Extensive enrollment of young handicapped in the Participation Law

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Abstract

This paper examines the effect of tighter conditions and a lower allowance on the enrollment rates by young handicapped in the disability insurance regulations. A policy reform in the Netherlands in 2015 entailed that individuals with working capabilities can no longer enter the current disability insurance scheme. They can now enter the Participation law, a regulation with tighter conditions and a lower allowance. To find the increased enrollment in this new regulation a forecasting model is used, based on data of the years 2011-2017. This model predicts the enrollment in both regulations as if the reform had not occurred. The effect is estimated for a sample of individuals that participated in schools for students with special educational needs. Results indicate that 32% from the individuals can no longer enter the disability insurance and enrollment in the Participation law increased with 13%-points in 2017. This leads to the conclusion that 40% of the affected young handicapped enter the new regulation in the third year after the reform. The results cannot directly be extrapolated to the young handicapped that have not participated in the special or practical education. It is likely that other young handicapped are more eager to enter the Participation law, the obtained result can be considered as the lower bound.

1. Introduction

In 2015 the Dutch government implemented a new law that severely changed the social security system for individuals with a disability. The Participation law (PL) is part of the continuous reform during the last decades of the Dutch social security system. During this reform some responsibility is returned to society, individuals have to participate. The Participation law follows this trend, everyone with some working capacity should work, if possible without government support (in the long run). This law is applicable to all individuals that are not able to find a job and who cannot earn an income independently. Municipalities are responsible to support these individuals with personalized plans and an allowance if needed. The reform merged three separate provisions into one general regulation. Social Assistance (SA)[1] was the biggest of the concerned provisions, this policy was intended for anyone without any income or wealth. Individuals that cannot independently provide in their subsistence. Social Assistance is not affected by the implementation of the PL, apart from the name change. Another regulation concerned the social workplaces (SW)[2]. These were intended for individuals with a disability that needed adjusted or sheltered workplaces. From the beginning of 2015, access to these social workplaces is closed. The affected individuals can instead enter the Participation law. The third regulation concerns a disability insurance (DI)[3]. This is a provision that pays out benefits for individuals that are not able to enter the labor market. Individuals with reduced working capabilities when they are 18 or after their studies were entitled to an allowance. The policy reform reduced admission to young adults that are unable to work at all, individuals that are able to perform some work can no longer enter the DI. Instead, they can be supported by the Participation law. The policy change in 2015 mainly affected two groups, individuals that otherwise would be entitled to work in a social workplace and young handicapped that would have entered the DI if they applied before 2015. Affected individuals can enter the PL, but this regulation has more extensive requirements and a lower allowance, therefore not everyone will actually enter the regulation. This thesis estimates the additional inflow in the Participation law caused by the partial closing of the disability insurance. The sample is formed by individuals that were enrolled in the education track for students with special needs. These students either need intensive supervision or require different learning methods than are taught in the regular education system. They can enroll in the special or practical education. A relatively large share of these individuals enter the DI and they make up a significant share of the disability insurance. Using enrollment data in the preceding years of the policy change, two models are created that give the relations between several personal characteristics and circumstances and enrollment in the DI and SA. Enrollment rates can be predicted in the years after the reform as if the policy change had not occurred. A comparison of the predicted and realized enrollment ratios gives the policy effect, decreased entry in the DI and increased enrollment in the PL. The ratio of these two effects gives the overflow into the PL, that is the substitution rate. The research question that is to be answered;

> "What is the entrance rate in the Participation law for individuals that can no longer enter the disability insurance?"

The remainder of this thesis is organized as follows. First, I describe the relevant regulations and the policy change. Section 3 describes some theoretical literature and the hypothesis. The next section elaborates on data and the methodology after which the results of the analysis are presented and discussed. Section 6 concludes.

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[1] Wet Werk en Bijstand (WWB), in this thesis I will refer to this regulation as social assistance or SA.
[2] Wet Sociale Werkvoorziening (WSW), in this thesis I will refer to this regulation as social workplaces of SW.
[3] Wajong, in this thesis I will refer to this regulation as disability insurance or DI. Note that the WAO, WIA, WAZ or ZW are different regulations and not relevant for this research.

2. Policy reform

The Netherlands is known as a typical welfare state, the first social insurance was introduced over a century ago and after the second world war the Netherlands has quickly expanded its welfare system. Solidarity and equal opportunities have been important principles in this process. Both risks and responsibilities were preferably shared. This entails a strong social security system with a collective pension scheme and allowances for the unemployed and disabled. The number of regulations, allowances and expenditures increased during the 20th century, until it was no longer feasible in the 1980s, figure 1.1 shows that costs were over 20% of GDP. Drastic measures had to be taken. Allowances were cut to reinforce the incentives to work, responsibilities were partly given back to the people. It was effective. The government succeeded in reducing the social contributions, lowering the burden for the working population (Bos, 2006). With this intervention a process started to reform the social security system. Besides solidarity and collectivity, individual responsibility and participation received more attention (Veen & Trommel, 1999). The intention is that everyone who is able to work, should work. Starting from September 2013, the Dutch government confirmed this transformation from welfare state to participation society. In the following years, this has expressed itself in several policies concerning social support and youth care. From 2015, municipalities became responsible for three areas, youth care, social support and participation. Since these areas can overlap, the decentralization enables to help individuals more thoroughly. It is also aimed at saving costs and ensuring the sustainability of social security in the long run.

Social Assistance System

Most individuals that are currently covered by the PL previously received social assistance. SA is intended for individuals without any (household)income or (household)wealth who are not entitled to another allowance. They can apply for a benefit at their municipality, this allowance equals 70% of the minimum wage for single adults. To receive the benefit, everyone needs to prove that they are unable to find work and continue their search after they receive the allowance, assistance in this search may be offered. Municipalities are compensated for the expenditures with predetermined budgets. In 2014 they received 5.5 billion for the allowances and 700 million for reintegration and support, adding up to 6.2 billion of reimbursements for SA. The budget for the allowances is determined using data on unemployment, wage- and price adjustments, realized expenditures in previous years and the expected consequences of new policies.
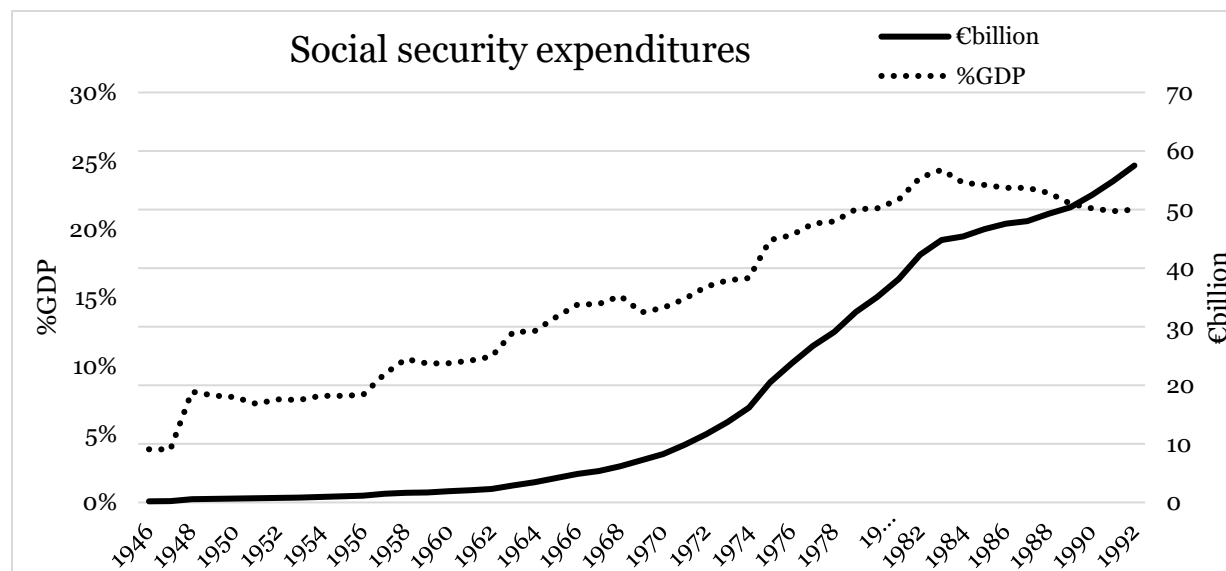

Figure 1.1: Social security expenditures in the Netherlands between 1946-1992 (CBS Statline).

In 2015 social assistance is incorporated in the Participation law, the scheme was overall retained. At the same time some extensive measures were introduced. One of the measures concerned a reduction in the benefit for individuals with a joint household, since their expenses are lower. Another extra condition is that recipients must provide some social activities in return for the benefit. Other than these measures the regulation has not changed and all individuals otherwise entering the SA will now enter the PL.

Social Workplaces
Social workplaces are workplaces created for individuals that are unable to work in a regular working environment. Municipalities created workplaces with adapted working conditions, this enabled these individuals to work despite their disability. In 2014 around 100,000 individuals worked in one of these social workplaces. Compared to similar countries this number is quite large. For this reason, the committee concerned with rethinking the SW advised the government in 2008 to reform the SW. They expected that a large share of the individuals would be able to work with regular employees. The government responded with the Participation law. Currently it is no longer possible for individuals to start working in a social workplace, although existing employees can keep their jobs. The social workplaces exist until the last person retires. Individuals that can no longer enter the SW can rely on the PL. Municipalities will support them in finding a job and provide eligible individuals with an allowance. For individuals who are unable to work in a regular working environment 30,000 workplaces are organized by so-called sheltered workplaces[4].

Disability Insurance
The third affected regulation is a disability insurance. This allowance is intended for individuals that are not able to enter the labor market because of their disability. Because individuals have not entered the labor market, the DI is not an employee insurance. Every Dutch citizen can be entitled to the allowance and allowances are paid out of tax revenues. Individuals with reduced working capabilities on their 18th birthday, during their studies or shortly after they finished their studies could enter the DI. The disability should cause a loss in working ability of at least 20%, relative to the income someone could have earned with schooling and experience (reference income[5]). The DI mainly considers individuals that never entered the labor market, therefore reference income is usually set equal to the minimum wage. For individuals with some work experience or that finished their studies the reference income could be increased. The benefit equals 75% of the minimum wage, regardless of the reference income or someone's wealth. Implementation of the DI is assigned to the UWV, the implementation institute for employee insurances. Even though DI is formally not an employee insurance, UWV is responsible because the execution is quite similar to that of disability insurances for employees. Recipients with working abilities are obliged to make effort in the search for work, they should be focused on their entrance into the labor market.

Ever since the introduction of the DI in 1998 the number of new and existing recipients increased every year. It appears that more people are unable to earn an income as intended due to illness, although it is likely that the growth is mainly caused by increased awareness for the existence of the DI. In particular because of the financial decentralization of SA around 2004. Since that year municipalities are no longer reimbursed for the costs of social assistance. Benefits and reintegration instruments are paid out of fixed budgets and deficits are not compensated. This created an incentive for municipalities to refer individuals to the DI-agency and inflow increased significantly (Roelofs & Vuuren, 2011). DI-allowances are fully reimbursed by the government. In addition to these referrals, enrollment increased because more mentally and psychiatric disabled applied. At the

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[4] In Dutch: beschutte werkplaatsen
[5] In Dutch: maatmaninkomen, the income that individuals could have earned without the disability, based on their schooling and experience.
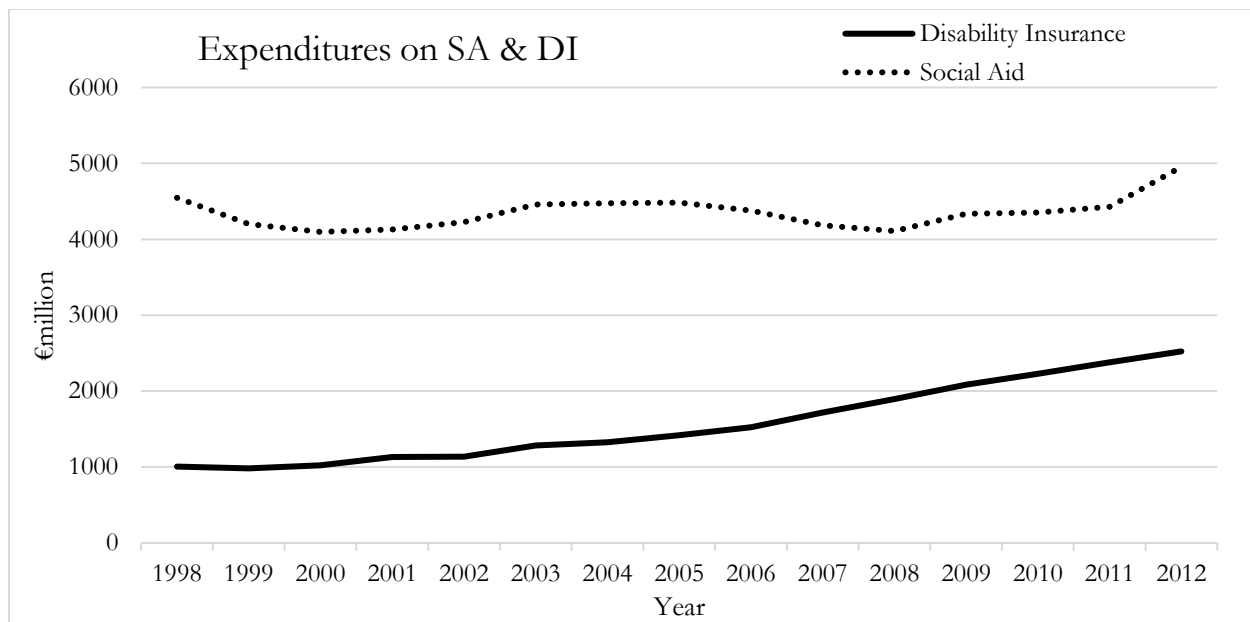
Figure 2.1: Expenditures on SA and DI since 1998 (CBS Statline).

time of introduction of the DI in 1998 most individuals received an allowance because they suffered from physical problems. Over the years more and more mentally disabled or individuals with a depression entered the DI, this increased the inflow (Vuuren, Es, & Roelofs, 2011). The UWV has also intensified its collaboration with special and practical education, which increased enrollment rates for these students. Between 2002-2006 there was an 11% increase of individuals with a history in the special or practical education under newcomers (Suijker, 2007). Besides the increased enrollment, the exit rate is extremely low (2-3%). The three main reasons for leaving are retirement, detention or death (UWV, 2016). The increased enrollment and the low exit rate lead to a yearly increase in the expenditures (figure 2.1). In 2010 the DI was adjusted to put more focus on participation and working abilities. Everyone is classified in three schemes, studying, work or allowance. All students belong to the studying regulation. They receive a reduced allowance of 25% of the minimum wage. Individuals with working capabilities belonged to the working scheme, a personalized plan is initiated to lead them to work. The individuals that are unable to perform any work entered the allowance provision. Working- and allowance schemes both received the full allowance (75% of the minimum wage). In 2010, the government initiated official committees to find possibilities to cut expenditures. One committee suggested to restrict the DI to individuals that are permanently incapable of working at all. This recommendation has been implemented in 2015, the DI is closed for individuals that are able to work. The benefit for existing recipients is maintained, but new enrollment by young handicapped is no longer possible. The benefit for individuals who are capable of working is lowered to 70% of the minimum wage, a decrease of 5%-points. In the remainder of this thesis I will refer to the excluded group as young handicapped. To determine if someone can claim the DI-benefit, the reference income is no longer relevant, instead four criteria were introduced. These eligibility criteria concern the capability of performing a task, having basic employee skills, being able to work one hour consecutively and being able to work at least 2-4 hours a day depending on the value of the work. Whoever cannot meet these criteria and is expected to fail them permanently, can still enter the DI.

