The influence of receiving an inheritance on labour supply in The Netherlands: Master Thesis Public Administration

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1. Introduction

Inheritances contribute to wealth inequality. Rising wealth-income ratios and wealth inequality will continue in the upcoming century because of both the slowdown of the population and the productivity growth and the increasing international competition to attract capital (Piketty & Goldhammer, 2017). Piketty argues that on average the return of capital is higher than the economic growth (Piketty & Goldhammer, 2017). This allows for a bigger build-up of assets over someone's lifetime with as a consequence a higher ratio of assets at their age of death to assets on the age the inheritance is received (Piketty & Goldhammer, 2017). This means that the role of inheritance is increasing.

If people receive a significant amount of money, for example from an inheritance, their wealth will increase which could lead to changing preferences regarding the labour supply. If people are more wealthy, they might value leisure higher than the extra income coming from labour. Therefore, they might start to work fewer hours a year or will go to retirement sooner when they received an inheritance. Potential changes in the labour supply are relevant to know for a country. People providing labour contribute to taxes. Since it is one of its major sources of tax revenues, the government has the interest to incentivise labour supply. This is especially the case in the current context of the ageing of the population (Barr, 2012). Receiving an inheritance can potentially decrease the incentive to work so in order to increase labour force participation, it is necessary to have an insight into the potential effect of receiving an inheritance on labour supply.

This research aims to get an insight into this relation in The Netherlands. This is done by determining if, and if so, to what extent, there is a relation between inheritance received and the labour supply. To define this, the following research question is composed: *To what extent does receiving an inheritance cause a decrease in the labour supply in The Netherlands?*

This research is not the first research that investigates the relationship between receiving an inheritance and the effects on labour supply. Labour supply is the number of hours people are able to and willing to work for, given a certain wage (McDowell, Thom, Pastine, Frank & Bernanke, 2012). This can be divided into the extensive and intensive margin. The extensive margin of labour supply is whether someone works or not (Blundell, Bozio & Laroque, 2011). The intensive margin of labour supply means how many hours someone works conditional on having a job (Blundell et al, 2011). One way to investigate the effect of receiving an inheritance on the extensive margin of labour supply is by investigating the effect of receiving an inheritance on the probability of going to retirement. The results of other papers that investigated this differ. Some researchers who investigate the same causal relationship do find a small effect or they do not find an effect statistically different from zero (Jouflain & Wilhelm, 1994; Sila & Sousa, 2014). However, a paper by Brown et al. (2010) found different results. Their results showed that receiving an inheritance leads to a significant increase in the probability of going into retirement. Receiving an inheritance is related to a 2.3 percentage point increase in the probability of retirement and increasing the value by 100,000 US dollar increased the probability of going to retirement by 2.0 percentage points (Brown et al, 2010). Because the results of the paper by Brown et al are not rejected in other papers, the theory for this research is that receiving an inheritance leads to a decrease in the retirement age so the extensive margin of the labour supply will decrease when someone receives an inheritance according to the theory.

The intensive margin of the labour supply is generally investigated by using the number of hours someone works as the dependent variable. The results show a small but incisively measured reduction in the number of hours worked (Joulfaian & Wilhelm, 1994). The theory in this research is therefore that receiving an inheritance matters little for the number of hours someone works.

Another effect that receiving an inheritance can have on the labour supply is that an inheritance can give a budget to go from salary-employment to self-employment. The annual hours a person works is increased by 4% among the people that switch from wage salary-employment to self-employment (Levine & Rubinstein, 2013). So the increase in self-employment because of the extra budget received by the inheritance to go towards self-employment is relevant to investigate.

Literature showed that life cycle considerations play a substantial role in labour supply adjustments instantly following an inheritance to deduce labour supply effects (Cox, 2014). This could be troublesome because life cycle effects can be downwardly biased when labour supply adjustments are not concurrent with inheritances (Holtz-Eakin, Joulfaian & Rosen, 1994). A wealth shock will only have an immediate effect when the inheritance is permanent and unexpected (Holtz-Eakin, Joulfaian & Rosen, 1994). If someone already expects the inheritance, the effect can be that the worker reduced working hours in advance. The consequence is that the person has reduced working hours, but there is no direct effect visible when the worker actually receives the inheritance. He or she is not going to work less compared to before.

The overview of the literature showed that there are already researches conducted about the potential relationship between receiving an inheritance and labour supply. However, this research still has scientific relevance. The researches that are already conducted show that the relation between inheritance received and hours worked after receiving the welfare transfer is either small or not significantly different from zero (Cox, 2014). So, although the effect is probably not large, there might be an effect. Moreover, most of the researches on this topic were based on data from larger countries or on a European level. No research about this topic is found based on Dutch data only. Therefore, it is relevant to track down if there is a relation and how the relation looks numerically in The Netherlands. This way, the scientific knowledge can be supplemented.

This research has policy relevance. The main reason is that this research can estimate the potential effects and provide information for public policies that induce changes in wealth (Suari-Andreu, 2018). Examples of these policies could be tax and pension reforms. This case about inheritance is especially relevant for policymakers since it can contribute by evaluating the optimal estate taxation. One of the ways in which reforms in the tax systems, private pensions systems and social security regulations are influenced is by changes in wealth effects (Brown, Coile, & Weisbenner, 2010). It is therefore important to provide policymakers empirical evidence so that they can generate an understanding of the wealth effects and make an informed decision in their policy analysis. This research has practical relevance because of the increasing difficulties to finance the welfare state. After this research, politicians do know what the behavioural responses of people in The Netherlands are on the labour supply when a

gift or inheritance is received. When there would be a shortage in the Dutch labour market, politicians do know how to let more people participate in jobs.

The research is quantitative research based on panel data. It consists of microdata from 1994 until 2020. The conclusions of this research are conducted based on fixed effect regression analysis. Also pooled OLS regressions are executed to compare these results to the fixed effect regressions. The results of the regressions show no significant relationship of receiving an inheritance on the actual amount of hours worked, the expected retirement age and self-employment. Therefore, no conclusions can be drawn from the empirical findings.

Chapter 2 contains information on the institutional background regarding inheritance in The Netherlands. The current inheritance tax system will be illustrated. In chapter 3, the literature review will be conducted. The research method is discussed in chapter 4. Chapter 5 shows the data that is used in this research. This chapter contains an overview of the data source, sample selection and main variables and is followed by summary statistics and descriptive statistics. Chapter 6 is the result section. Chapter 7 & 8 are the conclusion and discussion and this is followed by the references and appendix.

2. Institutional background

In this chapter, the situation regarding receiving an inheritance in The Netherlands is discussed. First, there is discussed what the inheritance tax looks like and which reforms were implemented in the research period. After that, there is discussed what the different perspectives are in the debate about the amount of inheritance tax. The benefits and disadvantages of a higher inheritance tax are discussed. Lastly, an overview is given showing what the position of the political parties is.

In case you receive an inheritance, you usually have to pay taxes over it. In The Netherlands, someone who receives an inheritance does not pay taxes over the first part. The rest of the inheritance is taxed.

The amount of this tax is dependent on a few factors. The value of the inheritance is of importance. The higher the value of the inheritance, the higher the percentage amount that has to be paid. Another relevant factor is the relation someone has with the deceased. If someone is not a family member of the deceased, the percentage amount of tax will increase compared to a family member of the deceased.

Someone has to pay inheritance tax over the inheritance when the deceased on the moment of death lived in The Netherlands or when the deceased had a Dutch identity and did not live already more than 10 years outside of The Netherlands (Belastingdienst, 2021b).

The inheritance tax is reformed during the research period. Before 2010, the inheritance tax was made out of 7 tax brackets (CBS, 2019). Also, a one-time donation under the increased exemption of 22 thousand euros from parent to child could be made before 2010 next to the donation that was subject to the regular exemption. After the new importation of the inheritance tax reform, the tax was simplified and two brackets remained (CBS, 2019).

Before 2010, the first 22 thousand euros after the exemption had a tax rate of 5% for a gift from parent to child. Between the 22 thousand and the 45 thousand euros, the tax rate was 8% and the tax rate was 12% between the 45 thousand and 90 thousand euros for a gift from a parent to child (CBS, 2019). After 2010, the tax rate for a gift from a parent to child became 10% for all gifts between the exemption and 118 thousand euros. The additional amount is taxed at 20% (CBS, 2019). So gifts from a parent to child lower than 100 thousand euros and higher than 136 thousand euros are taxed more than before the tax reform in 2010.

Moreover, a one-off increased exemption of 50 thousand euros was implemented for a gift from parents to their child in order to help to finance a study or home (CBS, 2019). It became also possible in 2013 and 2014 to donate 100 thousand euros tax-free to help someone finance their own house (CBS, 2019). This is regardless of the relation of the giver and receiver.

The exact amount of inheritance tax someone has to pay are corrected annually because of the inflation rate but the rates below are explained based on the year 2021.

The partner, children, foster children, stepchildren of the deceased pay a tax rate of 10% over the first 128.750 euros and after that a tax rate of 20% (Belastingdienst, 2021b). Grandchildren and further descendants of the defunct pay a tax rate of 18% over the first 128.750 and after that a tax rate of 36% (Belastingdienst, 2021b). Other heirs such as parents, brothers, sisters of

the defunct pay a tax rate of 30% over the first 128.750 and a tax rate after that a tax rate of 40% (Belastingdienst, 2021b).

As mentioned before, someone only pays inheritance tax when the inheritance is higher than the exemption. The exemption also depends on someone's relationship to the defunct. A spouse, registered partner or a cohabiting partner of the defunct have an exemption of 671.910 euros (Belastingdienst, 2021a). Children, foster children, stepchildren and grandchildren have an exemption of 21.282 euros (Belastingdienst, 2021a). There are extra requirements for a disabled child but in general, they have an exemption of 63.836 euros (Belastingdienst, 2021a). The exemption for the parents of the defunct is 50.397 euros (Belastingdienst, 2021a). If both parents inherit, then the exemption of 50.397 euros is for both parents together. Great-grandchildren and other heirs have an exemption of 2.244 euros in 2021 (Belastingdienst, 2021a). It is also possible that someone inherits a business. In that case, someone pays less or no inheritance tax when he or she continues the firm and uses the business succession scheme (Belastingdienst, 2021a).

