Minimum youth wage and unemployment – the spillover and direct employment substitution effect on young adults

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Abstract

This paper aims to research the spillover effect and direct employment substitution effect of minimum wage changes. Both the Netherlands and United Kingdom have recently introduced policy changes concerning minimum wages. In the Netherlands wages between youth and adults are converging where in the United Kingdom these wages are diverging. Studying both countries allows for additional insight into these phenomena. A review of existing empirical literature indicates that the spillover effect and substitution effect exist and are easy to analyse using a second control group. Additionally, due to time lag restrictions, it is not yet possible to measure the effects in both countries. Therefore, I advise the Dutch CPB to take these effects into account when they will evaluate the effects of the policy change in 2019, which could affect the Dutch' government's choice whether to introduce a second wage convergence in 2019.

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1. Introduction

In 2016 changes were announced regarding both the percentage and the maximum age of minimum youth wages in the Netherlands in 2017. Where the Netherlands is increasing minimum youth wages the United Kingdom (UK) seems to have taken the opposite direction. In April 2016 the National Living wage was introduced, providing a decent standard of living for all employees of 25 years and older. This change reduced the relative income of employees under the age of 25. This magnifies a trend that has been seen in the UK for the past fifteen years, where the relative income of youth has been decreasing due to unequal adjustments to minimum wages. (Farthing, 2016) This opposition between wage convergence in the Netherlands and wage divergence in the UK provides a unique opportunity to analyse the different effects of both regulatory changes and provide additional valuable insights into this phenomenon.

According to the publication of the CPB (Netherlands Bureau for Economic Policy Analysis) (Centraal Planbureau, 2015) minimum youth wage and unemployment have an employment elasticity between 0 and -0.4[1] for the corresponding demographic of 15-23 year olds. However, this area of research remains highly debated and the expected negative employment effects are doubtful at the very least. I investigate the foundations on which the CPB based its research to judge the validity of their conclusions. Additionally, I will research whether the CPB has failed to recognize the possible increase of job demand for young adults, being those aged above 23 years old. I expect a(n) (relative) increase in the demand for those over the age of 23, the direct employment substitution effect[2], because employers bound by the regulatory changes tend to prefer older, more experienced workers when wages are equal or wage gaps decrease. (Schmitt, 2013) Therefore this direct employment substitution effect (in short: substitution effect) will reduce the employment elasticity concerning the entire working-age demographic, which could possibly affect the political dispositions concerning minimum youth wage regulatory changes. Another element of this paper is the spillover effect, which consists of the effect that minimum wage changes has on the wages of employees that already earned

[1] A minimum youth wage increase of 1% is expected to result in a 0% to 0.4% decrease in employment.
[2] This article focuses only on labour-labour substitution. Labour-capital substitution falls outside the scope of this article.

more than the minimum wage, which the CPB also fails to recognise. Therefore, the main research question is: "*Are there spillover effects and employment substitution effects between youth and young adults when minimum youth wages increase?"* Apart from providing academic insight into the spillover effect and the direct employment substitution effect, two areas that have been researched only very limitedly, this article advises on how the CPB can account for both effects when the results of the first policy change will be measured in 2019. However, it remains debateable whether the effects are measurable in 2019 due to the time lag of all employment effects. This evaluation of the changes of 2017 will determine whether a second set of minimum wage changes will be introduced. Even though my suggestions are specific to the situation and policy changes in the Netherlands, they can easily be transferred to other countries with minimum wage changes. Due to the almost simultaneous but opposite policy changes in the Netherlands and UK, comparing both changes can give additional insight on their relative effects on unemployment, spillover and substitution.

The rest of my article proceeds as follows. In Section 2 and Section 3 respectively, the regulatory framework of the Dutch and the UK minimum (youth) wage system provides a basic description of its fundamentals. In Section 4 I introduce basic economic theories such as the labour market model, the spillover effect and the direct employment substitution effect. Both sections are combined in Section 5, the discussion, in which I will provide an extensive review of empirical literature. Finally, my conclusion wraps everything up in Section 6.