Participation Law
With the policy reform in 2015 the Participation law was introduced. This regulation is equivalent to social assistance. However, enrollment rates are expected to increase relative to social assistance, because individuals with some working capabilities are no longer allowed to enter the SW or DI. The PL is organized in two

components, income and reintegration. Most of the budget is concerned with the income component. Municipalities pay out benefits to individuals that have no income or wealth, are actively looking for a job and are not entitled to other allowances. Income and wealth is tested at a household level, individuals with income or wealth are expected to support their partner. The composition of the household also affects the height of the benefit. Singles receive 70% of the minimum wage and couples get 100%. When you live with other adults, e.g. a parent, brother, adult children or friends, you can share several expenses. This is reflected in a reduction of the benefit. In order to receive the benefit, recipients are obligated to search for work. When they do not meet this condition, they can experience a reduction of their allowance. Individuals can be relieved from this requirement when it is not reasonable in their situation. This applies mainly to single parents or disabled persons.

Reintegration covers all the effort put in helping individuals find a job. These individuals are not necessarily disabled or entitled to the benefit, municipalities are responsible for all citizens that need help. Several instruments are available to guide individuals to payed work, for example job application courses, (re)training or participation places. With the introduction of the PL another important instrument was introduced, wage cost subsidy(WCS). Municipalities reimburse employers for the difference between productivity and the minimum wage when they hire an employee with a productivity below the minimum wage. This instrument focusses on the individuals that enter the PL instead of the SW or DI, especially newcomers will profit by this instrument. Note that partner income or the possession of wealth is irrelevant for WCS, only the productivity is important.

Enrollment in the PL is defined as enrollment in the benefit regulation or WCS. There is a possibility that individuals are supported by other reintegration instruments, but this number of individuals is quite low, and most costs are caused by the allowance and WCS. Therefore, only the allowance and WCS of the Participation law are considered in this thesis.

Policy effect
The PL is intended for everyone who is able to perform work, but does not have a job. This differs from the target group for social assistance. It is expended with former enrollers of the SW and DI. Not all of these individuals will enter the PL, since strict conditions apply to the allowance. Access to reintegration is also limited, only individuals whose wage capacity is lower than the minimum wage are entitled. This wage capacity will apply for most young handicapped, but not all of them. Some individuals with a higher reference income, e.g. individuals with a university degree, will be able to earn the minimum wage despite their disability. With the implementation of the PL the choice of young handicapped has changed. The alternatives for entering the DI are listen in table 2.2. Besides entering the PL, individuals will start working, continue their education or rely on their partner or family. Some individuals may not be eligible for an allowance given the requirements and some will prefer work or continue studying above entering the Participation law.

Before 2015	After 2015
Studying	Studying
Working	Working
No allowance or income	No allowance or income
Social Assistance	Participation Law
Social Assistance - working	Participation Law – working
Disability Insurance	Participation Law – working (WCS)
Disability Insurance - studying	
Disability Insurance - working	

Table 2.2: Possible outcomes for young handicapped

In this thesis three policy effects of the reform are estimated, change of enrollment in the DI and the PL and the substitution-ratio. This substitution rate gives the proportion of individuals that enter the PL relative to the number of individuals that do not enter the DI. It is impossible to observe the enrollment rates in the DI and the PL in the post-policy years if the reform did not take place. I will predict these enrollment rates with two models based on data about the DI and SA in the years before the implementation of the PL. A prediction model based on the enrollment in the pre-policy years can predict the entrance rates for the DI and SA in the post-policy years as if nothing changed for these regulations. The PL equals the SA, apart from the fact that more individuals will enter the PL relative to the SA. Therefore, social assistance can be considered as the PL without the policy reform. Individuals will now enter the Participation law instead of the social workplaces or the DI and enrollment in the PL is likely to exceed enrollment of the SA. A comparison of the predicted enrollment and the real entrance rates gives the policy effects. Enrollment in the PL will also increase because of the entrance of former workers in sheltered workplaces. This implies that the policy effects are also affected by the closing of the social workplaces. That effect is not relevant for this study. Since it is impossible to distinguish between the increased enrollment caused by young handicapped or former SW-workers, this could lead to an overestimation of the policy effect. However, the number of individuals that are affected by the closed admission of the SW is negligible. This is caused by the specific group that is used in this analysis, individuals that recently left school are not eager to enter the social workplaces. The data used in this paper point out that in the four years before the policy reform 0.2% of the individuals that did not receive an allowance by the DI or SA entered the SW. This was even lower between 2011-2013 (0.14%). The average ratio increased because more individuals were allowed in 2014, because of the reform. This suggests that the effect of closing the SW is negligible for our sample. The policy effects for the Participation Law can thus be estimated by the difference between the predicted enrollment in the SA in the post-policy year and the actual entrance rates in the PL in these years.

The policy effect for the DI gives the number of young handicapped; individuals that cannot enter the DI, because of the reform. The number of individuals that enter the PL because of the DI-reform, is given by the policy effect for the PL. The number of individuals that enter the PL divided by the number of young handicapped gives the substitution-ratio.

Special & Practical Education
For this thesis I determine the policy effect for young adults that participate or have participated in the previous three years in the special or practical education. These individuals represent (56%) of total enrollment in the DI and an even bigger share, 85%, of the 18-year-old enrollers (SEO, 2018). They represent more than half of the enrollment and therefore the policy effects of this group are very relevant. Schools in the special or practical education offer different education than is offered at the regular education. Figure 2.3 shows a graphical illustration of the Dutch secondary schooling system. VWO, HAVO and VMBO are the regular types of education, more than 90% of all students are enrolled in these schools. VWO prepares the students to enroll in university after graduating and thus very theoretical. HAVO is also theoretical and most students enroll in the higher vocational education (HBO). VMBO focusses more on vocational education and guides the students to continue their education in the middle vocational education (MBO). This is the lowest level of education offered in the regular education. Practical education is aimed that are not able to enter VMBO. It is aimed at guiding students to the labor market, only half of the students continue their education after leaving the practical education. The special education can offer all previously mentioned levels of education, but most education is offered at the level of VMBO. Students can participate in the special education and be educated according to the level of practical education, these students are still documented as following the special education.

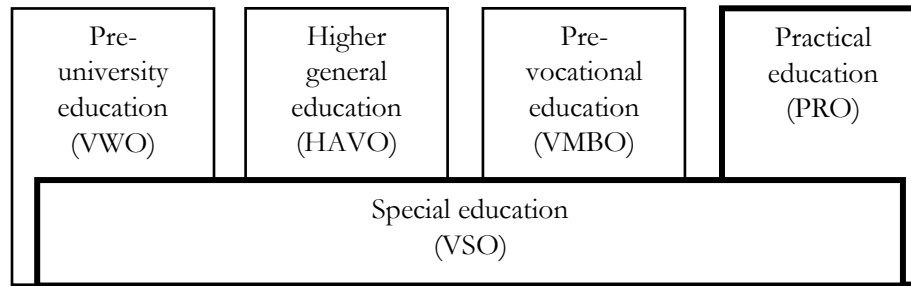| Pre-university education (VWO)	Higher general education (HAVO)	Pre-vocational education (VMBO)	Practical education (PRO)

Special education (VSO)

Figure 2.3: Illustration of the Dutch secondary schooling system (Statline, 2017 & DUO, 2017).

The special education is intended for students with needs than cannot be fulfilled in the regular education. In 2017 37,643 students were registered, 4% of the students enrolled in the secondary schooling system (DUO, 2017). It mainly concerns students with a disability or disorder or students who are chronically ill. The Dutch system distinguishes four clusters, with different schools for each cluster. Separate schools are available for the blind, deaf, physically or mentally disabled and students with behavioral problems or psychiatric disorders. Some students are able to continue their education in the regular schooling system after a couple of years, while others are prepared for a future in the day care. An individual development plan is designed for all students, in this process personal attention, smaller classes and the right provisions are crucial. To align the level of the courses with the personal competences, different levels of education can be followed. Students can be enrolled in special secondary schools from their 12th birthday until they are 20, however almost halve the students leave when they are 17 or 18. Roos & Bloem (2014) found that 46% of the students that exit the special education after age 15 continues their education. One in four students starts working, while 15,6% of the students that exit the special education after age 15 do not receive an income or allowance or participate in schooling. When only 18-year-olds are considered, two out of three leaving the special education in 2011 received the DI-allowance. Enrollment in SA is significantly lower, data used in this study shows that 5% of students received SA three years after they left the special education (CBS, 2013).

Practical education focuses on individuals that are unable to keep up in the regular education. About 30,000 students followed this type of education in 2017, this is equal to 3% of all students (DUO, 2017). Up to 1998 this education was part of the special education, a separate cluster for hard-learning students. The practical education is not associated with the provision of facilities, it is mainly focused on providing the education that fits the level of the students and leads them to a job and a certain level of independency. It is not focused on preparing students for further education, but entering the labor market. Enrolling students have significant learning disadvantages and an IQ between 60 and 80. Students that leave the practical education are intended to be quite independent and prepared to enter the labor market. However one year after their exit, only 24% is independently active at the labor market, while 58% receives some sort of allowance. Others continue their schooling or rely on their family for support. In 2007 the UWV estimated that 50-55% of the individuals that once participated in the practical education eventually entered the DI (Stoutjesdijk & Berendsen). Data that are used in this paper, point out that only 5% enters the SA three years after their exit of the practical education.

3. Theoretical Framework

For this thesis two types of literature are relevant; scientific research on the effects of the design of disability allowances and literature that is concerned with the implementation of this specific policy. Scientific research can give an idea on the effects of changing the benefits scheme for individuals with a disability and the specific research about this policy reform gives an idea of the found effects so far. Both will be discussed.

Scientific Research
Research supports the idea that that this policy reform will increase labor participation, since more incentives are created for the young handicapped to start working. This implies that some individuals enrolled in a disability insurance are unemployed, the DI contains hidden unemployment. Because disability insurances are less focused on countering unemployment, this unemployment lasts longer and enrollment in regulations is higher than necessary. In 1999, Mooij published a model that took this hidden unemployment into account and emphasized the importance of considering this idea in policy making. The existence of the concept is confirmed by Koning & Vuuren(2007). They find that 11% of the inflow in the Dutch disability insurances is caused by hidden unemployment. According to Koning and Lindeboom (2015) several policy measures caused a decline in hidden unemployment. One of the effective policy measures was to sharpen the gatekeeping and introduce tighter eligibility criteria.

This implies that individuals can work despite the diagnose of the disability, again this is confirmed by several researches. Marie & Castello (2012) studied a quasi-experiment on disabled with some working capabilities in Spain. They find that a 36% increase of the benefit leads to an 8% decrease in labor market participation. In the Netherlands a similar result was found by Koning and Sonsbeek (2017), an elasticity of 0.12 on the extensive margin. When the allowance decreases with 1%, 0.12% more individuals start working. Besides the effect of the height of the allowance on labor market participation, the fact whether individuals receive an allowance is also relevant. French and Song (2012) have estimated that participation on the labor market is reduced with 26% because of benefit receipt. In 2013 Maestas, Mullen and Strand have confirmed this effect. They find that on average 28% of individuals with a disability will work after two years when their disability-benefit is stopped, corrected for economic circumstances. This ratio is significantly higher for marginal applicants (50%) while individuals with the most severe disabilities are not affected.

These studies mainly considered the disability insurances for individuals that have entered the labor market before entering the disability programs, while this type of regulation is not examined in this thesis. It is likely that most of this hidden unemployment indeed occurs in other regulations. However, the shift from SA to DI since 2004, shows there might be some hidden unemployment (Vuuren, Es, & Roelofs, 2011). The papers support the implementation of the Participation law and that this policy reform will increase the participation and decrease the allowance dependency. The statement can be made that not all young handicapped will enter the Participation law. Some will start working, are discouraged to enter because of the tougher conditions or are not eligible. This gives that the substitution-ratio is likely to be lower than 100%.

Specific Research
The policy reform is quite specific and recent; therefore, little is known about the actual effects of the policy. Before the implementation, reports focused especially on the savings associated with the policy change. The first publication is part of the 'Broad reviews'[6] in 2010, a collection of possible policy changes. One of the policy changes considered was closing the DI for individuals with working capacity. When the Dutch government proposed the policy change in parliament, the Ministry of Social Affairs and Employment (SAE) performed more extensive calculations and predicted structural savings to a total of 1190 million euros (2013). In these calculations, predictions of the additional inflow in the PL created by the exclusion of individuals with working abilities were published. This rate of substitution determines the size of the savings. In the first year after the implementation (2015), the inflow in the DI is predicted to decrease with 10,000, from 16,000 to 6,000. About five thousand of these individuals were expected to enter the Participation law, assuming a substitution rate of 50%. In the structural situation the reduced inflow in the DI will amount 247,000, while 170,000 individuals are expected to enter the PL, this gives a substitution rate that equals 69%. Substitution is thus expected to increase from 50% in the first year to 69% in the structural situation. This expected increase points

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[6] In Dutch: Brede Heroverwegingen.

out the learning curve. This learning curve means that it takes some time to completely implement a policy and the behavioral responses have stabilized. In this situation this is mainly caused by individuals that are still enrolled in school, are no longer entitled to the DI and the PL is also closed for students. Besides that, the allowance for individuals under 21 is significantly lower, which could lower their incentives to enter the PL. These things could cause them to delay their entrance. In this situation the learning curve could also be caused by the time municipalities need to adjust to the reform. At first they may experience trouble reaching the individuals. At the same time individuals are not directly aware of their possibilities and in the first years of the new policy it may take longer for them to enroll in the PL. Because of these tendencies, the substitution ratios are expected to increase in the first years.

Currently a cooperation of several inspections[7] performs an analysis on the social economic status of school-leavers, including students that left the special or practical education. Because of this analysis, Statistics Netherlands published data about these individuals in the years 2014-2016. They determined the social economic status of all school-leavers[8] in October, a couple of months after they left school. This gives information about individuals that left the special or practical education and did not continue their education. Data are given for everyone that left the education in school years 2013-2014, 2014-2015 and 2015-2016. Graph 3.1 shows the developments in the years around the policy reform. It gives the share of individuals that receives an allowance, works or neither, relative to the number of individuals that left the special or practical education in the previous year and did not continue their education. It is shown that less individuals depend on an allowance in the year after they left the special or practical education. At the same time the number of individuals that works without an allowance has increased as well as the ratio of individuals that does not work or receive an allowance. The data do not give a distinction between receiving an SA-allowance or a DI-allowance. This implies that it is not possible to find the actual policy effects on the inflow in the DI and PL. However, the conclusion can be drawn that the substitution-ratio is lower than 100%. This is given by the fact that the share of allowance-recipients decreased after the policy reform.

Another relevant report is published by SEO in 2018, a quantitative research on the effects of the policy change. It approaches the affected group of individuals through propensity score matching and determine the impact on the outcomes for this group. The impact is only estimated for the inflow of 18-year-olds to minimalize the error in the matching process. It finds a rather low effect on the inflow in the allowance of the PL, about 15%. This would imply that 85% of the individuals that normally would have entered the DI entered the labor market independently, continued in school or did not receive an allowance or income. The short-term perspective of the research could be causing the low estimate, as well as the focus on the 18-year-olds. They only consider the entrance in the allowance and ignore the wage cost subsidy. I avoid these restrictions in this thesis.

The policy effect that is estimated in this thesis is part of the total intended effect. That is increasing the participation and decreasing the allowance dependency. Because of the implementation of the Participation law, individuals are more likely to start working, the extra incentives will guide them to work. This makes it likely that less than 100% of the young handicapped will enter the PL, but how much is still unclear. This thesis will estimate the substitution ratio for students from the special and practical education in the first three years after the implementation of the policy.