There are two sides in the public debate when it comes to the usefulness of an inheritance tax. There is a camp that justifies an inheritance tax and the other camp argues it is not justified. The main argument of the camp that does not justify an inheritance tax is that taxes over the wealth of the defunct are already paid. The defunct already had to pay income and wealth taxes. Adding an inheritance tax would mean that the tax is levied twice according to this perspective.

The camp that justifies an inheritance tax can in general divided into two perspectives. One perspective is based on the argument brought up by economist Thomas Piketty. He argues that legacies are a major source of wealth inequality (Piketty & Zucman, 2014). The optimal inheritance tax rate is around 50-60% and this might be even higher for the very large legacies (Piketty & Saez, 2013). The idea of this perspective is that an inheritance tax can reduce the impact that legacies have on wealth inequality. This perspective is mostly popular under the left-winged parties in the Netherlands. The other perspective that justifies an inheritance tax is a classic liberal. If someone inherits a lot of money, then there is no incentive to work (Melkevik, 2019). This would have negative consequences for the economic growth. Without an inheritance tax, people who receive a significant sum of inheritance will not have to work to become wealthy. The idea from this perspective is that an inheritance tax would stimulate to keep working.

The inheritance tax is considered an emotionally charged subject for citizens (Prabhakar, 2015). The parties in the parliament are therefore divided. The party that is represented in the Dutch parliament that wants to abolish the inheritance tax is FVD (FVD, 2021).

Other parties want to reform the tax. The VVD, the biggest party in The Netherlands, wants to modernize the inheritance tax by lowering the tax rates without a partner or without children who want to donate or leave their wealth to friends and acquaintances (VVD, 2021). JA21 wants to lower the tax rates and raise the exemptions (JA21, 2021). D66 and Groenlinks and BIJ1 also want to reform the inheritance tax. However, in general, they want to increase the inheritance tax rates. Groenlinks wants to abolish the inheritance tax for common households (Groenlinks, 2021). These are households that receive an inheritance that is considered average or less than average (Groenlinks, 2021). However, Groenlinks wants to increase the inheritance tax rate for large inheritances. Moreover, they want to abolish the business succession scheme (Groenlinks, 2021). D66 and BIJ1 want to increase the rate for the inheritance tax (D66, 2020;

BIJ1, 2020). Furthermore, D66 wants to narrow down the distinction between the different categories of recipients. They want the rates to become more progressive so that over large inheritances more taxes are paid (D66, 2020). PVDA also wants to tackle the potential wealth inequality caused by inheritances. They want to achieve this by tackling the possibilities of evasion for example by tackling the current business succession scheme (PVDA, 2021). ChristenUnie wants to raise the inheritance tax rates and wants to lower the exemptions (ChristenUnie, 2021). However, in contrast to other parties in the left spectrum, they want to preserve the business succession scheme (ChristenUnie, 2021). The remaining parties that are represented in the Dutch parliament did not give their position on this topic.

Based on the information provided in the election manifestos. The estimation in this research is that the camp that wants to abolish the inheritance tax has 8 out of the 150 seats in the Dutch parliament, the parties sharing the wealth inequality views of Piketty have 47 seats and the classical liberal perspective has 34 seats in the Dutch parliament. Thus, the majority of the parties justify an inheritance tax.

3. Literature review

3.1 Concepts, literature and theory

In this chapter, theories that relate to the potential effect of inheritance received on labour supply in The Netherlands are discussed. There is a focus on the potential effects of inheritance received on labour supply.

The relevant literature is discussed in the following section. Expectations are formed from this literature. These expectations debouch into hypothesises in the section after and these hypothesises are tested later in this research.

On average the return of capital is higher than the economic growth (Piketty & Goldhammer, 2017). This has as a consequence that people have a bigger build-up of assets over someone's lifetime. The result is a higher ratio of assets at their age of death to assets on the age the inheritance is received (Piketty & Goldhammer, 2017). This means that the role of inheritance is increasing.

Because the role of inheritances is increasing, it is relevant to take a look at wealth effects. If people receive a significant amount of money, such as an inheritance, their wealth will increase which could lead to changing preferences regarding the labour supply. This can be explained from two perspectives.

The first perspective is the income effect from a neo-classical view. From this perspective, the labour supply curve comes from a trade-off between labour and leisure. Leisure is seen as a normal good (Brown et al, 2010). The demand for normal good increases when real income increases (McDowell et al, 2012). When the real wage rate rises, a worker earns more income given the hours worked. According to the income effect, the worker will spend less hour on labour when the real wage rate increases. Instead, the worker will spend this increase of income on leisure. However, receiving an inheritance is an effect that is not structural like an increase in the real wage rate. Therefore, taking a look from a Marxist perspective might be more relevant.

Labour supply is a necessity according to this perspective. To secure labour supply and prevent labour shortage, it is needed that a large part of the population does not have any sources of self-provisioning (Bruce, 1947). People should not be independent but instead, they must be forced to sell labour in order to survive (Bruce, 1947). When someone receives a large inheritance, their wealth will increase. This increase in wealth makes them more self-provisioning and the need to sell labour will decrease. So from a Marxist perspective, social welfare transfers like receiving an inheritance will probably decrease labour supply. If this is indeed the case will be tested in the empirical analysis.

When taking a look at how inheritances received influence labour supply, it is relevant to take the life cycle labour supply into account. Life cycle considerations can play a role in labour supply adjustments instantly following an inheritance to deduce labour supply effects (Cox, 2014). This could be troublesome because life cycle effects can be downward biased when labour supply adjustments are not concurrent with inheritances (Holtz-Eakin, Joulfaian & Rosen, 1994). For example, a person can expect an inheritance. The effect can be that the worker will reduce working hours in advance. The consequence is that the person has reduced working hours, but there is no direct effect visible when the worker actually receives the inheritance. He or she is not going to work less compared to before. Another example is that

receiving an inheritance at the start or midway their career could lead to retirement more early. However, no effect is visible because current work is not affected. So a wealth shock, like an inheritance, will only have an immediate effect if it is unexpected and permanent.

There are already a couple of researches conducted that investigated the effect of wealth shocks on labour supply. This is done, among other things, by investigating the effects of the intensive margin of labour supply. This is the number of hours someone works on the condition that someone works (Blundell et al, 2011). One way to investigate this is by looking at the effect of inheritances on hours worked. The results show a small but incisively measured reduction in the number of hours worked (Joulfaian & Wilhelm, 1994). The annual amount of hours worked for men would fall by approximately 14 hours when inheriting 125,000 US dollars (Joulfaian & Wilhelm, 1994). Similar results were produced in larger estate tax data (Cox, 2014).

Other papers take a look at specifically, the effect of receiving an inheritance on retirement behaviour. This focus is on the extensive margin of labour supply. The extensive margin of labour supply refers to whether someone working or not (Blundell et al, 2011). When people go to retirement more early because of a wealth transfer, this decreases the labour supply because people quit the labour market. In addition, receiving an inheritance happens most at or near the retirement age. Therefore, this research also takes a look if people retire more early when they receive an inheritance.

The results of the analysis conducted by Brown, Coile & Weisbenner (2010) are that receiving an inheritance has a significant increase in the probability of retirement (Brown et al, 2010). This is especially the case when the inheritance is unexpected (Brown et al, 2010). So the downward biased life cycle considerations mentioned earlier do play an important role for research that looks to this relation. Receiving an inheritance is related to a 2.3 percentage point increase in the probability of retirement (Brown et al, 2010). Also, using the value of receiving an inheritance had a significant effect. Increasing the value by 100,000 US dollar increased the probability of going to retirement by 2.0 percentage points (Brown et al, 2010). Other studies who investigate the same causal relationship do find a small effect or they do not find an effect statistically different from zero (Jouflain & Wilhelm, 1994; Sila & Sousa, 2014; Suari-Andreu, 2018). However, papers, like Suari-Andreu (2018), control if the findings by Brown et al. (2010) can be rejected and come to the conclusion that based on their data, this is not the case (Suari-Andreu, 2018). Because the findings by Brown et al. (2010) are not rejected in any of the studies, the expectation in this research is that receiving an inheritance leads to an increase in the probability to go into retirement more early.

There is also a theory which states that labour supply can increase when inheritance is received. The idea is that receiving an inheritance or gift gives a budget to go from wage salary-employment to self-employment. The annual hours a person works is increased by 4% among the people that switch from wage salary-employment to self-employment (Levine & Rubinstein, 2013). Taking this effect into account is relevant because in the paragraph that discusses the potential relation between receiving an inheritance and hours worked, it is implied that receiving an inheritance would result in negative labour supply effects. Providing an understanding to what extent the incentive to decrease working hours is compensated by the increase in self-employment with as a result an increase in working hours for this group is relevant. When the results of this research would not show a significant effect between inheritance received and hours worked, the relation between inheritance received and self-

employment shows if there is no big effect in hours worked because of the change towards self-employment or if there would be no effect anyways. The relation of receiving an inheritance and self-employment is less influenced by the life cycle effects, such as the inheritance being expected, compared to the number of hours worked and the retirement age. Receiving an inheritance creates the budget to switch towards self-employment. But for this to happen, the inheritance is needed. Before the moment the inheritance is received, the budget that is needed is not there and only after the budget is there, it becomes possible to switch towards self-employment.

3.2 Theory and hypothesis

On the basis of other empirical research, receiving an inheritance can influence the labour supply in three ways. First, receiving the wealth transfer could potentially lead to a decrease in hours worked. Other empirical research did only find small effects for this relation. However, receiving an inheritance could be an incentive to work fewer hours and therefore there will be tested if this research also finds a small, negative effect of receiving an inheritance on hours worked. To test this, the following two hypotheses are set up.

1. H_0= Receiving an inheritance or gift does not have an effect on the number of hours people work
1. H_1= Receiving an inheritance or gift has a negative effect on the number of hours people work

Receiving an inheritance or gift can also have an impact on labour supply by going to retirement more early. Other empirical research found as a result that receiving an inheritance does increase the probability to retire (Brown et al, 2010). To test if this is also the case in The Netherlands, the following two hypothesises are set up.

2. H_0= Receiving an inheritance or gift has no effect on the expectation of going to retirement
2. H_1= Receiving an inheritance or gift has a positive effect on the expectation of going to retirement

Finally, other relevant papers also indicated that the effect of receiving an inheritance or gift can have positive consequences for the labour supply. Receiving an inheritance or gift can give a capital impulse to facilitate self-employment. In general, people who switch from wage-salary employment to self-employment increase their hours worked (Levine & Rubinstein, 2013). Because, according to the theory, people will go to self-employment more often when they receive a wealth transfer like an inheritance, the negative effect of receiving an inheritance on labour supply could be reduced. To test if people are indeed going to entrepreneur more often, the following two hypothesises are set up.