2. Dutch law and the minimum (youth-)wage.

2.1. The minimum wage

The Dutch Law regarding minimum wages was introduced in 1968 to protect employees from being exploited by employers. Article 7 and 8 of 'Wet minimumloon en vakantiebijslag 1969' states that every employee over the age of 25 has the right of payment of a minimum wage. In 1970 the minimum age was adjusted to 23 and the wages were adjusted with the wage index (in Dutch: loonindex).

According to Dutch and European Law it is unlawful to discriminate on basis of age. (Article 1 'Wet gelijke behandeling op grond van leeftijd bij de arbeid' and Directive 2007/78/EG) However, an exception is justified when it regards an appropriate measure for a legitimate goal. The minimum wage was introduced when employees and employers could no longer find consensus on wages. The legitimate goal therefore was to protect employees, because employers generally have a stronger bargaining position. To insure employees of an income that would provide, regarding the current economic situation, a social acceptable minimum standard of living. The minimum wage would protect the weakest working part of the population. (Ministerie van Sociale Zaken en Werkgelegenheid, 1967)

2.2. The minimum youth wage

In 1974 a minimum youth wage was introduced for residents between the ages of 15-23, calculated as a percentage of the minimum wage. Since 1983 this percentage is regulated in the 'Besluit minimumjeugdloon'. Minimum youth wages were introduced to improve the employment prospects of youth on the labour market, which would provide experience or would motivate youth to continue their education due to the lower wages. (CPB, 2012) The argument, used during the introduction of the minimum youth wage, that youth requires a lower income in order to have the same standard of living is no longer used. (Hietkamp, 2017)

In January 2017 official changes concerning the Dutch minimum youth wage were announced, because the Netherlands has the lowest minimum youth wage of Europe and the wages are criticized of being unproportionate. From July 2017 onwards 22 year olds will receive full minimum wages and the percentages for 18-21 year olds are increased. (Hietkamp, 2017; Staatsblad van het Koninkrijk der Nederlanden, 2017) Its effect on the labour market will be investigated and, unless there is a significant negative effect on the labour market, the second step – a further increase in the percentages of minimum youth wages and lowering the age limit to 21 – will automatically be introduced in 2019. (Ministerie van Sociale Zaken en Werkgelegenheid, 2016) A summary of the respective changes can be found in Table 1.

To compensate employers affected by the measure and to satisfy all political parties an additional measure is introduced. The "subsidieregeling lage inkomensvoordeel' is introduced to prevent increasing unemployment amongst youth. However, while employers are compensated they will have to pay for it themselves through higher disability insurance premiums. (Ministerie van Sociale Zaken en Werkgelegenheid, 2016) Therefore, the possible employment effects of this subsidy are ambiguous and will not be taken into further account in this article.

3. UK law and the minimum (youth-)wage.

The United Kingdom was one of the first countries to introduce a minimum wage in 1909 with the Trade Boards Act. The Trade Boards Act and several other acts in the following decades regulated the minimum wages in several industries. It was not until 1999, when the reduced power of trade unions had weakened employees' bargaining power and in combination with the political climate[3], that a national minimum wage was introduced. With its introduction employees over the age of 22 had the right to minimum wage and youth between the ages 18-22 had the right to a lower minimum youth wage. Due to recommendations of the Low Pay Commission (LPC) several amendments were introduced. In 2004 the threshold age for the minimum youth wage was lowered from 18 years old to 16 years old, to protect the teenagers from exploitation by employers. (Davey, 2010; Pyper, 2014) In 2010 the threshold age for the minimum (adult) wage was lowered from 22 to 21 years old, because 21 year olds were largely already paid the adult rate and the impact on employers' wage costs would be minimum. (Low Pay Commission, 2010)

In 2015 the UK Department for Business Innovation and Skills ordered a report from the Low Pay Commission to investigate the possibilities of introducing a National Minimum Wage. The LPC was asked to advise with regards to "*help as many low-paid workers as possible without damaging their employment prospects*" (2016b, p 8) concerning the wages of those aged 18-24. However, concerning adults the requirement of sustained employment prospects was released.

