: 348). Lastly, one of the key findings of their research was that the ordering of information is important because more attention is paid to the indicators presented at the top/as first (idem: 349). Thus, evidence shows that overall or aggregated indicators and indicators presented as first could be important factors for consumers making decisions using publicly, comparative performance information.

When we look at the effectiveness of publicly available data and the (improved) choices of consumers, there is no clear evidence. In the case of health care providers, there is no compelling evidence linking the availability of public performance data and the choices of consumers for high-quality providers, however, there is some evidence which argues that it has an effect on the providers themselves (Harris & Buntin 2008: 11). Other reports suggest *"that the public release of performance data stimulates change at the level of the hospital"* (Shekelle, Lim, Mattke & Damberg 2008: 6). The empirical literature on using publicly available performance data is, however, still limited (ibid). In short, current

research is ambivalent on the effectiveness of public performance data on the improvement of the quality of an organization.

To sum up, consumers can play an important role in improving the quality and efficiency of organizations. However, it is important that consumers can find and are aware of publicly available performance information. Lastly, the design and use of the (online) information source are also of importance for the decision-making process.

When we look at the situation in the Netherlands regarding the use of publicly available performance information on the higher education sector, we can look at the National Student Survey (in Dutch: Nationale Studenten Enquete, NSE). The NSE is administered by the organization Studiekeuze123. Studiekeuze123 is funded by the Ministry of Education, Culture, and Science. The Supervisory Board consists of members of the different interest groups active in the higher education sector (VSNU, VH, ISO, LSVB, etcetera). The NSE is a survey in the form of a questionnaire that is administered every year (Studiekeuze123 2020c). In the questionnaire, students can grade their study programme on different aspects, including, but not limited to, quality of teachers, internationalization, group-size, etcetera. The response of the NSE in 2019 was 29.8% (n=91184) (Studiekeuze123 2020c). In general, the study programmes are graded 4.06 (including both bachelor's and master's). When looking solely at the master programmes of the universities, the average grade of the study programs is 4.1 (ibid.). In the Netherlands, last year the minister of Education, Culture, and Science, made participation in the national student survey mandatory after the universities for applied sciences opted-out of the NSE and the University of Utrecht was also planning to do so (Scienceguide 2019a; Scienceguide 2019b). By making participation with the NSE mandatory, the Dutch government wanted to ensure that there would be no backlash regarding the information asymmetry and argue that good information for students on the quality of universities *"is a job for the government"* (Van Engelshoven 2019; Scienceguide 2019b).

Hypotheses

When we combine the concepts we can get a better picture of the casual mechanism on how publicly available performance data can improve the quality of an organization. The higher education sector in the Netherlands is a quasi-market. Universities compete with each other for a bigger market share of student enrollment. Namely, because more students enrolled at a particular university will lead to more funding from the government for that university—due to the allocation of funding based on the number of students enrolled. However, because students, as consumers, are keen on getting the most out of their education will choose the university and study programme that best suits their needs and will give them the best tools they need in their later career in the form of an adequate degree and professional skills. There is an information asymmetry because students do not know which university

and study programme is 'the best'. In the Netherlands, the government steps in to ensure that there is no information asymmetry (or as little as possible) by funding the NSE and making participation mandatory for the educational institutions. The NSE provides students with performance information about universities and the study programmes they offer. The information is provided by the students in the previous cohorts. Also, the administrator of the university, faculty, and the study programmes, can use this information to know where they can improve the quality (and possibly the efficiency) of their education. Thus, in short, better-scored study programmes will attract more students.

Following the scientific literature, my first hypothesis is:

H_1 = A rise in the average NSE score of a study programme will lead to an increase in student enrollment.

For this study, I will focus on the general satisfaction indicator of the study programmes. As discussed in the theoretical framework, there is an emphasis on general or overall indicators when using comparative performance information. So, for this study, I will use the general satisfaction of study programmes. In the next section, I will discuss which variable I will use to reflect this general satisfaction level. Also, for this study, I will focus solely on the master programmes of universities because I assume that aspiring master students are more aware of what they exactly want after finishing their bachelor study. Also, students tend to switch universities when picking their follow-up master programme (VSNU 2014). In both cases needing sufficient and adequate performance information about different universities and study programmes.

When we dive further into the information-provision and look at the specific reasons for people to go to college is predominately the outlook for a better future. In other words, career-prospects. Students want and expect, that the university can provide a role in their career preparation (VSNU 2016; ISO 2017; Algemeen Dagblad 2018). Universities also tend to place these career preparation programmes in high regard (VNSU 2016). Also, when we look at the NSE results, "career preparation" and "connection between study and career" are some of the lowest grades for master programs, besides "internationalization" and "internships" (Studiekeuze123 2020c). Lastly, following the previous hypothesis and the theoretical framework, that if students approach the choice of the study programmes very rationally—thus trying to maximize labour market benefits—are more likely to collect such performance information and thus be influenced by the score.

Universities are investing in and promoting different kinds of career-oriented programs. For example, but not limited to, Leiden University and the University of Amsterdam (Leiden University 2020; Universiteit van Amsterdam 2020). It can be assumed that there is a possible connection between the focus on labor market orientation on the universities, and students making a choice for universities/study programmes which score better on these kinds of indicators in the NSE. In other words, students choose a university/study programme that has a better score on labor market

TABLE I. Number of observations NSE benchmark dataset & VSNU dataset

	NSE benchmark (individual)		NSE aggregated		VSNU	
University	*Obs*	*%*	*Obs*	*%*	*Obs*	*%*
Erasmus Universiteit Rotterdam	20.203	6,9	401	6,0	481	6,0
Radboud Universiteit Nijmegen	22.248	7,6	547	8,2	687	8,5
Rijksuniversiteit Groningen	26.159	9,0	876	13,1	1.151	14,3
Technische Universiteit Delft	28.645	9,8	304	4,5	314	3,9
Technische Universiteit Eindhoven	12.316	4,2	221	3,3	223	2,8
Tilburg University	16.058	5,5	403	6,0	464	5,8
Universiteit Leiden	23.621	8,1	596	8,9	710	8,8
Universiteit Maastricht	20.968	7,2	421	6,3	450	5,6
Universiteit Twente	12.648	4,3	286	4,3	305	3,8
Universiteit Utrecht	34.823	11,9	793	11,8	908	11,3
Universiteit van Amsterdam	28.366	9,7	846	12,6	1.132	14,1
Vrije Universiteit Amsterdam	27.941	9,6	720	10,8	931	11,6
Wageningen University	17.926	6,1	282	4,2	285	3,5
Total	**291.922**	**100**	**6.696**	**100**	**8.041**	**100**

Source: VSNU 2020; Studiekeuze123 2020.

orientation schemes. Thus, my second and final hypothesis is:

H_2 = Master programs with a higher grade on career-related indicators result in a higher number of student enrollment

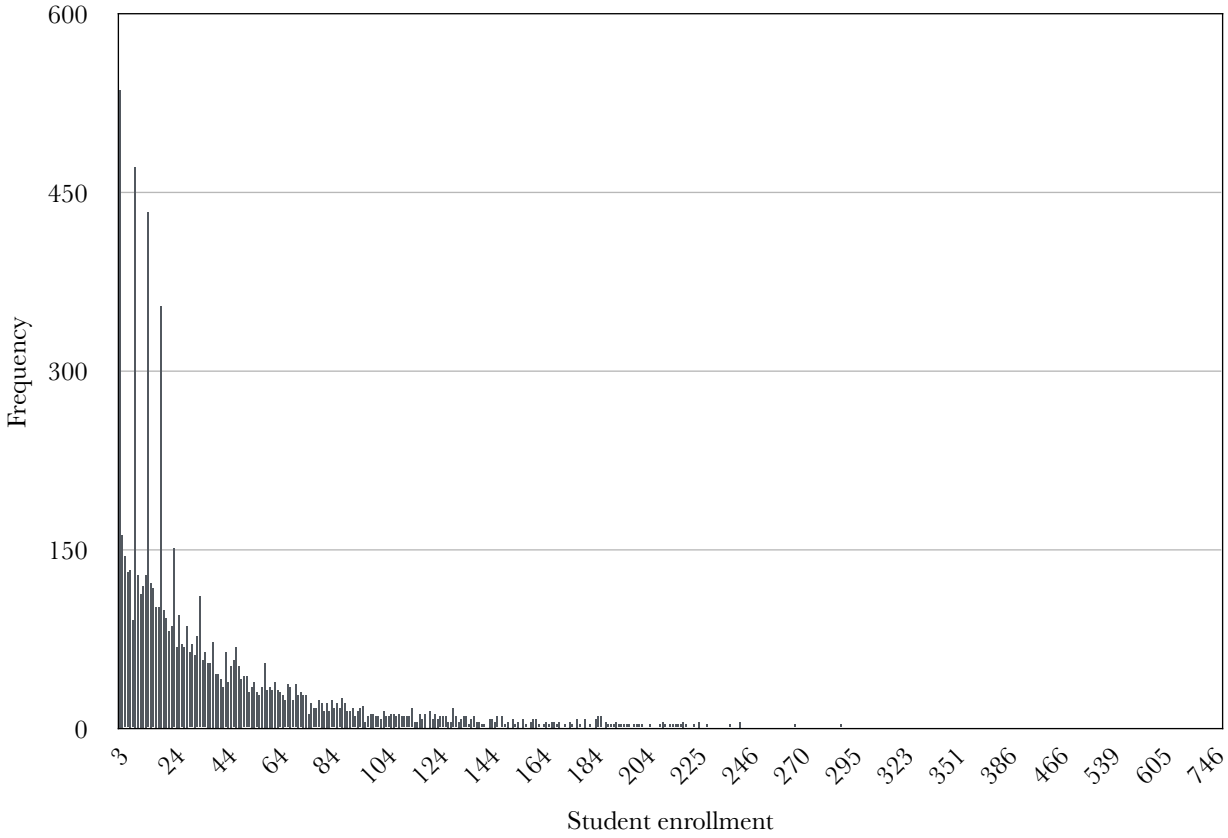
Dataset & Methodology

The datasets I will be using for this research are provided by the Vereniging van Universiteiten (Association of Universities in the Netherlands, VSNU) and Studiekeuze123. The data provided by the VSNU contains the yearly student enrollment of all the study programmes of the publicly funded universities in the Netherland from 2010 until 2019. Studiekeuze123 provides the NSE benchmark dataset containing all the respondents of the NSE from 2010 until 2019. In the unaltered NSE benchmark dataset, there are 2.3 million observations. However, these also include observations from the universities for applied sciences (HBO) and bachelor programmes from universities. The dataset also contains universities that are not present in the VSNU dataset (e.g., 'Academie for Wetgeving', 'Driestar Educatief', 'Duisenberg School of Finance'). These observations are omitted from the dataset. After omitting these observations the dataset has 291.922 observations left. Table I shows how the observations of the datasets are distributed among the universities. In order to combine the NSE dataset with the VSNU dataset, the NSE data needs to be aggregated to the study programme level. After aggregating the data from the NSE dataset by year, CROHO, and university, the number of observations was reduced to 6696.

From the VSNU dataset, I have renamed some of the university indicators to ensure the same name is used in both datasets. For example, in the VSNU dataset Wageningen University was called 'Wageningen Universiteit', and the 'Vrije Universiteit' was missing 'Amsterdam'. Due to the use of different CROHO labels over the years, the merging of multiple studies to one, or the discontinuing of certain study programmes, there is a discrepancy between the two datasets. Because I have merged the two datasets using the CROHO, university, and year indicator, some observations of the NSE dataset cannot be matched with the observations of the VSNU dataset and vice versa. Different comparisons were done between the datasets and variables to ensure the data was still correct and missing the least number of observations. However, some observations were dropped because they missed enrollment data from the VSNU dataset or results from the NSE dataset. When merging the two datasets, using the identical year, CROHO, and university indicators, there are 6109 observations left (see Table I). These observations have results on both the number of student enrollments (from the VSNU dataset) and results from the NSE dataset. The unit of analysis of the merged dataset is study programmes per cohort from 2010 until 2019.

Due to the nature of the cross-sectional time-series data, the method I will be using is fixed effects models to estimate the effect of the independent variable of the dependent variable. I will be

Graph I. Frequency distribution of yearly student enrollment 2010-2019



Source: VSNU 2020. Mean: 58.2, Median: 28.0, Skewness: 3.840.

running different models with different student enrollment variables as I will discuss below. I will also run models comparing the study programmes on the satisfaction level of labor market orientation to test my second hypothesis. In order to decide whether to use fixed-effects or random-effects, I will use the Hausman test. I will elaborate on the test and the results in the analysis section.

Variables

My dependent variable is *student enrollment*, which is the number of new students enrolled at a specific study programme in a specific year. This data comes from the VSNU. The definitive enrollment count is on October 1st of every year. For some study programmes less than 5 students enrolled in a year. For privacy reasons, these observations are labeled with <5 by the VSNU. I have recoded these results to 2.5 (average between 0 and 5) to ensure that they can be used in the models.