3. H_0= Receiving an inheritance or gift has no effect on self-employment
3. H_1= Receiving an inheritance or gift has a positive effect on self-employment

The results of these hypotheses together creates a picture of to what extent receiving an inheritance or gift influences the labour supply.

4. Methodology

This research is quantitative research based on panel data. Panel data is data to which the behaviour of entities are observed across time (Neuman, 2013). The data comes from the Dutch National Bank. The data is based on individuals, however, it can be determined if the respondents are from the same households. It is therefore possible to cluster on a household level and this is done in this research because someone may receive an inheritance but the effect of the inheritance on labour supply can be that their spouse starts working less. This potential effect can be taken into account by clustering on a household level.

The aim of this research is to give policy-makers an insight into the potential relation between wealth transfers, like receiving an inheritance, and labour supply. Therefore, the most recent data is needed. This is the year 2020. The year 1994 is chosen so that the trend can be seen over a large number of years. This way, there are more observations available and this makes it easier to determine a significant trend. The numbers of years reached its maximum from the year 1994 because of the data available.

The method that will be used is fixed effects. Fixed effect regressions use demeaning. Demeaning basically uses a separate intercept for every respondent (Allison, 2005). The average is determined for every variable over time and deducted from every variable (Allison, 2005). The fixed effect method uses the effect within a person. Therefore variables that do not differ within a person, like sex and ethnicity, do not have an effect and will therefore not be used. Only control variables that can change within a person will be used. So predictors that do not vary over time are dropped within the fixed effect regressions. The reason behind this method is that a variable that does not change over time is a constant and cannot have an impact on the dependent variable.

The reason behind the choice of the fixed effects method is that the fixed effects method corrects for both measured and unmeasured not time-varying predictors (Allison, 2009). The fixed effects method removes the omitted variable bias by measuring the changes within groups over time (Allison, 2009). Control variables are included to account for this potential omitted variable bias.

Based on the fixed effect model, an equation is conducted for this research. The equation that is used is:

$$Y_{it} = \beta_0 + \beta_{it} INH_{it} + \beta_{it} x`_{it} + \alpha_i + \delta_t + u_{it}$$

In this formula, Y_{it} is the dependent variable observed for an individual i over time. β_0 is a constant. INH is the main independent variable. This shows the amount of inheritance a household receives. This value varies per individual over time. $x`_{it}$ are the vector of the other independent variables that are used in the regression analysis. These are control variables whose value vary over time. α_i represents the unique value of each individual. It is the fixed effect, it represents are characteristics of the individual that do not change over time. δ_t is a time-specific intercept. In this research, it is the values of year. It captures differences in the outcome of the dependent variables that vary across time periods but not across households. It will capture macro data, for instance legislations that the retirement age would increase, changes in the economic conjunction or changes in the organization of the work process like free child care. U_{it} completes the error effect. This changes across individuals and over time.

The fixed effects regression method is used in order to generate the results and form a conclusion. However, also a pooled OLS regression is conducted for each dependent variable. A pooled OLS estimation is an OLS technique run on panel data (Miles & Shevlin, 2001). A major limitation is that all individual specific effects are ignored (Miles & Shevlin, 2001). The consequence is that basic assumptions like the error term are violated and the risk of omitted variable bias is much higher than with fixed effects. Because of these limitations, the results of the pooled OLS estimation are not used to form a conclusion in this research. However, this method is still used for the purpose of comparison.

The methods that are used in the regressions are explained. The method used has an impact on the quality of this research. To determine the quality of this research further, the reliability and internal and external validity of this research are examined in the following paragraphs. The validity indicates whether what the researcher wants to measure is being measured. The internal validity indicates the extent to which a causal conclusion can be justified on the basis of the study (Neuman, 2013). This is achieved by making as few systematic mistakes as possible. The external validity examines whether can be generalized for comparable situations (Neuman, 2013). The reliability shows how accurate and precise the measurements are (Neuman, 2013).

There is determined what the level of validity and reliability presumably are. The datasets that are being used are from the Dutch National Bank. The variables in the dataset do have a label making clear what is measured exactly. Therefore, it is possible to determine precisely which variables will be useful. The external validity is considered decently. The DHS survey contains information for 27 years and thousands of observations in The Netherlands. Therefore, the external validity of this research is high. The scope of generalization is The Netherlands. The internal validity could use an improvement. This research would like to explain the effect of inheritances on the labour supply. However, the main independent variable is the sum of inheritances/gifts received. This means that not only inheritances are measured. The theory behind it is the same for gifts but because not only inheritance is measured, the validity decreases. Another reason for a lower validity in this research is that the amount of wealth someone already has and whether an inheritance is expected or not is not taken into account in this research. This is explained further in the discussion.

The reliability could use improvements because of three reasons. The survey is filled in by respondents so the values in this dataset are based on what they have filled in. The results are not controlled for mistakes made by the respondents. Therefore, typing errors or untrue data could have an influence on this research and therefore the liability of this research is not great. By dropping values that are deemed to be untrue, an attempt is made to increase the liability. The other reason that affects the liability of this research is that not every respondent filled in the full survey every year. Therefore, there are missing values that lead to a decrease in the reliability.

5. Data

The data chapter consists of three parts. In the first part, the data source and the sample selection are explained and the main variables are described. This is followed by the summary statistics in the second part of this chapter. Lastly, the descriptive statistics that are relevant for this research are shown.

5.1 Data source, sample selection and main variables

The data in this research is data from the Household Survey of the Dutch National Bank. In this research, this is referred to as the DHS data. Via the DNB Household Survey, economic data in The Netherlands is collected annually. The DHS survey contains information for 27 years and each year over 1500 households in The Netherlands participate. All the respondents are aged 16 or over. The research period in this research is from 1994 until and including 2020. The data in the survey contains information about households, work & pensions, accommodations, income, wealth and psychological concepts. The DHS data is executed on an individual level. However, since it can be determined which people belong in the same household, the data in this research is clustered at the household level for the regression analysis.

As told before, labour supply can be divided in the intensive and extensive margin. The intensive margin of labour supply refers to how many hours someone works on the requirement of having a job (Blundell et al, 2011). To find out if the intensive margin of labour supply changes when someone receives an inheritance, the dependent variable for hypothesis one is hours worked. The DHS data contains two variables that might be relevant. These are the variables hours per week worked in your current job based on your contract and the actual hours per week worked in your current job. Based on the descriptive statistics, it becomes visible that the amount people are supposed to work based on their contract differs from the actual amount people work. This is explained further in the descriptive statistics chapter. Based on the theory, people will make a trade-off between working an hour or instead having an extra hour of leisure. In general, people enjoy an hour of leisure more than an hour of work but working an extra hour gains extra income. However, in principle does someone receive their income based on their contract and not necessary the actual amount of hours someone works. So ideally for this research, the hours per week worked according to the contract and the actual amount would be the same. This is not the case and for this research, it was decided to go for the actual amount of hours per week someone works. A lot of jobs do pay out the extra amount of hours someone works. Moreover, this variable shows the actual amount people have worked, meaning that the rest is on leisure. Therefore, the dependent variable for the first regression in this research is the number of hours per week someone actually works in a certain year. To determine the effects of receiving an inheritance on the intensive margin of labour supply, only people that work at least one hour per week are selected for the regression and the people that quit working are excluded from the regression. The people who quit working are investigated when the extensive margin of labour supply is researched.

Because of the regression with hours worked as the dependent variable, there can be determined what the effect of receiving an inheritance on the intensive margin of labour supply is. In order to discover the effect of receiving an inheritance on the extensive margin, the dependent variable for the second hypothesis is the expected retirement age. The extensive margin of labour supply refers to whether someone works or not (Blundell et al, 2011). If someone goes into retirement after receiving an inheritance, the extensive margin of labour supply decreases.

This is of increasing importance because, as will be showed in the descriptive statistics, the average age someone receives an inheritance is increasing. This increases the probability that people quit the labour market for good when they stop working and therefore decrease the extensive margin further.

In the DHS dataset, there is a variable at what age people expect to retire. In the regression, there will be checked if people expect to go into retirement earlier when they have received an inheritance or gift. Another variable in the dataset is what age people retired or used early retirement. This variable is not chosen so that the number of respondents does not decrease massively. This is done because there is a possibility that they received an inheritance or gift but did not actually retire in the research period yet. Missing out on these observations would be unfortunate.

The last dependent variable in this regression is self-employment. This is included in to control if the intensive margin of labour supply can also go in the other direction when someone receives an inheritance. The theory behind this is that the inheritance causes a budget to which people can switch towards self-employment. In the dataset, there is a dummy variable that describes whether someone is self-employed in a certain year. This variable is one when someone is self-employed and zero if someone is not. This is called the linear probability model and is used in the regression analysis that tests the third hypothesis.

The main independent variable in this research is inheritance or gifts received in a year. In the first regression of this research, this is a dummy variable indicating whether the respondent did receive a research in that year. In regressions in column two and three are based on another variable of the DHS dataset. This variable shows the sum of inheritance or gifts received in a year. This variable is in absolute numbers and is in euros. Because an increase of one euro would lead to a very small coefficient in the regression analyses, this variable is divided by 1000 in this research. So the coefficient in the regression analysis shows an increase or decrease of the dependent variable when the sum of inheritances/gifts received increases with a 1000 euros. The possible relationship between receiving an inheritance and the amount of inheritance and/or gifts that is received to the three dependent variables, the expected retirement age, the actual amount of hours worked and self-employment, is the basis for this study. However, also control variables are used.

A control variable is a variable that is included in the research but that is not immediately addressed (Neuman, 2013). These variables are included for multiple reasons. One reason is that a control variable is included is because it can have an impact on the dependent variable (Miles & Shevlin, 2001). Another reason is that a control variable can be coherent with the main independent variable (Miles & Shevlin, 2001). Not using control variables is not an option because it would make the research less accurate. Control variables are necessary to prove a potential statistical relationship and account for omitted variable bias.

The control variables that will be used in the regression with hours worked as the dependent variables are age, the health status, the number of children, the number of hours the respondent likes to work, a dummy variable for owning a house, a variable showing the amount the houses owned are worth, the total net household income, marital status and years. The variables that give information about owning a house are included as proxy variables for wealth.