[3] The Labour Party returned after being in the opposition for 18 years.

Employees of 25 years and older would receive a premium over the minimum wage, which would consequently increase the wage gap between youth and adults. The aim of the National Minimum Wage is *to "move away from a low wage, high tax, high welfare society and encourage a model of higher pay and higher productivity – supporting people who work hard and want to get on in life to fulfil their aspirations*" (Department for Business Innovation and Skills, 2015, p 2) and to reach 60 percent of median earnings by 2020. The changes were introduced in April 2016 and resulted in a three-way division of minimum wages. Those aged between 18-21 are entitled to the minimum youth wage, those aged between 22-24 are entitled to the minimum adult wage, and those aged 25 and older are entitled to the National Living Wage. (Low Pay Commission, 2016b) A summary of the respective changes can be found in Table 1.

	Netherlands	**United Kingdom**
Old situation	16-23: Minimum youth wage % of adult wage ≥ 23: Minimum adult wage	18-21: Minimum youth wage fixed £ amount ≥ 22: Minimum adult wage
Date policy change	1 July 2017	1 April 2016
Policy change	16-22: Minimum youth wage increased % of adult wage ≥ 22: Minimum adult wage	18-21: Minimum youth wage 22-24: Minimum adult wage ≥ 25 National Living Wage
Date second policy change	1 July 2019	Non-applicable
Policy change	16-21: Minimum youth wage increased % of adult wage ≥ 21: Minimum adult wage	Non-applicable

Table 1: Summary of respective minimum wage changes in the Netherlands and United Kingdom. (Sources: CPB, 2016; Low Pay Commission, 2016)

4. The labour market model and the direct employment substitution effect.

In order to investigate whether there is in fact a direct employment substitution effect, there first needs to be a theoretical framework on the effects of (minimum) wage changes and a clear definition of the effect, this section provides this framework.

4.1. The labour market model

The effect of minimum wage on employment is ambiguous at the very least. Where some researchers discover a negative effect (Pereira, 2003; Hyslop and Stillman, 2005; Liu et al., 2016), others find no significant effect (Stewart, 2004; Card and Krueger, 1994) and others find a positive effect on employment (Card and Krueger, 1995; Spriggs and Klein, 1994). Basic economic literature indicates an expected decrease in labour demand due to decreased marginal production value for employers, because productivity of employees remains the same after an increase in wage costs.[4] In a competitive labour market employers will decrease their labour demand until an equilibrium between wage and the marginal production value is reached. However, in practice labour markets are imperfect. Employees are faced with risks and costs when changing jobs, and employers have a certain degree of monopsony power. (Low Pay Commission, 2014) This monopsony power allows employers to exploit employees by offering lower wages, which is according to society an undesirable effect. Wage floors are introduced to protect employees from this market failure of employers' bargaining power.

4.1.1. Explanations for diverse results

Variations in results can possibly be explained by several factors. First of all, the method of measuring the effect such as difference-in-differences or a time-series method could be the cause of diversification in results. However, evaluating the best type of analysis falls outside the scope of this article. Other factors have been known to influence the magnitude and perhaps even the direction of the employment effect.