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[7] Toezicht Sociaal Domein, cooperation between Inspections of healthcare & youth, education, justice & security, social affairs & employment.
[8] Only individuals older than 12 and younger than 26 were included.
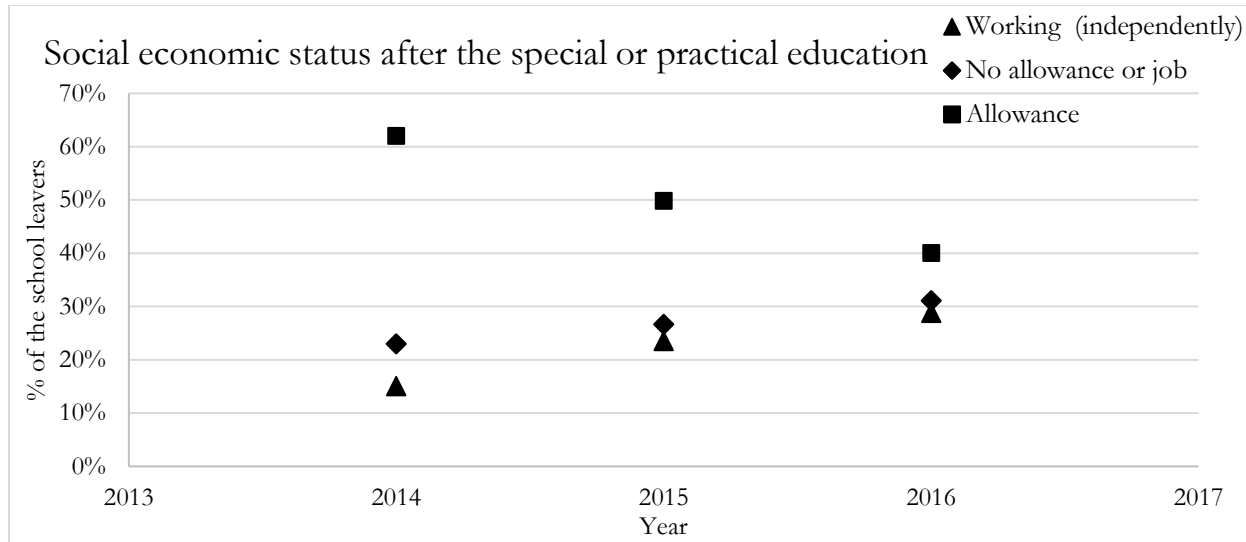
Graph 3.1: Social economic status in the year after students left the special or practical education and have not continued their education (CBS, 2018).

4. Data & Methodology

The policy effect is given by extra enrollment in the Participation law that is generated by the closing of the DI for young handicapped with working possibilities. A time series model is used to predict the enrollment in the DI and the PL as if the reform had not occurred. The policy effect is found by comparing these predictions with the real admission rates. To correct for changes in the composition of the sample and a trend, the model incorporates an extensive set of variables and the year. This section explains the data and methodology that are used to retrieve the results.

Data

Data are retrieved from Statistics Netherlands (CBS), they collect data on individual level about the entire population. The data are collected from several sources and Statistics Netherlands document this into linkable data[9]. This facilitates selecting the specific group for this study and the matching of personal characteristics and circumstances in a specific year to the individuals in the sample. The data include information about the period between 2008 and 2017. This enabled the creation of yearly databases for 2011-2017, since several variables required information from previous years. Information is thus available for four years before the policy reform and three years after.

The starting point is selecting the population, individuals that participated in the special or practical education. For each year between 2011 and 2017, everyone that is registered in the special or practical education between the current year or three years before were selected. Individuals must be older than 18 to enter the DI and thus everyone younger than 18 is left out of the population. Figure 4.1 provides an illustration of the selected population. This indicates that individuals can be included in the databases for one or multiple years, it depends on their circumstances. Someone that leaves the practical education at age 16 will only be included for two years. There are only two years when this person is older than 18 and enrolled in the practical education less than three years ago. At the same time, individuals that leave the special education when they are 20 are included in the data for six years.

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[9] Used documentation is listed in the appendix.

Total Dutch Population

Individuals that participated in Special Education between year t and t-3 (0.84%)

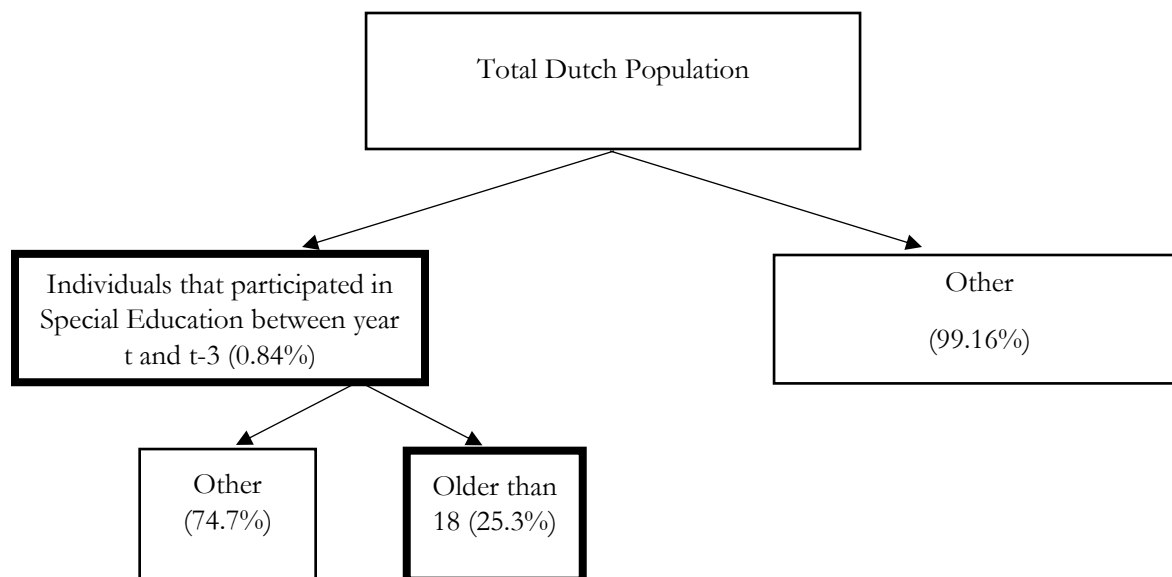Other (99.16%)

Other (74.7%)

Older than 18 (25.3%)

Figure 4.1: Illustration of the selection of the population (bold squares is the selected subgroup)

The regression models focus on predicting the enrollment in the SA and DI in the years after the policy reform. To formulate the dependent variables, I distinguish individuals that are new receivers of the SA or DI. Data on the payout of benefits are used to determine which individuals are covered by the DI or SA. This data indicate when individuals started receiving the allowance. This enables to distinguish the entrants and determine the enrollment rates for all years. A dummy variable for new entrants in SA and a dummy variable for new entrants in the DI give the dependent variables.

Independent variables
Enrollment in DI or SA is heavily affected by personal circumstances, the independent variables control for these effects. Some variables have constant values over time, while most variables give information about situation in the current year. The first category is quite straight forward, personal data such as sex and the number of parents that were born abroad. Another relevant variable gives information about immigrants, Statistics Netherlands distinguishes between first- and second-generation immigrants. First-generation immigrants are born outside the Netherlands, while second-generation immigrants are born in the Netherlands, but have parents who were born abroad[10].

All other variables differ over time and are therefore specified for each year independently, evidently age is one of these variables. To find an unambiguous relation, age is included as the years that someone is older than 18 at the 31st of December[11]. Note that only adults can enter the regulations. This might lead to extensive enrollment for 18-year-olds and thus a dummy is included for all individuals that are 18 at the 31st of December. Individuals that have passed away or emigrated during the year are less likely to enter a regulation, a dummy is included to control for this effect. Individuals from special or practical education differ in their enrollment rates, this should be taken into account in the regression. The relevant variables clarify whether someone is registered in the special or the practical education at October the 1st in the current year, or in one of the previous years. Some parameters interact with participation in the special or practical education, for instance the residence of students in the special education is registered. Other variables concern type of schooling in the

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[10] This variable is only included in the regression for DI enrollment.
[11] The relation has appeared to be quadratic for DI enrollment and cubic for SA enrollment.

special education and the years of followed education[10] (separated between special and practical education). It should be noted that the coefficients of these variables are only relevant for a share of the sample.

Besides education, living circumstances and changes in this situation are also likely to affect the enrollment probability. For this reason, a list of variables is included that indicate whether someone enters, exits or resides the entire year in several household types. This is done for the following household types; residential institution, single, couple, with parents, single parent and other. Being the head of the household, the reference person, is incorporated in the same way. To clarify the effect, when an individual is leaving his parental home, it is more likely that he will enter the DI that same year since his expenses have increased and he needs the money. The size of a household can also affect enrollment, the number of persons some lives with at 31st of December that year is here incorporated in the analysis[10]. To prevent outliers, all households with more than 15 individuals are limited at 15. Another variable is the logarithm of health care costs, the height of a person's health care costs is positively correlated with the probability that someone is disabled. The probability to enroll in the DI is accordingly correlated and this is thus controlled for in the regression for DI enrollment. Instead of the absolute value of health care costs, I included the natural logarithm. The relation is best described by a linear effect of a relative change in health care costs. Data was only available until 2016, for this reason I used health care costs of the previous year. Only relevant health care costs are included, e.g. dentist costs are ignored. The last variable that is included concerns refugees, these have proven to be overrepresented in the enrollment rates. All individuals that received a residence permit less than five years ago, were marked with the year of receiving their permit.

To incorporate the trend and allow for different trends between students from the special and practical education, a year variable is included for the individuals from the special education and another year variable for individuals that once participated in the practical education. The year variable for special education equals zero for individuals from the practical education and the other year variable applies to individuals that only participated in the special education. For individuals that participated in both types of education, I included the year variable of their last followed education.

Descriptive statistics are given in table 4.2. The size of the group increased over time, because the number of students in the special and practical education increased. Especially the group in the first two years is smaller. This is caused by improper documentation of students from the special education in 2008 and 2009. These individuals are thus underrepresented, but this can be controlled for with the included variables. Enrollment rates are still relatively high in 2011, but this is also observed for students in the practical education. Selection bias is thus not considered a problem.

Variables	2011	2012	2013	2014	2015	2016	2017
Male (%)	35.4	35.1	34.4	33.5	33.2	32.8	32.8
Age	19.2	19.3	19.4	19.3	19.4	19.3	19.3
Eighteen (%)	34.7	33.4	31.9	32.0	32.2	32.7	32.4
Special education (%) between t and t-3	74.2	75.7	76.7	76.5	75.8	75.1	74.7
Participated in current year (t)	24.1	21.4	20.0	19.2	17.5	14.6	13.5
Participated previous year (t-1)	25.4	23.7	21.8	22.5	23.0	23.4	21.6
Participated two years ago (t-2)	26.1	28.7	28.3	27.4	29.3	30.1	31.1
Participated three years ago (t-3)	24.4	26.2	30.0	30.9	30.3	31.9	33.8
Indication of disability (students in the special education)							
Visual limitation (%)	1.0	1.0	1.1	0.9	1.0	1.0	1.0
Hearing impairment (%)	4.8	4.9	4.8	4.8	4.6	4.7	4.8
Physically or mentally disabled (%)	40.0	38.5	37.4	37.1	36.7	36.1	36.2
Mental or behavioral disorders (%)	54.2	55.6	56.6	57.2	57.7	58.2	58.0
Years of participation in special education	4.70	4.85	5.11	5.63	6.27	6.81	7.25
Type of residence (concerns students in the special education)							
Institution for disabled care (%)	4.3	4.1	3.7	3.4	3.0	2.8	2.4
Institution for youth care (%)	8.7	9.5	10.2	9.9	9.5	9.0	8.5
Institution for youth health care (%)	5.7	5.4	4.7	4.0	3.5	3.5	3.2
Judicial youth institution (%)	5.7	4.6	4.2	3.7	3.3	3.0	2.8
Practical education (%) between t and t-3	26.9	25.3	24.4	24.4	24.9	25.4	25.7
Participated in current year (t)	15.3	16.5	16.0	17.0	16.7	17.9	17.6
Participated previous year (t-1)	31.0	27.3	27.9	28.6	28.9	28.7	28.2
Participated two years ago (t-2)	27.9	29.9	27.1	27.7	28.5	27.1	28.3
Participated three years ago (t-3)	25.8	26.3	29.0	26.7	26.0	26.3	25.9
Years of participation in practical education	3.61	4.08	4.35	4.55	4.62	4.67	4.71
# parents born abroad	0.45	0.45	0.45	0.46	0.46	0.46	0.45
No. individuals	29,348	32,607	34,438	34,854	35,410	36,390	36,440

Table 4.2: Sample statistics of the population by year.[12]

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[12] Descriptive statistics for the other variables are included in the appendix.

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                    ┌─────────────────────────┐
                    │  Total Dutch Population  │
                    └─────────────────────────┘
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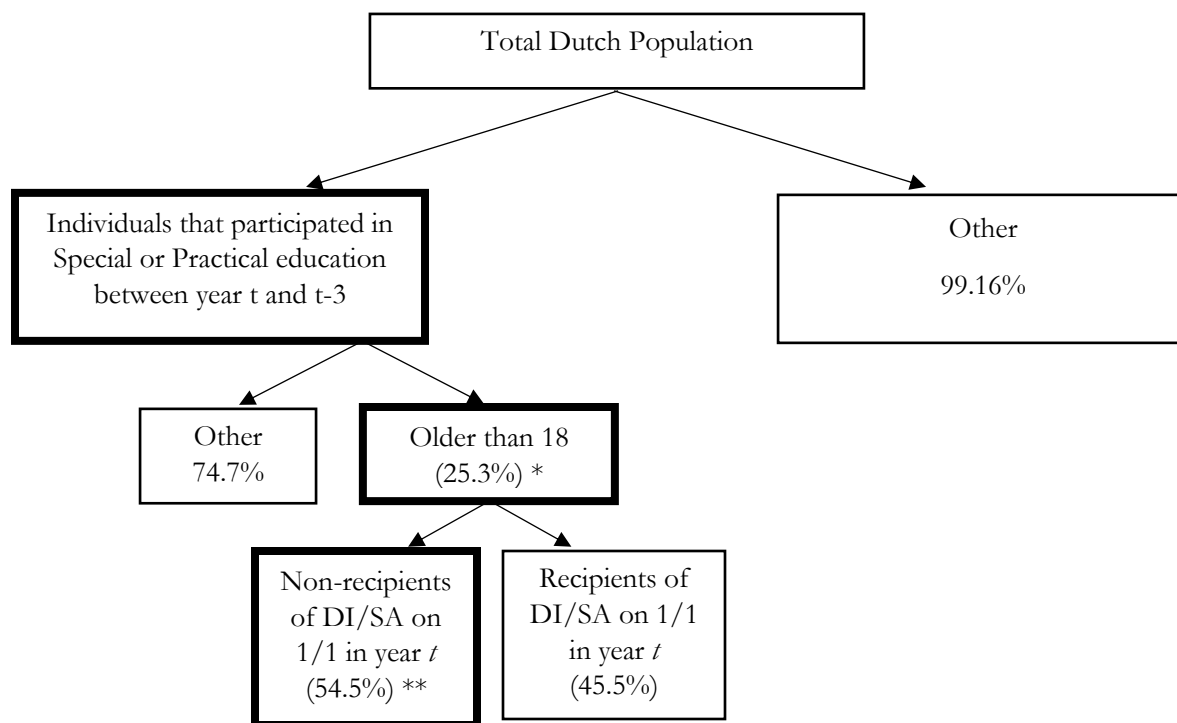
Figure 4.3: ratios from 2015
* population ** sample

Methodology

The identification strategy is based on a time series analysis[13]. Since the dependent variable is dichotomous and observations are at the individual level, the OLS-regression will estimate the probability of enrollment for all individuals given the year and several variables. The coefficients of the variables and the value of the trend are estimated with data about the years before the policy reform. With this model the enrollment chance can be estimates as if there is no treatment effect.