For the second regression, the control variables are alsmost the same. Just a dummy variable indicating whether the respondents has grandchildren is added to the regression.
For the regression that takes a look at self-employment, the dependent variables are similar to the regressions on hours worked.

5.2 Summary statistics

Summary statistics of the main variables are visible in table 1.

Table 1

Summary statistics of main variables

Variable	Observations	Mean	Median	Std. dev	Min	Max
Amount of hours worked	53,829	36.10	39	13.202	-9	185
Expected retirement age	25,525	47.18	63	31.726	-9	99
Being self-employed	67,086	0.0927	0	0.290	0	1
Amount of inheritance on the condition of receiving one	3,045	18.030	5	49.588	-0.009	725.000
Inheritance with people not receiving one included	66,901	0.819	0	11.22	-0.009	725.000

Actual hours worked is the dependent variable for the first hypothesis that will be tested. As mentioned in the previous section, this variable shows the actual amount of hours someone works in a week. In the 1994-2020 research period, this variable has 53,829 observations. The maximum amount is 185. This would mean that someone works 185 hours per week. A week only has 168 hours so even without sleep and any time spend on leisure this is impossible to reach. Therefore, this respondent must have made an error filling in the survey. In order to prevent these errors influencing the results, values higher than 150 hours per week are dropped. The minimum is -9 indicating someone does not know, the actual amount of hours someone works. These variables are also dropped. After dropping these values, 53,709 observations remain for the actual weekly hours someone has worked.

The dependent variable for the second hypothesis is the expected pension age. This shows the age someone expects to retire in a certain year. This variable has 25,525 observations in the research period. The mode is 65 years and the median is 63. The mean is 47.18. The reason why this is so low is because 5077 observations have a minus value indicating they do not know when they expect to retire. After dropping these observations, 17,396 observations remain and the mean is 64.58 years.

The third dependent variable is called self-employment. This is a dummy variable which shows whether the respondent is self-employed in a certain year. The variable is one when someone is self-employed in that year and zero when someone is not self-employed. This variable

contains 43,253 observations. Out of those 43,253 observations is in 1920 observations someone self-employed. This is approximately 4.44%.

The main independent variable the total sum of an inheritance/gift. This variable shows the total sum of inheritances/gifts received in a certain year. An overview of the statistics showed that 3,045 people received an inheritance/gift in the research period. The minimum value is -0.009. This indicates that someone received an inheritance/gift but does not know the amount of money he or she received. 379 respondents did not know this amount. The maximum value is 725 euros meaning that the respondent who received the highest inheritance received 725,000 euros. The mean is 18.030. The median and the mode of this variable are at 5000 euros. This median means that more that 50% of the people receive an inheritance/gift that is lower or the same as 5000 euros. The mean is significantly higher meaning that a smaller group respondents receive an high amount of inheritance. In this research, the values are divided by 1000 to give a better overview of the coefficients in the regression analysis. So for example, a value of 30 is given when someone receives an inheritance of 30,000 euros in a certain year. In the regression analysis, also the people who do not receive an inheritance are included in the sample.

5.3 Descriptive statistics

It is relevant to gain an insight in the trends of the main variables. Descriptive statistics is used to enable this.

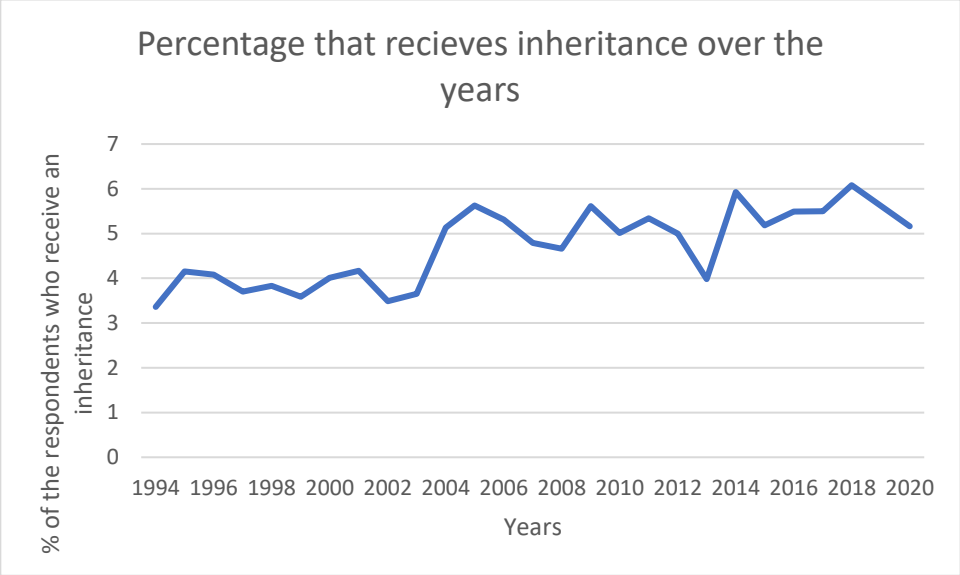

Figure 1

Th percentage of respondents that receives inheritance/gifts over the years

Figure 1 shows the percentage of respondents that receives an inheritance per year in this dataset. What can be seen is that this has an increasing trend. From 1994 until 2004, the yearly percentage of people that receives an inheritance was lower than 5% in all the years while in the years from 2014 until and including 2020 the percentage hasn't been lower than 5%. Because relatively more people are receiving an inheritance, the need to investigate the potential wealth effects caused by receiving an inheritance is increasing. The importance of this research is therefore increasing.

The second trend that will be discussed is hours worked. As been told in the data section, there is a difference between the actual amount of hours someone works per week and the amount of hours contract per week. Based on the DHS dataset, on average someone works more hours than the amount of hours on their contract. The amount of hours someone has to work according to their contract has a mean of 35.03 hours per week while the actual amount of hours someone works per week has a mean of 36.07 hours per week.

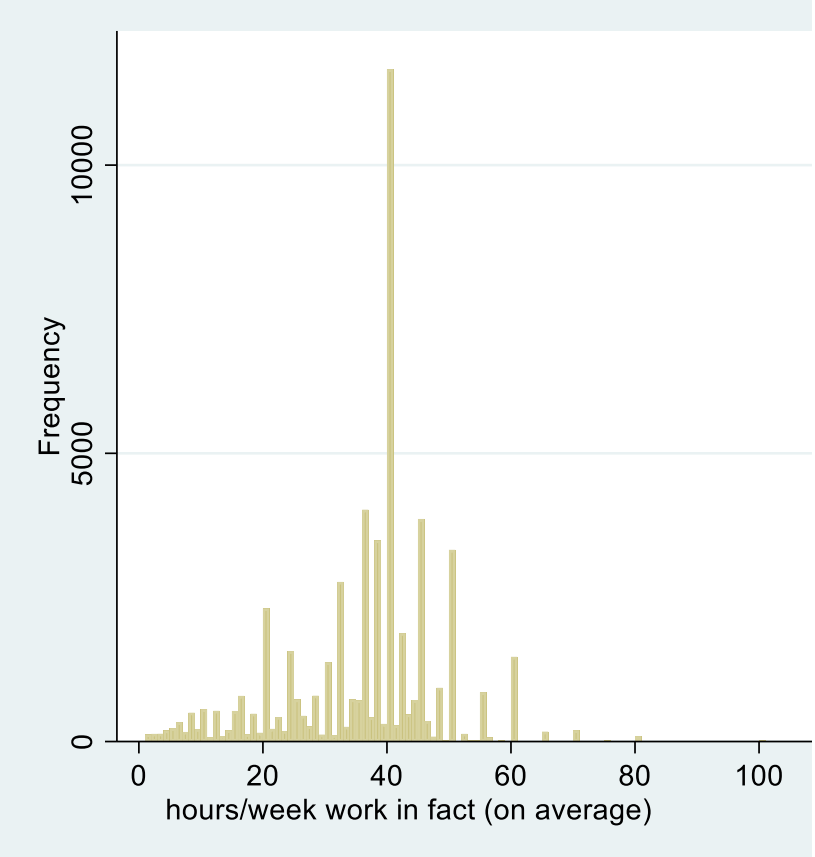

Figure 2

Frequency histogram of hours per week worked

When taking a look at the distribution of the number of hours someone works, it can be noticed that few people work more than 60 hours per week. Working 40 hours per week is the number of hours per week that is most used. 11,665 observations were 40 hours per week. In The Netherlands, working more than 35 hours per week is considered working full time but 40 hours per week is most common. The working environment in The Netherlands is known for working part-time (Ministerie van Financiën, 2020). This can be seen in figure 3.

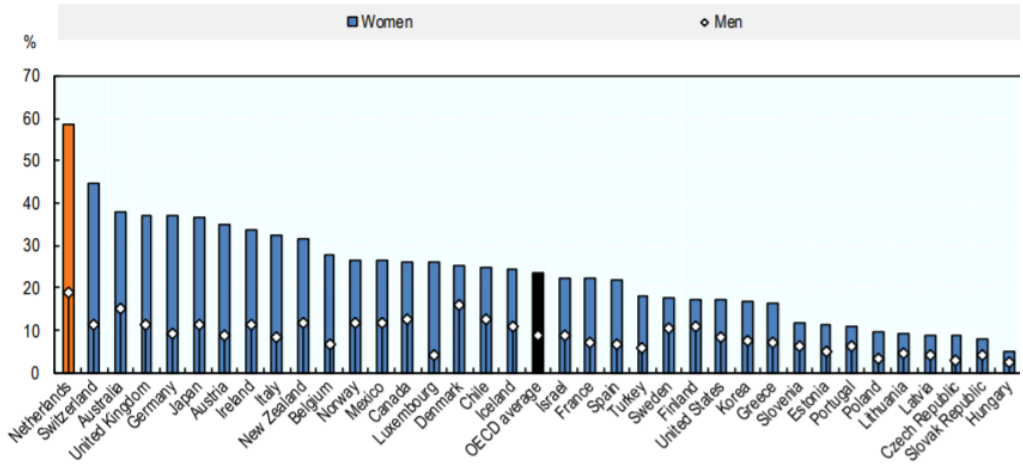

Figure 3

Share of parttime workers in OECD countries in 2017 (source: OECD, 2019)

Reports show that both males and females work more often part-time compared to other OECD countries. In 2017, 37.4% of the Dutch employees did work less than 30 hours per week (OECD, 2019). The average of The Netherlands is therefore twice as high as that of the other OECD countries combined (OECD, 2019). In The Netherlands, close to 60% of the females work part-time and close to 20% of the males does. There are multiple reasons why the amount of part-time labour is so much higher in The Netherlands. First, labour participation especially among females is higher in The Netherlands compared to the other countries (OECD, 2019). Secondly, the difference in the quality of part-time and full-time jobs is smaller in The Netherlands compared to other countries (OECD, 2019). In other countries, part-time jobs are usually less attractive. Based on the histogram, it becomes clear that indeed a significant amount of people does not work full time. 33.31% of the respondents in the DHS dataset work less than 35 hours per week and 26.11% did work less than 30 hours per week. This is less than the OECD data expected but still a considerable amount. Including a graph about the percentage of part-time work is relevant since this working environment of working part-time shows that the intensive margin of labour supply is relatively low in The Netherlands compared to the rest of the world.