There are large differences between researchers in the length of the investigated period. For example, Stewart (2004) only examines the first year after the introduction of minimum wage in the UK, but many other researchers investigate multiple years and sometimes include the period between the announcement of policy changes and their actual introduction. Conlon et al. (2015), a tendered research for the Low Pay Commission, investigated the employment effect in three distinct time periods of a temporary policy change. Between the announcement and the introduction, during the

[4] There is some evidence of increased productivity due to wage increases, however the relative marginal benefits are expected to decrease. (Liu et al., 2016)

introduction, and throughout its introduction and three subsequent years. Only in the period after the temporary measure significant effects were found. Pereira (2003) investigated a three year period, the effect of the first year after introduction was lower compared to subsequent years. Hyslop and Stillman (2007) found no evidence of the employment effect directly after the wage reform in New Zealand. However, they did find evidence two years after the reform. This conclusion was also reached in 2011, once again by Hyslop and Stillman, about the 2008 minimum youth wage reform. These are all indications that there is a time lag of approximately one year before the employment effect can be measured. Additionally, the effects can be measured until a few years after the wage changes. This causes a problem for the Dutch government that wishes to evaluate the 2017 policy change in 2019, to decide whether a second policy change will be introduced. The time lag causes that any effects of the 2017 policy change cannot be completely measured in 2019.

Other differences between research such as the current position in the economic cycle, the magnitude of the wage change, the starting level of unemployment, the ratio of minimum wage to average wage, and the percentage of employees paid the minimum wage are also possible factors that could influence results. However, these largely fall outside the scope of this article.

4.1.2. Youth and the labour market model

Where there is no general consensus on the effects of wage increases on unemployment, there is a consensus that if there is indeed such an effect, the employment effect is stronger on youth than on adults. There are several explanations regarding the larger effects on youth compared to adults.

Adults have a larger chance of having a permanent contract than youth, who depend more on temporary contracts. In the Netherlands in the first quarter of 2017 approximately 82 percent of 15-20 year old employees had a temporary contract, compared to 27 percent average for all employees between ages 15-75. (CBS, 2017a) Employees with a temporary contract are easier to fire than employees with a permanent contract, which is why youth is more vulnerable to wage changes. (Virtanen et al., 2002) Additionally, an increase in minimum youth wages will encourage youth to participate on the labour market, increasing the labour market supply. (Meyer and Wise, 1983; Stewart, 2004; Hyslop and Stillman, 2007; Liu et al., 2016; Low Pay Commission, 2016b) Wage

increases encourage the search activity of high-productivity youth. (Guiliano, 2009) Especially in the Netherlands, where the minimum youth wages are barely above the level of social benefits, an increase in wages will make participating in the labour market more attractive. An increase in the labour supply without an equal increase in labour demand will result in a higher unemployment level. Additionally, youth is more likely to be constrained by their geographic area, limiting their employment opportunities compared to adults, making them more sensitive to changes in labour demand. (Stoll, 1999)

4.2. The direct employment substitution effect

Substitution in economic terms means a positive cross-elasticity of demand, which entails that different goods, at least partly, satisfy the same needs of consumers and thus if the price of one good goes down the sales of the other good decrease, and vice versa. (Pindyck and Rubinfeld, 2013) Therefore the employment substitution effect refers to the relative increase in wages for one demographic influencing the labour demand for another, otherwise largely similar, demographic group. (Pereira, 2003; D'Arcy, 2016)

Employers prefer employees who produce more over employees who, given equal wages, produce less. The relative productivity is therefore relevant for the employer's decision who they will employ. Whether older employees are more productive remains part of an ongoing discussion. One could argue that older employees are usually more experienced and therefore more productive. (Van Ours and Stoeldraijer, 2011) However, youth tends to have jobs in industries which require no or little experience and knowledge such as retail and hospitality[5]. But even when experience is disregarded, employers prefer older workers because they are experienced to be more reliable and to require less supervision. (D'Arcy, 2016; Hietkamp, 2017)

A relative increase in the wages of youth could therefore result in a decrease in their labour demand, but an increase in labour demand for now relatively cheaper and more productive older employees; the direct employment substitution effect.

[5] The hospitality industry is composed of waiting staff, bar staff, hotel cleaners, et cetera.