I have also recoded the student enrollment variable into two *market share* variables. The first market share variable is the *yearly market share.* This variable is computed by the share in a percentage of the number of students who are enrolled at a specific study programme in a specific year from the total amount of students who enroll in the same year. The second market share variable is the *yearly market share per CROHO* variable. This variable is the share of students enrolled at a specific study programme in a specific year as a share of the total number of students enrolled at that specific study at all the universities in the same year. For example, this variable compares the number of students

enrolled at the study programme 'M Rechtsgeleerdheid', with the CROHO-label 60084, at the Erasmus University, and compares it with the total amount of students enrolled at that particular study programme at all the universities in the same year. I have created these two variables because I want to compare these two conditions. The first being students who maybe do not exactly know which study programme they want to choose. So having the option to choose for any study programme the student sees fit. The second case is when a student knows which specific study programme she or he wants to enroll in, but not yet at which university. Additionally, as we can later see in the analysis section, the average student enrollment has steadily grown over the last decade. In total, I have three different measurements of the dependent variable: *student enrollment,* which is the absolute number of newly enrolled students at a study programmer, *yearly market share,* and, yearly *market share per CROHO.*

Lastly, as we can see in graph I, the data is highly positively skewed (mean: 58.2, median: 28.0, skewness: 3.840). In other words, there are more smaller study programmes with a few newly enrolled students each year than there are bigger programmes with high levels of student enrollments. The data is also skewed for the *early market share,* and, yearly *market share per CROHO* variables—because the number of study programmes with a small student intake does not change. To address this, I have recoded the student enrollment variables into a logarithmic scale.

My main independent variable is *general satisfaction,* which is provided by the NSE benchmark dataset. The variable in the NSE dataset is called *algemeenOordeel_01.* The students were asked in the questionnaire what their general satisfaction was regarding their study programme (Studiekeuze123 2020a, NSE codebook). The answers range from 1, very unsatisfied, to 5, very satisfied. There also was the option the fill in 'does not apply', which is coded in the number 6 (these results were excluded from the models). The original observations, and thus results, were (from) individual students. These observations were aggregated to the study programme level as I discussed earlier. So the average of each study programme per university, per year is presented in the dataset. To test my second hypothesis, I want to determine whether a better score on the labor market orientation indicator of the NSE will lead to an increase in student enrollment. My second independent variable is *labor market satisfaction.* For this, I will use the *VoorbereidingBeroepsloopbaan* indicator provided by the NSE. The students were asked in the questionnaire what their general satisfaction was regarding the preparation for the labor market (Studiekeuze123 2020a, NSE codebook). The answers range from 1, very unsatisfied, to 5, very satisfied. There also was the option the fill in "does not apply", which is coded in the number 6 (these results were excluded from the models). As with the general satisfaction variable, the data of all the individual students was aggregated to the mean score of a study programme.

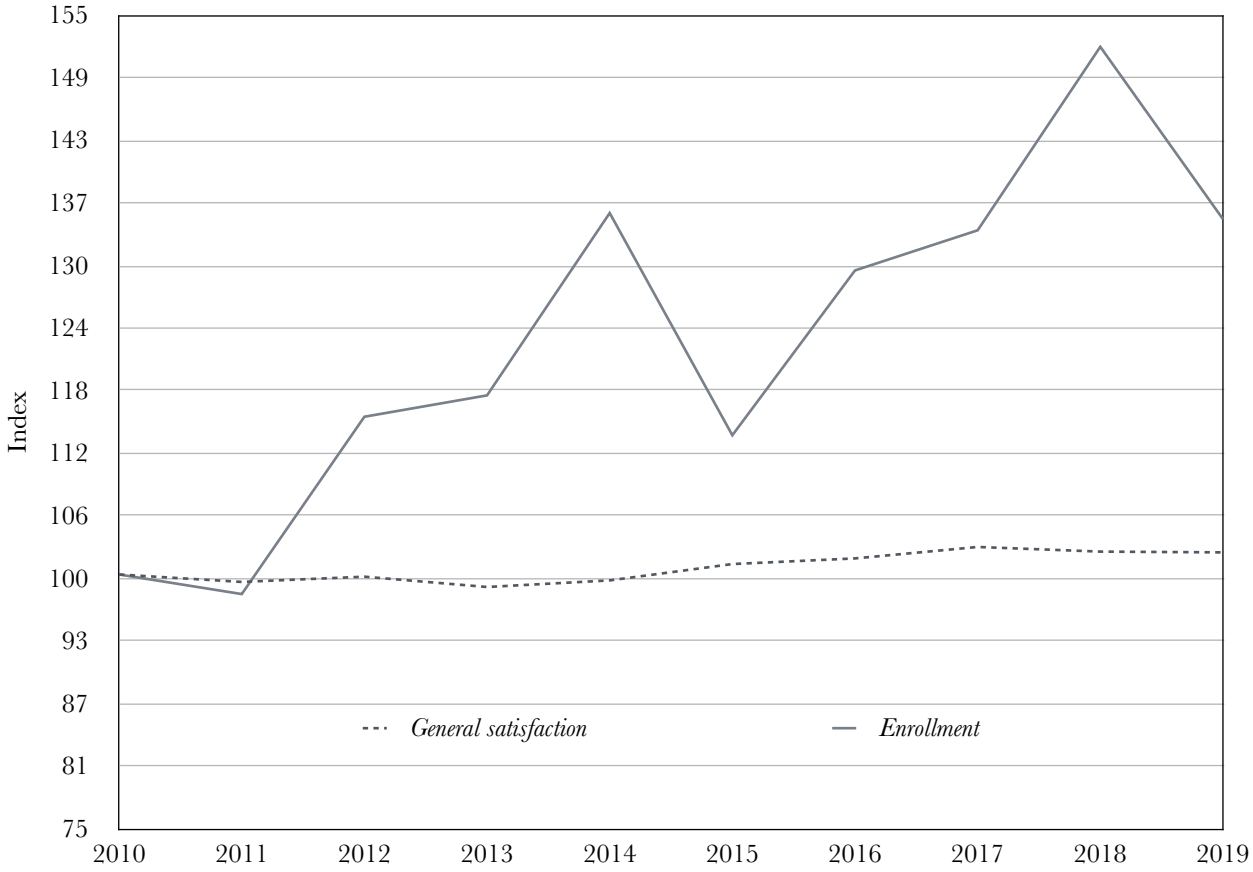
Lastly, because the NSE score gets published in June of each year (Studiekeuze123 2020b), and the enrollment closes on May 1st (Rijksoverheid 2020), I need to lag the effects of the NSE score compared to the enrollment data. For example, when a student wanted to enroll in the year 2015

(before May 1st), he or she will be using the NSE data from 2014 (because it gets published in June of each year). The general satisfaction and labor market satisfaction variables will be lagged by one year. It is not necessary to also lag for two or multiple years because the NSE gets published every year. See table A for a summary of all the variables.

