ERASMUS UNIVERSITY ROTTERDAM

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Master Thesis Policy Economics

The effect of a positive income shock on labour supply – An Australian study of the effects of inheritance receipt on labour supply

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Abstract

This paper examines the effects of inheritance receipt on individual labour supply by using the panel data gathered by the Household, Income and Labour Dynamics in Australia (HILDA) survey. The results suggest that individuals who received an inheritance, although the effect is small, are more likely to drop out of the labour force. Individuals that received an inheritance are also more likely to adjust their average hours of work per week, the average hours worked decrease on average with about 1.1 hours. The empirical findings both suggest effects are stronger for men and are stronger when the amount of the inheritance increases. Men adjust their labour supply immediately after inheritance receipt, while the response by women is lagged. No significant effects are found for earlier retirement because of inheritance receipt or changing the type of labour after inheritance receipt.

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I.   Introduction

The growing problem of income inequality has received more and more attention over the years worldwide, especially after Piketty (2011) shed some light on this problem. One of the biggest problems of wealth accumulation, which leads to more income inequality, are inheritances according to current economic theory. The reason being, that people with more wealth make other choices in their labour supply. It is therefore likely that, because the wealth of a person changes with the receipt of an inheritance, there will be effects in their labour supply as well. In several current models used by researchers as well as policy makers however, the assumption is made that the effect of wealth on labour supply is zero, as proposed in the model by Greenwood, Hercowitz and Huffman (1988). For several other studies, the assumption is made that leisure is a normal good, suggesting wealth does impact labour supply. To draw correct conclusions in the research field, it is important to examine the effect of wealth on individual labour supply and conclude what the actual impact is, to be able to make more precise and better assumptions for the models used. For policy makers the effect of wealth on individual labour supply is also important, especially since there is growing attention for the mitigation of inequality over the years. If inheritances would impact the individual labour supply, this might give important insights for potential welfare programs and taxes to be introduced in an attempt to decrease the inequality. Although there are several studies done on this subject for multiple countries, it has not yet been done for Australia, while this specifically is a country that has no inheritance taxation yet abandoned it about four decades ago.

This paper analyses several labour supply variables and looks whether and in what way inheritance receipt changes the individual labour supply choices. The research question for this paper is therefore: *Do individuals adjust their labour supply after receiving a positive income shock in the form of an inheritance?* The data used for this analysis is the Household, Income and Labour Dynamics in Australia (HILDA) survey. By using this data, I show the negative impact of inheritance receipt on individual labour supply choices is small but significant. Individuals that receive an inheritance do adjust their labour supply.

I find people are more likely to quit the labour force after inheritance receipt. I do not find people change the type of work after inheritance receipt (e.g. change from employee to having an own business). People tend to work less hours per week after having received an inheritance, they decrease their labour supply by about 1.1 hours per week. I find the effects are stronger for men and when the inheritance amount received is between $75,000 and $500,000 dollars, people that receive such amounts tend to work almost 2.5 hours less per

week. Last, I looked at the effects of inheritance receipt on retirement. In this study, I do not find any significant effects, for example people choosing early retirement after inheritance receipt.

Next, I looked for possible lead or lagged effects of inheritance receipt on labour force status and the average number of hours worked per week. I also differentiated between men and women, looking whether this changed the results. I find more and stronger effects for men, especially in the average number of hours worked per week. After 4 years of inheritance receipt, men tend to work almost 4 hours less per week, while women work at most 1 hour less per week. The effects for men are also immediate, while the effect for women is, if there is any, lagged. The labour force status effects are slightly negative and seem quite similar, although again the effect for women is lagged while for men there is an immediate effect.

The paper is structured in the following way. Section 2 presents the theoretical framework, discussing several papers and giving some indications for expected results. Section 3 describes the data and section 4 describes the methodology and presents some descriptive statistics. Section 5 discusses the empirical results, section 6 concludes.

II.   Theoretical Framework

i.   Labour Supply

To analyse the effect of income shocks on labour supply, it is crucial to analyse what kind of good leisure is. In most macroeconomic models, it is assumed that leisure is a normal good. This is also taught in most (economic) schools. When leisure is a normal good, it means the income effect of an increase in wealth, leads to an increase in the amount of leisure and a decrease in the labour supply. This theory is supported by many studies done concerning this subject. Mocan and Altindag (2011) conclude in their study done by analysing an exogenous shock in the salaries of members of the European Parliament, that an increase in overall salaries reduced the labour supply and therefore increased the demand for leisure. The same is concluded by Sila and Sousa (2014). They investigated empirically whether workers adjust the number of hours worked in response to windfall gains and losses. They find for windfall gains; individuals are more likely to drop out of labour force and they find this effect increases when the windfall gain increases. They also find the effects are larger for young and old individuals and married individuals with younger children. However, for single individuals without children the effect is positive, explained by for example setting up their own business or becoming self-employed.

However, leisure could also be an inferior good. This would mean the effect of an increase in wealth does not impact the labour supply of individuals. Beaudry and Portier (2014) find in their study in which the effect of a news shock on macroeconomic variables is analysed, that there is no effect of wealth on individual labour supply.

ii.   Wealth Shocks

A way to test the exact effect of wealth on labour supply, is by examining this by using natural experiments. The advantage of natural experiments is that this overcomes endogeneity issues. There could be a correlation between non-labour income and unobserved preferences for work. In the empirical literature, several types of natural experiments are examined to look at an exogenous income shock on labour supply.

The first type of natural experiment that is used in the empirical literature, is the wealth shock by a lottery. This is also examined by Picchio, Suetens and van Ours (2018). This article uses data from the Dutch state lottery to look at the effect of winning a substantial lottery prize and how this affects an individual's labour supply. They do find a small but significant effect, people who win a substantial amount at the lottery, tend to work less hours from the moment they win the lottery. Cesarini, Lindqvist, Notowidigdo and Östling (2017) use data from Swedish lottery players in a calibrated dynamic model. They study the effect of monetary prizes on labour supply. They find that winning a lottery prize reduces earnings, a persistent and immediate reduction. They find the effect of winning a lottery price on earnings is similar for all ages, education level and gender. The same was also concluded by Arvey, Harpaz and Liao (2004), who conducted a study amongst lottery winners in the United States, in the state Ohio. Using several regression models, they also find that the amount of money won in a lottery is significantly related to whether individuals continued to work. In this study work centrality also played an important role, by work centrality the authors mean how important work was in their life.

The second type of natural experiment examined in the empirical literature is the sudden wealth shock caused by changes in taxes or social security. Since sudden changes in taxes or social security systems are independent of individuals decision making, they can be used to study the effect of wealth changes on labour supply. The first natural experiment is a tax reform of the French minimum income. Census data was used, and a regression discontinuity design was used to study the effect of the French minimum income. It is found the increase in French minimum income tax reform significantly drops the labour supply of

uneducated childless single men (Bargain and Doorley, 2011). Coile and Gruber (2007) study the effect of a social security policy on labour supply decisions. Survey data from the United States is used and implemented in a model that studies the impact of social security incentives. They find that social security policies are significant determinants of retirement, and therefore reduce labour supply.

The last type of wealth shock that might affect labour supply is the effect of inheritance receipt. Joulfaian and Wilhelm (1994) find that inheritances do not impact the labour supply a lot and do not find large reductions in labour supply by man and married woman. They used panel data from Michigan and created a life cycle model to study the effect of wealth on labour supply. In a more recent study done by Blau and Goodstein (2016) there is found an effect of receiving an inheritance on labour supply by older married couples. They find an inheritance does reduce the labour supply by four percentage points, they however do not find this effect on the labour supply of the spouse. This is an American study and a dynamic, collective model was used to study the effects. In an even more recent study, Niizeki and Hori (2019) also examine the effect of wealth on individual labour supply. They use Japanese panel data and use an individual fixed effect model and find that the receipt of an inheritance does not impact the hours worked by man but does impact the labour supply of women.

iii.   Labour supply effects

The effect of a wealth shock on labour supply could affect the labour supply in various manners. First, individuals could choose to supply less labour, e.g. reduced hours worked per week as studied and found by Blau and Goodstein (2016) and specifically impact the hours worked by women as found by Niizeki and Hori (2019).

Another way is for example the effect on retirement decisions, e.g. people might retire earlier when receiving an inheritance. This has been studied by Garbinti & Georges-Kot (2019), using a French wealth survey with a theoretical model. They find the probability of early retirement is larger among people who receive an inheritance. Eder (2019) uses panel data of several Europeans and uses binary choice models to estimate the effect of inheritance on retirement decisions. He finds receiving an inheritance greatly influences the probability of earlier retirement and also finds the effect becomes even larger when the amount of inheritance that is received is larger. Brown, Coile and Weisbenner (2010) find a similar effect and show in an empirical study that a wealth shock caused by an inheritance significantly increases the probability of retirement.

A study done by Hurst and Lusardi (2004) finds that at the top of the wealth distribution, a positive relationship can be found between the propensity to become a business owner and wealth. They also find that receiving an inheritance predicts business entry (change in type of labour, not so much an increase in labour supply). This same result is also found by Sila and Sousa (2014) among individuals around the age of 40 years old that have no children.

Another effect on the labour supply caused by receiving an inheritance could be an effect of the labour supply of the spouse (Blau and Goodstein, 2016). Lastly, other factors that might influence the effect on labour supply by inheritance receipt could be difference between gender (Niizeki and Hori, 2019; Doorley and Pestel, 2020) or differences in age, when the inheritance is received (Blau and Goodstein, 2016) or differences in marital status, married women might react differently on inheritance receipt than single women (Joulfaian and Wilhelm, 1994).

iv.   The role of expectations

Another factor that might influence the behaviour of individuals when receiving an inheritance is the role of expectations. Standard economic theory predicts people will smooth out their income over time (Morduch, 1995). For the receipt of inheritance this could imply as soon as people expect they will receive an inheritance in the future, they will adjust their economic behaviour, which could mean the effect of the inheritance in economic behaviour is already present before the inheritance is received. Several papers have studied the effect of expected inheritance receipt on economic behaviour. The first paper that examines the effect of expected inheritance on labour supply is the study done by Doorley and Pestel (2016). By using a model and implementing German micro-data they find that specifically women decrease their labour supply by decreasing the hours worked. Both men and women who are self-employed, are more likely to stay self-employed after an inheritance. They also find the effect on labour supply because of an inheritance receipt changes for anticipated and unanticipated inheritances, however the magnitude of the effects is similar. More recently it was found by again using individual level micro-data from Germany and doing empiric research, women are less likely to work full time after inheritance receipt, this effect is larger when the inheritance is unanticipated. Men do not change their labour supply after an inheritance, the effect is the same for anticipated and unanticipated inheritances. They also find the effects are stronger for both men and women without children (Doorley and Pestel 2020). Lundberg (2020) empirically tested the same with Swedish data. He finds that individuals readjust their savings after they

know they can expect an inheritance. He does not find an effect in adjustment of the labour supply for men but does find this effect for women.

v.   Legal framework inheritance taxes and policy relevance

To mitigate the income effect when receiving an inheritance, most countries worldwide will apply an inheritance or estate tax. However, for Australia, the country of interest in this study, inheritance taxes were abolished in 1979. When receiving an inheritance in Australia, there is no tax you have to pay. For OECD countries, the average inheritance tax is about 15%, the median tax rate is about 7%. However, taxes on inheritances differ greatly, with the highest tax rates on inheritances being about 50%.

The inheritance tax is a very unpopular tax, as many people feel the tax is 'unfair', because the heir that leaves the inheritance, has already paid taxes all their life. Therefore, an inheritance tax feels for many individuals as if the amount they inherited is taxed twice, once by the heir and once by the inheritor. However, more and more studies do suggest wealth accumulation is a big cause in inequality. Inheritances do contribute to wealth accumulation, therefore when wealth inequality is seen as a problem, taxing inheritances might be a relevant policy (Piketty, 2011). Although wealth accumulation is not in the scope of this paper, if it is found there are economic behavioural effects on the labour supply caused by inheritances that contribute to inequality, Australia might want to consider taxing inheritances to mitigate these effects.