4.3. The spillover effect

Increases of youth wages can have a positive effect on the wages of young adults, this is the spillover effect. Not accounting for the spillover effect can result in measuring employment effects that are too negative, if the spillover effect affects the wages of the control group. (Dickens et al., 1998) When this spillover effect is large, the difference between minimum youth wages and minimum adult wages will change less compared to a small or no spillover effect. When comparative wage changes are small the expectation is that the substitution effect will be also small. Therefore, the substitution effect could potentially be reduced if there is a (large) spillover effect. However, empirical evidence shows that spillovers are usually small and tend to get even smaller further up the wage hierarchy. (Katz and Krueger, 1992)

Pereira (2003) argues that youth (<25 years old) and young adults (>25 and <30 years old) are similar groups regarding substitution effects, however a clear explanation why these age intervals are chosen is not given. Selecting the right age intervals is important because their substitutability will determine the scale of the effect. (Hamermesh and Grant, 1979) The CBS only provides data with age intervals of five years, starting at the age of fifteen. Approximately 82 percent of employed youth, aged 15-20, had a part-time contract in the first quarter of 2017, compared to 63 percent of 20-25 year olds and 36 percent of 25-30 year olds. CBS (2017a) This indicates that concerning the type of contract, 20-25 year olds are possible substitutes for 15-20 year olds, while 25-30 are less compatible. Considering the industry of employment, in 2015 approximately 52 percent of 15-20 year olds were employed in the retail and hospitality industry, compared to approximately 29 percent of 20-25 year olds and 20 percent of 25-30 year olds. (CBS, 2017c) Both nominal wages and wage growth between age cohorts are lower in the retail and the hospitality industry. (CBS, 2017d) The low growth of wages between age cohorts allows for a higher chance of substitution, as wage gaps between age cohorts are smaller. These figures indicate that an age cohort maximum ten years above minimum youth wage is likely to experience substitution in case of minimum youth wage increases. However, the exact advisable age cohort cannot be determined due to the limitation of the data provided by the CBS caused by age cohorts of 5 years instead of data for each age and it is not possible to select an age cohort starting directly at the division between youth and adult minimum wage. Therefore, if the CBS

itself is also subjectable to this limitation, the substitution effect will have to be measured in the age cohort of 25-30 years old with a control group that is in one of the older age cohorts.

5. Discussion

This section will combine the economic theory of substitution, the reports of both the Netherlands and the UK, and existing empirical literature in a literature review in order to investigate whether the CPB failed by excluding the substitution effect from their research report. The results of each paper is briefly discussed including my personal critique on its methods, data or results.

5.1. Literature used by the CPB

In 2015 the Dutch CPB reported an expected employment elasticity of 0 to -0.4 between minimum youth wage and employment for the corresponding demographic of 15-23 year olds. However, the CPB did not comment on the potential existence of the substitution effect. The three studies that were used by the CPB to determine the employment elasticity, mention the substitution effect in various degrees.

First of all, Pereira (2003) investigated the effect of assigning 18 and 19 year olds the full adult minimum wage in Portugal in 1987, resulting in a 49.3 percent increase in the minimum wage of 18-19 year olds. Pereira used two control groups (20-25 and 30-35 year olds) to eliminate other economic factors (such as wage and overall employment changes), which enabled her to investigate the different effects for all age groups. There were no significant wage changes between the two control groups, indicating no (significant) spillover effect. Comparing the employment growth of young adults to both control groups shows that young adults' (20-25 year olds) employment grew with 0.063 more workers per firm in 1987, 0.089 more in 1988, and 0.212 more in 1989 (all significant at the 1 percent level). This accounts for respectively 72 percent, 45 percent and 95 percent of the measured employment decrease of 18 and 19 year olds. Assuming all age groups follow the same employment trends, this is clear evidence of the substitution effect. Pereira's estimated employment elasticity of -0.4 is considered as inelastic, but compared to other employment effect studies it is relatively high,

additionally the elasticity of substitution is estimated at 0.09. A one percent increase in the wages of youth leads to an 0.4 percent decrease in youth employment and a 0.09 percent increase in young adults' employment.