The data give information about which individuals are covered by which regulation. Individuals can be a recipient or not at the beginning of year t. Individuals that receive an allowance, either DI or SA allowance, have significantly lower enrollment rates during that that year. The probability of enrolling in the DI is more than two times smaller for individuals that received an SA-allowance in the beginning of the year, compared to individuals that did not receive an allowance at the first of January. The effect is even bigger the other way around. Individuals are 20 times less likely to enter the SA when they receive the DI at the beginning of the year. Switching between regulations is indeed not an obvious choice. Individuals that are entitled to a DI-allowance, are usually entitled since their 18th birthday. This implies that individuals who receive an SA-allowance and can switch to the DI, were entitled to the DI at the time on their enrollment in the SA. Because the DI-allowance is higher, it is more likely that these individuals will directly enter the DI. Switching from the DI- to the SA-allowance is even less likely, because of the lower allowance in the DI.

Besides the lower enrollment rates, recipients will also be less affected by the policy change. Individuals that are enrolled in the DI do not face the new conditions and are thus not affected. Individuals that already receive PL could indeed encounter the new restrictions, when they want to switch to the DI. However, because they

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[13] In the appendix alternative methodologies are discussed.

cannot enter the DI and they are already a recipient of the PL, they will remain in the PL. This effect is not taken into account, because only entrance rates are studied and these individuals will not enter the PL. Recipients of the DI in the beginning of the year are not at all affected by the policy reform, because they are already covered by the regulation and the new conditions do not affect them.

For this reason, these individuals are dropped from the population. Figure 4.3 illustrates the composition of the new group. I will refer to this new created group as the sample. The share of individuals entering a regulation gives the enrollment probability. The probability of enrollment is thus given by the number of enrollers divided by the total population minus the recipients of DI and SA. This gives that the enrollment rates are given by;

$$P_{DI} = \frac{\# \: of \: entrants(DI)}{Population - Recipients(DI \: or \: SA)}, \qquad P_{SA} = \frac{\# \: of \: entrants(SA)}{Population - Recipients(DI \: or \: SA)}$$

The enrollment rates in the different regulations are displayed in graph 4.4. After the policy reform the enrollment rates in the DI will reduce substantially, since young handicapped can no longer enter. Not every one of these young handicapped will enter the PL. This implies that the sample holds fewer recipients in the years 2016 and 2017, since enrollment in the previous year(s) has decreased. Less observations are dropped and the samples for these years are relatively large. Individuals with higher probabilities of enrolling in the DI are still in the sample, this should be corrected for. To illustrate, table 4.5 gives that the sample size is higher in 2016 and 2017 and individuals participated longer in the special and practical education than the years before. It is thus important to include other variables, than the trend. These can control for the higher proportion of individuals with a high probability to enroll in the DI.

With the inclusion of these variables, there should be no correlation between the implementation of the policy and the value of the variables. For example, the policy is likely to stimulate labor participation, at the same time there is a negative correlation between working and enrollment in the DI. This would give an underestimation of the enrollment of DI without policy intervention in the post-policy years. For this reason variables that concern working or schooling are excluded. Labor participation and enrollment in schooling have changed over the years, less individuals followed schooling and more started working (figure 4.6). Economic developments will also affect this trend, but the interaction between policy and these variables cannot be excluded. For the included control variables there is no correlation between the policy and the value of the variables. Personal characteristics will not be influenced by the reform, for example sex and health care costs are not likely to be affected. Other variables mainly concern the household type, SEO(2018) studied the effect of the reform on household types and they find no significant correlation.

Multicollinearity is also not a problem, because correlation between variables only affects the level of the standard errors. This could lower the significance of several variables. However, the use of the coefficients is in predicting the enrollment. It is not intended to find a significant effect of one variable on the other or determine a causal relationship. When multicollinearity causes some variables to be insignificant, this is not a problem for the estimation of the policy effects. All correlated variables are interaction terms, therefore they are still very relevant.
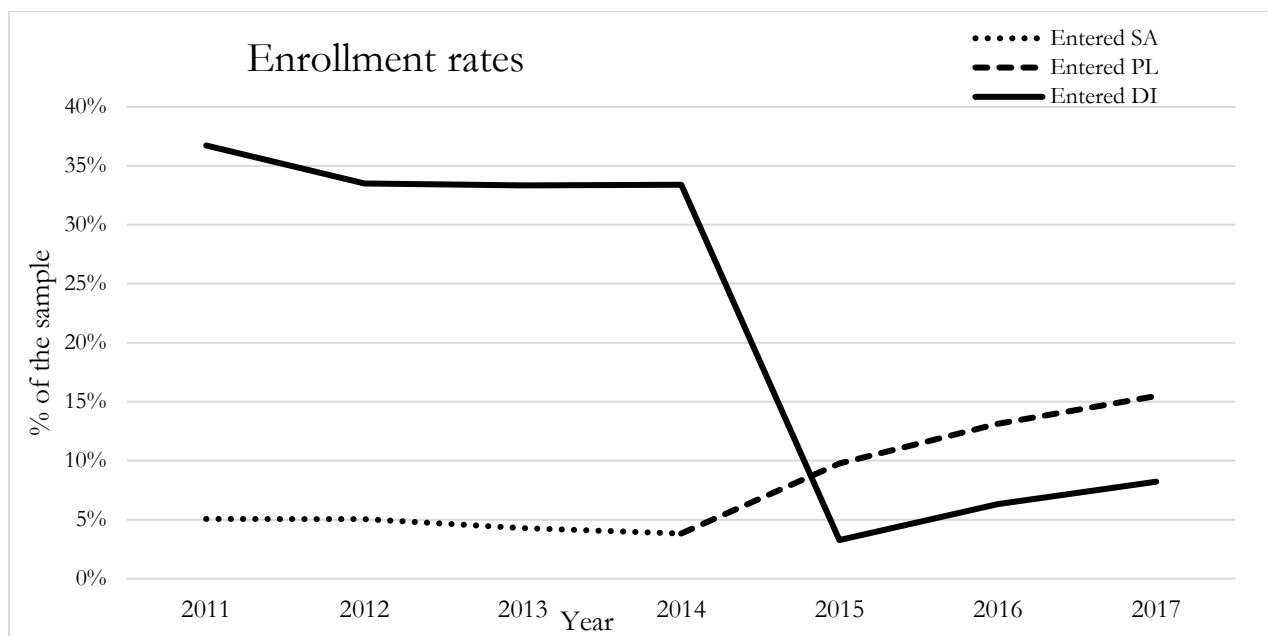
Figure 4.4: Share of the sample that entered a regulation by year.
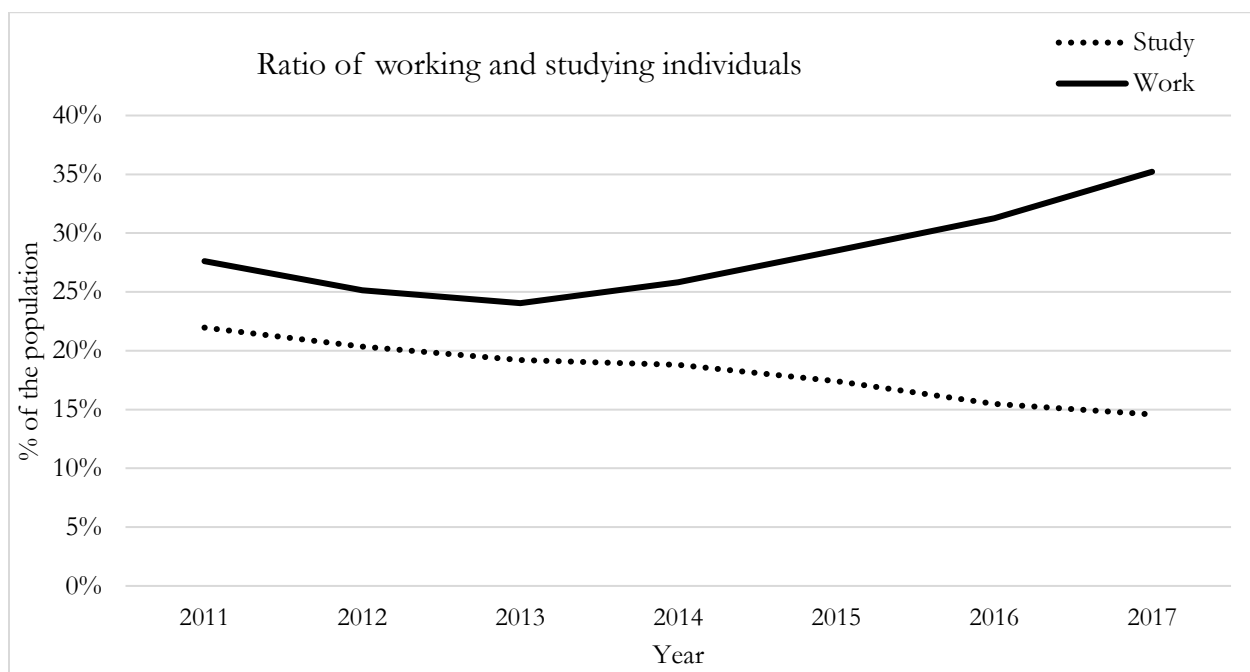
Figure 4.5: Share of working and studying individuals in the population (all students from special and practical education, including recipients of an allowance in the beginning of the year).

Variables	2014	2015	2016	2017
Female (%)		30.5	31.1	61.5
Age		18.7	18.8	18.9
Eighteen (%)		59.0	48.4	43.2
Special education (%) between t and t-3		73.4	73.3	73.9
Participated in current year (t)		23.7	21.0	17.9
Participated previous year (t-1)		25.0	27.6	27.1
Participated two years ago (t-2)		26.5	27.2	27.8
Participated three years ago (t-3)		24.8	24.3	27.3
Indication of disability (students in the special education)				
Visual limitation (%)		0.6	0.8	0.9
Hearing impairment (%)		5.6	5.4	5.2
Physically or mentally disabled (%)		19.9	24.7	27.6
Mental or behavioral disorders (%)		73.8	69.1	66.3
Years of participation in special education		5.44	6.27	6.78
Type of residence (concerns students in the special education)				
Institution for disabled care (%)		2.2	2.3	2.3
Institution for youth care (%)		11.9	10.5	9.8
Institution for youth health care (%)		4.0	3.9	3.4
Judicial youth institution (%)		4.7	3.5	3.0
Practical education (%) between t and t-3		27.5	27.3	26.6
Participated in current year (t)		26.9	24.5	22.7
Participated previous year (t-1)		37.7	38.1	35.2
Participated two years ago (t-2)		19.8	22.9	23.5
Participated three years ago (t-3)		15.6	14.4	18.7
Years of participation in practical education		4.56	4.64	4.68
# parents born abroad		0.50	0.47	0.46
No. individuals		19,288	24,554	27,204

Table 4.6: Sample statistics of the sample (population without recipients) by year[14].

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[14] Descriptive statistics for other variables are included in the appendix.

Next, I incorporated a trend. This trend corrects for developments in enrollment over time. Figures 4.7 and 4.8 show the yearly entrance rates before and after the policy reform. Enrollment differs between students from the special and the practical education, they follow a different trend. For this reason separate year variables are included for the special and practical education. In order to make out-of-sample predictions, it is necessary to assume that the pre-policy trend would continue in the post-policy period. A relevant argument that this assumption does not apply is that enrollment in SA is likely to be affected by economic circumstances. However, the sample of individuals that is used in this study is quite different from the normal population. In contrast with society, enrollment may be less correlated with economic developments. Figures 4.9 and 4.10 show that while enrollment rates for the entire labor force are indeed affected by the business cycles, the enrollment rate for individuals from special and practical education appears to be unaffected by these developments. The DI allowance is even less likely to be affected, because admission is determined by having a disability, data confirm this assumption. This study therefore uses a trend that is not related to any economic developments. This leads to the following regression equations;

$$\hat{P}_{DI} = \hat{\alpha} + \hat{\beta} * variables + \hat{\gamma}_1 * year_{special} + \hat{\gamma}_2 * year_{practical} \qquad (1)$$

$$\hat{P}_{SA} = \hat{\alpha} + \hat{\beta} * variables + \hat{\gamma}_1 * year_{special} + \hat{\gamma}_2 * year_{practical} \qquad (2).$$

To find the appropriate effects, an OLS-regression is estimated with data of the pre-policy years. Any predictions made with this model are estimations of the inflow probability in the regulation as if the policy change had not taken place. With the models the enrollment probabilities are predicted in the post-policy years on the individual level. The average value of these probabilities gives an estimation of the enrollment rate for the used sample. Comparing these forecasts with the actual enrollment rates gives the policy effect on admission.

To use the predictions, it is useful to test the reliability of the model. This can be done by testing the model out-of-sample. Before the implementation of the policy, only four years of data are available. This is not sufficient to test the quality of the trend out-of-sample. To test the impact of the trend, a sensitivity analysis is incorporated. Enough data are available to test the predictive power of the coefficients out-of-sample. To do this, the yearly datasets are separated in four random groups. With three of the four groups the models are estimated and with these models the entrance rates are predicted for the fourth group. The observations of this group were not included in the determination of the model and the predictions are thus made out-of-sample. The error of these predictions is found by the difference between predicted and observed entrance rates. Repeating this process gives a collection of prediction errors, in this study 100 errors were determined. Multiple key figures can be derived to say something about the average prediction error. The mean error (ME), the mean absolute error (MAE) and the root mean squared error (RMSE);

$$ME = \frac{1}{n}\sum prediction - observation \qquad (3)$$

$$MAE = \frac{1}{n}\sum |prediction - observation| \qquad (4)$$

$$RMSE = \sqrt{\frac{1}{n}\sum (prediction - observation)^2} \qquad (5).$$

The ME is useful to find the average bias of the predictions. It says something about the sign of the error, more than the size of the deviations. When the positive and negative errors even each other out, the ME equals zero,

regardless the size of the errors. The average value of the deviation is given by the MAE. This key figure ignores the sign of the error and is thus more informative about the value of the deviations. The last indicator of reliability is the RMSE, this figure squares the prediction errors. This implies that more variance between the prediction errors increases the RMSE, squaring the errors gives more weight to larger errors. The RMSE is quite similar to the standard deviation of the prediction errors. The difference is that the RMSE does not correct for the degrees of freedom. The computation of these three key figures gives us an idea about the quality of the model (ME) and the error of predictions (RMSE) and can therefore help by the judgment whether the model and corresponding predictions and policy effects are significant.