III.   Data

i.   Household, Income and Labour Dynamics in Australia

The data that will be used in this study is the Household, Income and Labour Dynamics in Australia (hereinafter referred "HILDA") survey. This is a household-based panel data study that collects information of about 12,000 to 17,000 households and includes more than 3,000 to 4,000 variables. The data contains detailed information about an individual's personal financial situation, wealth, health and the labour market, for example retirement and employment information. The dataset also contains several wealth indicators such as socio-economic decile and it also includes several weights. It has started from 2001 onwards and by now there are 19 waves available. For this study, only the last 9 waves will be used (2011-2019). The reason being that from 2011 onwards, the sample was replenished with about 2000 extra households. Therefore, about 17,000 observations each year can be assured and there is also more information available. Lastly, the weights that are included in the dataset are more reliable from 2011 onwards, because the way the weights are composed was renewed and more

reliable because of the addition of the top-up sample. Because of the larger amount of observations, there is also a larger number of individuals that receive an inheritance, which makes the study more reliable.

The data is gathered in several ways. As mentioned, it is survey data and most of the data is obtained by interviewers. There are several questionnaires. The first one is the household questionnaire, this data is obtained by an interviewer, however different household members can answer the data. The main focus is therefore on the household, not on individuals. There are also person questionnaires, these are administered for all household members aged 15 years and older. The person questionnaires are divided into questionnaires for people who have been interviewed before and who have not. These are also obtained by the interviewer. Lastly there are the self-completion questionnaires. These are questions that could be difficult for people to answer directly to the interviewer and are therefore sent to people to be filled in at home and to be returned by mail. Secondly the data is collected and if possible, matched.

Since I am interested in labour supply changes per individual, I will look at data per individual, not per household. There are two different types of individual data collection, data per responding person, this contains all information with the persons who are interviewed themselves. There is also enumerated person data, this contains information on all persons in the responding households, even persons who themselves did not get interviewed. The information of the latter is more limited. Lastly there is a dataset in which all three types of data indicated above are combined. Since I am interested in extensive individual data, the data file used will be the datafile including the responding person data.

The HILDA survey dataset contains an extensive amount of weights for researchers to use. It contains multiple cross-sectional and longitudinal weights. Since this study will look at changes from individuals over time with repeated observations, longitudinal weights will be included. In this study, only responding person data will be used, so there is no data included from self-completion questionnaires. Therefore, the relevant weights are full balanced longitudinal weights from wave 11 until wave 19. The weights used are based on the probability of selecting the household.

The HILDA survey contains information that is important for the study of this paper. First of all, it contains detailed general information about the individuals. For example, the type of household, the number of children and marital status. It also contains information about age and whether someone is already retired. Besides it also has many information about expectations concerning retirement and job satisfaction variables. It contains information about whether someone received an inheritance and the amount of the inheritance. It also contains a

lot of financial information, whether someone is an employee or self-employed, income from royals/dividends or rental income. It also contains information on the different sources of income from governmental benefits and insurances, and information about private and state pensions. Lastly it contains several weight variables and in what decile of the wealth distribution someone belongs to in Australia.

ii. The sample selected

Several changes will be made to the data as provided to be able to study the effects I am interested in. First, the data is provided per wave. As I am only interested in wave 11 until wave 19, I will keep the relevant variables and combine the different datasets per wave to a big panel data set. As there are some individuals who drop out of the survey or who are added, it is an unbalanced data set when appending all the waves. However, to mitigate the measurement errors, a balanced data set is created. All observations are dropped for which there is not an observation every year from 2011 until 2019. Because of this, about 33% of the observations are dropped, so the dataset contains now a total of over 107,000 observations. This means I have data from 9 years from 11,903 individuals.

Second, the dummy *POST* has to be created. This is a dummy that turns one from the year onwards when an individual receives an inheritance. This dummy is crucial in studying several effects as there can now be distinguished between the period before the inheritance is received, and after the inheritance is received. Lastly a time indicator variable is created as well, *InhIt*. This variable takes the value t=0 the year the inheritance is received and takes other values for t considering the year of inheritance receipt. If for example an inheritance is received in 2015, t=0 in 2015, but takes value t = -1 in year 2014 and t = 1 in the year 2016.

The data included one observation with a big outlier, as becomes clear from Figure 1 in the appendix. The amount of inheritance from the outlier was over $5,000,000 while the second largest inheritance amounted about $2,500,000. After the outlier was removed, the data was better distributed as becomes clear from Figure 2 in the appendix. Since the outlier could strongly influence the data, this outlier will be removed from the data. After dropping the outlier, 107,118 observations are left. At last some numeric variables included negative values (e.g. value -1 for 'not asked'), these values were replaced with a missing value to prevent measurement errors.

IV.   Methodology

i.   The individual fixed effects models

Since I will be using panel data, I use an individual fixed effects regression model. Besides this, I want to use several control variables that might influence the effect of the variable of interest. The time invariant control variables will be controlled for in the fixed effects model already, therefore only time variant control variables will be included. The following variables will be controlled for: age, marital status, education, number of resident children and income. These variables are based on available studies as discussed in the theoretical framework. The reason the number of resident children is included, is because people might change their employment status when having more resident children to take care of the children, therefore not including this in the control variables might lead to biased results. In the regression I want to study the change in employment status of those who received an inheritance compared to those who did not. I therefore get the following equation:

$$(1): Y_{it} = \beta_0 + \beta_1[POST_t * Inher_{i0}] + \beta_2 X_{it} + \alpha_i + \mu_t + \varepsilon_{it}$$

The model looks at individual *i* who is observed at time *t*. In this equation, t = 0 when the individual receives the inheritance. Y is the labour supply outcome variable of interest. There are several labour supply outcome variables that will be tested. The relevant variables being employment status, employment type, desired and actual hours of work per week, desired or actual retirement age. Employment status is a dummy variable asked to every individual in which there are two options: employed or unemployed/not in the labour force. Employment type is a variable that looks more specified to the type of work of an individual. This is only asked to individuals that are employed, not to the individuals that answered not to be in the labour force or to be unemployed. The options here are: employee, employee of own business or employer/self-employed. Desired and actual hours of work contain the number of hours people actually work per week and would like to work per week, this is a numeric variable. Of course, this is not asked to individuals that were retired or unemployed. There are also individuals that do now know this, refused to answer it or who gave implausible values. These are registered as missing observations. The last dependent variable is the retirement age, this is again a numeric value containing at what age people did retire or would like to retire (when not retired yet). The first is only asked to individuals that said to be retired.

As mentioned above, several control variables are included as well: age, marital status, education, number of resident children and income. Age is a numeric variable that contains the age of an individual. Marital status is a categorical variable which has several values: either legally married, de facto relationship (People are not married but live together on a genuine domestic basis), separated, divorced, widowed or never married and not de facto. The highest level of education is again a categorical variable, starting from year 11 and below, year 12, cert III or IV, advanced diploma, bachelor or honours, graduate diploma, postgraduate. Number of resident children is a numeric variable that measures the number of resident children at that moment. Income is a numeric variable that contains the gross wages and salary per year.

Inher is a dummy that equals one if an individual received an inheritance, and zero otherwise. *POST* is a dummy that equals one if *t* is bigger or equal to zero, and zero otherwise. *X* is a vector that consists of the control variables. Parameter β_2 captures the additional effect of inheritance receipt in changes in the probability of working. Variable α captures the individual fixed effect, and the aggregate effects are captured by μ. Lastly ε was included, the error term. As for employment status as dependent variable, since this is a dummy variable, it will be a linear probability model with fixed effects. For the numeric variables, it will be a regular fixed effect model.

Second, it is likely the inheritance amount also matters for the effect, I therefore change the equation and add the variable *InAm* (inheritance amount) to study how this effects the results. I then get the following equation, with the remaining variables meaning the same as explained in equation (1):

$$(2): Y_{it} = \beta_0 + \beta_1[POST_t * InAm_{i0}] + \beta_2 X_{it} + \alpha_i + \mu_t + \varepsilon_{it}$$

For equation (1) as well as equation (2), the regressions will also be run while differentiating by gender, as multiple previous studies found labour supply effects might differ between men and women.

ii. Panel event study

At last, it could be investigated whether expectations of inheritances might influence the effect. Our dataset unfortunately does not include such variables, however following Niizeki and Hori (2019), this could be studied by investigating whether the probability of working in the period

t = -1 to t (= -8, -7, -6, -5, -4, -3, -2, 0, 1, 2, 3, 4, 5, 6, 7, 8) differ, comparing people who received an inheritance and who did not. This way, it can be checked whether the effect has a possible time lag, because people who expect an inheritance, already change their labour supply in the period prior to the inheritance receipt. I do this by introducing a time indicator variable *InhTi* that turns one when an individual received an inheritance at time t and zero when an individual has not. I will run a regression for each i therefore I obtain nine estimates for β_1 (t=-4 – t=4). The reason for not regressing t < -4 or t > 4, is that will be more likely the effects will be biased because there might be other income shocks and it is likely the effect is caused by something else. This leads to the following estimation, in which all other variables are identical to those in equation (1):

$$(3): Y_{it} = \beta_0 + \beta_1[InhTi(t = i) * Inher_{i0}] + \beta'_2 X_{it} + \alpha_i + \mu_t + \varepsilon_{it},$$

$$(i = -4, -3, -2, 0, 1, 2, 3, 4)$$

As mentioned before, several labour supply indicators will be tested. For this regression the variables employment status and actual hours worked per week will be used as dependent variables. Both are variables that could change after an individual has a positive income shock. Last, I will differentiate between men and women for this regression, to examine whether the effects between men and women are different, as this is suggested in some papers as studied in the theoretical framework. The method used is the difference in difference event study with fixed effects.

iii. Descriptive Statistics

Several descriptive statistics are included in Table 1 to get a better understanding of the dataset. As already mentioned before, there are 107,118 observations that means 9 observations (each year) of 11,902 individuals. After adding the weights, some individuals get weight 0, so 106,434 observations are left, meaning 11,826 individuals. The average age is 47, with the minimum age being 15 and the maximum age being 100. Of the sample, about 51% of the individuals are woman and 49% of the individuals are men. The women are slightly overrepresented. The average total amount of children ever had, is about 2. About 42% of the individuals do have children living at home, with on average having one child living at home. From the individuals that indicate to have own resident children, the median number of children is two. The average amount of income per year is $41,153 in this dataset. More than 50% of the population in our dataset is legally married, followed by never married and not de facto

(about 22%) as followed by de facto after this (about 12%), as becomes clear from Table 1 of the appendix. As indicated by Table 2 of the appendix, only a total of about 28% has at least a Bachelor or honours degree, and about 24% did not finish high school.

Table 1 – descriptive statistics independent variables, weighted

Variable	N	Mean	Std. Dev.	Min	Max
Age	106,434	47.41	17.70	15	100
Gender	106,434	1.51	0.50	1	2
Children	106,434	1.77	1.59	0	13
Resident children	106,434	0.77	1.10	0	12
Yearly income	106,434	41,153.24	54,879.11	0	930,828
Inheritance	106,434	0.02	0.13	0	1
Inheritance amount	1,989	113,686.80	191,678.40	1	2,500,000

As becomes clear from Table 1, about 2% of our observations indicate having received an inheritance in the 9-year time period. This is about 2,000 observations for about 11,826 individuals. This means about 14.8% of the individuals did receive an inheritance in the 9-year time period. Of the inheritances received, the minimum amount is 1 and the maximum amount is 2.5 million Australian dollars. The average inheritance amount over all years is $113,687. As becomes clear from Table 2, the average amount of individuals that receive an inheritance per year fluctuates between 174 until 278 per year. Especially in 2018 and 2019 relatively a lot of people received an inheritance. Each year a few people indicate they either do not know the amount they inherited or refuse to answer it. This fluctuates between 1 to 11 people per year. The total amount of inheritance highly fluctuates, with in most years minimum amount of a few hundreds of dollars to a maximum amount of over a million dollars. The standard deviations of the average inheritance amount are relatively high, which means the inheritance amount data is relatively spread out, not clustered around the mean.