The CPB has used Pereira's employment elasticity of -0.4 without assessing its several obvious shortcomings, which I believe is a mistake, because these factors could influence the deduction of employment elasticity in the Netherlands. First of all, Pereira uses data from the 80's in Portugal, where overall unemployment was 7.8 percent (Trading Economics, 2017), compared to 5.4 percent in the Netherlands at the end of 2016 (CBS, 2017b). Additionally, in Portugal minimum wage increased a whopping 49.3 percent, compared to between 2-15 percent in the Netherlands. Above, in Section 4.1.1, it was already mentioned that the starting level of unemployment could have a positive effect on the magnitude of the employment. Therefore, when the employment elasticity of -0.4 is transferred to the Netherlands, I argue that this elasticity is probably overstated.

Stewart (2004) investigated the employment effects of the introduction of the minimum wage and the minimum youth wage in the UK in 1999. He compared employment changes with a control group, being those paid slightly above the minimum, and excluded full time students from the sample. Using only one control group requires the assumption that minimum wage changes do not affect employment probabilities in the control group, being no spillover effect and no substitution effect. Stewart found no proof of significant employment effects.

Introducing a second, older, control group would have allowed Stewart to investigate and control for both the spillover effect and the substitution effect. This would have given valuable insight in the effects of wage changes. Stewart found no proof of significant employment effects, I believe this could be caused by time lag, because Stewart limited his research to one year after wage changes while Section 4.1.1 of this paper clearly indicates a time lag of expected effects. Additionally, Stewart excluded students and youth under the age of eighteen from his research, who are generally expected to being more sensitive to wage changes.

Hyslop and Stillman (2007) examined employment effects of New Zealand's wage reform that lowered the age limit for minimum wage from 20 to 18 years old and increased minimum youth wages for 16 and 17 year olds with 41 percent in 2001. The effects on both age groups are compared to the

control group of 20-25 year olds. Like Stewart (2004) the assumption is made that the changes of the 16-20 year olds do not affect the employment of 20-25 year olds. However, Hyslop and Stillman do take it one step further than Stewart and suggest that if there in fact is a substitution effect, this will result in a direct overstatement of the employment elasticity, due to the fact that the young adults are used as a reference group.

Again, with respect to Stewart, I believe that Hyslop and Stillman could have introduced a similar method as Pereira to investigate the spillover effect and substitution effect. Hyslop and Stillman do implement some robustness checks to account for possible spillover effects and substitution effects, dividing the control group into cohorts of 20-22 year olds and 23-25 year olds. However, the justification of the chosen age groups remains absent, leaving the possibility that the chosen control groups are also affected by the employment effects.

5.2. Literature used by the Low Pay Commission

Where the Dutch CPB report completely disregarded the substitution effect, the reports from the UK's Low Pay Commission were aware of its possible influence on employment. Before and after the introduction of the National Living Wage the Low Pay Commission discussed the substitution effect on multiple occasions.

The Low Pay Commission mentioned the substitution effect explicitly in its 2015 report. The commission referred to the research of Hyslop and Stillman (2011) which found evidence of substitution when the minimum youth wage in New Zealand was reformed again in 2008, resulting in a 28 percent wage increase for 16 and 17 year olds. With a control group of 20-21 year olds, a 5-6 percentage point decrease in employment was found for studying 16-17 year olds and an increase of 3-4 percentage point for non-studying 16-17 year olds. Additionally, employment among 18-19 year olds increased, largely among those studying, suggesting a substitution of 18-19 year old students for 16-17 year old students.

In 2016(a) the LPC issued its advise about the introduction of the National Living Wage in which it explicitly warned for a possible substitution effect. The gap between minimum adult and youth wages had been increasing since its introduction, and would be increased further with the

introduction of the National Living Wage. The LPC based its recommendations on research by Dickson and Papps (2016) which found evidence of substitution effects as increases in wages of 21-24 year olds were associated with increases in employment of 16-17 year olds.