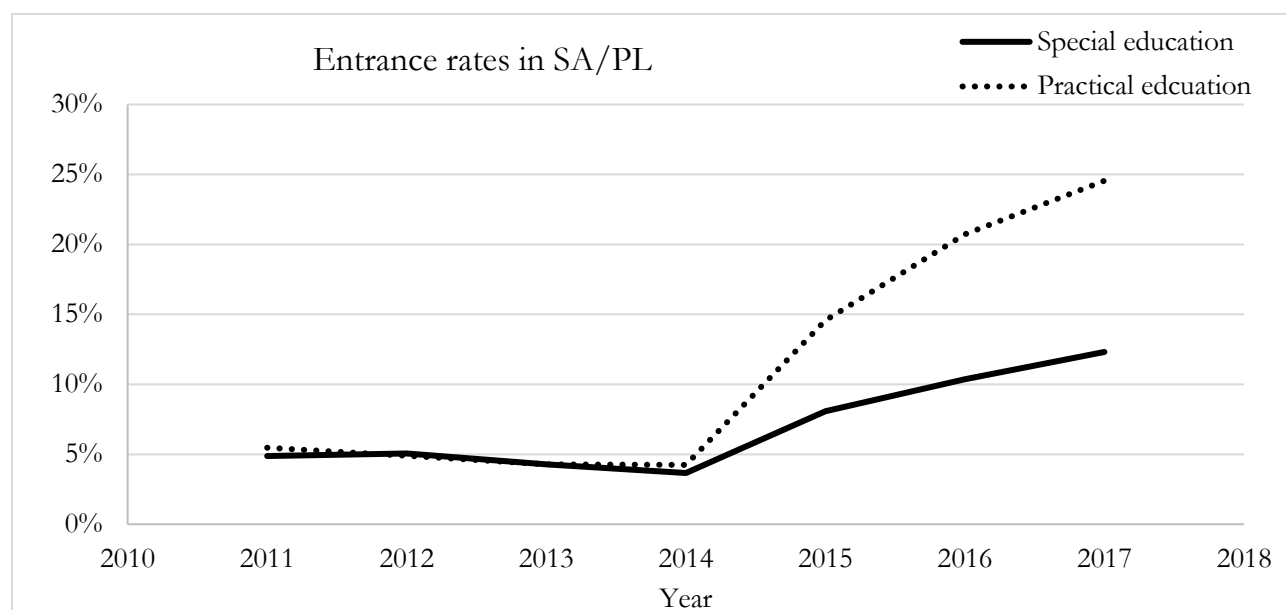Figure 4.7: Enrollment in SA/PL by individuals from the special education or practical education
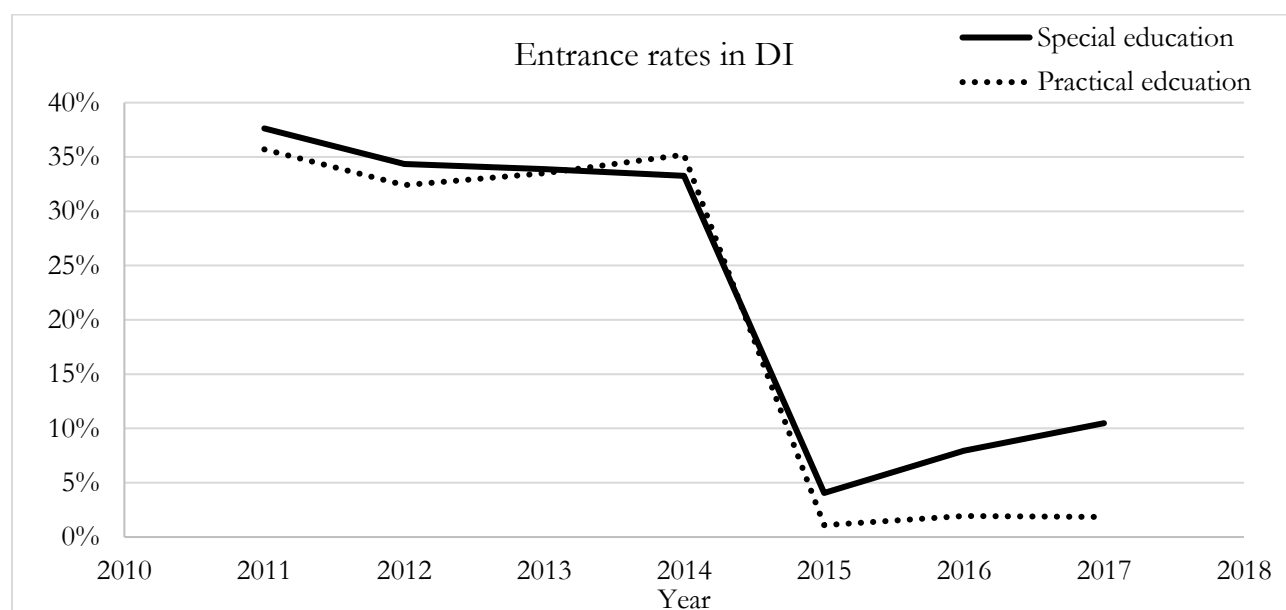
Figure 4.8: Enrollment in DI by individuals from the special education or practical education
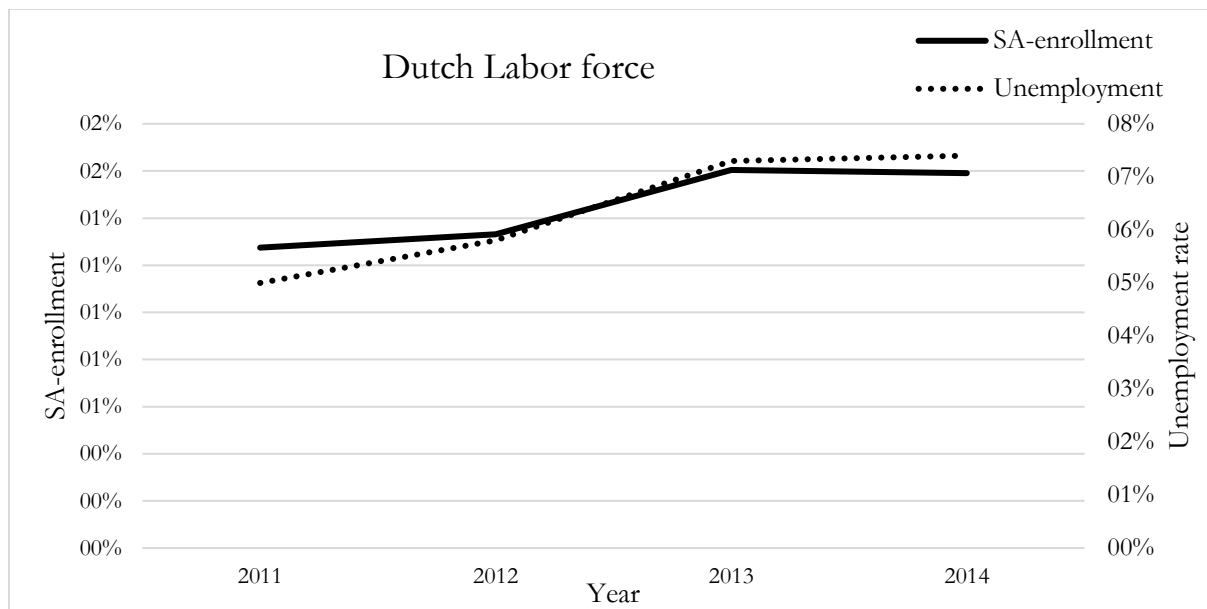
Figure 4.9: Relation between unemployment and SA-enrollment for the Dutch Labor force
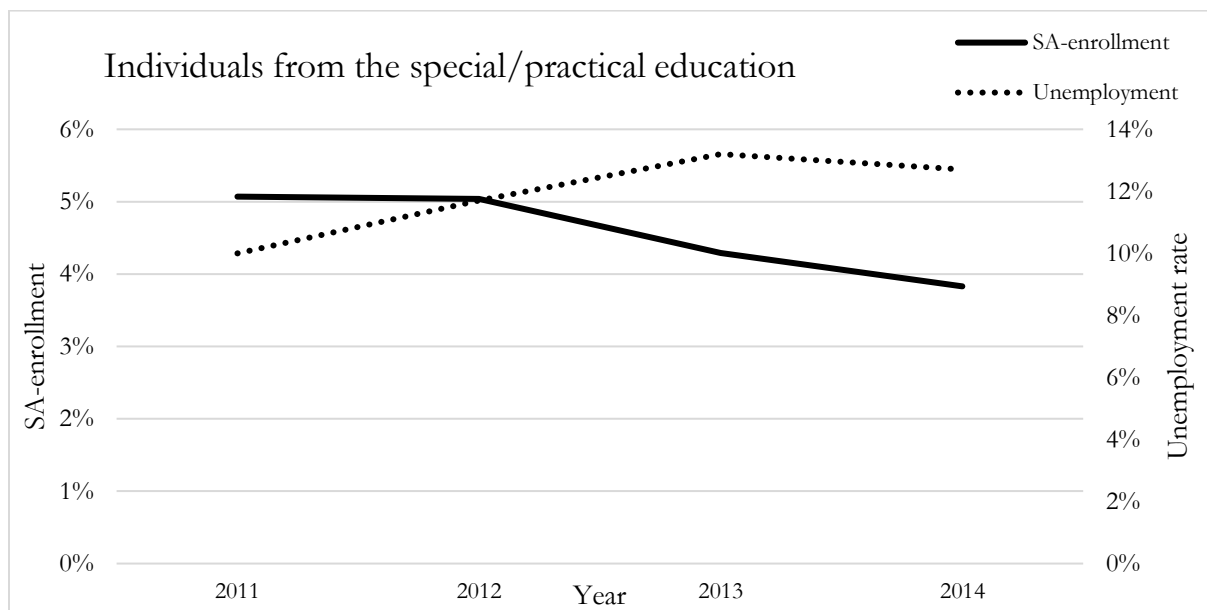
Figure 4.10: Relation between unemployment and SA-enrollment for the individuals from special/practical education

5. Results

This section presents the estimated time series model with their predictive power and the predicted enrollment rates in the post-policy years. A comparison of the predicted enrollment with the actual entrance rates in the DI or PL gives an indication of the policy effects for several subgroups in the years 2015-2017. The sensitivity analysis gives the impact of the inclusion of the trend and finally the interpretation of the results is discussed.

In the estimation of the time series model a trend and a set of variables are included. Especially the estimation of the trend is relevant, where the coefficients for the other variables are quite straight forward. Tables 5.1 (DA) and 5.2 (PL) give the coefficients for the trend as estimated by several models. The appendix presents the coefficients for the other variables.

The first model in table 5.1 is the final DI-model. This model includes a linear negative trend for individuals from the special education and a quadratic trend for everyone that participated in the practical education. The probability that someone from the special education will enter the DI decreases yearly with XX%. The marginal impact of the trend for individuals from the practical education is harder to read, because it is quadratic. The impact of the trend is lowest in 2013 and increases ever since. In this model the year is included with the last number, 2011 is thus reflected as 1 and 2015 as 5. The other models that are presented in table 5.1 show that the model (1) included the preferred relation. Model (2) gives that the linear trend is only significant for the special education and model (4) shows that the quadratic trend is significant for individuals from the practical education. Models (3) and (5) give the marginal effects of the logit regression for the same models as (2) and (4) respectively. The effects are similar to the OLS- estimates. The interpretation of OLS-models is more straightforward and because of these small differences between the logit- and OLS-estimation, the OLS-model

Enrollment in DI	(1) OLS	(2) OLS	(3) Logit, marginal effects	(4) OLS	(5) Logit, marginal effects	(6) OLS	(7) OLS
Year: special education	-0.00739*** (0.00154)	-0.00684*** (0.00154)	-0.00815*** (0.00164)	-0.00440 (0.00838)	-0.00400 (0.00873)	-0.0136*** (0.00184)	-0.00807*** (0.00154)
Year: practical education	-0.0701*** (0.0142)	-0.00209 (0.00278)	-0.00123 (0.00224)	-0.0694*** (0.0143)	-0.0597*** (0.0118)	-0.0492*** (0.00677)	-0.0695*** (0.0143)
Year^2: special education				-0.000596 (0.00163)	-0.000947 (0.00172)		
Year^2: practical education	0.0138*** (0.00281)			0.0137*** (0.00282)	0.0118*** (0.00232)	0.00990*** (0.00170)	0.0137*** (0.00283)
Constant	0.101*** (0.0227)	0.0542** (0.0203)		0.0998*** (0.0229)		0.380*** (0.00517)	0.0361 (0.0212)
No. of observations	71625	71625	71625	71625	71625	71625	71625
R²	0.323	0.323		0.324		0.001	0.313
Household variables	Yes	Yes	Yes	Yes	Yes	No	No
Other variables	Yes	Yes	Yes	Yes	Yes	No	Yes

Standard errors in parentheses $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

Table 5.1: estimates regression enrollment in disability insurance, years 2011-2014

Enrollment in SA	(1) OLS	(2) Logit, marginal effects	(3) OLS	(4) Logit, marginal effects	(5) OLS	(6) OLS
Year: special education	-0.00575*** (0.000789)	-0.00573*** (0.000823)	-0.00330 (0.00432)	-0.00221 (0.00440)	-0.00480*** (0.000715)	-0.00604*** (0.000790)
Year: practical education	-0.00475*** (0.00131)	-0.00452*** (0.00125)	-0.00915 (0.00662)	-0.0106 (0.00655)	-0.00385*** (0.000843)	-0.00500*** (0.00133)
Year^2: special education			-0.000494 (0.000837)	-0.000715 (0.000872)		
Year^2: practical education			0.000901 (0.00130)	0.00124 (0.00131)		
constant	0.0629*** (0.0154)		0.0651*** (0.0160)		0.0570*** (0.00204)	0.0754*** (0.0143)
No. of observations	71625	71625	71625	71625	71625	71625
R^2	0.066		0.066		0.001	0.040
Household variables	Yes	Yes	Yes	Yes	No	No
Other variables	Yes	Yes	Yes	Yes	No	Yes

Standard errors in parentheses   * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5.2: estimates regression enrollment in social assistance, years 2011-2014

is preferred. Models (6) and (7) give more information about the relevance of the other variables. The explanation power decreases and the trend differs, this confirms the use of personal variables.

The final PL-model, model (1) in table 5.2, incorporates a negative linear trend for both individuals from the special and the practical education. Each year the probability of enrollment in the SA decreases with XX% for individuals that participated in the special education and XX% when they were enrolled in the practical education. Model (3) shows that a quadratic trend is insignificant for either the special education and the practical education. The marginal effects of the logit coefficients (models 2 and 4) support the magnitude of the trend as given by the OLS-model. The relevance of the individual variables is confirmed by models (5) and (6).

The key figures with information about the reliability of the forecasts are presented in table 5.3. The numbers are based on errors found by simulating 100 out-of-sample predictions. The ME shows that the bias of the predications is very small. This would likely to be even lower when the number of out-of-sample predications is increased. The average out-of-sample prediction gives an underestimation of the actual enrollment rates of less than 0.006 percentage-points. For the interpretation of the results, the RMSE is used as if it gives the standard deviation of the error. These are also quite small for the entire sample, less than 0.4% for the DI-predictions and less than 0.2% for the predictions of SA-enrollment. Because the predicted enrollment rates in social assistance is are than the enrollment in the DI, the relative reliability is smaller for the SA-predictions.

Regulation	Disability Insurance	Social Assistance
Mean Error	-0.0000578	-0.00014
Mean Absolute Error	0.002978	0.00127
Root Mean Standard Error	0.003605	0.001588

Table 5.3: Key figures on prediction errors

With these models, the enrollment rates in the DI and SA can be predicted. This enables to predict the inflow in these regulations in the post-policy years as if the policy reform had not taken place. By comparing these forecasts to the actual enrollment, the effect of the policy on the admission rates can be estimated. The substitution-ratio is derived by dividing the share of the sample that enters the PL by the share of young handicapped in the sample. In table 5.4 the policy effects for the entire sample are given and table 5.5 gives the policy effects for several subgroups.