Table 2 – descriptive statistics inheritance receipt per year

Inheritance amount	N	Mean	Std. Dev.	Min	Max
2011	174	86,885.10	119,445.70	200	700,000
2012	213	98,065.22	154,649.30	130	1,000,000
2013	223	92,025.70	134,098.00	40	700,000
2014	223	111,362.90	185,055.40	1	1,800,000
2015	230	121,938.30	189,643.30	200	1,000,000
2016	216	137,824.10	211,452.20	250	1,700,000
2017	225	98,264.13	174,781.50	26	1,800,000
2018	258	140,089.80	286,139.90	207	2,500,000
2019	278	126,093.60	187,129.20	180	1,500,000

Table 3 – descriptive statistics inheritance amount men/women

Inheritance Amount	N	Mean	Std. Dev.	Min	Max
Men	811	107,268.80	190,801.60	26	2,500,000
Women	1,178	118,598.70	192,288.10	1	1,800,000

Last, I made a scatterplot of the inheritance amount differentiating between men and women. In Figure 1 the results for men are presented, Figure 2 presents the scatterplot for inheritance amount among women. In Table 3 some descriptive statistics are also added on the difference in inheritance amount between men and women. As becomes clear, most individuals, men and women, receive an inheritance amount with a maximum of $500,000. Inheritances between $500,000 and $1,000,000 are also quite common, however substantially more women receive those larger inheritances. Men and women both hardly receive inheritances of more than $1,500,000. As becomes clear from Table 3, the average inheritance amount among women is about 10% larger than the average inheritance amount among men. It also becomes clear from Table 3 that substantially more women in this sample received an inheritance compared to men.

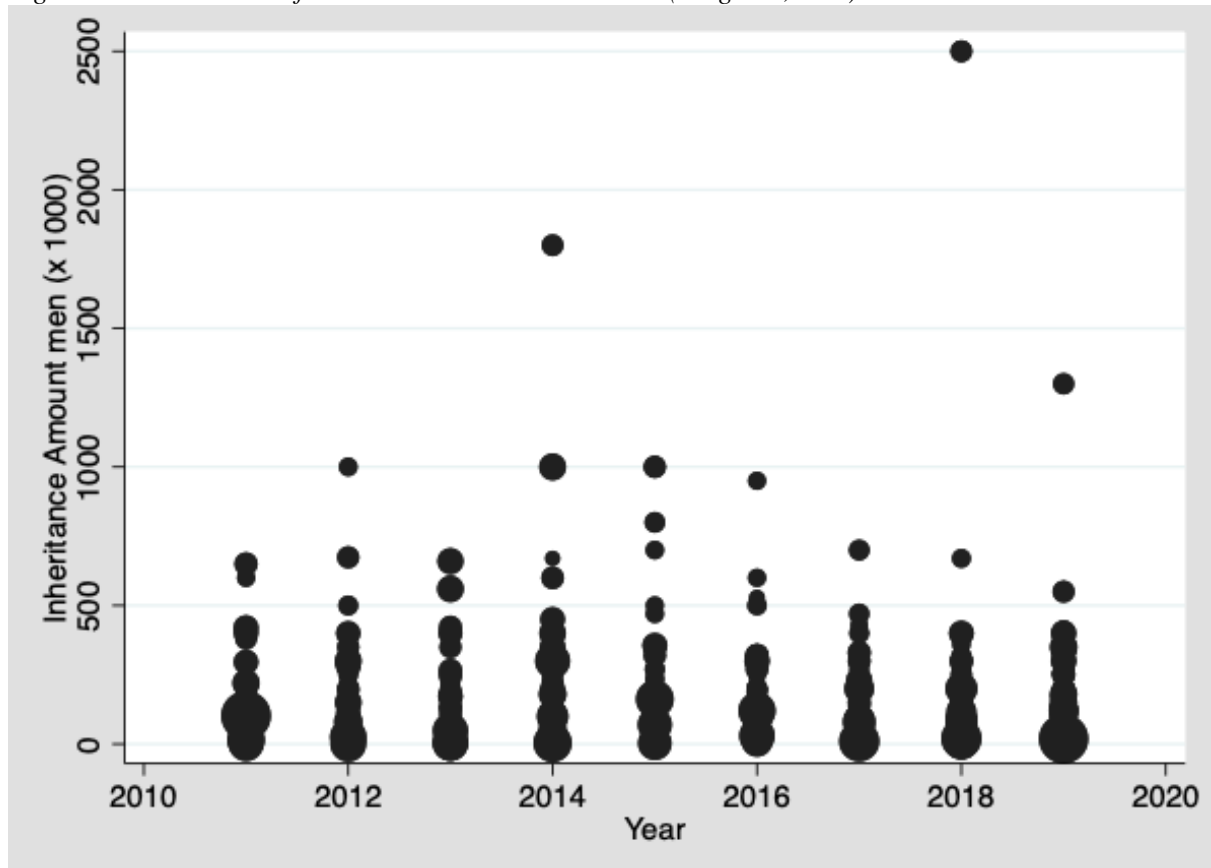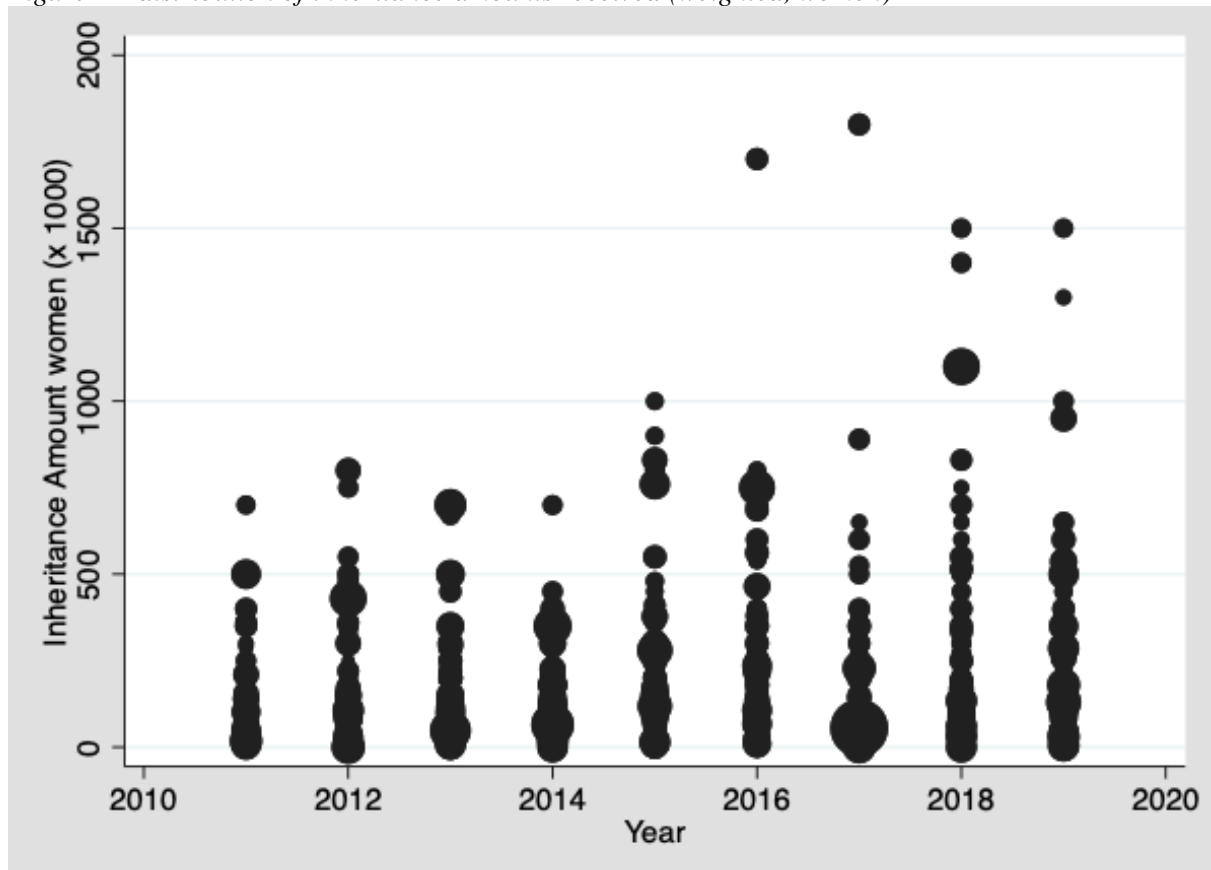*Figure 1 – distribution of inheritance amounts received (weighted, men)*

Figure 2 – distribution of inheritance amounts received (weighted, women)

The dependent variables that will be used in this study are employment status, employment type, average amount of hours worked, average of hours an individual would like to work and expected or actual retirement age. As becomes clear from Table 4 of the appendix, about 65% of the individuals is employed, 3% is unemployed and 32% is not in the labour force. Of the people that are employed, 85% is an employee, 6% is an employee of own business, 9% is employer/self-employed and less than 1% is an unpaid family worker. Of all people that are not in the labour force, about 23% are either completely or partly retired as becomes clear from Table 5 of the appendix.

Table 4 – descriptive statistics labour supply

Variable	N	Mean	Std. Dev.	Min	Max
Average hours worked per week	68,059	36.92	14.26	1	140
Average hours preferred to work per week	67,861	35.52	12.28	1	140
Age completely retired or expect to retire	40,845	61.43	9.29	16	110

As becomes clear from Table 4 the average actual hours worked per week is slightly lower than the average preferred hours worked per week. The standard deviation is slightly lower as well. On average, an individual would like to work about 35 hours per week but works about 37 hours per week. The average retirement age (or expected retirement age when not yet retired) is about 61 years old.

iv. Correlation table

In Table 6 of the appendix the correlation table of the data is created. There seem to be quite some significant correlations which suggest there could be some relevant effects. The correlation factor between most variables is not very high, which is positive because this means there is not a lot of collinearity. There are some very high correlations, however these are easy to explain (e.g. age on several labour supply variables and inheritance receipt on inheritance amount). When running the regressions, not all of these variables will be in one regression, only the variables relevant for the regression. For this study, the correlation between inheritance/inheritance amount and labour supply variables is relevant. Employment and labour force status are significantly correlated with inheritance receipt, which could indicate

that when receiving an inheritance employment and labour force status changes. Retirement status is also positively correlated with inheritance receipt, which could also indicate retirement status changes when receiving an inheritance. The amount of inheritance is correlated with retirement age and status and the preferred hours worked, which could indicate that for some effects the amount of the inheritance is also relevant.

V. Results

i. The effect of inheritance receipt on employment status

First, several linear probability models with fixed effects (regression 1 as mentioned in the methodology section) were run to study the effect of inheritances on different employment dummies as presented in Table 5. Normally a probit-model would be used for this type of analysis, however due to inconsistencies because of the fixed effects model I used a linear probability model instead. The different dependent dummy variables are employment status, employee, employer of own business, and self-employed. The variable of interest in this study is the post inheritance dummy. This dummy takes a value of 1 in the period of the inheritance receipt and after, and 0 in periods prior to the inheritance receipt. The reason being, that after a wealth shock, an individual adjusts their labour supply, not only in the period in which the inheritance is received but also after. In these first regressions, only whether someone inherited is taken into account, not the total amount someone inherited

According to the economic theory as described in the theoretical framework, I expect to find a negative effect of the inheritance receipt on the labour supply. Economic theory suggests people are more likely to drop out of the labour force when experiencing a positive income shock. Some studies suggest people who inherited are more likely to start a new business or become self-employed (Hurst and Lusardi, 2004). As becomes clear from column 1 in Table 5, the receipt of an inheritance has a negative effect on the probability of the employment status, and although the effect is small, it is significant. So, individuals are more likely to leave the labour force when receiving an inheritance. When differentiating between men and women as is done in Table 7 of the appendix, the effect seems to be larger for men (the probability for men to drop out of the labour force is 2.5% more likely for men that received an inheritance compared to men that did not receive an inheritance) than women, besides the effect is only significant for men at a 90% confidence interval while for women, the effect is not significant.