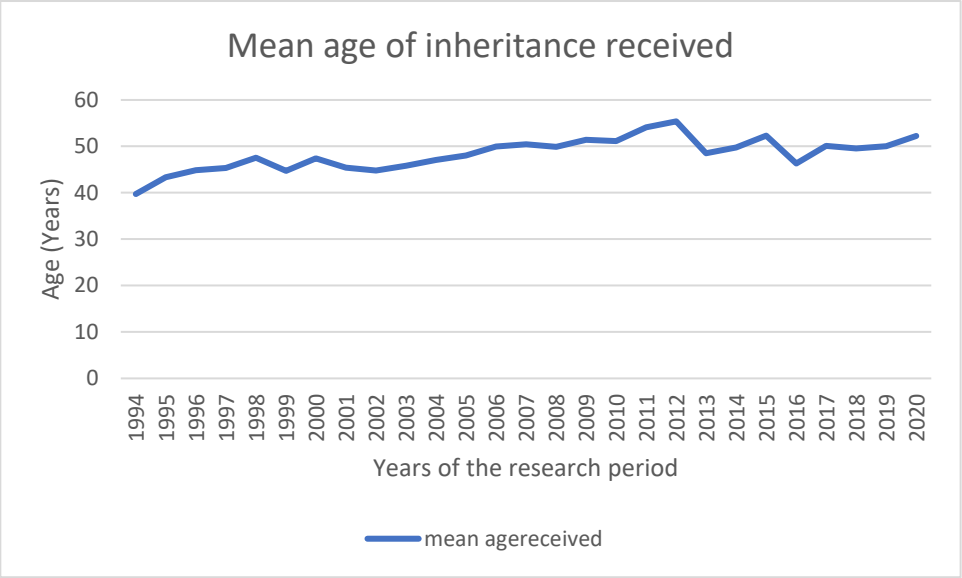

Figure 4

The mean age of the respondents who receive an inheritance

Figure 4 shows the mean age someone has when someone receives an inheritance. In 1994, the start of the research period, this age is on average 40 years old. In 2020, the end of the research period, this is on average over 50 years old. So what can be seen is that the average age someone receives an inheritance has increased substantially in the research period. In 1994, people were on average 25 years away from the retirement age when they received the inheritance. In 2020, this is less than 17 years. Because the age of people receiving an inheritance is increasing and therefore becomes closer to the retirement age, it becomes more relevant to take a look at potential retirement effects. Therefore, this research takes a look at how inheritance receipt can influence retirement.

In order to take a look at the retirement age, the next dependent variable in this research is the expected age of going into retirement. This variable is chosen instead of for example the actual retirement age. The reason for this is that for most people the retirement age is still years away. Figure 5 showed that in 1994 this was around 25 years and in the more recent years this is still 17 years from the official retirement age. Therefore, most people who received an inheritance did not have the chance to retire yet, even when they are planning to go into retirement earlier because of the inheritance. In order not to decrease the number of observations, the expected age of going into retirement is used. Now, the people who expect to retire earlier but are not in retirement already are included and it is still possible to take the potential effect of receiving an inheritance on the probability to go into retirement into account.

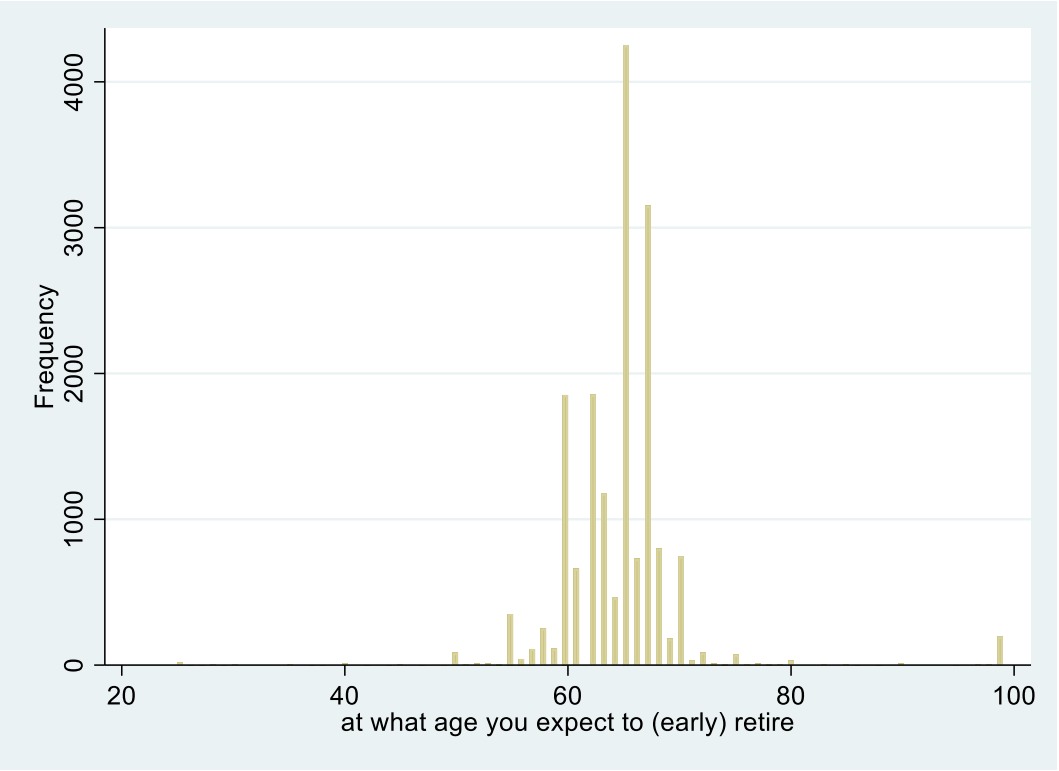

Figure 5

Frequency histogram showing at what age the respondents expect to retire

A histogram of this variable in this dataset is deviated. 1% of the total observations expects to retire somewhere between the age of 25 and 55. The vast majority of the observations, around 91% expects to retire between the ages of 59 up to and including 70. 65 is the most common observation with 4,253 observations followed by 67 with 3150 observations. These two peaks follow logically from the government legislations. In 2012, the government decided to increase the retirement age for which someone receives government benefits. The age was 65 and would increase to 67. Most of the data is collected before 2012 so a mode of 65 is coherent. The increase in the retirement age goes in steps and the age at which you will receive government pension benefits is dependent on your year of birth (Ministerie van Algemene Zaken, 2020). In 2024, the retirement age is supposed to be 67 (Ministerie van Algemene Zaken, 2020). After that, the plan is to increase the retirement age by 8 months for every year increase in the life expectancy (Ministerie van Algemene Zaken, 2020).

The last dependent variable is being self-employed. The trend of self-employment over the years can be seen in figure 6.

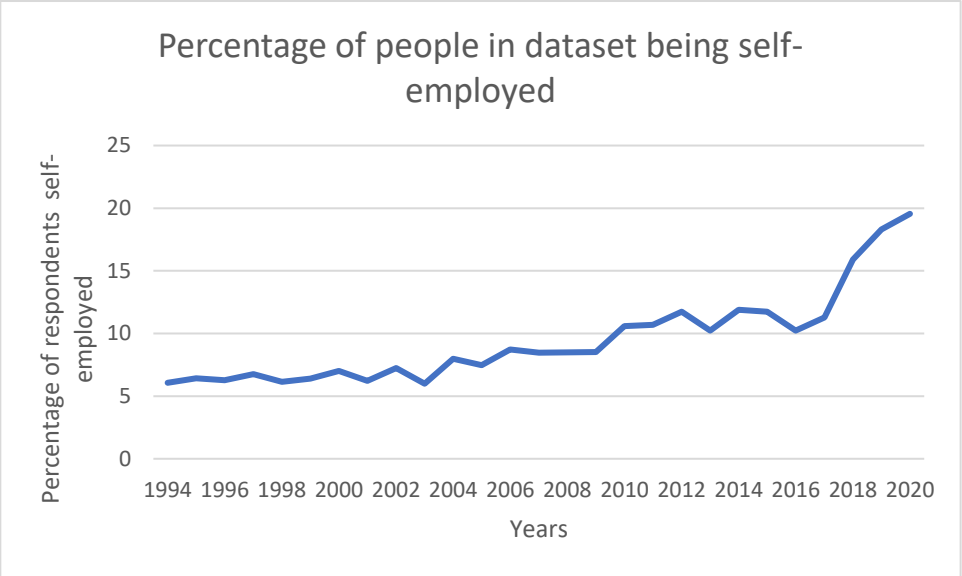

Figure 6

The percentage of respondents who are self-employed over the research period

Self-employment has an increasing trend. Until 2003, around 6% of the respondents were self-employed. In the total population of The Netherlands, this is around 1 million people in the labour market (CBS, 2021). After, 2003, the slope of the increase become higher and the slope increased even further in the most recent years. For example, in 2019 18.31% of the sample were self-employed. This is relatively three times the amount of the years at the beginning of the research period. In 2019, it was approximately 1.5 million people in the Dutch labour market who were self-employed. Because self-employment is increasing and literature showed that a switch towards self-employment could lead to an increase in working hours, self-employment is relevant to investigate in this research.