TABLE A. Summary of independent and dependent variables

Variable	Mean	St. Dev	Min	Max
General satisfaction	3.97	0.334	1.6	5
Labour market statisfaction	3.29	0.546	1.33	5
Student enrollment	56.35	83.67	2.5	850
Yearly Market Share	0.12	0.18	0.004	2.08
Yearly Market Share per CROHO	60.09	38.93	0.38	100

Graph II. Indexed results of average general satisfaction score and student enrollment per year for all universities



Source: Studiekeuze123 2020; VSNU 2020. Alterations done by author. See Appendix I for Table II and graphs IIa-IIm for results per university.

Analysis

For the preliminary analysis, and to investigate the fluctuations of the two variables over time, I have compared the average *general satisfaction* score and student enrollment per year in graph II. The figure shows indexed results of the average NSE score and student intake from 2010 until 2019 to roughly compare the variations between the two variables. We can clearly see a slight growth in the average NSE compared to a much higher growth in the average student enrollment from 2010 until 2019. The absolute average NSE score (for these results see appendix I, table II-iv) rises 3.95 in 2010 to 4.03 in 2019. The average absolute student enrollment is 46,06 students per year per study programme and rises to 62.16 students in 2019 (ibid.). For the averages per year for all the universities combined and the average of each university, you can consult Table II and Graphs IIa to IIm in Appendix I.

When we move further to the analyses, it is first important to decide whether to choose for fixed effects or random effects in order to address the impact of the variations of the variables over time. As we could see these variations in the previous figure. Using the Hausman test provided in STATA, I have compared the results of a regression model with random effects and fixed effects. The Hausman test compares these results. The null hypothesis is that random effects are appropriate and the alternative hypothesis is that fixed effects are appropriate (Chmelarova 2007). When running the Hausman test, it finds that the null hypothesis should be rejected in favor of the alternative (Prob>chi2 = 0.0000). Thus, for the following analyses, I will use fixed effects.

General satisfaction

For the first models, I will run the *student enrollment* variable as a dependent variable. This variable measures the absolute yearly student enrollment at a study programme. This variable is, like the other two variables measuring student enrollment, recoded to a logarithmic scale to address the skewed data. The first results are presented in Table III. The first model finds that the *lagged general satisfaction* variable does significantly influence *student enrollment* (table iii, column 1). The model explains that, if the general satisfaction rises with one, the student enrollment will rise by 7.4% (inverse logarithm of .072). However, the R-squared is quite low (0.0010). In the second model, dummy variables representing each year are added with 2011 as a base level. The effect of the independent variables loses significance. The dummy variables show that from 2011 there is a growth in student enrollment, which corresponds with the growth of student enrollment clearly visible in Graph II. In models 3 and 4, all the observations with a 100% market share are dropped from the analysis to see whether these drive my results. Specifically, these observations are dropped because there is no competition possible between study programmes. After all there is only one study programme of that kind in the Netherland. So students cannot choose between the same study programme offered at different universities. When these observations are dropped, the effect of *general satisfaction* on *student*

TABLE III. Estimation results of fixed effects on student enrollment log

	(1)		(2)		(3)		(4)	
General satisfaction (lagged + 1 year)	.072***	(.022)	.029	(.022)	.126***	(.032)	.097**	(.032)
Year								
2012			.097***	(.022)			.097***	(.031)
2013			.089***	(.022)			.089**	(.030)
2014			.207***	(.021)			.207***	(.030)
2015			.050**	(.021)			.050	(.030)
2016			.176***	(.021)			.176***	(.030)
2017			.204***	(.021)			.204***	(.030)
2018			.246***	(.021)			.246***	(.031)
2019			.140***	(.021)			.105***	(.031)
Constant	3.38***	(.089)	3.41***	(.089)	3.24***	(.128)	3.23***	(.130)
N	5456		5456		2883		2883	
Number of groups	795		795		439		439	
R^2	0.0010		0.0051		0.0024		0.0040	

**Significant at 5%; **significant at 1%; ***significant at 0.1%.*
Note: Unstandardized regressioncoefficient with standard error in parentheses. Presented coefficients are logarithmic.
Model 3 and 4: observations with a 100% market share are dropped from the analysis
Source: VSNU 2020; Studiekeuze123

enrollment rises to 13.42% (inverse logarithm of .126) (table iii, column 3). However, the R-squared is still quite low (0.0024). In the last model of table iii, dummy variables are added to look at the effects over the different years compared to the base level of 2011. The effect of general satisfaction on student enrollment drops to .097–thus the model explains that when the average grade of a study programme rises with 1, the student enrollment will increase by 10.2%. With an R-squared of 0.0040, explaining only 0.4% of the variance of the dependent variable that can be explained by the independent variable. Also, for all the years except 2015, we can see significant results for a rise in student enrollment compared to the base level of 2011 (table iii, column 4).

When we move on to the next models in Table IV, I have replaced the *student enrollment* variable —measuring the yearly student intake in absolute numbers, for the *yearly market share variable*. This variable measures the share of the yearly student enrollment at the observed study programme, compared to the overall student enrollment in the same year for all the universities in the Netherlands. When we run the models with the same independent variable as the previous model (*lagged general satisfaction)*, we can see different results in models 1 and 2. The effect of *yearly market share* (also in logarithmic scale) is not statistically significant with the dependent variable. In models 3 and 4 we can

TABLE IV. Estimation results of fixed effects on yearly market share log

	(1)		(2)		(3)		(4)	
General satisfaction (lagged + 1 year)	.022	(.021)	.029	(.022)	.072*	(.031)	.097**	(.032)
Year								
2012			.002	(.022)			.009	(.031)
2013			-.028	(.022)			-.027	(.030)
2014			-.035	(.021)			-.033	(.030)
2015			-.028	(.021)			-.053	(.030)
2016			-.045*	(.021)			-.078**	(.030)
2017			-.043*	(.022)			-.070*	(.030)
2018			-.036	(.021)			-.066*	(.031)
2019			-.023	(.021)			-.057	(.031)
Constant	-2.54***	(.087)	3.41***	(.089)	-2.67***	(.126)	-2.54***	(.130)
N	5456		5456		2883		2883	
Number of groups	795		795		439		439	
R^2	0.0006		0.0008		0.0018		0.0032	

**Significant at 5%; **significant at 1%; ***significant at 0.1%.*
Note: Unstandardized regressioncoefficient with standard error in parentheses. Presented coefficients are logarithmic.
Model 3 and 4: observations with a 100% market share are dropped from the analysis
Source: VSNU 2020; Studiekeuze123

see similar results as the previous table with an effect of 7.4% (.072) and 10.2% (.097) respectively and an R-squared of 0.0018 and 0.0032 respectively. However, for the dummy variables of the year 2016, 2017, and 2018 we can see negative effects (table iv, column 4). Contradicting the effects of the models in Table III.