Table 5 – effect of inheritance receipt on employment (type)

Dependent variable:	(1) Employment Status	(2) Employment type employee	(3) Employment type own business	(4) Employment type Self-employed
Post Inheritance	-0.022***	-0.021**	0.005	-0.006
	(0.007)	(0.020)	(0.256)	(0.274)
Age	-0.010***	-0.011***	0.001***	0.000
	(0.000)	(0.000)	(0.007)	(0.632)
Resident Children	-0.000	-0.006*	0.005**	-0.001
	(0.871)	(0.078)	(0.008)	(0.795)
Wage (Gross, weekly)	0.000***	0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.006)	(0.000)
Female	-0.185	-0.159	-0.005	-0.020**
	(0.219)	(0.252)	(0.487)	(0.020)
Grad. Diploma	-0.067*	-0.040	-0.007	-0.021*
	(0.060)	(0.293)	(0.469)	(0.054)
Bachelor or honours	-0.067***	-0.038*	-0.004	-0.024**
	(0.003)	(0.091)	(0.393)	(0.012)
Advanced Diploma	-0.117***	-0.084***	-0.010	-0.024**
	(0.000)	(0.006)	(0.155)	(0.024)
Cert. III or IV	-0.163***	-0.141***	-0.006	-0.019*
	(0.000)	(0.000)	(0.374)	(0.087)
Year 12	-0.135***	-0.088***	-0.010	-0.034***
	(0.000)	(0.002)	(0.105)	(0.000)
Year 11 or below	-0.368***	-0.310***	-0.010	-0.048***
	(0.000)	(0.000)	(0.149)	(0.000)
Undetermined	-1.258***	-1.169***	-0.015*	-0.073***
	(0.000)	(0.000)	(0.099)	(0.000)
De facto	0.012	0.037***	-0.008	-0.015**
	(0.224)	(0.000)	(0.151)	(0.023)
separated	0.002	0.015	-0.008	-0.003
	(0.870)	(0.200)	(0.203)	(0.734)
Divorced	0.016	0.034**	-0.008	-0.010
	(0.282)	(0.033)	(0.206)	(0.184)
widowed	-0.010	0.003	-0.008	-0.003
	(0.620)	(0.881)	(0.308)	(0.631)
Never married /de facto	0.023*	0.072***	-0.022***	-0.026***
	(0.064)	(0.000)	(0.008)	(0.001)
Constant	1.230***	1.086***	0.020	0.118***
	(0.000)	(0.000)	(0.240)	(0.000)
Observations	104,331	104,331	104,331	104,331
Groups	11,820	11,820	11,820	11,820
R² within	0.161	0.202	0.004	0.012
R² between	0.458	0.440	0.003	0.036

*$p< 0.10$, **$p<0.05$, ***$p<0.01$ p-value between brackets*

The reference category for Marital Status is "legally married", the reference category for Education is "postgrad". All regressions include weights and individual fixed-effects.

Table 6 – effect of inheritance receipt on hours worked and retirement age

Dependent variable:	(1) Actual hours usually worked	(2) Preferred hours worked	(3) Actual retirement age
Post inheritance	-0.888***	-0.902***	-0.070
	(0.006)	(0.004)	(0.401)
Age	-0.411***	-0.402***	0.087***
	(0.000)	(0.000)	(0.000)
Total resident children	-0.302**	-0.286**	-0.046
	(0.029)	(0.025)	(0.205)
Wage	0.009***	0.008***	-0.000***
(gross, weekly)	(0.000)	(0.000)	(0.001)
Female	-4.411	-4.750	
	(0.605)	(0.535)	
Grad. Diploma	-6.205***	-4.988***	-0.935**
	(0.000)	(0.000)	(0.033)
Bachelor or honours	-4.039***	-3.959***	-0.475
	(0.000)	(0.000)	(0.244)
Advanced Diploma	-11.286***	-11.018***	-0.074
	(0.000)	(0.000)	(0.880)
Cert. III or IV	-13.846***	-13.956***	-0.673
	(0.000)	(0.000)	(0.209)
Year 12	-15.444***	-15.188***	-1.322*
	(0.000)	(0.000)	(0.071)
Year 11 or below	-23.613***	-24.622***	-1.421**
	(0.000)	(0.000)	(0.028)
Undetermined	-55.557***	-77.658***	
	(0.000)	(0.000)	
De facto	1.033*	1.591***	0.231
	(0.050)	(0.000)	(0.324)
separated	0.368	0.510	0.117
	(0.496)	(0.298)	(0.493)
Divorced	0.796	1.361**	0.576**
	(0.150)	(0.016)	(0.045)
widowed	0.695	1.003*	-0.063
	(0.253)	(0.090)	(0.532)
Never married /de facto	-0.418	1.172**	-0.276
	(0.536)	(0.046)	(0.537)
Constant	51.968***	51.655***	56.875***
	(0,000)	(0.000)	(0.000)
Observations	104,331	104,331	40,184
Groups	11,820	11,820	4,878
R² within	0.268	0.212	0.025
R² between	0.481	0.449	0.001

*p< 0.10, **p<0.05, ***p<0.01 p-value between brackets

The reference category for Marital Status is "legally married", the reference category for Education is "postgrad". All regressions include weights and individual fixed-effects

When looking at the several employment types, the post inheritance dummy only finds a significant negative effect for the employment type employee, meaning that when having received an inheritance someone is less likely to be an employee. This could suggest individuals change their employment type (e.g. becoming self-employed or starting an own business after inheritance receipt instead of being an employee), however I do not find this in the results (people are not more likely to have an own business or be self-employed after inheritance receipt). It could also indicate people drop out of the labour force, which is more indicated by the results I find, especially when someone was an employee before inheritance receipt. I do find a very small positive effect for having an own business after having received an inheritance, this effect is however not significant. This study does therefore not support the theory that individuals might be more likely to start their own business after an inheritance receipt. I find a small negative effect for being self-employed after having received an inheritance as well, this effect however is not significant either. When differentiating between men and women, I again find the effect is only significant for men being employee, not for women, suggesting men are significantly more likely to stop being an employee after inheritance receipt, the effect being again about 2.6%, while for women this effect is not significant.

ii.   *The effect of inheritance receipt on working hours and retirement age*

Second, several linear fixed effects models were run to study the effects of inheritance receipt on the hours an individual works and the retirement age as presented in Table 6. Again, the dummy post inheritance takes the value 1 in the year someone received an inheritance and keeps the value 1 in the years after. In the years before inheritance receipt, the dummy takes the value 0. The actual hours worked are the actual hours an individual works per week. The preferred hours worked are the preferred hours an individual would like to work per week. The dependent variable retirement age takes the value of the age when the individual did retire when an individual is already retired. If an individual is not yet retired, it takes the value of the age the individual intends to retire. Relatively a lot of missing values are recorded in this last model (presented in column 3 of Table 6).

According to the economic theory as described in the theoretic framework, I would expect that the actual/preferred hours worked, and the retirement age would decrease after having received an inheritance. The positive income shock of the inheritance is expected to influence the labour supply negatively. I do find a significant negative effect of the inheritance receipt on the hours worked in the complete sample. The effect is stronger for the actual hours

worked than for the preferred hours worked, however this could be explained by the fact that people on average would like to work slightly less than they actually do work, which mitigates the effect. For the retirement age, I do find a small negative effect, however this is not significant. Based on this study therefore, the expectation that the retirement age decreases (e.g. individuals choose to retire early) because of inheritance receipt is not supported.

When differentiating between men and women as is presented in Table 8 of the appendix, the results suggest the effects for actual and preferred hours worked are only significant for men, not for women. On average, men that received an inheritance work about 1.6 hours less per week compared to men that did not receive an inheritance. For retirement age, I do not find any significant effects, not for men and not for women.

iii.   The effect of the amount of inheritance on labour supply

intuitively it would be likely the amount of the inheritance is also relevant for the effect on the labour supply. It is quite reasonable that people who inherit a substantial amount of money will react stronger, and therefore the effect will be larger, in the adaptation of their change in their labour supply. Therefore, the regression will be run again but now also taking into account the amount an individual inherited (regression 2 of the methodology section). The amount is per $100,000 Australian dollars, to make tables more readable. All other variables are interpreted the same as in the previous models described above. The results of the regressions in which the inheritance amount is taken into account are presented in Table 7 and Table 8.

Based on existing economic theory I would expect to find a significant decrease in the labour supply when an individual receives an inheritance. The bigger the inheritance, the bigger I expect the labour supply effect to be. Most variables are quite similar also in interpretation as described in the previous models. However, the variable of interest, post inheritance, now measures the effect per $100,000 Australian dollars inherited instead of measuring the effect of inheritance receipt in general. For employment status, I find a small negative significant effect as becomes clear from Table 7. Suggesting that the bigger the inheritance, the more likely it is an individual will quit the labour force. I find the same small negative significant effect for being an employee, meaning that if someone is an employee, it is more likely someone will quit the labour force when inheriting, with the effect becoming bigger when inheriting a larger amount of money. When an individual has their own business or is self-employed, I find hardly any effect and it is not significant, so based on this study, there cannot be concluded someone that has an own business or is self-employed, is more likely to quit the labour force when receiving an inheritance.

Table 7 – effect of inheritance amount on employment (type)

Dependent variable:	(1) Employment Status	(2) Employment type employee	(3) Employment type own business	(4) Employment type Self-employed
Post Inheritance	-0.006**	-0.005**	0.000	-0.001
	(0.022)	(0.047)	(0.897)	(0.453)
Age	-0.010***	-0.011***	0.001***	0.000
	(0.000)	(0.000)	(0.003)	(0.746)
Resident Children	-0.000	-0.006*	0.005***	-0.000
	(0.892)	(0.083)	(0.008)	(0.807)
Wage (Gross, weekly)	0.000***	0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.006)	(0.000)
Female	-0.187	-0.161	-0.004	-0.021**
	(0.214)	(0.246)	(0.530)	(0.014)
Grad. Diploma	-0.067*	-0.039	-0.007	-0.021*
	(0.063)	(0.300)	(0.464)	(0.056)
Bachelor or honours	-0.066***	-0.038*	-0.004	-0.024**
	(0.004)	(0.094)	(0.388)	(0.012)
Advanced Diploma	-0.117***	-0.084***	-0.010	-0.024**
	(0.000)	(0.006)	(0.155)	(0.025)
Cert. III or IV	-0.163***	-0.141***	-0.006	-0.019
	(0.000)	(0.000)	(0.370)	(0.088)
Year 12	-0.134***	-0.088***	-0.010	-0.034***
	(0.000)	(0.002)	(0.105)	(0.000)
Year 11 or below	-0.367***	-0.310***	-0.010	-0.048***
	(0.000)	(0.000)	(0.152)	(0.000)
Undetermined	-1.258***	-1.169***	-0.015	-0.073***
	(0.000)	(0.000)	(0.106)	(0.000)
De facto	0.012	0.037***	-0.008	-0.015**
	(0.219)	(0.000)	(0.152)	(0.023)
separated	0.002	0.015	-0.008	-0.003
	(0.854)	(0.194)	(0.202)	(0.738)
Divorced	0.015	0.034**	-0.008	-0.010
	(0.287)	(0.033)	(0.209)	(0.182)
widowed	-0.010	0.003	-0.008	-0.003
	(0.617)	(0.887)	(0.322)	(0.610)
Never married /de facto	0.023*	0.073***	-0.022***	-0.026***
	(0.062)	(0.000)	(0.008)	(0.001)
Constant	1.238***	1.094***	0.018	0.121***
	(0.000)	(0.000)	(0.295)	(0.000)
Observations	104,331	104,331	104,331	104,331
Groups	11,820	11,820	11,820	11,820
R^2 within	0.161	0.202	0.004	0.012
R^2 between	0.458	0.440	0.003	0.039

*$p< 0.10$, **$p<0.05$, ***$p<0.01$ p-value between brackets*

The reference category for Marital Status is "legally married", the reference category for Education is "postgrad". All regressions include weights and individual fixed-effects.