Policy effects

Table 5.4 gives the policy effect and substitution ratio for the entire sample. The policy effects give the change in enrollment as a share of the sample, the change in percentage-points. The decrease of enrollment in the DI is relatively constant over the three years, around 32%. Roughly 32% of the samples did not enroll in the DI because of the policy reform. This indicates the number of young handicapped; 6205 individuals in 2015, 7813 in 2016 and 8786 individuals in 2017. Some individuals are included in more than one sample, therefore these individuals cannot be summed. Entrance rates in the Participation law have increased because of the reform. 6.67% of the sample entered the PL in the 2015 caused by the policy change. This share has increased in the following years, to 10.45% of the sample in 2016 and 13.05% in 2017. This comes down to; 1287 individuals in 2015, 2566 in 2016 and 3550 extra individuals entered the PL in 2017. The extensive enrollment is partly formed by individuals that receive WCS. To indicate how many individuals receive this WCS, I give the share of the sample that entered the Participation law but is not a recipient of an allowance. These individuals only receive WCS. The RSMEs are included in the table between parentheses, these give the RSME for the predictions and thus the policy effects[15]. To simplify the interpretation, these numbers are in the same unit of measurement as the policy effects. Even though the RSME cannot exactly be interpreted as the standard error, the small errors compared to the large policy effects for the entire sample, give that they are indeed significant.

The unit of measurement of the substitution ratio is different than for the policy effects. Substitution ratios are not given in percentage points, but as a share of the. The ratios give the share of young handicapped that entered the PL. In 2015 21% of these individuals entered the Participation law, this increases to 40% in 2017. As was argued in the theoretical framework, this policy reform knows a learning curve. The increase in the substitution ratio makes the learning curve very visible. These are increasing over the years. Especially the enrollment in the WCS experiences a steep increase in enrollment. Municipalities needed some time to implement this instrument. Such that individuals can now work with WCS instead of receiving allowance.

Year	Predicted enrollment	RMSE	Actual enrollment	Policy effect
Disability insurance				
2015	35.46%	0.36046	3.27%	-32.17%
2016	38.15%	0.36046	6.33%	-31.82%
2017	40.52%	0.36046	8.22%	-32.30%
Participation law				
2015	3.08%	0.15882	9.75%	6.67%
2016	2.69%	0.15882	13.13%	10.45%
2017	2.43%	0.15882	15.48%	13.05%

Table 5.4: Policy effects for the entire sample

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[15] The RSME applies to the prediction. To find the policy effect, the actual enrollment is subtracted from this prediction. Because there is no uncertainty in the determination of the real entrance rates, the uncertainty of the policy effect is only caused by the prediction. Since the unit of measurement does not change, the RSME can be directly applied to the uncertainty of the policy effect.

Policy effects	2015	2016	2017
Total sample: all individuals that participated in the special or practical education between now and 3 years ago.			
Disability Insurance	-32.17%	-31.82%	-32.30%
	(0.36046)	(0.36046)	(0.36046)
Participation Law	6.67%	10.45%	13.05%
	(0.15882)	(0.15882)	(0.15882)
Share of the sample that only receives WCS	0.68%	3.11%	6.32%
Substitution rate	20.73%	32.83%	40.41%
No. of observations	19,289	24,555	27,202
All individuals that participated in the special education between now and 3 years ago.			
Disability Insurance	-29.98%	-27.32%	-24.94%
	(0.40460)	(0.40460)	(0.40460)
Participation Law	5.21%	7.93%	10.20%
	(0.17029)	(0.17029)	(0.17029)
Share of the sample that only receives WCS	0.25%	1.52%	3.43%
Substitution rate	17.39%	29.03%	40.91%
No. of observations	14,166	17,992	20,098
All individuals that participated in the practical education between now and 3 years ago.			
Disability Insurance	-39.09%	-44.63%	-53.61%
	(0.63739)	(0.63739)	(0.63739)
Participation Law	10.97%	17.38%	21.26%
	(0.33971)	(0.33971)	(0.33971)
Share of the sample that only receives WCS	1.83%	7.40%	14.45%
Substitution rate	28.07%	38.94%	39.66%
No. of observations	5,299	6,713	7,225
All individuals that are 18.			
Disability Insurance	-44.71%	-43.71%	-46.41%
	(0.50578)	(0.50578)	(0.50578)
Participation Law	9.79%	12.25%	14.04%
	(0.14169)	(0.14169)	(0.14169)
Share of the sample that only receives WCS	1.00%	2.84%	5.61%
Substitution rate	21.89%	28.02%	35.56%
No. of observations	11,382	11,882	11,753
All individuals that are 19.			
Disability Insurance	-18.52%	-25.13%	-26.75%
	(0.74331)	(0.74331)	(0.74331)
Participation Law	3.36%	11.47%	14.16%
	(0.42041)	(0.42041)	(0.42041)

Share of the sample that only receives WCS	0.33%	4.41%	7.36%
Substitution rate	18.12%	45.63%	52.92%
No. of observations	4,491	8,545	8,579

All individuals that are 20.

Disability Insurance	-9.05%	-12.79%	-16.15%
	(0.94407)	(0.94407)	(0.94407)
Participation Law	1.22%	3.97%	11.57%
	(0.62577)	(0.62577)	(0.62577)
Share of the sample that only receives WCS	0.09%	1.50%	7.27%
Substitution rate	13.46%	31.03%	71.61%
No. of observations	2,281	2,929	5,422

All individuals that are 21.

Disability Insurance	-6.49%	-8.54%	-12.67%
	(1.08445)	(1.08445)	(1.08445)
Participation Law	-0.88%	1.83%	5.63%
	(1.23714)	(1.23714)	(1.23714)
Share of the sample that only receives WCS	XX	0.45%	2.79%
Substitution rate	13.54%	21.45%	44.44%
No. of observations	861	885	1,112

All individuals that left the special or practical education in the previous year.

Disability Insurance	-41.28%	-38.43%	-39.82%
	(0.76375)	(0.76375)	(0.76375)
Participation Law	14.45%	21.04%	24.78%
	(0.30149)	(0.30149)	(0.30149)
Share of the sample that only receives WCS	2.08%	6.83%	12.76%
Substitution rate	35.00%	54.75%	62.22%
No. of observations	5,541	7,527	7,984

All individuals that participated in the special or practical education between now and 2 years ago.

Disability Insurance	-38.46%	-37.45%	-38.62%
	(0.45852)	(0.45852)	(0.45852)
Participation Law	7.95%	12.20%	15.09%
	(0.18307)	(0.18307)	(0.18307)
Share of the sample that only receives WCS	0.85%	4.49%	7.48%
Substitution rate	20.67%	32.57%	39.06%
No. of observations	15,050	19,312	20,450

Note: RMSEs in parentheses. XX indicates that this data were not allowed to be published, to prevent disclosure of personal information.
Table 5.5: policy effects

Besides the policy effect for the entire sample, table 5.5 presents the effects for different subgroups. The composition of the sample is quite diverse, the policy effects for these several subgroups also differ. For the interpretation of the results, it is useful to determine the policy effects per subgroup. Prediction errors are also determined for these subgroups, to correct for the smaller samples. Most effects are still quite significant, only the PL-effects for 20- and 21-year-olds are not clearly significant. Individuals that participated in the special education are not directly comparable to individuals that participated in the practical education. Policy effects are bigger for individuals from the practical education, young handicapped make up a relatively large share of the practical education. This is however not observed in the substitution ratio, these are similar. Individuals of different ages also know different policy effects. The substitution rates of 18-year-olds are lower than substitution ratios of older individuals in 2016 and 2017. This is probably caused by the large share of students and low allowance for 18-year-olds in the PL.

Sensitivity analysis
To test the robustness of the results, it is useful to test the effect of an assumption on the results. When changing the assumption does not cause the results to change significantly, the results are robust for that assumption. An important assumption is concerned with the continuation of the trend. The included trend is based on entrance rates in the years 2011-2014. To extrapolate this trend to the post-policy years, the assumption is made that the trend would indeed continue in these years. This is a risky assumption, since there is no further information to support this assumption and the trend is based on only four years. For this reason, I test the effect of freezing the effect of the trend at the year 2014.

Policy effects	2015	2016	2017
Total sample			
DI	-32.17%	-31.82%	-32.30%
	(0.36046)	(0.36046)	(0.36046)
PL-allowance	6.67%	10.45%	13.05%
	(0.15882)	(0.15882)	(0.15882)
Substitution rate	20.73%	32.83%	40.41%
Observations	19,289	24,555	27,202
Year is set equal to 2014			
DI	-31.27%	-29.25%	-27.50%
	(0.36046)	(0.36046)	(0.36046)
PL-allowance	6.123%	9.352%	11.405%
	(0.15882)	(0.15882)	(0.15882)
Substitution rate	19.58%	31.97%	41.47%
Observations	19,289	24,555	27,202

Note: RMSEs in parentheses.
Table 5.6: Policy effects without trend

A comparison of the results in table 5.6 shows that the policy effects are smaller, but still large and thus very significant. The level of substitution is hardly affected by the exclusion of the trend. Therefore it can be stated that the substitution rates are quite robust, even if the assumption of the trend does not hold.

Discussion
The presented results give an idea of the extensive enrollment of young handicapped in the Participation law that participated in special or practical education in one of the previous years (XX individuals). This only covers a part of the entire group of young handicapped. For the interpretation of the results it is important to consider

the possible differences between the results as presented before and the structural effect on all young handicapped.

The average age in the sample is relatively low, a large share of the sample is made up by 18-years-olds. Older individuals are also affected by the reform. These individuals are more likely to enter the PL, because their allowance is higher and less likely to follow education. The substitution ratios are automatically lower, as is confirmed in table 5.5. The schooling effect is confirmed by the results, individuals that left the special or practical education in the previous year are less likely to be enrolled in school. The substitution rates are relatively high for these individuals, more than 60% in 2017. This gives that the extensive enrollment is likely to be higher for the entire group of young handicapped.

Students from the special and practical education are not completely representative for DI-entrants. The DI-agency (UWV) communicated with the special and practical schools, to help individuals in their application for the allowance. Municipalities adopted the relations with these schools. These students are therefore better informed on their possibilities of receiving an allowance or WCS in the Participation law and are often supported in their appliance. This will increase the policy effect in the PL for these individuals. It could be an overestimation of the substitution ratio for the other young handicapped. This effect is confirmed by the higher substitution ratio for 18-year old that is found in this paper, compared to the research as conducted by SEO (2018). They find a substitution ratio of 15% for all 18-year old young handicapped, I find this to be 20%[16] for individuals from the special or practical education.

The structural effect probably differs from the policy effects in the first years after the implementation. This is caused by two effects; it takes some time before all individuals are familiar with the reform and the delayed enrollment. This paper studies the first three years after the poly reform, the results show that a constant effect is not yet observed. The substitution ratio increased over the years and equals 40% in 2017. It is likely that this ratio will still increase in the next years, the results are an underbound.

In the years after the implementation of the new policy, municipalities have had severe deficits in their fixed budgets. Especially the increased immigration that started in 2015 created these deficits. The determination of the budgets did not yet control for these external shocks. Deficits could have caused municipalities to be more careful in handing out the allowances (COELO, 2013). However, this is not likely to affect the enrollment for young-handicapped. Municipalities are obliged to pay out allowance to all entitled individuals. They are more eager to stimulate exit rates and prevent fraud, rather than deny individuals an allowance.

The entrance rates in the future years are therefore expected to be higher than in the current situation, since the deficits are only temporary.

The sum of these four effects give that the structural effect for the entire group is likely to be higher than the results found in this paper. The estimations are thus an underestimation of the structural effect.

6. Concluding Remarks
The research question that was to be answered in this thesis was;

> "What is the entrance rate in the Participation law for individuals that can no longer enter the disability insurance?"

This entrance rate is given by the substitution rates. This rate equaled 21% in 2015 and increased to 40% in 2017. These rate are very significant and I can conclude a substantial share of the young handicapped enter the

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[16] Entrance in the WCS is ignored, SEO only considered enrollment in the allowance of the Participation law. The substitution ratio is 22% when all individuals are considered that enrolled in the PL, when only the allowance is taken into account, the substitution ratio decreases to 20%.

participation law. The substitution rate increased in the three post-policy years. This is probably caused by a delayed entrance of individuals because of schooling and the relatively low allowance for young-adults. The analysis confirms that younger individuals have lower substitution rates. Another source of the learning curve is the time it takes for municipalities to implement the policy and the time it takes the young handicapped to find the municipalities. This is confirmed by the steep increase of enrollment in the WCS, municipalities needed time to implement this instrument. Several effects give that the substitution rate for the group of young handicapped that never participated in the special or practical education is probably higher. The found results give an underbound of the structural effect for the entire group of young handicapped.

Some other relevant questions about the policy reform cannot be estimated with the analysis from this paper. The total sum of affected individuals is not estimable with this analysis. First because only a part of the entire group of young handicapped is considered. Second, because individuals can appear in the datasets of multiple years. This implies that their policy effects are taken into account in several years. Therefore the financial effects are not estimable with the results of this paper. Further research on this aspect is recommended.

No conclusions can be drawn on the other effects of the policy reform. Individuals appear to be more active on the labor market and less active at school, but these developments are likely to be affected by the positive economic developments. To find the share of young handicapped that have to rely on their family or partner and do not receive an income of allowance, more research is needed. This find these results it is better to determine on the individual level whether someone is young handicapped. The scope of this research does not reach that far. More research is advised.

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Appendix

A1: Used Microdata documentation

AOUITKERINGTAB, data about DI allowances, 2010-2017

BIJSTANDUITKERINGTAB, data about paid out allowances SA/PL, 2011-2017

INSCHRWECTAB, data about students in special education, 2008-2017

ONDERWIJSINSCHRTAB, data about students in regular education, 2000-2017

GBAHUISHOUDENSBUS, data about household characteristics, 1995-2017

GBAPERSOONTAB, data about personal characteristics, 1995-2017

SPOLISBUS, data about work and social workplaces, 2010-2017

ZVWZORGKOSTENTAB, data about health care costs, 2009-2016

VRLMIGMOTBUS, data about registered immigrants, 1999-2017

SRGPERSOONPWETBUS, data about the use of reintegration instruments by municipalities (WCS), 2015-2017

A2: Descriptive statistics of the population

Variables	2011	2012	2013	2014	2015	2016	2017
Born abroad (%)	7.57%	7.26%	7.16%	7.10%	7.10%	6.91%	6.61%
At least one parent born abroad (%)	20.44%	20.76%	21.33%	21.62%	21.62%	21.88%	21.56%
Died or emigrated (%)	0.23%	0.27%	0.30%	0.30%	0.39%	0.57%	0.89%
School (%)							
In	1.29%	1.09%	1.00%	0.91%	0.65%	0.69%	0.55%
Out	27.05%	24.77%	23.40%	24.13%	24.58%	24.82%	23.39%
31/12	21.96%	20.35%	19.20%	18.80%	17.42%	15.49%	14.58%
Work (%)							
In	21.98%	19.39%	17.67%	18.90%	19.96%	22.01%	23.25%
Out	18.06%	18.02%	16.53%	15.04%	15.11%	16.55%	16.60%
31/12	27.60%	25.14%	24.04%	25.81%	28.50%	31.26%	35.21%
# persons in household	3.18	3.18	3.18	3.18	3.19	3.22	3.21
Residential institution (%)							
Entered	5.64%	6.20%	5.05%	5.10%	4.50%	4.43%	4.16%
Left	10.89%	11.74%	10.77%	4.17%	3.53%	3.44%	3.26%
Entire year	2.77%	3.24%	3.72%	7.80%	8.20%	8.08%	7.98%
Left in the last 10 years	25.71%	25.13%	25.85%	25.01%	24.10%	22.61%	21.64%
Single household (%)							
Entered	10.08%	9.33%	10.22%	10.20%	8.71%	8.45%	8.36%
Left	12.94%	12.16%	13.13%	12.36%	11.64%	10.93%	10.40%
Entire year	3.56%	3.72%	3.76%	4.13%	4.57%	4.46%	4.66%
At home with parents (%)							
Entered	4.49%	4.23%	4.36%	4.01%	3.71%	3.41%	3.21%
Left	10.70%	11.49%	10.41%	10.56%	9.38%	9.34%	8.81%
Entire year	63.63%	62.73%	62.96%	63.79%	65.56%	66.62%	68.20%
Couple household (%)							
Entered	4.53%	4.93%	5.06%	4.84%	4.28%	4.09%	3.78%
Left	2.92%	3.12%	3.31%	3.34%	3.18%	3.02%	2.52%
Entire year	1.23%	1.20%	1.20%	1.10%	1.09%	1.01%	0.99%

