

Inheritance as a Disincentive to Labor Effort

Erlend E. Bø, Elin Halvorsen and Thor O. Thoresen*

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Abstract

Whether an inheritance has a negative impact on labor supply is important for understanding the behavioral effects of inheritance/estate taxation, the effect of unearned income on labor supply, and the dynamics of inter-generational transfers of resources. Using panel data covering all registered inheritances in Norway, we find that inheritance does have a negative, but small, impact on the recipient family's earnings in the years following the receipt of an inheritance. Our data gives the opportunity to follow recipients for a long time, and because the sample of inheritors is so large, to get good estimates for heterogeneous responses. We find that for young inheritors respond more along the intensive margin than the extensive margin, and that the effect is exhausted after five to six years. An older person who inherits is found to respond more along the extensive margin, and the effect is increasing over time. For all age groups we find that women reduce their earnings more than men after inheriting.

Keywords: Inheritance, labor supply, taxation

JEL: D10, D80, D91, J22

*Research Department, Statistics Norway, 0033 Oslo, Norway. Corresponding authors: elin.halvorsen@ssb.no, erlend.eide.bo@ssb.no.

1 Introduction

Taxation of intergenerational transfers generates substantial controversy. Opponents of the inheritance tax argue that it lacks legitimacy, as it adds to the suffering of mourning families, and that it harms the labor supply and investment decisions of parents, who plan to transfer resources to their children. As tax revenues from the estate tax or the inheritance tax often are rather modest, one may question the logic of upholding a tax which imposes substantial compliance and administrative costs.

A standard justification for an inheritance tax (or estate tax) is that it prevents wealth concentration and therefore may be seen as contributing to equalization of opportunities. The efficiency arguments concerning taxation of inheritance usually focus on the disincentive effects on donors. However, once one turns the attention to effects of wealth transfers on the donees (children), there is potential for an additional gain from taxation of intergenerational transfers: it encourages the labor supply of donees, as it curbs the positive effects of wealth transfers on the purchase of leisure for the recipients.

The validity of the labor supply argument for taxation of intergenerational transfers depends on how intergenerational transfers are used to reduce labor supply. Are they used to permanently reduce labor supply over the entire life-cycle or are they used to consume a few hours of leisure at the end of the working career? The aim of the present study is to provide a rather comprehensive characterization of effects involved by discussing empirical estimates of how different recipients are affected by this type of transfers.

The 19th century industrialist Andrew Carnegie warned that the inheritance has harmful effects: "the parent who leaves his son enormous wealth generally deadens the talents and energies of the son, and tempts him to lead a less useful and less worthy life than he otherwise would ..." (Carnegie, 1881/1962).¹ As bequests in many societies in the twenty-first century more often are received by "children" in their fifties rather than by young adults, one may suspect that Carnegie's conjecture has less relevance today: for example, life expectancy for a 20 year old Norwegian male has increased by around 50 percent from the days of Carnegie up till now, from approximately 40 years to 60 remaining years. However, the significance of the Carnegie conjecture depends on to what extent the heir anticipates the inheritance. If the inheritance is expected, and there are no liquidity constraints, the standard life-cycle model predict that the transfer will be fully absorbed in the life-cycle plan of the recipient. A perfectly foreseen inheritance would lower the heir's marginal utility from the first year of his economic life, yielding a downward shift in his entire life-cycle profile of labor.

¹Carnegie gave or bequeathed most of his vast fortune to charity.

There are several reasons though, for expecting labor supply effects (if there are any) to materialize shortly after the actual transfers of resources from parents (or other donors) to children. Firstly, there is uncertainty about both the timing and amount of inheritances. Even though Norwegian succession laws offer some predictability, as it is regulated by law that two-thirds of the estate (up to a threshold) is transferred to children for equal sharing, these regulations are mainly for preventing unequal division between children. Recipients may receive larger and smaller inheritances than expected, dependent on how much time parents possess to consume of their wealth (under the life-cycle hypothesis). Parents may unexpectedly make transfer to people or organizations outside the family, such as religious movements. Secondly, although inheritances may be anticipated, credit constraints may prevent the heir from incorporating the inheritance into his budget. Thirdly, risk averse recipients will avoid using money they do not have full control over.

The results have implications for the relationship between inheritance and lifetime income inequality. If inheritances cause large labor disincentives, then the dispersion in the distribution of earnings will be reduced. The reduction in earnings inequality will mitigate the increase lifetime income inequality caused directly by the inheritance. Furthermore, the results are of interest because of the enormous wealth that current young generations stand to inherit from their parents. A large labor disincentive would reduce the future earnings base producing obvious consequences for tax policy.