Table 8 – effect of inheritance amount on hours worked and retirement age

Dependent variable:	(1) Actual hours usually worked	(2) Preferred hours worked	(3) Actual retirement age
Post inheritance	-0.212**	-0.185*	-0.013
	(0.028)	(0.055)	(0.549)
Age	-0.419***	-0.410***	0.086***
	(0.000)	(0.000)	(0.000)
Total resident children	-0.298**	-0.282**	-0.046
	(0.031)	(0.027)	(0.208)
Wage	0.009***	0.008***	-0.000***
(gross, weekly)	(0.000)	(0.000)	(0.001)
Female	-4.507	-4.846	
	(0.598)	(0.527)	
Grad. Diploma	-6.183***	-4.965***	-0.934**
	(0.000)	(0.000)	(0.033)
Bachelor or honours	-4.024***	-3.944***	-0.479
	(0.000)	(0.000)	(0.241)
Advanced Diploma	-11.274***	-11.007***	-0.080
	(0.000)	(0.000)	(0.871)
Cert. III or IV	-13.828***	-13.938***	-0.675
	(0.000)	(0.000)	(0.208)
Year 12	-15.429***	-15.175***	-1.323*
	(0.000)	(0.000)	(0.071)
Year 11 or below	-23.605***	-24.617***	-1.423**
	(0.000)	(0.000)	(0.028)
Undetermined	-55.583***	-77.690***	
	(0.000)	(0.000)	
De facto	1.038**	1.594***	0.231
	(0.049)	(0.000)	(0.324)
separated	0.377	0.518	0.116
	(0.486)	(0.291)	(0.494)
Divorced	0.790	1.355**	0.575**
	(0.153)	(0.017)	(0.045)
widowed	0.687	0.988*	-0.065
	(0.259)	(0.095)	(0.523)
Never married /de facto	-0.411	1.178**	-0.274
	(0.542)	(0.045)	(0.540)
Constant	52.298***	52.019***	56.921***
	(0,000)	(0.000)	(0.000)
Observations	104,331	104,331	40,184
Groups	11,820	11,820	4,878
R^2 within	0.268	0.212	0.025
R^2 between	0.481	0.450	0.001

*$p< 0.10$, **$p<0.05$, ***$p<0.01$ p-value between brackets*

The reference category for Marital Status is "legally married", the reference category for Education is "postgrad". All regressions include weights and individual fixed-effects.

When differentiating between men and women as done in Table 7 of the appendix, I find contrary to the previous results that the employment status after inheritance receipt is significantly lower for women than for men, with the effect being bigger when the inheritance amount is higher. If for example a woman inherits $300,000, the probability of being employed decreases with (3*0.006) 1.8%. For men the results are not significant. When looking at different employment types, only for male employees a significant negative effect is found after inheriting, suggesting men are less likely to be an employee after having received an inheritance, suggesting they will either drop out of the labour force completely or change their employment type. For the latter no significant effect is found. For women a significant effect is only found for women that have their own business, suggesting women are less likely to have their own business after inheritance receipt, contrary to studies suggesting individuals might start their own business after inheritance receipt (Hurst and Lusardi, 2004).

For the actual and preferred hours to work after inheritance receipt, as presented in Table 8, I also find a small negative effect, suggesting that one who receives an inheritance is more likely to actually work less hours and also prefer to work less hours per week. Again, the effect is significant although small, and the effect increases when an individual receives a larger inheritance amount (e.g. when inheriting $500,000, individuals work on average 1 hour less (5* 0.21) per week). Last, I find a small negative effect for the retirement age, meaning the retirement age decreases when someone inherits a substantial amount of money. However, the effect is not significant so I cannot say based on this study the retirement age decreases when one inherits a substantial amount of money.

When differentiating between men and women (Table 8 of the appendix), I again find there is only a significant effect for men for the dependent variable actual hours worked, the effect is slightly larger than the overall effect as presented in Table 8. I do not find any other significant effects.

iv.   *Inheritance amount categories*

Second, I want to regress the different inheritance amounts in categories, to study whether there are differences between several categories of amounts of inheritances. It is likely effects will be small or there will not be any effect at all when someone receives a very small amount of money, while the labour supply of someone that receives a large amount of money will decrease substantially. To study this, I divided the inheritance amount in 5 categories. The categorical variable takes value 0 when an individual did not receive an inheritance. The value

takes value 1 if an individual received a very small inheritance of less than $25,000 Australian dollars, value 2 if one received a small inheritance between $25,000 and $75,000 dollars and value 3 if one received a medium inheritance between $75,000 and $200,000 dollars. If one received a large inheritance between $200,000 and $500,000 Australian dollars, the variable takes value 4 and the variable takes value 5 if someone received a very large inheritance of $500,000 or more. The results of the several regressions are presented in Table 9 and Table 10 of the appendixes.

Again, most variables do not change substantially, however the variable of interest, the inheritance amount categories, do show the effects differ between the different categories of inheritance receipt. For employment status, I now only find a significant negative (but larger) effect for individuals that inherit an amount between $75,000 and $500,000 Australian dollars, with the effect being about the same for all, so based on this study I find people that inherit $75,000 have a similar labour supply reaction concerning the employment status to people that inherit about $500,000. This is not what you would expect, as it is expected the labour supply effect will be larger when the amount inherited is larger. It is also striking that when inheriting more than $500,000 the labour supply is not significant, indicating that based on this study people do not decrease their labour supply when inheriting $500,000 or more. However, since the number of observations for this category is relatively low, there could be a case of some measurement errors. It is also likely people that inherit such amounts differ in their labour supply preferences. For the employment type, I only find a negative significant effect when someone is an employee, suggesting that based on this study people that inherit a significant amount are more likely to quit their job as an employee, however the effects are small and not significant for all categories. For individuals that have their own business or are self-employed, I do not find any significant effects suggesting that based on this study, people that inherit are not more likely to drop out of the labour force when being self-employed or are employee of own business, not even when inheriting significant a significant amount of money. Besides, I also do not find people are more likely to have an own business or be self-employed after inheritance, implicating people do not start their own business or become self-employed after inheriting.

When differentiating between men and women (Table 7 of the appendix), I again find most significant effects for men (similar to the overall effects as described above) for employment status. For employment type I also find hardly any significant effects, the effects however do seem to differ between men and women. The results can be interpreted similar as the results described above.

The effect of inheritance receipt on amount of actual and preferred hours to work also differs between the different categories of inheritance amount received. I also find significant effects for individuals that inherit between $75,000 and $500,000 dollars, with the effect being significantly larger when inheriting a larger amount. I find people that inherit between $75,000 and $200,000 dollars, prefer to work 1.6 hours less per week and actually work 1.7 hours less per week. When one received an inheritance between $200,000 and $500,000 dollars, one prefers to work 2.2 hours less per week and actually works 2.4 hours less per week. Again, it is striking I do not find a significant effect for people that inherited $500,000 dollars or more, this could again be because of reasons mentioned above. For the retirement age I do not find a significant effect, suggesting based on this study people do not retire earlier when having received an inheritance. This could be explained by the fact that the age at which one receives an inheritance also plays an important role for early retirement, so further study is needed.

When differentiating between men and women, I find significant effects for both men and women in the actual hours worked per week (Table 8 of the appendix). The effects I find are only significant for individuals that inherit more than $75,000 dollars. It seems women consider the inheritance amount received more when adjusting their labour supply response than men. I now also find some effects of inheritance receipt on labour supply, for women when receiving more than $500,000 dollars and for men when receiving between $200,000 and $500,000 dollars, suggesting men and women retire slightly earlier when having received an inheritance amount, the effects however are very small.

v.   The effect of the timing of inheritance on labour supply

Last, one could imagine there might be lagged effects, people changing their labour supply a few years after receiving an inheritance. Or there could be lead effects, for example when expecting an inheritance and therefore change your labour supply based on the expectation of an inheritance in the nearby future. One way to be able to examine this would be to have an indicator of whether someone expects to receive an inheritance or not, however unfortunately such an indicator is not included in this dataset. Therefore I used an alternative and straightforward approach following Niizeki and Hori (2019) meaning that I will study whether changes in the probability of working and the hours worked in period from t = -1 to t (= -4, -3, -2, 0, 1, 2, 3, 4) differ when comparing individuals that did receive an inheritance to individuals that did not receive an inheritance, regression 3 of the methodology section. If people expect an inheritance, it is likely they will adjust their labour supply in t < 0. Besides I will be able to

look at possible lagged effects. In the regression, t = 0 when someone received an inheritance amount.

The results for the several event studies can be found in Figure 3 until Figure 6 on the next pages. As becomes clear from Figure 3 and Figure 4, there is a clear effect of inheritance receipt on employment status. The reference year is t = -1, and there is a clear negative trend after inheritance receipt. For example, 3 years after having received an inheritance (t = 3) the probability of being employed decreased with about 3.5 percentage for women who did receive an inheritance compared to women that did not receive an inheritance. For women there does seem to be a lagged effect, the labour supply seems to decline substantially 3 years after inheritance receipt, however not all results are significant. For men, the effect on labour supply of the inheritance receipt is significant and starts in year t = 0, immediately after having received an inheritance. This indicates the lagged effect for men is minimal, while the lagged effect for women seems to be more present.

In Figure 5 and Figure 6 the results become clear from the effect of inheritance receipt on the actual hours worked. For women there seems to be a slight lagged effect, only after about 2 years after having received an inheritance, women that received an inheritance work less hours per week than women that did not receive an inheritance, although the effects are small and not all lags are significant. Besides it becomes clear from Figure 5 the actual hours worked for women fluctuates in all nine years considered for this study, indicating the labour supply effect might be a response to another external factor. Based on this study I cannot conclude there is a lagged labour supply effect for women after inheritance receipt.

For men there is not a clear lagged effect either, immediately after receiving an inheritance the number of hours worked per week for men that did receive an inheritance is significantly less than the number of hours worked per week for men that did not receive an inheritance. For example, as becomes clear in Figure 6, 2 years after inheritance receipt for men, the actual number of hours worked on average per week declines with about 1.5 hours after inheritance receipt. After 4 years post inheritance receipt, the average hours worked for men that received an inheritance declined with about 3.5 hours per week. Besides, there might even be a slight lead effect, as the decline in average hours worked per week seems to start already at t = -1, although the effect is very small.

The lagged effects in Figure 4 and Figure 6 for men are significant at a 95% confidence interval, the lead effects are not significant. For women, some lags are significant, however overall the results are not significant, and neither are the lead effects.

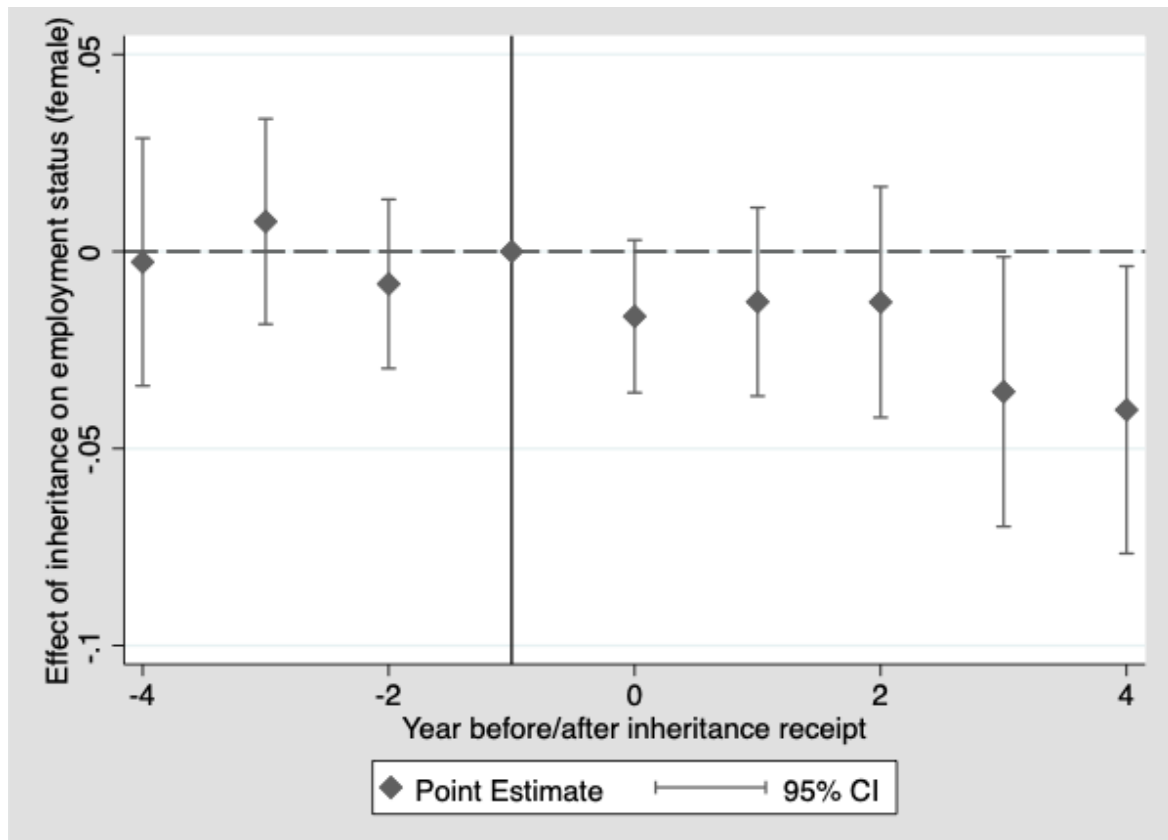*Figure 3 – Event study results: Inheritance effect on employment status for women*