There are multiple reasons why people are starting as an entrepreneur. The most used reason is that they want a new challenge (Van der Torre et al, 2019). Another reason is that they want to determine themselves when and how much they work (Van der Torre et al, 2019). Other reasons that are often used is that they did not want to work for a boss anymore and that they always wanted to be self-employed (Van der Torre et al, 2019). Dismissal or no contract extension or changing towards self-employment because the employer wants it plays a smaller role (Van der Torre et al, 2019). From an international perspective, self-employment is in The Netherlands not much different from most other European countries. This can be seen in figure 7.

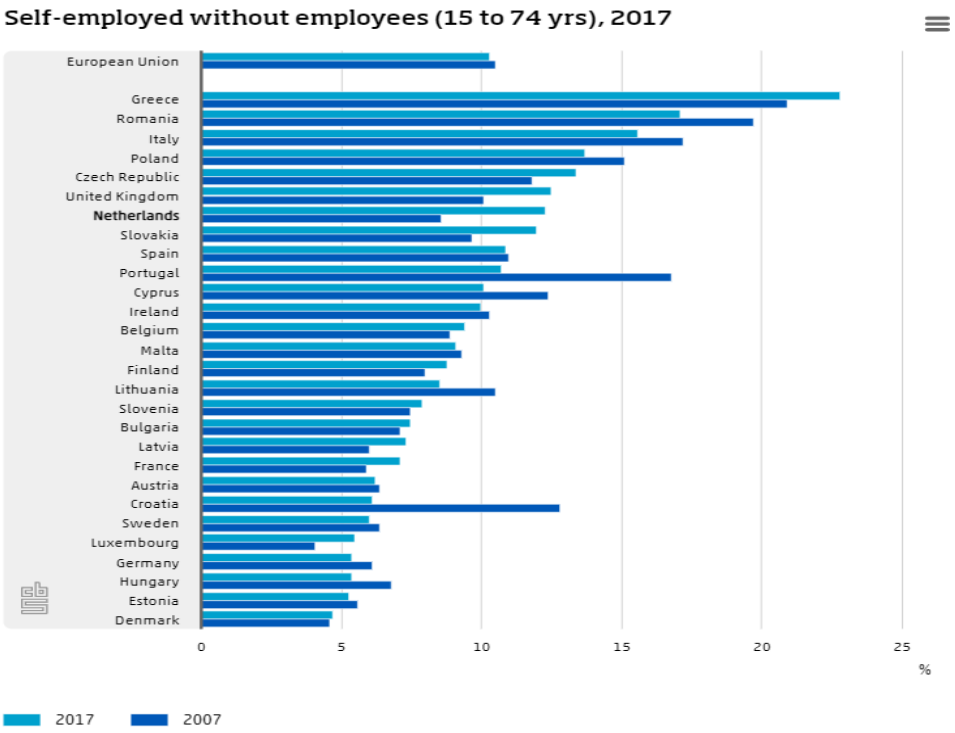

Figure 7

The self-employed without employees rate of The Netherlands in perspective of other European countries (Source: CBS)

To provide more information about the main independent variable in the second and third regression for each dependent variable, more information about the sum of inheritances/gifts received are given in figure 8.

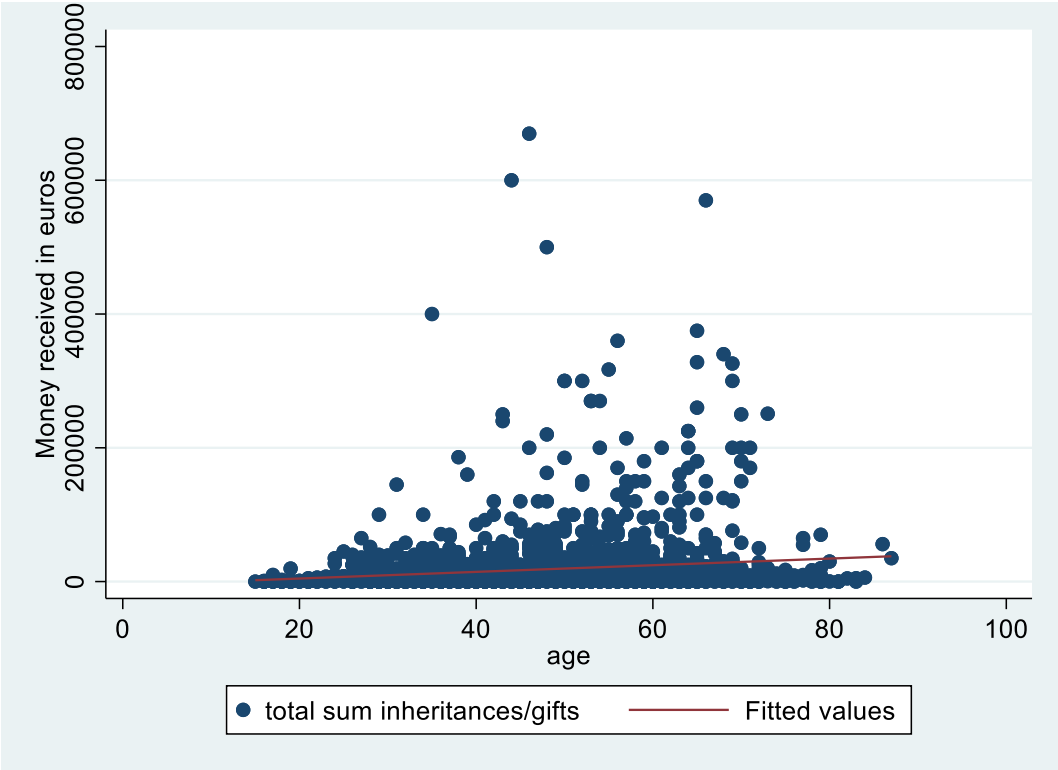

Figure 8

Scatterplot between age and the inheritance/gift received in this dataset

Figure 8 shows a scatterplot of the age individuals received an inheritance in the dataset. The y-axis shows the sum of inheritance the respondent received. Each point in the scatterplot is an observation. What can be noticed is that most inheritances that are received are below 100,000 euros. Overall, the scatterplot has an ascending gradient. Under the age of thirty less people received an inheritance/gift compared to older age groups. After the age of 70, the amount of people who receive an inheritance decreases again. Most inheritances are received between 50 and the retirement age.

6. Results

The statistics and figures that form a basis for this research, now have been discussed. Therefore, the regression analyses are performed in this section. The regression analyses attempt to find out what the effect of receiving an inheritance or gift is on labour supply. Moreover, there is determined what the extent of this possible relationship is and if the outcomes of this research are in the same directions as the expectations based on the literature. There may be several trends that can influence hours worked, the expected retirement age and self-employment. That is why time dummies and other relevant variables are also included in the regressions. Within the regressions, it is important to take a look at the significance.

The first regression is executed to see the potential effect of receiving an inheritance on the intensive margin of labour supply. For this regression, only people who work at least one hour per week are selected. The results in table 2 consist of three different parts. Column one shows the results of the fixed effects regression with a dummy variable, whether someone receives an inheritance/gift, as the main independent variable. Column 2 is also a fixed effects regression. However, the main independent variable this time is the sum of inheritance/gifts received in thousands. The third column is another regression. Here, instead of the fixed effects method, the pooled OLS regression method is used. The main independent variable in this regression is the sum of inheritance/gifts received in thousands.

Table 2

Display of the different regression coefficients on hours worked

Actual hours weekly worked	(1) Coefficient Fixed effects regression with dummy	(2) Coefficient Fixed effects regression showing the amount	(3) Coefficient Pooled OLS regression
Inheritance/gift	-0.3642	0.003683	-0.001505
Age	-0.07279	-0.07227	-0.04317***
Health	0.1015	0.09917	-0.4884**
Number of children	-0.2328	-0.2334	-0.07470
Hours like to work	0.1485***	0.1488***	0.4213***
Dummy owner of house	1.4525***	1.4497***	1.2987***
Amount owner of house	-7.30e-09	-2.24e-08	4.64e-06***
Total net household income	-0.0000708	-0.0000748	-0.0003252*
Marital Status			
Married	-0.03087	-0.02123	0.4897
Divorced	0.1819	0.1587	-1.8711***
Living together	-0.1511	-0.1514	-0.03089
Widowed	0.7339	0.7211	-3.1181**
Never married	0.5715	0.5824	0.1826
Year			
1996	-0.05103	-0.0406	-1.09621***
1997	-0.3928	-0.03860	-1.0452***
1998	-0.1347	-0.1287	-2.2275***
1999	-0.1856	-0.1948	-1.9562***
2000	-0.0601	-0.6121	-1.1348
2001	-1.4322	-1.4333	-2.1668***

2002	-2.5416**	-2.5326**	-3.7481***
2003	-2.0345*	-2.0292*	-2.3471***
2004	-2.3828*	-2.3853	-3.2200***
2005	-2.1428	-2.1475	-2.7001***
2006	-2.3237	-2.3326	-2.7020***
2007	-2.2922	-2.2967	-2.8832***
2008	-1.9994	-2.0061	-2.0331***
2009	-1.9256	-1.9400	-1.1792**
2010	-2.6784	-2.6802	-2.5318***
2011	-2.1454	-2.1496	-2.1291***
2012	-2.7357	-2.7401	-2.7783***
2013	-2.8346	-2.8424	-2.0300***
2014	-2.8702	-2.9022	-1.5238***
2015	-3.1010	-3.1248	-2.7156***
2016	-3.2430	-3.2679	-3.0262***
2017	-3.1234	-3.1312	-2.5961***
2018	-3.1812	-3.1935	-3.0876***
2019	-3.4967	-3.5063	-3.0363***
2020	-3.8284	-3.8416	-3.2360***
Constant	36.3537***	37.0352***	27.3834***
Number of observations	16,089	16,073	16,073
Number of groups	5239	5236	
R2	0.2197	0.2200	0.2855

Note **p>0.1 **p>0.05***p>0.01* (Standard error adjusted for clusters in household)

Table 2 shows the results of the first regression analyses. The coefficient represents the slope between the independent variables and the dependent variable (Healey, 2011). The fixed effects regression with the dummy variable has a negative coefficient. This means that someone who received an inheritance would have a higher probability of going to work less. However, these results are not significant and therefore, there cannot be concluded that receiving an inheritance/gift would lead to a small decrease in the amount of hours worked. The coefficient showing the amount of inheritance received has a positive coefficient. This would incline that an increase in the inheritance/gift with a thousand euros leads to an increase in the number of hours worked per week. But again, these results are not significant and this cannot be concluded.