In Table V, I have replaced the dependent variable for the *yearly market share per CROHO* variable. This variable measures the share of student enrollment at a study programme, compared to the total amount of students enrolled at the same study programme but offered at other universities. For example, the study Public Administration with CROHO label 60020 is offered at Leiden University, Erasmus University, and Utrecht University. In these models, we can see similar results as the previous table. The effect of the independent variable is not significant when it is solely added in models 1 and 3. The effect of the independent variable becomes significant when the dummy variables are added in models 2 and 4. Also, with the same negative effects for all the years compared to the base level of 2011. When comparing model 2 and 4, we can see the effect of general satisfaction rise from 3.3% (inverse logarithm of .033) to 7.1% (.069) and an R-squared of 0.0063 and 0.0052 respectively (tables, column 2, 4).

TABLE V. Estimation results of fixed effects on yearly market share per CROHO log

	(1)		(2)		(3)		(4)	
General satisfaction (lagged + 1 year)	.027	(.015)	.033*	(.016)	.053	(.029)	.069*	(.029)
Year								
2012			-.069***	(.016)			-.105***	(.028)
2013			-.079***	(.016)			-.127***	(.028)
2014			-.084***	(.015)			-.133***	(.027)
2015			-.098***	(.015)			-.161***	(.027)
2016			-.099***	(.015)			-.161***	(.027)
2017			-.094***	(.015)			-.153***	(.027)
2018			-.082***	(.015)			-.135***	(.028)
2019			-.077***	(.016)			-.130***	(.028)
Constant	3.68***	(.063)	3.73***	(.065)	2.84***	(.115)	2.91***	(.118)
N	5456		5456		2883		2883	
Number of groups	795		795		439		439	
R^2	0.0118		0.0063		0.0051		0.0052	

**Significant at 5%; **significant at 1%; ***significant at 0.1%.*
Note: Unstandardized regressioncoefficient with standard error in parentheses. Presented coefficients are logarithmic.
Model 3 and 4: observations with a 100% market share are dropped from the analysis
Source: VSNU 2020; Studiekeuze123

TABLE VI. Fixed effects of labor market satisfaction on student enrollment (1)

	Student enrollment log		Yearly market share log		Yearly market share per CROHO log	
Labor market satisfaction (lagged + 1 year)	.056**	(.018)	.015*	(.018)	-.002	(.013)
Constant	3.48***	(.062)	-2.50***	(.060)	3.79***	(.044)
N	5456		5456		5456	
Number of groups	795		795		795	
R^2	0.0035		0.0042		0.0191	

**Significant at 5%; **significant at 1%; ***significant at 0.1%.*
Note: Unstandardized regressioncoefficient with standard error in parentheses. Presented coefficients are logarithmic.
Source: VSNU 2020; Studiekeuze123

TABLE VII. Fixed effects of labor market satisfaction on student enrollment (2)

observations omitted with 100% market share

	Student enrollment log		Yearly market share log		Yearly market share per CROHO log	
Labor market satisfaction (lagged + 1 year)	.047	(.026)	-.013	(.025)	-.006	(.023)
Constant	3.58***	(.083)	-2.38***	(.082)	3.08***	(.075)
N	2883		2883		2883	
Number of groups	439		439		439	
R^2	0.0008		0.0012		0.0003	

**Significant at 5%; **significant at 1%; ***significant at 0.1%.*
Note: Unstandardized regressioncoefficient with standard error in parentheses. Presented coefficients are logarithmic.
Observations with a 100% market share are dropped from the analyses
Source: VSNU 2020; Studiekeuze123

Labor market satisfaction

To test the second hypothesis, I have rerun the previous models but with *labor market satisfaction* as the independent variable. The results presented in Table VI and VII contain the three different variations of the dependent variable: *student enrollment log, yearly market share log,* and, *yearly market share per CROHO.* For ease of reading, I have presented all three variables in the same table (see upper row). In the models in Table VI, all the observations are added from the dataset and in Table VII the observations with a 100% market share are omitted (as I did with the previous models).

At first sight, we can see positive and significant results for *student enrollment log* and *yearly market share log.* The effect of *early market share per CROHO* is not significant. Model 1 explains that if the average labor market satisfaction of a study programme rises by 1, student enrollment will increase by 5.7% (inverse logarithm of .056), measured in absolute student intake (table vi, column 1). For model 2 the model presents an effect of 1.5% (inverse logarithm of .015). With an R-squared of 0.0035 and 0.0042 respectively. However, if we move to Table VII, where the observations with 100% market share are dropped from the analyses, all the effects lose their significance.

To conclude, the models have shown different results indicating that there is a significant effect of *general satisfaction* on *student enrollment.* The effects vary between 3.3% and 13.4%. Most of the models, however, have an R-squared between roughly 0.001 and 0.006. The effects are significant, thus I can reject the null hypothesis and accept the H_1.—an increase of the average NSE grade of a study programme can lead to an increase in student enrollment. Regarding the second hypothesis, measuring the effect of *labor market satisfaction* on student enrollment, none of the effects were

significant after omitting the 100% market share observations. Thus, the second hypothesis can be rejected.

Discussion

In this section, I first want to discuss the results of the analyses. Secondly, I want to discuss some of the limitations of my research and its approach and simultaneously provide some suggestions for possible follow-up research. Thirdly, I want to discuss some policy recommendations. Finally, I want to discuss how my research relates to the increased globalization in our education and the rise of other forms of education besides the physical university.

What do the results tell us? First and foremost, there is an effect between the average satisfaction score of a study programme and its market share. This could indicate that the causal mechanism which we discussed earlier could work in practice: the quality of the study programme improves, aspiring students are aware of this via the publication of the NSE, leading to more students enrolling for a study programme. Thus, students could be responsive to a better scoring study programme. But, as I said, this effect is limited. Follow-up research could investigate this more extensively. First, whether and how universities use the NSE scores and whether they attempt to improve their quality due to this instrument. Secondly, whether and how students use this information—or any other type of information. Probably with the use of focus groups or more qualitative measures to better understand the causal mechanism.

Regarding labor market satisfaction, no significant effects were found. This could mean that students who are deciding on which master programme they want to enroll at, are not responsive to these career orientation programmes. This could mean that students who want to go to the university for a better, and more theoretical, understanding of a certain topic and maybe do not care if this does not directly lead to employment or a better chance of it. This is, however, of course speculative and thus also needs to be researched further.

Also, for follow-up research, when setting up the research design, it is important to take into account that the results can differ when some of the observations have a 100% market share—without any competition. As the analyses of this paper have shown, these can influence the results.