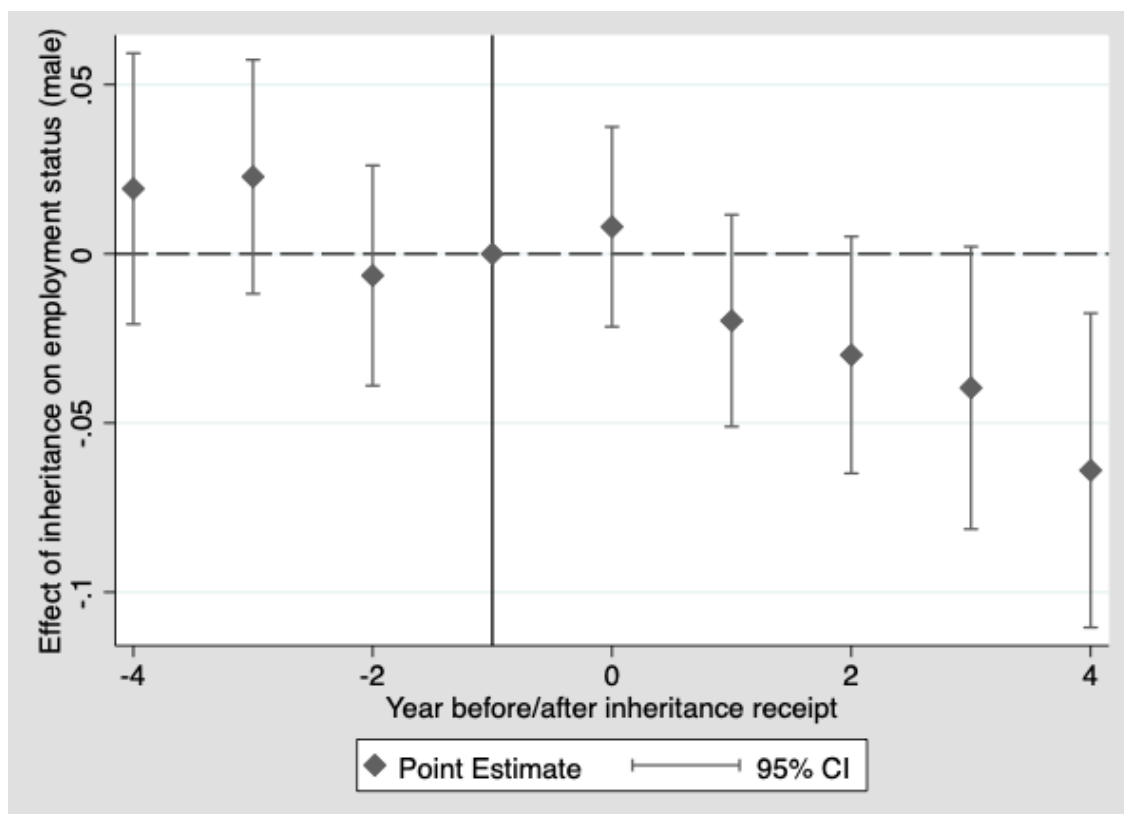*Figure 4 – Event study results: Inheritance effect on employment status for men*

Figure 5 – Event study results: Inheritance effect on Actual hours worked for women
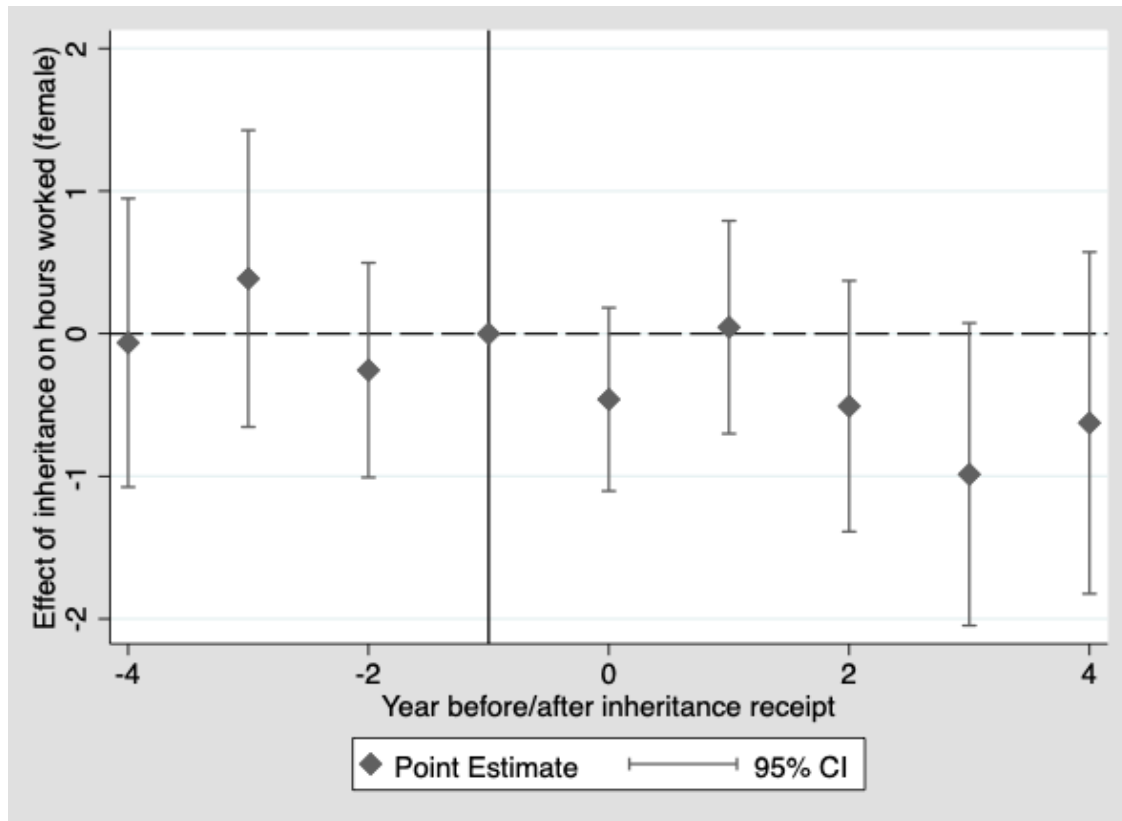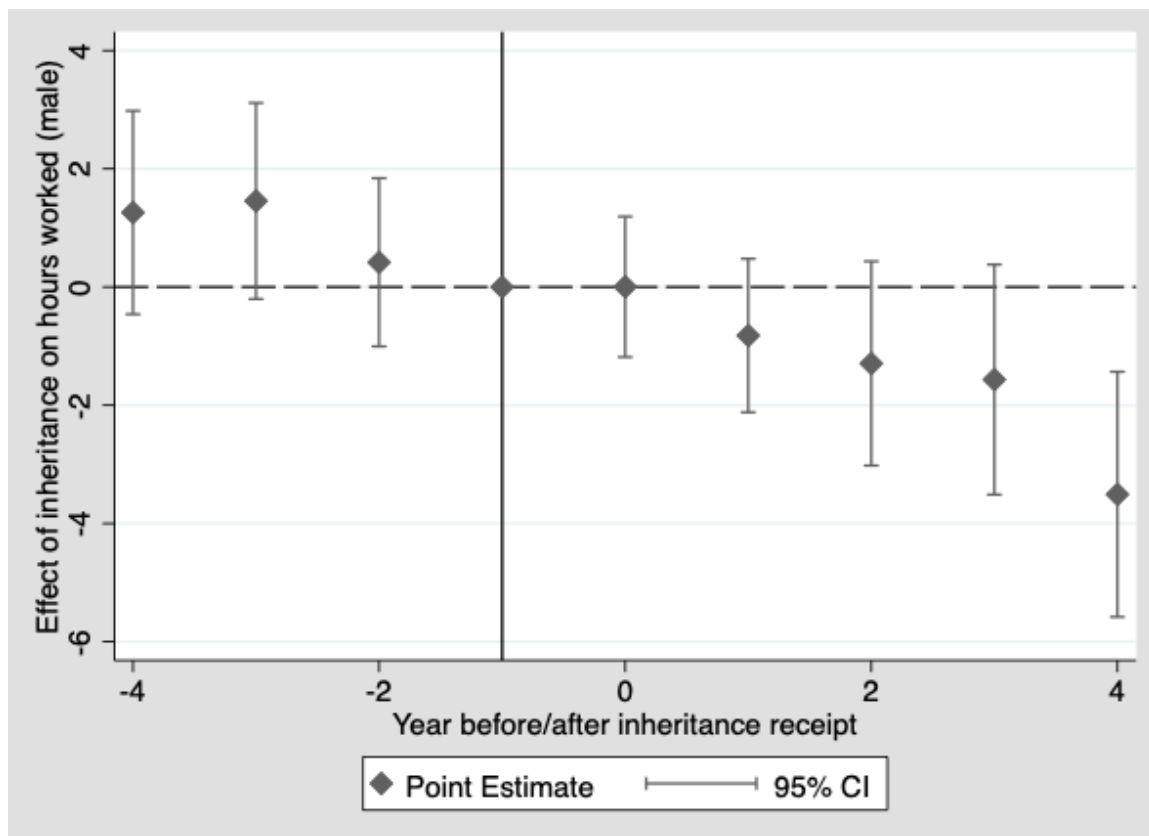

Figure 6 – Event study results: Inheritance effect on Actual hours worked for men

vi.   The Difference between Female and Male

Striking is that in almost all the findings the labour supply effects for men seem to be stronger than the effects for women. This is contrary to the results found in other studies, where is found the labour supply effect is stronger for women than for men (Niizeki and Hori, 2019; Doorley and Pestel, 2020). This difference is also hard to explain based on our dataset, since the inheritance amount for men and women does not seem to differ substantially, men on average receive even lower and fewer inheritances than women (Figure 1, Figure 2 and Table 3). There might be other possible explanations for these results in this study.

The first possible explanation could be cultural differences. The study by Niizeki and Hori (2019) is based on the Japanese culture, in which it is still quite rare for women to work, besides there are still big wage gaps between men and women (Catalyst, 2021). A lot of women in Japan are still concentrated in low wage and part time jobs. It is therefore likely women will quit the labour when inheriting, as it will no longer be profitable to work anymore. In Australia, the numbers are different. Women on average are well educated, the wage gap between men and women is not as large and relatively a lot of women are in the labour force, although women do work more in part time compared to men (WGEA, 2021). As becomes clear from Table 11, Table 12 and Table 13 of the appendix, in this sample about 70% of the men are employed and 60% of the women are employed. Women work on average 19 hours per week earning about $563.48 per week, while men work on average about 29 hours per week earning about $942.48 per week. This means women earn on average $30 ($563.48/19) per hour, while men on average earn $32 ($942.48/29) per hour. The difference is not as big, so it is less obvious women will decrease their hours worked compared to men. However, the study done by Doorley and Pestel (2020) used data from Germany which is a country more like Australia concerning labour supply statistics and they also find women decrease their labour supply more than men, so there could also be other cultural/social differences that could explain these results.

The question remains why I find hardly any significant effects for women, while I do find significant effects for men. So why do men respond stronger to inheritance receipt than women? It could be, because women already work part time, they feel less need to decline their labour supply as women already have more leisure. However, for men that usually do work full time, the demand for more leisure is stronger, as they have little leisure on average, as could be explained by the standard economic supply and demand curves. The more amount of leisure one already has, the less valuable more leisure becomes. Another possible explanation could be the possible difference in age when the inheritance is received. It is likely the labour

supply response is stronger when individuals are older at the time they receive an inheritance. So, it could be that men for example are on average older when receiving an inheritance, this however is not looked into in this study, so further research is needed to study this explanation.