There are two control variables significant in the first two regressions. These are the number of hours per week someone likes to work and whether someone owns a house. So if someone likes to work one hour extra per week, the actual amount of hours someone works increases with 0.1485 hours per week. This is significant with a 99% confidence level and is according to the expectations. Whether someone owns a house is used as a proxy variable for wealth in this research. The coefficient of 1.4525 means that someone who is a homeowner generally works 1.4525 hours per week more than someone who is not a homeowner. This relation is significant at a 99% confidence level. Based on the literature review, the expectations are that wealth would have a negative effect on labour supply. The results in these regressions go therefore against the expectations. Except for two time dummies, for the other control variables no significant effect can be found. Therefore, there can not be concluded that there is a causal relationship between these variables and the number of hours someone works.

The pooled OLS regression shows a lot more significant variables than the fixed effect regressions. The variables that are significant in the pooled OLS regression show that there is a correlation between these variables and the number of hours someone works. However, because of the differences with the more valid fixed effect regressions, these relations are probably no causal relations with the number of hours someone works. The main independent variable, the amount of inheritance/gifts received is also not significant in the pooled OLS regression. The R^2 are 0.2197 and 0.2200 in the fixed effect regressions. This means that 21.97% and 22.00% of the potential relationship between the actual amount of hours someone works per week can be explained from the independent variables that are chosen. An R^2 that is between 0.1 and 0.25 shows a weak relation (Healey, 2011).

The regressions in table 2 show the effects of receiving an inheritance on the intensive margin of the labour supply. As told before, it is also relevant to investigate the extensive margin of labour supply. Therefore, the regressions in table 3 are conducted. The extensive margin of labour supply is investigated by determining the probability of going into retirement. The dependent variable that is used is the expected retirement age. Again, column one shows the results of the fixed effects regression with a dummy variable whether someone receives an inheritance/gift as the main independent variable. Column 2 is also a fixed effects regression but the main independent variable this time is the amount of inheritance/gifts received in thousands of euros. The third column is another regression. Here, instead of the fixed effects method, the pooled OLS regression method is used. The main independent variable is the amount of inheritance received.

Table 3

Display of the different regression coefficients on the expected retirement age

Expected retirement age	(1) Coefficient Fixed effects regression with dummy	(2) Coefficient Fixed effects regression showing the amount	(3) Coefficient Pooled OLS regression
Inheritance/gift	0.03144	0.0007965	-0.001550
Age	0.1631***	0.1626***	-0.01488
Health	-0.07818	-0.07757	-0.1190
Number of children	-0.1752	-0.1774	0.01242
Grandchildren	0.1789	0.1762	-0.1443
Hours like to work	0.02295**	0.0230**	0.04964***
Dummy owner of house	0.8580**	0.8579**	-0.2174
Amount owner of house	-1.80e-06	1.81e-06	-1.82e-06***
Total net household income	8.25e-06	8.74e-06	0.0000264
Marital Status			
Married	-0.2820	-0.2811	0.1399
Divorced	-0.7275	-0.7272	0.6816***
Living together	0.1424	-0.1394	0.3322
Widowed	-0.7754	-0.7744	1.1387**
Never married	-0.2295	-0.2316	0.4345**

Year			
1996	0.1218	0.1208	0.1655
1997	-0.1599	-0.1629	0.09457
1998	-0.0506	-0.0521	0.3835
1999	-0.1596	-0.1616	0.03080
2000	-0.2473	-0.1948	-0.7029
2001	-0.4716	-0.4796	0.6432
2002	-0.6201	-0.6466	0.6139
2003	-0.6266*	-0.6340*	0.3264
2004	-0.8040**	-0.8106**	0.2417
2005	-0.8363**	-0.8429**	0.2014
2006	-0.6265*	-0.6318*	0.6648*
2007	-0.5615*	-0.5664*	1.0622***
2008	-0.2419	-0.2458	1.3999***
2009	-0.1161	-0.1196	1.8381***
2010	1.2753	1.2726***	4.1220***
2011	0.7803**	0.7779**	3.6452***
2012	-0.1471	-0.1493	2.7055***
2013	0.3159	0.3139	3.2047***
2014	0.0626	0.05766	3.2067***
2015	0.3210	0.3184	3.6443***
2016	0.4283	0.4148**	3.8110***
2017	0.3757**	0.3760**	3.9429***
2018	0.3003**	0.3017*	4.1237***
2019	0.08781	0.0894	4.0709***
2020	0 (omitted)	0 (omitted)	4.2984***
Constant	55.3000***	55.2725***	62.2032***
Number of observations	8252	8245	8245
Number of groups	2401	2401	
R2	0.0165	0.0167	0.1697

Note **p>0.1 **p>0.05***p>0.01* (Standard error adjusted for clusters in household)

Table 3 shows the results of the regressions with the expected retirement age as the dependent variable. The coefficients of receiving an inheritance/gift on retirement are positive, meaning that receiving inheritance would lead to an increase in the expected retirement age. This would not be according to the expectations of the literature. However, for these coefficients, no significant effect is found. Therefore, no conclusions can be drawn. So it cannot be said that receiving an inheritance/gift has a positive impact on the expected retirement age.

Besides the constant and time dummies, three variables do give a significant effect on the expected retirement age. These variables are age, the hours someone likes to work and the indicator that shows whether someone owns a house. The coefficients of age are 0.1631 and 0.1626 and the results are determined with a 99% certainty. The coefficient of 0.1631 means that an increase of the age of 1 probably leads to an increase of the expected retirement age with 0.1631 years. This goes against the expectations of this research. The age where you receive AOW, the Dutch government pension benefits is dependent from the year on birth (Ministerie van Algemene Zaken, 2020). People that are older receive these benefits at a younger age than the younger people will. The results in the regression analyses are therefore unexpected. A potential explanation for this is that younger people are uninterested in pensions and therefore unaware that they probably have to work longer than the current AOW-age while elderly workers are more aware of the legislation and have more realistic expectations. The hours some

likes to work has a significant effect on the expected retirement age. An increase of one hour in the number of hours someone likes to work per week leads to an increase in the expected retirement age of 0.02295 years. This relation follows logically from the expectations. Someone who likes to work more probably does not hate their work and expects to retire later. The proxy variable of wealth, being an owner of a house, also has a significant effect on the expected retirement age. The coefficient means that owning a house generally leads to an increase in the expected retirement age of 0.8580 years. This relation is determined at a 95% confidence level. Based on the literature, the expectation was that wealth leads to an increase in the probability of going into retirement more early. So the results of this control variable are in contradiction with the theories of the literature. A possible explanation for this contradiction can be that, such as age, there is a variable that impacts both being an owner of a house and the expected retirement age.

The pooled OLS regression showed significant results for the hours someone likes to work, marital status factors where only one person in the household works and the amount of euros the house that someone owns is worth. The correlation between being divorced, widowed and never married on the expected retirement age can possibly be explained by the fact that because in general only one person earns income in this household, the need to earn money remains longer and this person expects to have to work longer. The correlation of the variable showing the amount the house is worth on the expected retirement age is negative in the pooled OLS regressions. This follows logically from the literature, With this proxy variable, it is assumed that when the house is worth more, the wealth of the respondent is higher. According to the theory, this person then has the opportunity to go into retirement more early. So these correlations can be explained.

The literature and descriptive statistics show that self-employment is increasing in The Netherlands and that the switch towards self-employment possibly leads to an increase in the labour supply. To take this into account, the regressions in table 4 are executed. Like, the other regressions, the columns represent respectively a fixed effects regression with a dummy as the main independent variable, a fixed effect regression showing the amount as the main independent variable and an OLS regression showing the amount as the main independent variable. Because the dependent variable is a dummy variable, the linear probability model is used.

Table 4

Display of the different regression coefficients on being self-employed

Self-employment	(1) Coefficient Fixed effects regression with dummy	(2) Coefficient Fixed effects regression showing the amount	(3) Coefficient Pooled OLS regression
Inheritance/gift	0.002178	0.0001283	0.0004744*
Age	-0.0006286	-0.0008387	0.002716***
Health	-0.007325	-0.007143	-0.005518
Number of children	0.007121	0.006843	0.003200
Hours like to work	-0.0004049	-0.0003978	-0.0004872
Dummy owner of house	-0.01805	-0.01936	-0.06871***
Amount owner of house	2.67e-08	2.78e-08	1.33e-07***

Total net household income	5.72e-06*	5.75e-06*	-3.55e-07
Marital Status			
Married	0.01646	0.01651	0.09967***
Divorced	0.06472**	0.06467**	0.02631
Living together	0.0.1738	0.01698	0.05857***
Widowed	0.07624*	0.07649*	0.1177**
Never married	0.0002315	0.003799	0.02891*
Year			
1996	-0.007730	-0.007378	-0.002054
1997	0.01227	0.01264	0.009869
1998	0.02418	0.02492	0.003023
1999	0.03737	0.03780	0.01196
2000	0.01379*	0.01809*	0.003941
2001	0.006118	0.006992	-0.01651
2002	0.005151	0.005692	-0.0104
2003	0.006357	0.007739	0.005349
2004	0.04392	0.04564	0.04481***
2005	0.03343	0.03533	0.03759***
2006	0.04673	0.04879	0.05515***
2007	0.03886	0.04122	0.04147***
2008	0.03707	0.03940	0.03778***
2009	0.04107	0.04388	0.0332**
2010	0.05480	0.05762	0.04738***
2011	0.05976	0.06273	0.07371***
2012	0.07587	0.07894	0.09585***
2013	0.06653	0.06979	0.06629***
2014	0.07403	0.07827	0.08035***
2015	0.06387	0.06718	0.06544***
2016	0.05498	0.05701	0.04971***
2017	0.06932	0.07235	0.06156***
2018	0.08904	0.09300	0.09345***
2019	0.1143	0.1183	0.1198***
2020	0.1085	0.1129	0.1184***
Constant	0.1304	0.1382	-0.02447
Number of observations	18495	18476	18476
Number of groups	5903	5901	
R2	0.0167	0.0156	0.0402

Note **p>0.1 **p>0.05***p>0.01* (Standard error adjusted for clusters in household)

The results of the regressions are shown in table 4. Receiving an inheritance/gift has a significant effect on self-employment in the OLS regression. This relation is positive and with 90% confidence. This coefficient means that receiving an inheritance of thousand euros extra increases the probability that someone is self-employed by 0.002716 percentage points. However, the fixed effect regressions do not show a significant relation of receiving a gift/inheritance on self-employment. Therefore, the correlation in the OLS regression is probably not a causal relationship and no conclusions can be drawn. The only variables that do have a significant effect on the dependent variable in the fixed effect regressions are the total net household income, being divorced, being widowed and one time dummy variable. The net household income has a positive influence on the probability of being self-employed. This means that the probability that someone is self-employed increases with 5.72e-06 percentage

points if the total net household income increases with one unit. The direction of this effect follows logically from the literature. The pooled OLS estimations shows a significant effect for multiple control variables, however, because these variables do not show a significant effect in the more reliable fixed effect regressions, no conclusions can be drawn for these variables.