Limitations

First, I want to discuss some of the limitations regarding the used variables and indicators. One of the variables I have used is market share. Because master programmes tend to be smaller and more unique than bachelor programmes, the market share was 100% for multiple study programmes. As we have seen, this heavily influenced the results. Follow-up research on bachelor programmes can have different results because of the more general and bigger study programmes. Following this, it could also be possible that in some cases the NSE score will not increase any further because it simply

cannot get any better or it mathematically reached its maximum grade, however, student enrollment could still increase. Regarding my main dependent variable, I have used the general satisfaction indicator provided by the NSE, because the scientific literature had shown that these indicators could be primarily used by consumers using these kinds of information sources. However, it of course could be possible that students (also) look at different indicators to help them make their decision. As discussed in the theoretic framework, in the case of selecting a health care provider, the information of family and friends play an important role, and sometimes more than the publicly available data (Harris & Buntin 2008: 3). Of course, the question remains whether and to what effect do students use the NSE (or other rankings) to help them in their decision-making process. This aspect could (and should) be investigated further.

The same critique which I have discussed in the introduction about the international rankings can also be applied to this research. It is hard to quantity quality and within universities there is a lot of differences between faculties. The latter aspect is, however, controlled for as much as possible because in my analysis I primarily focussed on the study programmes instead of faculties or the universities as a whole.

Another limitation, something I haven't discussed yet, is the internal and external oversight on quality which is currently in place in and around universities. The internal oversight is mostly conducted by the internal surveys which the universities administer themselves. For example, the University of Amsterdam uses UvA Q, and most of the universities in the Netherlands have a system similar to this. However, those records are mostly kept confidential and are only used by the university itself. Compared to the NSE, the internal surveys are sometimes more tailored-made for the university, faculty, or the study programme. This could possibly provide better and more specific data that the administrators can use to improve the quality and efficiency of their educational programmes. Or it is possible that these results are compared with and used side-by-side with the NSE. The external oversight is conducted by 'visitation committees' organized by the Nederlands-Vlaamse Accreditatieorganisatie (Dutch-Flemish Accreditation organization, NVAO). This organization checks both the study programmes, as well as the university as a whole (NVAO 2020). The NVAO can decide whether the accreditation of an inquired study programme can be kept or not—of course also allowing the university and the study programme to fix the problems (ibid.). The workings of these forms of oversight and the influence of them on (the improvement) of the quality of education is a possible gap in our knowledge and could be investigated in follow-up research.

Lastly, another limitation of my research is the possible influence of the influx of international students in the last decade. It could be possible that there is a difference between national and international students in the degree of how they experience the quality of the education—because the latter could have a different frame of reference. It is also possible that international students, who pay a higher tuition fee than their national counterparts, could be more vocally about the quality or

possible lack of it. Also, the question of whether or not intentional students use the NSE more (or less), or if they mostly use the international rankings which we discussed in the introduction. Furthermore, the influence of switching to bilingual or full-English speaking study programmes on the quality of education (Scienceguide 2017). All these factors could influence the improvement (or deterioration) of the quality of education, thus could be investigated in follow-up research.

Regarding possible policy recommendations, it is important that students should be made aware of the availability of performance data as the NSE. More awareness is always better for students, who then could make a better and more well-informed decision about their education, and also for the universities themselves to compare and improve the quality and efficiency of their organizations.

Lastly for the discussion, I want to try to compare how this research and its findings can relate to the increased globalization of our educational system. In the last decade, the rise of MOOCs (Massive Open Online Courses), as well as SPOCs (Small Private Online Courses), gave a new dimension to the way we study. And in this time of the COVID-19 crisis, more people are working from home and students are studying from home. This could have interesting implications on how we study, especially when it is easier and cheaper to enroll in a MOOC or SPOC than a university with its barrier of tuition fees. However, also in that case it is important that there is enough adequate and clear performance data available for students—and of course everyone searching for a study opportunity, to decide which educational institution is better for the consumer its needs. Thus, also if MOOCs or SPOCs will increase in market share compared to the traditional universities, it is important that publicly available performance data is being collected and processed by an independent organization.

Conclusion

To conclude, this paper looked at the relationship between publicly available performance data and how it can improve the quality of the service an organization provides. This study lies within the broader sphere of how market-based instruments can be used for governing the (higher) education sector and improving the quality. This study tested some of the assumptions of that logic—e.g. via the use of consumer information and choice. I have investigated this causal mechanism using the NSE evaluation score of study programmes of Dutch universities and comparing them with student enrollment. In other words, checking whether students are responsive to a study programme with a better evaluation score. This study found that there is a relationship between an increase in the evaluation score of a study programme and an increase (of the market share) of enrolled students. However, the variance explained by the statistical models are quite low (ranging between 0.001 and 0.006). No effects were found between better scoring on career/labor market orientation programmes and an increase in student enrollment. This research provided interesting insights for follow up research regarding the influence of observations with 100% market share—thus no competition.

Because these can (substantially) influence the results. Lastly, I discussed the limitations of the chosen approach and methodology at length and suggested follow-up researched.

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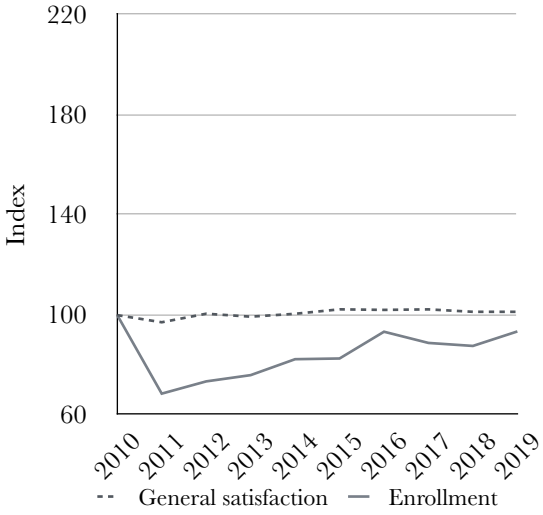
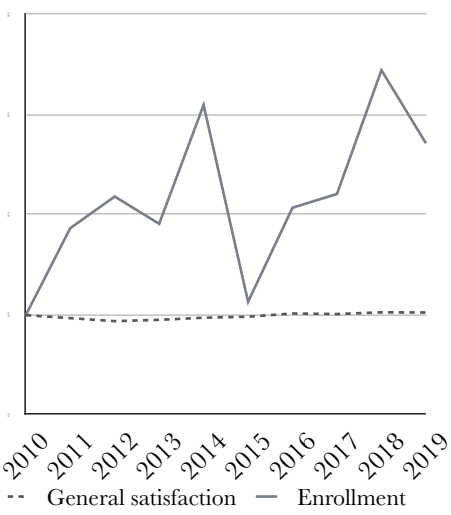
Appendix I