Variables	2011	2012	2013	2014	2015	2016	2017
Single parent (%)							
Entered	0.56%	0.54%	0.53%	0.56%	0.51%	0.48%	0.36%
Left	0.46%	0.43%	0.38%	0.39%	0.39%	0.30%	0.29%
Entire year	0.21%	0.18%	0.20%	0.17%	0.21%	0.19%	0.25%
Other household (%)							
Entered	2.86%	2.92%	3.06%	2.93%	2.67%	2.37%	2.34%
Left	2.67%	2.65%	3.14%	2.90%	2.72%	2.43%	2.37%
Entire year	1.45%	1.47%	1.43%	1.46%	1.41%	1.38%	1.37%
Reference person (%)							
Entered	10.50%	9.81%	10.56%	10.56%	8.92%	8.60%	8.45%
Left	8.59%	8.05%	8.15%	7.00%	6.45%	6.25%	5.30%
Entire year	4.71%	4.92%	5.04%	5.39%	5.92%	5.71%	6.00%
Health care costs (t-1)	€4441	€4175	€3801	€4051	€3337	€2758	€2768
Immigrated current year (t)	0.01%	0.00%	0.01%	0.02%	0.02%	0.02%	0.02%
Immigrated previous year (t-1)	0.03%	0.06%	0.03%	0.03%	0.05%	0.06%	0.05%
Immigrated two years ago (t-2)	0.07%	0.09%	0.09%	0.03%	0.10%	0.10%	0.13%
Immigrated three years ago (t-3)	0.17%	0.16%	0.18%	0.21%	0.11%	0.22%	0.22%
Immigrated four years ago (t-4)	0.19%	0.25%	0.26%	0.29%	0.31%	0.16%	0.32%
No. of individuals	29,339	32,594	34,428	34,845	35,411	36,391	36,438

A3: Descriptive statistics of the sample

Variables	2014	2015	2016	2017
Born abroad (%)	7.95%	7.79%	7.11%	6.68%
At least one parent born abroad (%)	23.63%	23.28%	22.48%	21.79%
Died or emigrated (%)	0.36%	0.49%	0.68%	1.00%
School (%)				
In	1.46%	1.09%	0.94%	0.68%
Out	28.36%	28.67%	30.59%	29.33%
31/12	26.28%	24.76%	22.07%	19.24%
Work (%)				
In	24.94%	27.11%	26.97%	27.26%
Out	20.69%	21.04%	20.62%	19.53%
31/12	31.64%	35.50%	36.21%	39.42%
# persons in household	3.34	3.36	3.34	3.27
Residential institution (%)				
Entered	4.01%	3.73%	3.98%	4.02%
Left	4.66%	3.87%	3.73%	3.54%
Entire year	3.60%	4.04%	5.23%	6.40%
Left in the last 10 years	20.83%	19.98%	19.51%	20.01%
Single household (%)				
Entered	10.38%	9.03%	8.59%	8.67%
Left	12.05%	11.36%	10.68%	10.65%
Entire year	3.15%	3.51%	3.69%	4.07%
At home with parents (%)				
Entered	4.89%	4.45%	3.92%	3.64%
Left	10.87%	9.64%	9.75%	9.01%
Entire year	69.29%	70.93%	70.28%	70.09%
Couple household (%)				
Entered	4.79%	4.15%	3.91%	3.80%
Left	3.20%	2.90%	2.77%	2.52%
Entire year	0.96%	0.85%	0.79%	0.93%

Variables	2014	2015	2016	2017
Single parent (%)				
Entered	0.51%	0.38%	0.39%	0.31%
Left	0.30%	0.31%	0.22%	0.22%
Entire year	0.12%	0.16%	0.13%	0.14%
Other household (%)				
Entered	3.24%	2.85%	2.51%	2.46%
Left	2.99%	2.74%	2.53%	2.48%
Entire year	1.48%	1.52%	1.41%	1.37%
Reference person (%)				
Entered	10.76%	9.18%	8.81%	8.82%
Left	6.99%	6.43%	6.23%	5.52%
Entire year	4.23%	4.62%	4.69%	5.18%
Health care costs (t-1)	€4064	€2912	€2200	€2493
Immigrated current year (t)	0.03%	0.03%	0.03%	0.03%
Immigrated previous year (t-1)	0.05%	0.07%	0.09%	0.06%
Immigrated two years ago (t-2)	0.06%	0.18%	0.13%	0.18%
Immigrated three years ago (t-3)	0.34%	0.18%	0.31%	0.27%
Immigrated four years ago (t-4)	0.41%	0.40%	0.21%	0.38%
No. of individuals	19050	19,289	24,555	27,202

A4: Alternative methodologies

The methodology used in this study was not the most apparent method. Some other methodologies are discussed here to indicate why the current method is preferred.

The data provided by Statistics Netherlands is panel data. All Dutch citizens are documented during their life and all types of characteristics and circumstances during this period are known. The obvious methodology with panel data are difference-in-difference. The identifying assumption for DiD-model is that enrollment would follow the same trend as an unaffected control group. This control group does not exist, because all potential DI-enrollers are affected. Another option is including fixed effects. For this method it is necessary that individuals are followed for a longer period and that the value of the dependent variable is correlated with itself in multiple periods. The problem is in both conditions. First, not all individuals are followed for a longer period of time. This depends on their age of leaving the special or practical education and the fact whether or not the enter one of the regulations. The other problem is in observing the dependent variable, that is enrollment in one of the regulations. When this equals 1, the individual is very likely to be excluded in the next years, because they are recipients. The lack of continuation makes it impossible to include fixed effects.

Policy dummies

Instead of using a forecasting model, the policy effects can also be estimated by including policy dummies in the regression model. This method is very similar to a regression discontinuity design. These dummies could give the distinction of enrollment in the post-policy years. To estimate the coefficients data about the pre- and post-policy years are included. This leads to the following regression equations;

$$\hat{P}_{DI} = \hat{c} + \hat{a}_1 * 2015 + \hat{a}_2 * 2016 + \hat{a}_3 * 2017 + \hat{\beta} * covariates + \hat{\gamma} * year$$

$$\hat{P}_{PL} = \hat{c} + \hat{a}_1 * 2015 + \hat{a}_2 * 2016 + \hat{a}_3 * 2017 + \hat{\beta} * covariates + \hat{\gamma} * year$$

The estimations of $\hat{a}_1, \hat{a}_2$ and $\hat{a}_3$ give the policy effects. Because the dummies only apply to one year, similar to year fixed effects, this will not affect the estimation of the trend. The coefficient gives the effect of the policy on the enrollment in the relevant year. Because the dependent variable is dichotomous, the effect presents the change in enrollment probability. The estimation of the coefficients for the policy dummies brings along a standard error and the significance can easily be determined. However, the method is sensitive for interactions between the control variables and the policy effect. In the main text I stated that there is no correlation between the implementation of the reform and the value of the variables. In this methodology another type of correlation is relevant.

Some individuals are still entitled to enter the DI after the reform, these individuals are permanently unable to work at all. Other individuals, the young handicapped are only able to enter in the pre-policy years. The included control variables can be correlated with the probability that someone is permanently unable to work. For instance, variables that are concerned with living in an institution or health care costs. Individuals that live in an institution for the disabled are likely to have a high probability of being unable to work permanently. Some variables can also say something about the probability that someone is a young handicapped. The young handicapped are only able to enter in the pre-policy years. It is important that the coefficients of the control variables estimate the effect on the variables on the enrollment in the pre-policy years. The effect of the variables on the enrollment rates in the post-policy years should not be estimated. This ensures that the coefficients of the policy dummies represent the actual value of the policy effects. Because the enrollment in the post-policy years is also included in the model and the coefficients are correlated in different levels, the coefficients are not properly estimated.

The results of this method are presented in table A.1. The policy effects for the DI differ significantly from the results that are found in the study. The coefficients give a lower decrease in enrollment rates. This makes sense

because the lower enrollment rates in the post-policy years are explained by the coefficients rather than the policy dummies. The policy effects in the PL is less sensitive for correlations and thus these differences are relatively small.

		2015	2016	2017
Policy dummies	Policy effect-DI	-29.7%	-27%	-25.1%
	Policy effect-PL	6.49%	10.0%	12.8%
	Substitution ratio	21.85%	37.04%	51.00%
Forecasting model	Policy effect-DI	-32.17%	-31.82%	-32.30%
	Policy effect-PL	6.67%	10.45%	13.05%
	Substitution ratio	20.73%	32.83%	40.41%
No. of observations		19,289	24,555	27,202

Table A.1: Policy effects of two different methodologies

Reliability of the model

To use the predictions, it is necessary to test the reliability of the model. In this study this is done by the computation of several key figures about out-of-sample prediction errors. These errors were found by comparing the average predicted enrollment with the average observed enrollment rate. A hundred errors were determined on the aggregate level. Another method is to start with the errors on the individual level.

The prediction errors on the individual level can be considered as the deviation of the average prediction error. The average value of the predication error should be 0. Therefore, the standard deviation of the prediction can be found by taking the root of the average of the all squared errors. With this standard deviation I can find the standard error of the mean by dividing it with the root of the number of observations. This gives that the aggregate prediction error is smaller for larger samples. In formulas;

$$Prediction\ error = prediction - observation$$

$$Standard\ deviation\ (individual\ level) = \sqrt{\frac{1}{n}\sum(prediction\ error - 0)^2}$$

$$Standard\ error\ (aggregate\ level) = \frac{standard\ deviation}{\sqrt{n}}$$

The errors found with this methodology are smaller than the errors that are applied in the main text. For this reason, the other errors were used to determine the significance. All significant policy effects are thus significant according to both methods.

A5: Coefficients of DI-model

Enrolled in Disability Insurance	(1) OLS	(2) Logit, marginal effects	(3) OLS	(4) Logit, marginal effects	(5) OLS	(6) Logit, marginal effects	(8) OLS
Female	0.0102**	0.00955**	0.0103**	0.00952**	0.0102**	0.00956**	0.0111***
	(0.00339)	(0.00322)	(0.00339)	(0.00322)	(0.00339)	(0.00322)	(0.00333)
Age-18	-0.0638***	-0.139***	-0.0643***	-0.140***	-0.0638***	-0.139***	-0.0618***
	(0.00589)	(0.0105)	(0.00589)	(0.0105)	(0.00589)	(0.0105)	(0.00589)
Age-18 (quadratic)	0.00915***	0.0185***	0.00920***	0.0186***	0.00914***	0.0185***	0.00950***
	(0.00103)	(0.00176)	(0.00103)	(0.00176)	(0.00103)	(0.00176)	(0.00103)
Eighteen	0.0718***	-0.00915	0.0717***	-0.00949	0.0718***	-0.00907	0.0778***
	(0.00731)	(0.0108)	(0.00731)	(0.0108)	(0.00731)	(0.0108)	(0.00733)
Special education between t and t-3							
Participated in current year (t)	0.189***	XX	0.191***	XX	0.189***	XX	0.200***
	(0.00595)		(0.00595)		(0.00595)		(0.00591)
Participated in previous year (t-1)	0.142***	XX	0.143***	XX	0.142***	XX	0.153***
	(0.00533)		(0.00533)		(0.00533)		(0.00530)
Participated two years ago (t-2)	0.00877*	XX	0.00895*	XX	0.00873*	XX	0.0124**
	(0.00431)		(0.00432)		(0.00432)		(0.00436)
Participated three years ago (t-3) (ref)	0	0	0	0	0	0	0
Years of participation in special education	0.0233***	0.0228***	0.0232***	0.0227***	0.0233***	0.0228***	0.0240***
	(0.000712)	(0.000747)	(0.000712)	(0.000747)	(0.000713)	(0.000748)	(0.000719)
Indication of disability - special education students							
Visual limitation	0.235***	XX	0.280***	XX	0.233***	XX	0.239***
	(0.0307)		(0.0290)		(0.0312)		(0.0309)
Hearing impairment	-0.0514*	XX	-0.00560	XX	-0.0531*	XX	-0.0523*
	(0.0210)		(0.0185)		(0.0217)		(0.0212)
Physically or mentally disabled	0.304***	XX	0.349***	XX	0.302***	XX	0.313***
	(0.0206)		(0.0181)		(0.0213)		(0.0208)
Mental or behavioral disorders	-0.0300	XX	0.0157	XX	-0.0317	XX	-0.0125
	(0.0200)		(0.0173)		(0.0206)		(0.0201)
Type of residence -special education students							
Institution for disabled care	0.114***	0.0949***	0.114***	0.0951***	0.114***	0.0949***	0.178***
	(0.0120)	(0.0117)	(0.0120)	(0.0117)	(0.0120)	(0.0117)	(0.0123)
Institution for youth care	-0.0477***	-0.0553***	-0.0477***	-0.0552***	-0.0477***	-0.0553***	0.0106
	(0.00591)	(0.00631)	(0.00591)	(0.00631)	(0.00591)	(0.00631)	(0.00547)
Institution for youth health care	0.0219**	0.0267**	0.0219**	0.0268**	0.0219**	0.0268**	0.0386***
	(0.00782)	(0.00831)	(0.00782)	(0.00833)	(0.00782)	(0.00832)	(0.00785)
Judicial youth institution	-0.0992***	-0.139***	-0.0992***	-0.139***	-0.0992***	-0.139***	-0.0396***
	(0.00679)	(0.00919)	(0.00679)	(0.00918)	(0.00679)	(0.00919)	(0.00638)
Practical education between t and t-3							
Participated in	0.260***	0.218***	0.239***	0.199***	0.261***	0.219***	0.287***