Last, I find on average, women are more careful and more hesitant in their labour supply response. In this study, it seems women are more considerate in their response, they consider inheritance amount more and the effects are smaller. This could also have to do with a difference in response in gender, e.g. psychological and behavioural differences. This again is beyond the scope for this study, but it could also explain the difference in labour supply response by men and women.

VI. Conclusion

In this paper, I investigated the effect of a positive income shock on the labour supply behaviour from individuals in Australia. I investigated whether individuals from Australia adjust their labour supply (in this paper meaning employment status, actual hours worked per week and retirement age) in response to an inheritance receipt. According to the standard economic theory as mentioned before, leisure is a normal good, meaning that the increase of wealth would lead to an increase in the demand of leisure. This leads to a decrease in the supply of labour. I used detailed panel data information from the Household, Income and Labour Dynamics in Australia survey for the 2011 to 2019 period to try to find an answer on the question of interest: *Do individuals adjust their labour supply after receiving a positive income shock in the form of an inheritance?*

I find weak but significant evidence that individuals do adjust their labour supply after having received a positive income shock in the form of an inheritance. The effects are mostly very small. The effect is on average stronger for men compared to women, and for individuals that received a higher inheritance amount. The adjustment of labour supply is done in either quitting the labour force or adjusting the actual hours worked per week. The adjustment of labour is, based on this study, not in the type of work (e.g. employee, self-employed or own business). It is neither appearing in the form of early retirement. After adding the inheritance amounts, the number of the effects slightly changes however, the direction of the effects do not change, implicating there is a significant negative effect of inheritance receipt on labour supply, individuals decrease the supply of labour but do not change in type of labour.

When looking for possible lagged effects, I looked whether the significant labour supply effects are immediate effects or whether the effects are possibly leaded or lagged. Besides I differentiated between men and women, investigating whether the effects are

different among sexes. The labour supply effects in labour force status as well as average hours worked per week seem to again be stronger for men than for women. Also indicated by this study is that men adjust their labour supply immediately after having received an inheritance, while for women the effects are lagged and smaller.

Concluding the results found in this study, despite the fact that men received smaller inheritances and received an inheritance less often, the effects on labour supply seem to be stronger among men than among women.

As indicated in the theoretical framework, there is currently no inheritance tax in Australia. However, following the results of this study, people do adjust their labour supply after inheritance receipt (e.g. decrease their labour supply). This indicates inheritances do lead to unequal situations since because of the increase in wealth by the inheritance receipt, individuals are able to make different labour supply decisions. This is also indicated by the wealth accumulation problem defined by Piketty (2011). To mitigate these inequality effects, based on this study, Australia might want to introduce an inheritance taxation. It is important for policy makers to keep in mind that the amount of the inheritance also matters, so this should be considered when designing optimal inheritance taxes or taxes on other positive income shocks.

Since this study is based on a survey, it is likely there are measurement errors. However, there were several questions asked twice to confirm the information, so it should be minimal. There are also several missing observations that might influence the results and there might be a bias because people that structurally fill in this survey might differ to people that do not. To minimalize this effect, weights were added that consider the representativeness of the observations. For further research, tax forms could be used to have even more reliable data. Besides, it is very likeable the effect of a positive income shock on labour supply differs considering the age one receives such an income shock. It is likely that younger people more change to other types of income (starting an own business, investments), while older aged people will adjust their labour supply by early retirement and working less. For further research it might therefore be interesting to extent the research on inheritance receipt for different groups of age. It is also likely the labour supply adjustment will depend on other possible wealth an individual already has, it might be interesting to do further research on positive income shocks taking other forms of wealth into consideration as well. Last, cultural and behavioural differences among sexes might also influence the labour supply response, further research is needed to explain these differences.

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Appendix

    i.   Figures

Figure 1 – distribution of inheritance amounts received (weighted, with outlier)
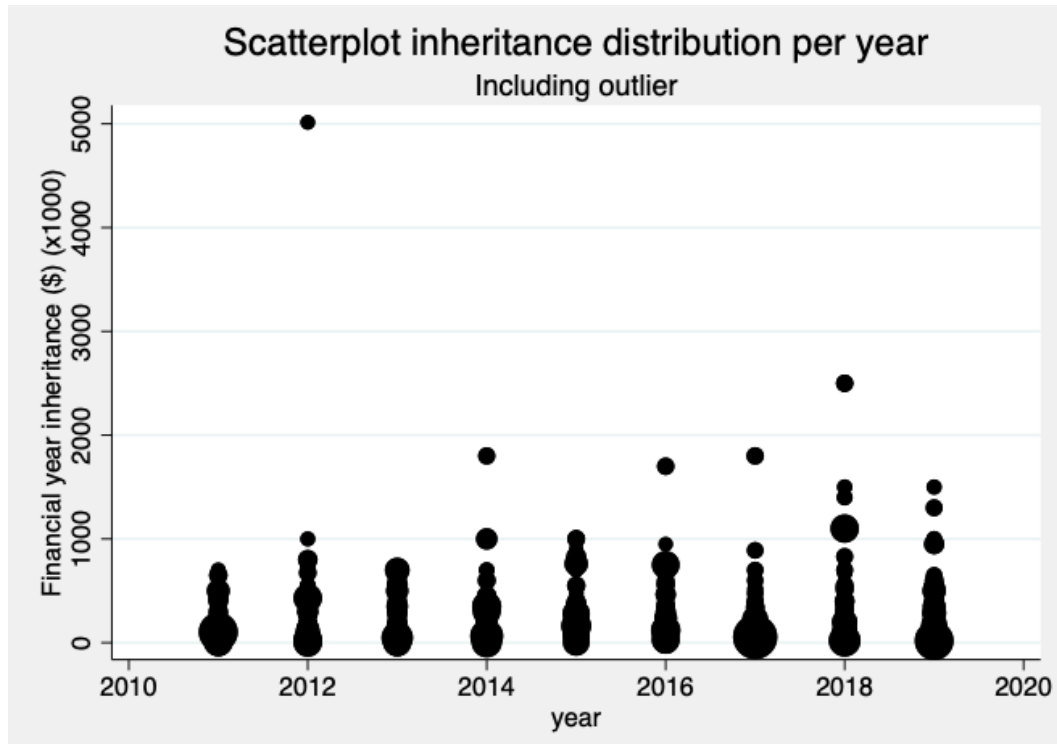
Figure 2 – distribution of inheritance amounts received (weighted, without outlier)
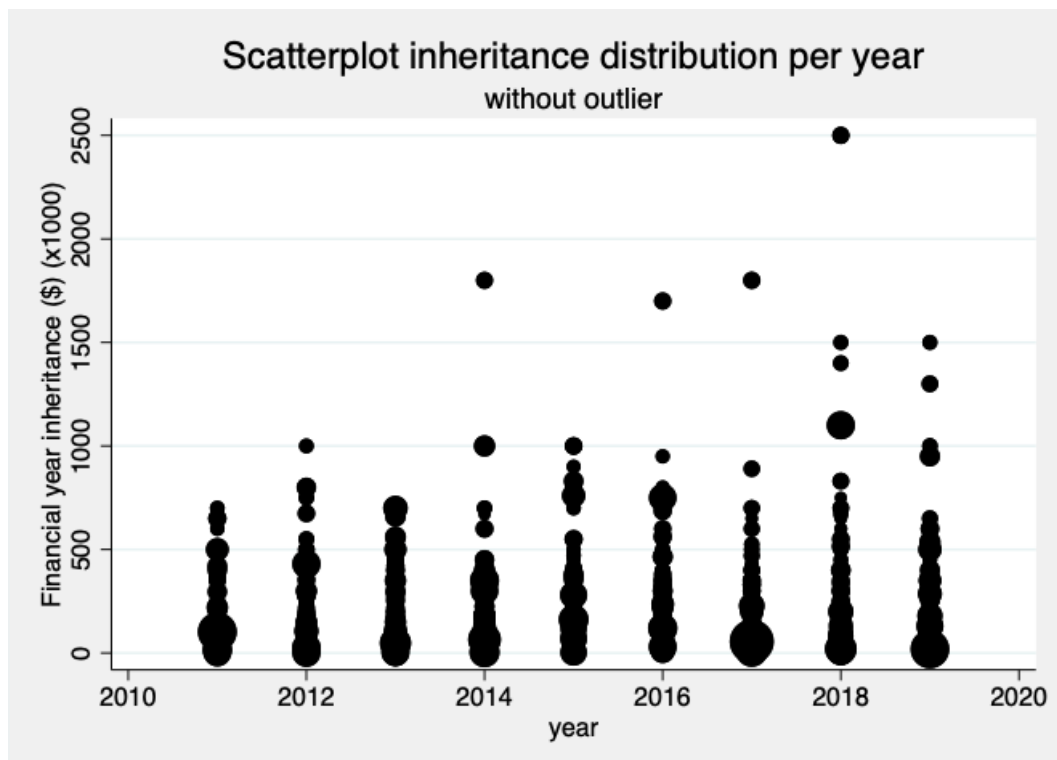
ii. Tables

Table 1 – Current marital status

Marital status	N.	Percentage
Legally married	57,344.00	53.88%
De facto	12,556.91	11.80%
Separated	2,858.28	2.69%
Divorced	6,020.91	5.66%
widowed	4,749.18	4.46%
Never married/de facto	22,897.73	21.51%

Table 2 – Highest education level achieved

Highest education level	N.	Percentage
Postgrad	7,061.49	6.63%
Graduate diploma	6,392.98	6.01%
Bachelor or honours	16,212.84	15.23%
Advanced diploma	10,679.40	10.03%
Certificate III or IV	24,136.60	22.68%
Year 12	16,429.07	15.44%
Year 11 and below	25,115.92	23.60%
Undetermined	405.70	0.38%

Table 3 – Current labour force status

Labour force status	N.	Percentage
Employed	68,779.32	64.62%
Unemployed	3,395.96	3.19%
Not in the labour force	34,258.73	32.19%

Table 4 – Current employment status

Employment status	N.	Percentage
Employee	58,056.47	85.07%
Employee of own business	3,864.98	5.66%
Employer/self-employed	6,104.62	8.95%
Unpaid family worker	217.93	0.32%

Table 5 – Current retirement status

Retirement status	N.	Percentage
Refused/not stated	1.93	0.01%
Don't know	31.45	0.09%
Not asked	17,583.72	49.56%
Completely retired	7,007.22	19.75%
Partly retired	1,089.52	3.07%
Not retired at all	9,397.79	26.49%
Not relevant – never been in paid labour force	366.37	1.03%

Table 6 – Correlation table (weighted) of the relevant inheritance and labour supply variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1 Age	1.000													
2 Sex	0.043*	1.000												
3 Resident Children	-0.086*	0.064*	1.000											
4 Income	-0.166*	-0.197*	0.148*	1.000										
5 Education	0.107*	0.041*	-0.080*	-0.315*	1.000									
6 Marital stat.	-0.317*	0.009*	-0.356*	-0.137*	0.156*	1.000								
7 Inheritance	0.031*	0.014*	0.000	0.009*	-0.025*	-0.017*	1.000							
8 Inheritance Amount	0.031*	0.010*	0.003	0.007*	-0.024*	-0.009*	0.501*	1.000						
9 Employ-ment stat.	-0.336*	-0.152*	0.136*	0.367*	-0.243*	-0.069*	0.019*	0.002	1.000					
10 Labour force stat.	0.460*	0.138*	-0.132*	-0.481*	0.274*	0.016*	-0.011*	0.006	-0.892*	1.000				
11 Retirement stat.	0.583*	0.004	0.014*	0.056*	0.021*	-0.245*	0.034*	0.036*	0.046*	0.006	1.000			
12 Retirement age (act/exp)	-0.099*	-0.210*	0.021*	0.169*	-0.204*	-0.020*	0.020*	0.010*	0.275*	-0.298*	0.263*	1.000		
13 Preferred hours work	-0.392*	-0.250*	0.115*	0.548*	-0.260*	-0.034*	0.001	-0.009*	0.773*	-0.845*	-0.015*	0.273*	1.000	
14 Actual hours worked	-0.344*	-0.245*	0.124*	0.592*	-0.279*	-0.072*	0.005	-0.006	0.762*	-0.822*	0.025*	0.259*	0.933*	1.000