Graph IIa. Erasmus Universiteit Rotterdam

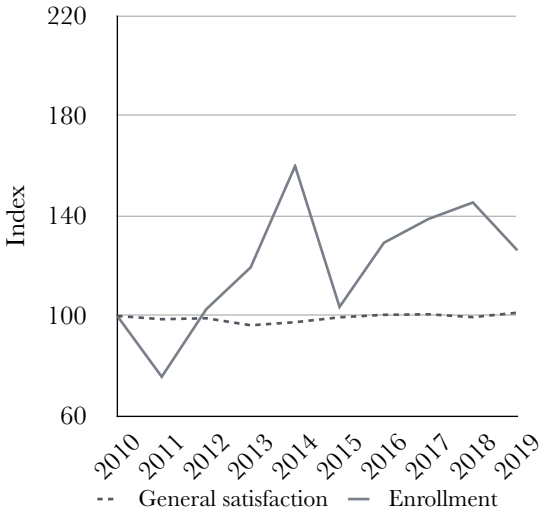


Graph IIb. Radboud Universiteit Nijmegen

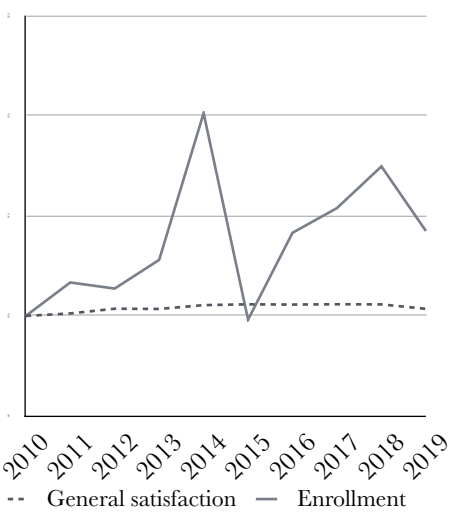


Graph IIc. Radboud Universiteit Nijmegen

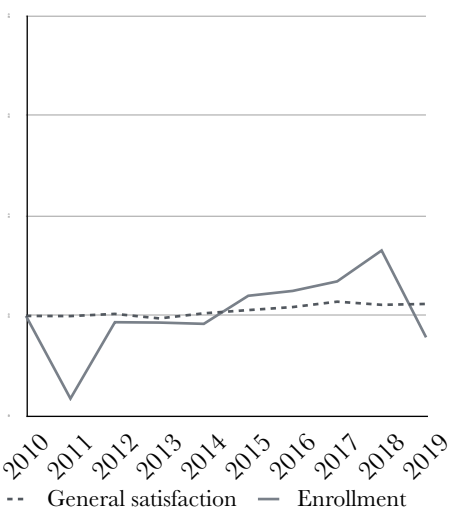
Graph IId. Technische Universiteit Delft



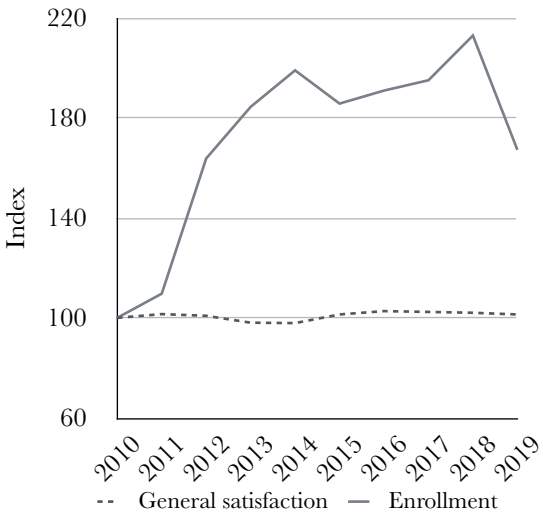
Graph IIe Technische Universiteit Eindhoven