current year (t)	(0.0187)	(0.0159)	(0.0184)	(0.0160)	(0.0188)	(0.0160)	(0.0188)
Participated in previous year (t-1)	0.361***	0.299***	0.340***	0.282***	0.361***	0.301***	0.388***
	(0.0180)	(0.0149)	(0.0177)	(0.0151)	(0.0181)	(0.0151)	(0.0181)
Participated two years ago (t-2)	0.117***	0.0969***	0.0972***	0.0811***	0.118***	0.0980***	0.142***
	(0.0174)	(0.0144)	(0.0171)	(0.0143)	(0.0175)	(0.0146)	(0.0175)
Participated three years ago (t-3)	0.0914***	0.0536***	0.0734***	0.0418**	0.0921***	0.0545***	0.113***
	(0.0167)	(0.0136)	(0.0164)	(0.0135)	(0.0168)	(0.0136)	(0.0168)
Years of participation in practical education	0.0118***	0.0110***	0.0119***	0.0110***	0.0118***	0.0109***	0.00807***
	(0.00214)	(0.00179)	(0.00214)	(0.00179)	(0.00214)	(0.00179)	(0.00217)
# parents born abroad	-0.0169***	-0.0195***	-0.0167***	-0.0194***	-0.0169***	-0.0195***	-0.0210***
	(0.00400)	(0.00432)	(0.00400)	(0.00433)	(0.00400)	(0.00432)	(0.00401)
Born abroad	-0.0649***	-0.0572***	-0.0649***	-0.0571***	-0.0649***	-0.0572***	-0.0555***
	(0.00734)	(0.00747)	(0.00734)	(0.00748)	(0.00734)	(0.00747)	(0.00735)
At least one parent born abroad	-0.0297***	-0.0265***	-0.0297***	-0.0265***	-0.0296***	-0.0265***	-0.0235**
	(0.00743)	(0.00782)	(0.00743)	(0.00783)	(0.00743)	(0.00782)	(0.00747)
Health care costs (ln)	0.0118***	0.0126***	0.0117***	0.0126***	0.0118***	0.0126***	0.0108***
	(0.000592)	(0.000653)	(0.000593)	(0.000653)	(0.000593)	(0.000653)	(0.000593)
Died or emigrated	-0.169***	-0.242***	-0.169***	-0.243***	-0.169***	-0.242***	-0.155***
	(0.0217)	(0.0377)	(0.0218)	(0.0377)	(0.0217)	(0.0377)	(0.0211)
# persons in household	-0.00681***	-0.00636***	-0.00679***	-0.00633***	-0.00681***	-0.00636***	
	(0.00104)	(0.00104)	(0.00104)	(0.00104)	(0.00104)	(0.00104)	
Residential institution							
Entered	0.0587***	0.0531***	0.0592***	0.0537***	0.0588***	0.0533***	
	(0.00975)	(0.00945)	(0.00975)	(0.00945)	(0.00975)	(0.00945)	
Left	0.0459***	0.0450***	0.0455***	0.0444***	0.0457***	0.0447***	
	(0.00882)	(0.00877)	(0.00883)	(0.00877)	(0.00883)	(0.00878)	
Entire year	0.0381**	0.0510***	0.0383**	0.0513***	0.0381**	0.0511***	
	(0.0127)	(0.0134)	(0.0127)	(0.0134)	(0.0127)	(0.0134)	
Left in the last 10 years	0.0599***	0.0547***	0.0601***	0.0548***	0.0600***	0.0547***	
	(0.00490)	(0.00524)	(0.00490)	(0.00524)	(0.00490)	(0.00524)	
Single household							
Entered	-0.0257	-0.0212	-0.0258	-0.0213	-0.0256	-0.0210	
	(0.0154)	(0.0196)	(0.0154)	(0.0196)	(0.0154)	(0.0196)	
Left	0.0325***	0.0331***	0.0327***	0.0333***	0.0325***	0.0331***	
	(0.00955)	(0.00991)	(0.00955)	(0.00992)	(0.00955)	(0.00990)	
Entire year	-0.0774***	-0.0777**	-0.0779***	-0.0788***	-0.0773***	-0.0776**	
	(0.0189)	(0.0237)	(0.0189)	(0.0237)	(0.0189)	(0.0237)	
At home with parents							
Entered	-0.0443***	-0.0460***	-0.0441***	-0.0456***	-0.0443***	-0.0458***	
	(0.00845)	(0.00856)	(0.00845)	(0.00856)	(0.00845)	(0.00856)	
Left	-0.0126	-0.0104	-0.0126	-0.0106	-0.0126	-0.0105	
	(0.00857)	(0.00908)	(0.00857)	(0.00909)	(0.00857)	(0.00908)	
Entire year	-0.0391***	-0.0394***	-0.0390***	-0.0393***	-0.0392***	-0.0394***	
	(0.00821)	(0.00873)	(0.00821)	(0.00873)	(0.00821)	(0.00873)	
Couple household							
Entered	-0.0402***	-0.0373***	-0.0402***	-0.0371***	-0.0402***	-0.0372***	
	(0.00986)	(0.0110)	(0.00986)	(0.0110)	(0.00986)	(0.0110)	
Left	0.0153	0.0170	0.0152	0.0167	0.0153	0.0169	

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	(0.0116)	(0.0134)	(0.0116)	(0.0134)	(0.0116)	(0.0134)	
Entire year	-0.0710***	-0.0943***	-0.0710***	-0.0948***	-0.0710***	-0.0942***	
	(0.0137)	(0.0229)	(0.0137)	(0.0230)	(0.0137)	(0.0229)	
Single parent							
Entered	-0.0803***	-0.0732*	-0.0806***	-0.0736*	-0.0803***	-0.0731*	
	(0.0243)	(0.0316)	(0.0243)	(0.0316)	(0.0243)	(0.0316)	
Left	-0.0221	-0.0553	-0.0216	-0.0546	-0.0221	-0.0553	
	(0.0256)	(0.0388)	(0.0256)	(0.0387)	(0.0256)	(0.0388)	
Entire year	-0.0914**	-0.119	-0.0923**	-0.120*	-0.0914**	-0.119	
	(0.0349)	(0.0609)	(0.0350)	(0.0610)	(0.0349)	(0.0609)	
Other household							
Entered	0.00705	0.00784	0.00719	0.00797	0.00712	0.00795	
	(0.0113)	(0.0117)	(0.0113)	(0.0117)	(0.0113)	(0.0117)	
Left	-0.0395***	-0.0433***	-0.0396***	-0.0433***	-0.0396***	-0.0434***	
	(0.0116)	(0.0126)	(0.0116)	(0.0126)	(0.0116)	(0.0126)	
Entire year	-0.0381**	-0.0403**	-0.0381**	-0.0405**	-0.0381**	-0.0403**	
	(0.0142)	(0.0147)	(0.0142)	(0.0147)	(0.0142)	(0.0147)	
Reference person							
Entered	0.0333*	0.0266	0.0335*	0.0270	0.0333*	0.0267	
	(0.0144)	(0.0187)	(0.0144)	(0.0187)	(0.0144)	(0.0187)	
Left	-0.0277**	-0.0272*	-0.0278**	-0.0275**	-0.0277**	-0.0273*	
	(0.0102)	(0.0106)	(0.0102)	(0.0106)	(0.0102)	(0.0106)	
Entire year	0.0347*	0.0380	0.0350*	0.0387	0.0347*	0.0380	
	(0.0169)	(0.0219)	(0.0169)	(0.0219)	(0.0169)	(0.0219)	
Constant	0.101***		0.0542**		0.0998***		0.0361
	(0.0227)		(0.0203)		(0.0229)		(0.0212)
No. of observations	71625	71625	71625	71625	71625	71625	71625
R^2	0.323		0.323		0.324		0.313
Trend (special education)	Linear	Linear	Linear	Linear	Quadratic	Quadratic	Linear
Trend (practical education)	Quadratic	Quadratic	Linear	Linear	Quadratic	Quadratic	Quadratic
Household variables	Yes	Yes	Yes	Yes	Yes	Yes	No
Other variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: XX indicates that not enough observations were available to determine the marginal effect.

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A6: Coefficients of SA-model

Enrolled in Social Assistance	(1) OLS	(2) Logit, marginal effects	(3) OLS	(4) Logit, marginal effects	(6) OLS
Female	0.00923***	0.00978***	0.00922***	0.00978***	0.0197***
	(0.00169)	(0.00165)	(0.00169)	(0.00165)	(0.00178)
Age-18	-0.0237	0.00482	-0.0236	0.00483	-0.0229
	(0.0173)	(0.00763)	(0.0173)	(0.00763)	(0.0174)
Age-18 (quadratic)	0.0172**	0.00325	0.0172**	0.00326	0.0178**
	(0.00634)	(0.00257)	(0.00634)	(0.00257)	(0.00638)
Age-18 (cubic)	-0.00163**	-0.000438	-0.00163**	-0.000439	-0.00169**
	(0.000623)	(0.000244)	(0.000623)	(0.000244)	(0.000623)
Eighteen	-0.0379**	-0.0232***	-0.0379**	-0.0231***	-0.0371**
	(0.0124)	(0.00612)	(0.0124)	(0.00612)	(0.0125)
Special education between t and t-3					
Participated in current year (t)	-0.00996***	XX	-0.0101***	XX	-0.0151***
	(0.00287)		(0.00288)		(0.00291)
Participated in previous year (t-1)	0.00619*	XX	0.00612*	XX	0.00581
	(0.00309)		(0.00309)		(0.00314)
Participated two years ago (t-2)	0.00707*	XX	0.00703*	XX	0.00682*
	(0.00308)		(0.00308)		(0.00315)
Participated three years ago (t-3) (reference)	0	0	0	0	0
Indication of disability (concerns students in the special education)					
Visual limitation	-0.0336***	XX	-0.0382***	XX	-0.0324***
	(0.00872)		(0.00962)		(0.00863)
Hearing impairment	-0.0437***	XX	-0.0484***	XX	-0.0452***
	(0.00710)		(0.00817)		(0.00712)
Physically or mentally disabled	-0.0269***	XX	-0.0314***	XX	-0.0256***
	(0.00700)		(0.00801)		(0.00702)
Mental or behavioral disorders	-0.0191**	XX	-0.0237**	XX	-0.00883
	(0.00700)		(0.00806)		(0.00702)
Type of residence (concerns students in the special education)					
Institution for disabled care	-0.00499	-0.00118	-0.00504	-0.00116	0.0111*
	(0.00561)	(0.00550)	(0.00562)	(0.00550)	(0.00538)
Institution for youth care	0.0139***	0.00853**	0.0139***	0.00847**	0.0441***
	(0.00389)	(0.00274)	(0.00389)	(0.00274)	(0.00375)
Institution for youth health care	0.000740	0.000832	0.000723	0.000817	0.00611
	(0.00435)	(0.00347)	(0.00435)	(0.00347)	(0.00444)
Judicial youth institution	0.00596	0.000606	0.00594	0.000605	0.0290***
	(0.00543)	(0.00310)	(0.00543)	(0.00310)	(0.00537)
Practical education between t and t-3					
Participated in current year (t)	-0.0319***	-0.0349***	-0.0298***	-0.0338***	-0.0334***
	(0.00640)	(0.00463)	(0.00700)	(0.00473)	(0.00635)

Participated in previous year (t-1)	-0.000411	0.00431	0.00160	0.00652	0.000842
	(0.00666)	(0.00899)	(0.00721)	(0.00934)	(0.00662)
Participated two years ago (t-2)	0.00593	0.00449	0.00787	0.00668	0.0101
	(0.00692)	(0.00880)	(0.00731)	(0.00906)	(0.00689)
Participated three years ago (t-3)	-0.0151*	-0.00887	-0.0133	-0.00709	-0.0103
	(0.00698)	(0.00755)	(0.00726)	(0.00771)	(0.00698)
# parents born abroad	0.0102***	0.00895***	0.0102***	0.00895***	0.0110***
	(0.00109)	(0.000895)	(0.00109)	(0.000895)	(0.00110)
Died or emigrated	-0.0219*	-0.0435*	-0.0219*	-0.0434*	-0.0467***
	(0.00994)	(0.0174)	(0.00994)	(0.0174)	(0.00980)
Immigrated current year (t)	-0.0405	-0.0193	-0.0405	-0.0196	-0.00381
	(0.0784)	(0.0273)	(0.0784)	(0.0272)	(0.0720)
Immigrated previous year (t-1)	-0.0288	-0.0247	-0.0286	-0.0244	-0.0162
	(0.0235)	(0.0240)	(0.0235)	(0.0243)	(0.0220)
Immigrated two years ago (t-2)	0.0272	0.0533	0.0273	0.0536	0.0310
	(0.0281)	(0.0415)	(0.0281)	(0.0416)	(0.0280)
Immigrated three years ago (t-3)	0.0276	0.0524*	0.0274	0.0520*	0.0339
	(0.0181)	(0.0232)	(0.0181)	(0.0231)	(0.0180)
Immigrated four years ago (t-4)	0.0631**	0.0750***	0.0630**	0.0746***	0.0692***
	(0.0196)	(0.0204)	(0.0196)	(0.0203)	(0.0201)
Lived in a residential institution	0.0264***	0.0174***	0.0265***	0.0174***	
in the last 10 years	(0.00329)	(0.00216)	(0.00330)	(0.00216)	
Residential institution					
Entered	0.0505***	0.0299***	0.0506***	0.0300***	
	(0.00647)	(0.00354)	(0.00647)	(0.00354)	
Left	-0.0113	-0.00568	-0.0114	-0.00579	
	(0.00585)	(0.00321)	(0.00585)	(0.00322)	
Entire year	-0.0205**	-0.0287**	-0.0204**	-0.0287**	
	(0.00665)	(0.00890)	(0.00665)	(0.00890)	
Single household					
Entered	0.0466***	0.0164**	0.0466***	0.0165**	
	(0.0135)	(0.00525)	(0.0135)	(0.00524)	
Left	0.0129	0.00775*	0.0129	0.00771*	
	(0.00690)	(0.00337)	(0.00690)	(0.00337)	
Entire year	0.0524***	0.0196**	0.0525***	0.0196**	
	(0.0158)	(0.00707)	(0.0158)	(0.00706)	
At home with parents					
Entered	0.0343***	0.0185***	0.0344***	0.0185***	
	(0.00579)	(0.00305)	(0.00579)	(0.00305)	
Left	-0.0130*	-0.00412	-0.0131*	-0.00422	
	(0.00656)	(0.00308)	(0.00656)	(0.00309)	
Entire year	0.0102	-0.00453	0.0102	-0.00457	
	(0.00580)	(0.00322)	(0.00580)	(0.00322)	
Couple household					
Entered	0.0553***	0.0223***	0.0553***	0.0223***	
	(0.00825)	(0.00357)	(0.00825)	(0.00357)	
Left	-0.0221*	-0.0126**	-0.0221*	-0.0126**	
	(0.0101)	(0.00402)	(0.0100)	(0.00402)	
Entire year	0.0397**	0.0142*	0.0397**	0.0142*	
	(0.0133)	(0.00609)	(0.0133)	(0.00609)	
Single parent					
Entered	0.257***	0.0635***	0.257***	0.0635***	

	(0.0310)	(0.00739)	(0.0310)	(0.00739)	
Left	0.0451	0.00739	0.0450	0.00735	
	(0.0369)	(0.00876)	(0.0369)	(0.00875)	
Entire year	0.283***	0.0732***	0.283***	0.0732***	
	(0.0500)	(0.0115)	(0.0500)	(0.0115)	
Other household					
Entered	0.0535***	0.0246***	0.0535***	0.0247***	
	(0.00876)	(0.00430)	(0.00876)	(0.00430)	
Left	-0.0215*	-0.0108*	-0.0215*	-0.0109*	
	(0.00899)	(0.00443)	(0.00899)	(0.00443)	
Entire year	0.0235**	0.0111	0.0235**	0.0110	
	(0.00870)	(0.00644)	(0.00870)	(0.00643)	
Reference person					
Entered	0.00659	0.0102*	0.00660	0.0103*	
	(0.0126)	(0.00493)	(0.0126)	(0.00493)	
Left	-0.0163*	-0.00936**	-0.0164*	-0.00941**	
	(0.00772)	(0.00353)	(0.00772)	(0.00353)	
Entire year	-0.0177	-0.00178	-0.0177	-0.00181	
	(0.0142)	(0.00637)	(0.0142)	(0.00637)	
Constant	0.0629***		0.0651***		0.0754***
	(0.0154)		(0.0160)		(0.0143)
No. of observations	71625	71625	71625	71625	71625
R^2	0.066		0.066		0.040
Trend (special education)	Linear	Linear	Quadratic	Quadratic	Linear
Trend (practical education)	Linear	Linear	Quadratic	Quadratic	Linear
Household variables	Yes	Yes	Yes	Yes	No
Other variables	Yes	Yes	Yes	Yes	Yes

Note: XX indicates that not enough observations were available to determine the marginal effect.

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$