7. Conclusion

This research attempts to investigate the influence of receiving an inheritance on labour supply in The Netherlands. To investigate this, regressions on different dependent variables are conducted. The fixed effects regression method is used to generate the results. The dataset is from the Dutch national Bank household survey and the research period is from 1994 until and including 2020. The three dependent variables are the actual number of hours someone works, the expected retirement age and whether someone is self-employed. The labour supply is divided into the intensive and extensive margin of the labour supply, the expected retirement age measures the extensive margin and the actual number of hours worked measures the intensive margin of labour supply in this research. In addition to the dependent variables and the main independent variables, extra variables are included. These variables are also included in the regressions because they can prevent omitted variable bias.

The expectations of the literature are that receiving an inheritance leads to no or a small reduction in the number of hours someone works. A null hypothesis is conducted in the theoretical framework to test this. This first null hypothesis is:

1. *H_0= Receiving an inheritance or gift does not have an effect on the number of hours people work*

The results of the regressions with the actual number of hours as the dependent variable show a negative coefficient of receiving an inheritance for the fixed effect regressions with the dummy variable and a positive coefficient for the fixed effect regression showing the sum of inheritance/gifts received and a negative coefficient on for the OLS pooled regression. However, none of the regressions showed a statistically significant effect between the inheritance/gift received on the actual amount of hours someone works per week. Therefore, no conclusions can be drawn and the null hypothesis cannot be rejected and the alternative hypothesis cannot be adopted. These empirical results follow the trend of the literature showing no to little effects on hours worked. This research fits therefore in the expectations based on the literature.

The regressions with the expected retirement age are conducted to investigate the effects on the extensive margin of the labour supply. Most studies about this subject did study the actual retirement age and not the expected retirement age. However, these studies can form an expectation for this research. Brown et al. (2010) found that the probability of going to retirement more early is increasing when receiving an inheritance (Brown et al, 2010). Other studies do find a small effect or they do not find an effect statistically different from zero. So overall, based on the literature, the expectation is that receiving an inheritance leads to a lower retirement age and in this research, there is expected that it therefore also leads to lower expected retirement age. To test this, a null hypothesis is conducted. This second null hypothesis is:

2. *H_0= Receiving an inheritance or gift has no effect on the expectation of going to retirement*

The empirical results of the regression analysis show a positive effect between the two variables. This would mean that receiving an inheritance would lead to an increase in the

retirement age. However, because this coefficient is not significant, this result cannot be interpreted. The null hypothesis can, based on the regressions in this research, therefore not be rejected and the alternative hypothesis cannot be adopted. The results in this research is at variance of the findings published by Brown et al. (2010) but in the same lines as other literature like Jouflain & Wilhelm (1994), Sila & Sousa (2014).

An interesting observation in this regression is that the proxy variable for wealth does have a significant positive relation with the expected retirement age. The expectations were that wealth would lead to a higher probability of going into retirement more early. So the effect is the opposite of the expectations.

Literature and descriptive statistics show that self-employment is increasing in The Netherlands and that the switch towards self-employment possibly leads to an increase in the labour supply. To take this into account, regressions with self-employment as the dependent variable are executed. To test these regressions, the following null hypothesis is set up:

3. *H_0= Receiving an inheritance or gift has no effect on self-employment*

The empirical result of the pooled OLS regression shows a positive significant effect for receiving an inheritance/gift on self-employment indicating that receiving an extra thousand euros of inheritance/gift increases the probability to be self-employed. The fixed effects regressions do not show significant results for this variable. Because of the limitations of pooled OLS, these are only used to compare the results with the fixed effects regressions. Because the fixed effect regressions do not show a significant result, the null hypothesis cannot be rejected and the alternative hypothesis cannot be adopted. Therefore, there cannot be concluded that the correlation found in the pooled OLS regression is a causal effect and that switching towards self-employment leads to an increase in labour supply.

Now that the link between the findings and hypotheses of the literature and the empirical results of the regressions is made, the research question can be answered. The research question is: *To what extent does receiving an inheritance cause a decrease in the labour supply in The Netherlands?*

In this research, labour supply is divided into the intensive margin and extensive margin of labour supply. One is investigated by looking at the relationship between receiving an inheritance/gift and the actual number of hours worked, the other by looking at receiving an inheritance/gift and the expected retirement age. For both the intensive and extensive margin of labour supply, no significant effect is found with receiving an inheritance or the sum of the inheritance. Therefore, based on this research, the answer to the research question is that there cannot be concluded that receiving an inheritance leads to a decrease in the labour supply in The Netherlands.

8. Discussion

There are some critical comments to be made about this research. Therefore, in the following section, there is discussed what the limitations of this research are. The potential errors and points of improvement are explained. Also, the policy implications and possibilities for future research are discussed.

One limitation of this research is the main independent variable. This study aims to investigate the potential effect of an inheritance on labour supply. However, the main independent variable in the first column of the regressions is a dummy variable showing whether someone receives an inheritance/gift and the main independent variable in columns two and three show the sum of inheritance/gifts received. Even though the effects of receiving an inheritance and receiving a gift are based on the same principles, because the main independent variables of the regressions do not make a distinction between receiving an inheritance and receiving a gift, it is difficult to prove that receiving an inheritance is the factor that has the impact on labour supply and not receiving a gift. Having a variable that only looks at whether someone receives an inheritance and a variable that gives the sum of inheritances received would be an improvement.

Another limitation of this study is that this study does not take into account whether an inheritance/gift is expected or unexpected. Literature showed that there is a substantial difference between people who expect an inheritance and the people who do not. Being able to distinguish between an expected and unexpected inheritance is seen as crucial (Suari-Andreu, 2018). This is therefore potentially the biggest limitation of this research. The problem behind this is that the people who expect an inheritance already take this wealth transfer into account before actually receiving the inheritance. The moment the inheritance is received does not change much since the preferences were already changed beforehand. The reason why this is not included in this study is that the provided data did not have information on this. However, only looking at the effect when the inheritance is actually received and not taking into account if the inheritance is expected is a major limitation.

Moreover, there is another limitation. This study is conducted based on the Dutch National Bank Household Survey. The values in this survey are not controlled for mistakes made by the respondents. Therefore, typing errors or untrue data could have an impact on this research, this is a limitation.

Lastly, there is controlled for omitted variable bias by including control variables in the regressions. However, it is impossible to take all potential variables into account. An attempt is made to include the most important control variables but there is a possibility that relevant variables are missing. An example of variables that potentially could have an influence and are missing are the death of the parents, survival probabilities or savings.

This research did not find a significant effect of receiving an inheritance on labour supply. The null hypotheses cannot be rejected. Because no conclusions are drawn, there are no policy implications for policymakers in this research.

The fact that no significant result is found between inheritance received on labour supply does not necessarily mean that there is no relation. Especially when taking into account if the inheritance is expected could lead to different results. Therefore, future research on this topic is needed. This can consist of similar existence as this research with the addition of other control

variables that can be seen as relevant. Also, future research regarding the extensive margin of labour supply can look at the effect of the actual retirement age instead of the expected retirement age if the number of observations is large enough. However, as been told before, it is most important to do a similar study in The Netherlands but this time with taking the expectation of an inheritance into account. Another reason why future research on this topic is helpful is because there is a need for repetitive research (Klarsfeld, Christiansen, Kuvaas, B., & van Witteloostuijn, 2016).

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10. Appendix

Table 5

Variable definitions

Variable	Definition
Actual weekly hours worked	The number of hours the respondent has worked per week; measured in the number of hours
Expected pension age	The age in years the respondent expects to go into retirement; measured in years
Self-employment	Dummy variable indicating if the respondent is self-employed; 1=self-employed 0= not self-employed
Inheritance (column 1)	Dummy variable showing whether someone received an inheritance/gift, 1=inheritance/gift received ; 0=no inheritance/gift received
Inheritance (column 2 & 3)	Variable showing the amount of inheritances/gifts received measured in thousands of euros
Age	Year of research - year of birth= age; number=age
Health	General health condition; 1= excellent, 2= good, 3= fair, 4= not so good, 5= poor
Number of children	Number of children in the household
Number of grandchildren	Dummy variable indicating whether someone has grandchildren; 1=yes 2=no
Hours like to work	The number of hours per week someone would like to work; measured in the amount of hours
Dummy owner of house	Dummy variable indicating if someone owns a house; 1= owns a house 0= does not own a house
Amount owner of house	The amount of euros the houses owned are worth; measured in value in euros
Total net household income	The total net income of a household over a year; 1= >= 0 & < 8000, 2= >=8000 & < 9500, 3= >=9500 & < 11000, 4= >=11000 & < 13000, 5= >=13000 & < 16000, 6= >=16000 & < 20000, 7= >=20000 & < 26000, 8= >=26000 & < 38000, 9= >=38000 & < 50000, 10= >=50000 & < 75000, 11= >=75000
Marital Status	Showing the marital status; 1= married or registered partnership, 3= divorced from spouse, 4= living together with partner (not married), 5= widowed, 6= never married
Year	Dummy variable indicating the year

Table 6

Summary statistics of control variables

Variable	Observations	Mean	Median	Std. dev	Min	Max
Age	134,815	49.59	48	17.885	0	150
Health	60,405	2.11	2	0.732	1	5
Number of children	134,642	1.22	1	1.269	0	7
Dummy grandchildren	43,163	1.64	2	0.477	1	2
Hours like to work	40,035	29.79	32	13.131	0	168
Dummy owner of house	44,022	0.67	1	0.468	0	1
Amount owner of house	44,020	205024	200000	472947	0	8.89+e07
Total net household income	48,764	1336.80	8	271707	0	6.00+e07
Marital Status	64,385	2.51	1	1.976	1	6
Year	73,373	2005.58	2005	8.453	1994	2020