* Significant at a 5% confidence interval

Table 7 – effects of inheritance receipt on employment (type) by gender

Dependent variable:	Employment status		R² Within	Employment type employee		R² Within	Employment type Own business		R² Within	Employment type Self-employed		R² Within
Gender	Female	Male	(F/M)	Female	Male	(F/M)	Female	Male	(F/M)	Female	Male	(F/M)
Post inheritance receipt	-0.016	-0.025*	0.231	-0.012	-0.026*	0.237	0.000	0.010	0.002	-0.005	-0.008	0.010
	(0.131)	(0.060)	0.152	(0.254)	(0.079)	0.189	(0.932)	(0.211)	0.006	(0.452)	(0.389)	0.014
Post inheritance amount receipt (per $100.000)	-0.006*	-0.006	0.231	-0.003	-0.009*	0.273	-0.002*	0.004	0.002	-0.001	-0.001	0.010
	(0.068)	(0.180)	0.152	(0.328)	(0.070)	0.189	(0.060)	(0.256)	0.006	(0.634)	(0.409)	0.014
Inheritance receipt less than $25,000	-0.008	0.009	0.231	-0.026	0.024	0.273	0.006	-0.007	0.003	0.007	-0.006	0.011
	(0.654)	(0.682)	0.153	(0.140)	(0.321)	0.189	(0.288)	(0.462)	0.006	(0.513)	(0.723)	0.015
Inheritance between $25,000-$75,000	-0.014	-0.021		-0.025	-0.050*		0.014	0.184		-0.002	0.011	
	(0.424)	(0.407)		(0.177)	(0.082)		(0.180)	(0.291)		(0.771)	(0.571)	
Inheritance between $75,000-$200,000	-0.028	-0.047**		-0.001	-0.035		-0.001	0.021*		-0.027*	-0.036**	
	(0.129)	(0.028)		(0.965)	(0.141)		(0.891)	(0.075)		(0.075)	(0.010)	
Inheritance between $200,000-$500,000	-0.012	-0.079***		0.024	-0.081**		-0.023*	0.004		-0.009	-0.001	
	(0.606)	(0.008)		(0.263)	(0.017)		(0.055)	(0.865)		(0.496)	(0.935)	
Inheritance receipt more than $500,000	-0.051	0.340		-0.055*	-0.0117		-0.0140	0.030		0.018	0.005	
	(0.100)	(0.441)		(0.060)	(0.824)		(0.111)	(0.214)		(0.296)	(0.849)	
Observations	56,365	47,966		56,365	47,966		56,365	47,966		56,365	47,966	
Groups	6,382	5,441		6,382	5,441		6,382	5,441		6,382	5,441	

*p< 0.10, **p<0.05, ***p<0.01 p-value between brackets

All regressions include control variables, weights and individual fixed-effects.

Table 8 – effects of inheritance receipt on hours worked and retirement age by gender

Dependent variable:	Actual hours usually worked		R² Within	Preferred hours worked		R² Within	Retirement age		R² Within
Gender	Female	Male	(F/M)	Female	Male	(F/M)	Female	Male	(F/M)
Post inheritance receipt	-0.167	-1.570***	0.393	-0.434	-1.345**	0.306	-0.036	-0.105	0.026
	(0.618)	(0.006)	0.234	(0.211)	(0.015)	0.188	(0.759)	(0.327)	0.028
Post inheritance amount receipt (per $100.000)	-0.149	-0.303*	0.393	-0.131	-0.277	0.306	-0.002	-0.033	0.026
	(0.149)	(0.091)	0.234	(0.198)	(0.147)	0.187	(0.955)	(0.256)	0.028
Inheritance receipt less than $25,000	0.597	-1.310	0.393	0.164	-0.630	0.306	-0.420*	-0.176	0.027
	(0.313)	(0.145)	0.234	(0.793)	(0.404)	0.188	(0.091)	(0.314)	0.028
Inheritance between $25,000-$75,000	0.068	-0.595		-0.613	-0.483		0.170	-0.110	
	(0.914)	(0.611)		(0.348)	(0.669)		(0.501)	(0.422)	
Inheritance between $75,000-$200,000	-1.089**	-1.011		-1.087*	-1.186		-0.080	-0.086	
	(0.040)	(0.283)		(0.052)	(0.181)		(0.617)	(0.586)	
Inheritance between $200,000-$500,000	-0.336	-4.662***		0.352	-4.139***		0.348	-0.307**	
	(0.666)	(0.000)		(0.670)	(0.001)		(0.376)	(0.025)	
Inheritance receipt more than $500,000	-1.597*	-0.003		-1.137	-0.118		-0.251*	0.009	
	(0.079)	(0.999)		(0.227)	(0.955)		(0.083)	(0.977)	
Observations	56,365	47,966		56,365	47,966		22,147	18,037	
Groups	6,382	5,441		6,382	5,441		2,694	2,184	

*p< 0.10, **p<0.05, ***p<0.01 p-value between brackets

All regressions include control variables, weights and individual fixed-effects.

Table 9 – effect of inheritance amount categories on employment (type)

Dependent variable:	(1) Employment Status	(2) Employment type employee	(3) Employment type own business	(4) Employment type Self-employed
Inheritance receipt less than $25,000	-0.003 (0.840)	-0.007** (0.653)	0.001 (0.852)	0.002 (0.864)
Inheritance between $25,000-$75,000	-0.018 (0.217)	-0.038** (0.022)	0.017* (0.094)	0.004 (0.669)
Inheritance between $75,000-$200,000	-0.042*** (0.002)	-0.022 (0.128)	0.009 (0.141)	-0.030*** (0.003)
Inheritance between $200,000-$500,000	-0.040** (0.029)	-0.020 (0.329)	-0.012 (0.357)	-0.006 (0.538)
Inheritance receipt more than $500,000	-0.026 (0.318)	-0.044* (0.094)	0.000 (0.999)	0.012 (0.393)
Age	-0.010*** (0.000)	-0.011*** (0.000)	0.001*** (0.007)	0.000 (0.630)
Resident Children	-0.001 (0.842)	-0.006* (0.074)	0.005*** (0.008)	-0.001 (0.785)
Wage (Gross, weekly)	0.000*** (0.000)	0.000*** (0.000)	-0.000*** (0.006)	-0.000*** (0.000)
Female	-0.187 (0.214)	-0.159 (0.249)	-0.005 (0.482)	-0.021** (0.014)
Grad. Diploma	-0.067* (0.061)	-0.040 (0.296)	-0.007 (0.464)	-0.022** (0.049)
Bachelor or honours	-0.067*** (0.003)	-0.038* (0.093)	-0.004 (0.389)	-0.024** (0.011)
Advanced Diploma	-0.117*** (0.000)	-0.083*** (0.006)	-0.010 (0.162)	-0.024** (0.023)
Cert. III or IV	-0.163*** (0.000)	-0.141*** (0.000)	-0.006 (0.379)	-0.019* (0.085)
Year 12	-0.135*** (0.000)	-0.088*** (0.002)	-0.010 (0.103)	-0.034*** (0.000)
Year 11 or below	-0.367*** (0.000)	-0.310*** (0.000)	-0.010 (0.153)	-0.048*** (0.000)
Undetermined	-1.257*** (0.000)	-1.168*** (0.000)	-0.015 (0.101)	-0.073*** (0.000)
De facto	0.012 (0.220)	0.037*** (0.000)	-0.008 (0.149)	-0.015** (0.023)
separated	0.002 (0.864)	0.015 (0.199)	-0.008 (0.204)	-0.003 (0.737)
Divorced	0.015 (0.292)	0.034** (0.033)	-0.008 (0.204)	-0.010 (0.178)
widowed	-0.010 (0.625)	0.003 (0.867)	-0.008 (0.323)	-0.004 (0.589)
Never married /de facto	0.023* (0.062)	0.073*** (0.000)	-0.022*** (0.008)	-0.026*** (0.001)
Constant	1.230*** (0.000)	1.085*** (0.000)	0.020 (0.241)	0.119*** (0.000)
Observations	104,331	104,331	104,331	104,331

Groups	11,820	11,820	11,820	11,820
R² within	0.161	0.202	0.004	0.012
R² between	0.457	0.440	0.003	0.037

*p< 0.10, **p<0.05, ***p<0.01 p-value between brackets

The reference category for Marital Status is "legally married", the reference category for Education is "postgrad". All regressions include weights and individual fixed-effects.

Table 10 – effect of inheritance amount categories on hours worked and retirement age

Dependent variable:	(1) Actual hours usually worked	(2) Preferred hours worked	(3) Actual retirement age
Inheritance receipt less than $25,000	-0.309	-0.227	-0.323**
	(0.550)	(0.640)	(0.043)
Inheritance between $25,000-$75,000	-0.285	-0.578	0.040
	(0.657)	(0.357)	(0.791)
Inheritance between $75,000-$200,000	-1.304**	-1.319**	-0.091
	(0.014)	(0.010)	(0.425)
Inheritance between $200,000-$500,000	-2.156***	-1.923***	0.082
	(0.003)	(0.009)	(0.732)
Inheritance receipt more than $500,000	-1.125	-0.774	-0.193
	(0.200)	(0.401)	(0.221)
Age	-0.411***	-0.402***	0.087***
	(0.000)	(0.000)	(0.000)
Total resident children	-0.305**	-0.290**	-0.045
	(0.027)	(0.023)	(0.221)
Wage (gross, weekly)	0.009***	0.007***	-0.000***
	(0.000)	(0.000)	(0.001)
Female	-4.495	-4.827	
	(0.599)	(0.528)	
Grad. Diploma	-6.206***	-4.987***	-0.928**
	(0.000)	(0.000)	(0.034)
Bachelor or honours	-4.036***	-3.955***	-0.463
	(0.000)	(0.000)	(0.259)
Advanced Diploma	-11.276***	-11.011***	-0.070
	(0.000)	(0.000)	(0.887)
Cert. III or IV	-13.831***	-13.942***	-0.677
	(0.000)	(0.000)	(0.207)
Year 12	-15.431***	-15.176***	-1.322*
	(0.000)	(0.000)	(0.071)
Year 11 or below	-23.589***	-24.602***	-1.425**
	(0.000)	(0.000)	(0.028)
Undetermined	-55.534***	-77.641***	
	(0.000)	(0.000)	
De facto	1.035*	1.593***	0.234
	(0.050)	(0.000)	(0.316)
separated	0.371	0.511	0.120
	(0.492)	(0.297)	(0.481)

Divorced	0.782	1.346**	0.583**
	(0.157)	(0.017)	(0.042)
widowed	0.704	1.002*	-0.061
	(0.248)	(0.090)	(0.543)
Never married /de facto	-0.412	1.178**	-0.275
	(0.541)	(0.045)	(0.538)
Constant	51.983***	51.686***	56.862***
	(0,000)	(0.000)	(0.000)
Observations	104,331	104,331	40,184
Groups	11,820	11,820	4,878
R^2 within	0.268	0.212	0.026
R^2 between	0.482	0.450	0.001

*$p< 0.10$, **$p<0.05$, ***$p<0.01$ p-value between brackets*

The reference category for Marital Status is "legally married", the reference category for Education is "postgrad". All regressions include weights and individual fixed-effects.

Table 11 – Employment status by gender

	Women		Men	
Employment Status	**N.**	**Percentage**	**N.**	**Percentage**
Employed	23,817.80	41.45%	14,181.17	28.95%
Unemployed	33,639.20	58.55%	34,795.83	71.05%

Table 12 – labour statistics Women

	N.	Mean	Std. dev.	Min	Max
Weekly wage	56,371	563.48	743.93	0	15,554
Actual hours worked weekly	57,457	18.775	18.840	0	140

Table 13 – labour statistics Men

	N.	Mean	Std. dev.	Min	Max
Weekly wage	47,967	942.48	1150.58	0	17,023
Actual hours worked weekly	48,977	29.100	21.959	0	140