The Low Pay Commission (2016a) therefore suggest that these findings indicate that increases in the wage gap between age groups would increase the likelihood of the substitution effect across these age groups.

5.3. Other relevant literature on substitution

Liu et al. (2016) used separations and accessions to measure worker turnover, and job creation and losses to measure job turnover as indicators of the effect of minimum wage levels on labour market flows in the United States during 2000-2009. Cross-state variation showed that higher minimum wages for 14-18 year olds had a positive spillover effect on 19-21 year olds, but no spillover effect on 22-24 year olds. Regarding 14-18 year olds a significant negative employment effect was found, no effect was found for 19-21 year olds, and a positive employment effect was found for 22-24 year olds. I argue that the substitution effect combined with the spillover effect on 19-21 year olds could explain the three different results. The employment of 14-18 year olds decreased while wages of 19-21 year olds increased, therefore the spillover effect counteracted the substitution effect on 19-21 year olds. Regarding 22-24 year olds there was no spillover effect to counteract the substitution which resulted in increased employment.

Kim and Hewings (2015) investigated the employment elasticity and substitution among four age cohorts, 16-24, 25-44, 45-64, and 65+. They confirmed relatively elastic labour demands for both 16-24 year olds and 65+ year olds, with an average employment elasticity of youth of -0.60. Additionally, evidence of substitution was found between all age cohorts, except between 16-24 year olds and 65+ year olds. When studying the results of Kim and Hewings, I noticed while comparing employment elasticity and substitution, which was subdivided per industry, that there are indications of a positive relationship, or at least a positive correlation, between employment elasticity and substitution. Therefore, it is possible that high labour demand elasticities are indications for high

substitution with other age-cohorts. Whether this is in fact true should be further investigated but falls outside the scope of this article.

5.4. Recommendations for the Dutch government and further research

In this section I will provide with several recommendations regarding measuring the employment, spillover and substitution effect after wage changes. These recommendations are especially focussed on the Netherlands, but can be applied practically everywhere.

The Dutch government will evaluate the results of the lowered threshold age for adult minimum wage and the increased rates of minimum youth wage in 2019, two years after its introduction. However, considering the limitation caused by time lag, it is very much possible that the effects of the policy change are not yet completely measurable. This is something the Low Pay Commission also recognises. In autumn 2016 the LPC tried to research whether effects of the spring 2016 introduction of the National Living Wage were measurable. However, the LPC recognised their research was based on limited data, due to a lag in the evidence in the real world and its recording into data. LPC (2016b) recognised that econometric analysis requires at least several quarters of data, which limits the explanatory power of LPC's data and puts major constraints on its results. Additionally, the decision of the UK to leave the European Union could bias results, due to its effect on the labour market. Therefore, the Dutch government should be cautious in interpreting any effects measured in 2019 and take into account the possibility that the effect is not yet measurable completely.

Adding to the explanations given in Section 4.1.2, another reason why the unemployment effect of youth is larger than of adults is that most studies compare the employment effects of both demographics to each other. However, I believe that when there is a substitution effect between the investigated age cohort and the control group, that this affects the measurement of the employment effect. When the substitution effect is disregarded, it would seem that the unemployment of youth increased faster than of young adults because of a shift of the labour demand from youth towards young adults (or vice versa). An easy and effective way to account for the substitution effect is using two control groups. One of the age cohort in which substitution is expected to occur and one of an age cohort that is older than the first control group and in which substitution is not expected to occur.

There is just one problem with this approach, it requires the assumption that all age cohorts have the same reaction to economic changes. However, as seen in Section 4.1.2, youth has a stronger reaction to economic changes than adults. This problem is inevitable but can be limited by reducing the distance between the age cohorts of the first and second control group.