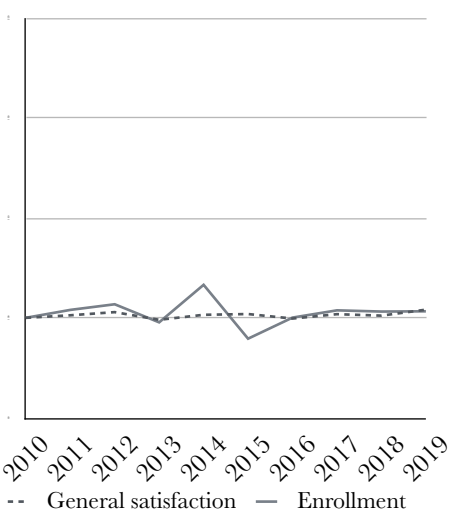
Graph IIf. Tilburg University



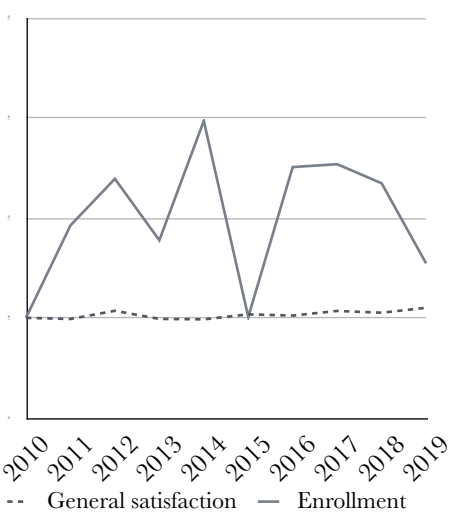
Graph IIg. Universiteit Leiden



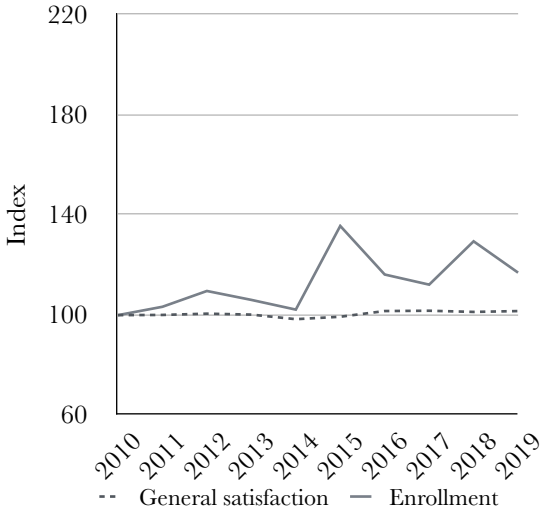
Graph IIh. Universiteit Maastricht



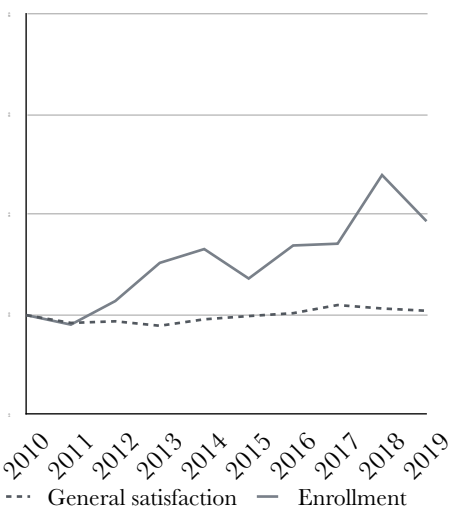
Graph IIi. Universiteit Twente



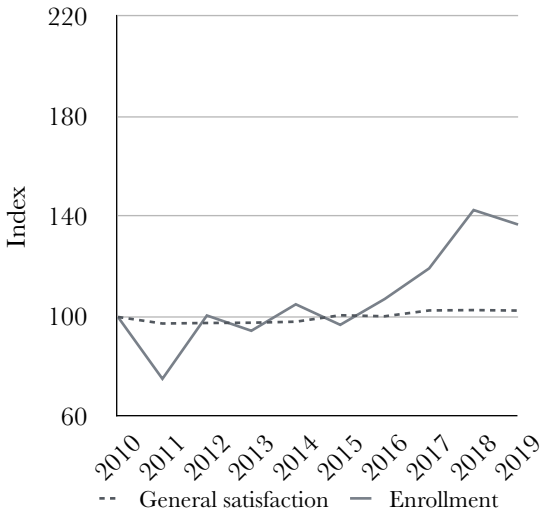
Graph IIj. Universiteit Utrecht



Graph IIk. Universiteit van Amsterdam



Graph IIl. Vrije Universiteit Amsterdam



Graph IIm. Wageningen University

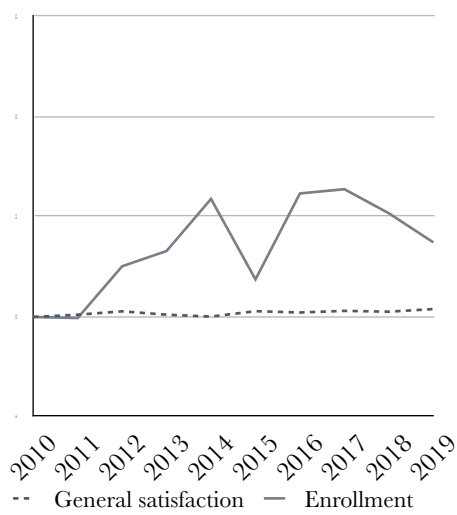


Table II. Average general satisfaction and student enrollments per university per year (I)

University	Erasmus Universiteit Rotterdam		Radboud Universiteit Nijmegen		Rijksuniversiteit Groningen		Technische Universiteit Delft	
Year	General satisfaction	Enrollment	General satisfaction	Enrollment	General satisfaction	Enrollment	General satisfaction	Enrollment
2010	3,99	124,26	3,99	34,94	3,91	33,62	4,03	92,22
2011	3,87	85,26	3,94	47,09	3,94	36,29	3,98	69,79
2012	4,01	91,34	3,89	51,51	3,91	38,67	3,99	94,67
2013	3,96	94,45	3,91	47,70	3,96	36,77	3,88	110,13
2014	4,01	102,37	3,95	64,30	3,94	43,65	3,93	147,47
2015	4,08	102,72	3,96	36,81	4,01	31,68	4,01	95,55
2016	4,07	116,02	4,01	49,95	4,03	37,77	4,05	119,23
2017	4,08	110,45	4,00	51,87	4,06	38,59	4,06	127,97
2018	4,04	108,96	4,03	69,17	4,06	46,09	4,01	134,06
2019	4,04	116,16	4,03	58,96	3,98	39,28	4,08	116,42

Table II. Average general satisfaction and student enrollments per university per year (II)

University	Technische Universiteit Eindhoven		Tilburg University		Universiteit Leiden		Universiteit Maastricht	
Year	General satisfaction	Enrollment	General satisfaction	Enrollment	General satisfaction	Enrollment	General satisfaction	Enrollment
2010	4,00	51,91	3,94	64,87	3,88	36,35	4,01	68,30
2011	4,04	58,86	3,93	43,43	3,94	39,86	4,05	70,46
2012	4,11	57,59	3,97	63,24	3,91	59,51	4,10	72,00
2013	4,11	63,55	3,90	63,15	3,81	67,01	3,98	67,06
2014	4,17	94,00	3,98	62,82	3,80	72,32	4,06	77,31
2015	4,18	51,14	4,03	70,10	3,93	67,49	4,07	62,60
2016	4,18	69,17	4,08	71,36	3,99	69,38	4,00	68,36
2017	4,19	74,30	4,16	73,83	3,97	70,88	4,07	70,34
2018	4,18	82,95	4,11	81,85	3,96	77,38	4,04	70,01
2019	4,11	69,55	4,13	59,32	3,93	60,77	4,14	70,08

Table II. Average general satisfaction and student enrollments per university per year (III)

University	Universiteit Twente		Universiteit Utrecht		Universiteit van Amsterdam		Vrije Universiteit Amsterdam	
Year	General satisfaction	Enrollment	General satisfaction	Enrollment	General satisfaction	Enrollment	General satisfaction	Enrollment
2010	4,01	35,05	3,92	18,53	3,87	47,46	3,92	50,94
2011	3,99	48,00	3,92	19,15	3,75	45,66	3,82	38,34
2012	4,12	54,53	3,94	20,32	3,77	50,14	3,83	51,24
2013	3,99	45,92	3,92	19,66	3,70	57,38	3,83	48,13
2014	3,98	62,65	3,85	18,94	3,80	60,00	3,85	53,52
2015	4,06	35,18	3,89	25,14	3,85	54,41	3,95	49,34
2016	4,04	56,18	3,98	21,54	3,90	60,68	3,93	54,60
2017	4,12	56,58	3,98	20,79	4,02	61,02	4,02	60,84
2018	4,09	53,91	3,97	24,00	3,97	74,05	4,03	72,72
2019	4,17	42,69	3,98	21,68	3,93	65,29	4,02	69,77

Table II. Average general satisfaction and student enrollments per university per year (IV)

University	Wageningen University		Average all universities	
Year	General satisfaction	Enrollment	General satisfaction	Enrollment
2010	4,14	57,28	3,95	46,06
2011	4,17	57,04	3,92	45,18
2012	4,23	68,89	3,94	53,21
2013	4,17	72,39	3,90	54,18
2014	4,14	84,32	3,92	62,43
2015	4,23	65,89	3,99	52,37
2016	4,21	85,57	4,01	59,83
2017	4,24	86,55	4,05	61,65
2018	4,22	81,03	4,03	69,96
2019	4,27	74,37	4,03	62,16