The introduction of a second control group also allows for measuring the spillover effect, giving additional insight in the employment effect. The spillover effect measures the effect of wage changes in the two control groups, it is expected to be larger in the group where substitution is likely to occur and to have a counteractive effect on the substitution effect. A large spillover could be an explanation to an absence of the substitution effect.

I believe that the increased search activity of (high productive) teens should also be taken into account, because this influences the unemployment rate. This could be accounted for by separating the unemployment change that is caused by the increased labour force participation and the change that is caused by changes in the amount of jobs. This separation will give insight in which part of the unemployment effect is due to increased search activity and which part is due to changes in available jobs.

An interesting additional option for further research is the indication of a positive relationship between the employment effect and substitution in the results of Kim and Hewings (2015).

6. Conclusion

In July 2017 several changes regarding the Dutch minimum youth wage will be introduced, in which the wage gap between youth (15-23 year olds) and adults converges. In 2019 the Dutch Centraal Planbureau (CPB) will assess the effects of the policy changes and determine whether youth has experienced significant negative employment effects. This will determine whether a subsequent automatic policy change will be introduced in 2019. The United Kingdom has undergone a policy change in 2016 that diverges wages between youth and young adults compared to adults. Introduction of this National Living Wage for all employees over the age of 25 provides current comparative insight, but also allows for interesting comparison after the effects of the policy changes have been

established in both economies. Both policy changes allow for natural experiments on the employment effect. Due to the fact that these policy changes are almost introduced at the same time and the countries are subject to the same economic changes, gives a unique opportunity to compare the results of these natural experiments of wage convergence in the Netherlands and wage divergence in the United Kingdom.

The CPB predicts that the policy change will have an employment elasticity of between 0 and -0.4 on youth, by referring to three studies. However, there are several problems comparing these results with the current situation in the Netherlands. Pereira's (2003) research was conducted in Portugal in 1987, where the starting unemployment rate in Portugal was 7.8 percent, compared to 5.4 percent currently in the Netherlands. Additionally, the magnitude of the change in Portugal was 49.3 percent compared to the 2-15 percent change that is introduced in 2017 in the Netherlands. These are indications that the upper band of employment elasticity of -0.4 is overstated and needs to be adjusted downwards when transferring these measurements to the Dutch situation. Both Stewart (2004) and Hyslop and Stillman (2007) only use one control group, where Pereira used two control groups. This allows Pereira to account for both the spillover effect, where wage changes impact the wages of near age cohorts, and the substitution effect, where wage changes have a positive effect on the employment opportunities of other age cohorts. In my opinion the CPB fails to recognise the existence of these effects and the implications for the possible impact on Dutch unemployment. Additional to Pereira, several other researchers, including the Low Pay Commission of the United Kingdom, have found evidence on the existence of both the spillover and substitution effect. The CPB can easily measure both effects by having two control groups instead of one. One control group should contain the age cohort that is likely to be a substitute for the demographic that is experiencing wage changes. The other control group should consist of an age cohort that is expected not to be a substitute and not to be affected by the wage changes. However, the second control group should also be as close as possible to the affected demographic to minimize measurement errors, due to the expectation that youth has a general stronger reaction to economic changes compared to adults.

Further research could use the policy changes in the Netherlands and the United Kingdom with natural experiments on the employment, spillover and substitution effect. Concerning the policy

changes in the Dutch minimum youth wage, I expect that if there is a negative employment effect on youth (15-23), that part of this negative effect is due to substitution for young adults (23-30). The Dutch government should take this into consideration regarding their future policy decisions. Concerning the policy changes in the UK, I expect a negative employment effect on adults over the age of 25, of which a part of this negative effect is due to substitution for youth under the age of 25. Comparing the results of the Netherlands and the UK can give additional insight in these phenomena. Additionally, I believe that introducing a second control group in measuring the effects of wage changes in both the UK and the Netherlands, could enable both governments and researchers to gain valuable additional insight in the employment effect, the spillover and substitution effect.

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