The results may also be used to shed light on the propensity to earn out of unearned income. It is important for policy makers to understand the effects of income on economic behavior such as labor supply. For instance, would the receipt of welfare payments (additional unearned income) to certain groups cause them to work less or, in some cases, stop working completely? Since randomly assigned and exogenous changes in income are quite rare, it has proved difficult to identify and precisely estimate the effect of unearned income on labor supply. Researchers often end up assuming either that spousal income or property income is exogenous, and try to use that to estimate the effect of unearned income. This is obviously a problematic assumption. Alternatively one may analyze experimental data with clearly exogenous sources of unearned income. Examples of these kinds of “natural experiments” are post-war one-time payments, lottery prizes, and to some extent, inheritances. Inheritances are obviously less exogenous than the two former examples, since most inheritances are more or less anticipated.

In the present analysis, we examine labor supply effects of donees by addressing information for a large sample of heirs, consisting of all Norwegians in working age who received an inheritance between 2000 and 2004. Identification of effects is obtained by comparing the behavior of the inheritors to the rest of the population.

Previous studies, as Holtz-Eakin, Joulfaian and Rosen (1993), Joulfaian and Wilhelm (1994) and Brown, Coile and Weisbenner (2010), suggest that inheritance reduces labor supply. However, the strength of the effects varies, and is to some extent conditional on the samples the different studies have had access to. As we have access to information about all bequests in the period, more than 170,000 transfers, we are able to provide a rather broad picture of the effects involved.

We examine effects both at the intensive and extensive margins. At the intensive margin, inheritance invokes an income effect on the purchase of leisure (given that leisure is a normal good). At the extensive margin, the inheritance increases the reservation wage, which means that some recipients will withdraw from the labor market. It is expected that those who already have high income in the non-work alternative, such as people eligible to the early retirement benefit, react. Whereas Carnegie warned about harmful effects of bequests and in the early years of life, we hypothesize that effects may be stronger in other phases over the life-cycle.

Providing greater understanding of the labor supply effects of intergenerational transfers is important from a policy-making perspective. In Norway, we expect to see a substantial increase in wealth and wealth transfers in the future, and if these gains to a large extent are used to increase the consumption of leisure, this is an argument for retaining the inheritance tax. Moreover, as we have access to data for a large number of recipients, we are able to provide evidence of how intergenerational transfers interact with other characteristics of the welfare state. In particular, we focus on responses to the combination of wealth transfers and eligibility to the early retirement scheme, as the joint work disincentive effect may be rather large.

2 Labor supply effects of wealth transfers

The structural life-cycle labor supply model of Heckman and MaCurdy (1980, 1982) establishes a theoretical foundation for assessment of effects of inheritance. Consider a simple model where the individual chooses consumption (c) and hours of work (h) by solving the problem:

$$\max E_t \sum_{t=0}^T \beta U(c_t, h_t, Z_t),$$

subject to the intertemporal budget constraint that describes the change in the value of assets a between periods

$$a_{t+1} = (1 + r_t)(a_t - c_t + w_t h_t + I_t),$$

where Z_t is a vector of preference shifts, β is the subjective discount factor, a_t are assets at the start of the period, r_t is the real interest rate, w_t is the wage rate and I_t is nonlabor income. Inheritance or the returns on the savings from inheritance are included in I_t . E_t denotes the subjective expectation of the individual, which could have been dropped in the model of Heckman and MaCurdy, as there is no uncertainty about future outcomes. The first order conditions for period t are

$$\begin{aligned}\frac{\partial U}{\partial c_t} &= \lambda_t \\ \frac{\partial U}{\partial h_t} &= -\lambda_t w_t\end{aligned}$$

where λ_t is the marginal utility of wealth. In an model with perfect foresight, such as Heckman and Macurdy (1980, 1982), variables such as future wage, personal characteristics and nonlabor income (inheritance) is captured by changes in λ_t , which only varies according to the relationship $\lambda_t = \rho(1+r)\lambda_{t+1}$, where ρ is the discount rate and r the interest rate. This framework leads to the so-called Frisch wage elasticity of labor, for constant marginal utility of wealth. Accordingly, the reservation wage of the model depends on λ_t . For example, for a higher lifetime wealth, which implies that λ_t is reduced, the reservation wage is increased.

Thus, taken literally, in a model with perfect foresight, an inheritance is fully absorbed, yielding a downward shift in the entire life-cycle profile of labor. As there is no capital constraints in the model, inherited wealth has no effect through responses from capital constrained families either. Thus, this prototype model serves as a benchmark for a model which predicts no labor supply effects after receiving an inheritance, the effect is already absorbed in the life-cycle adjustments. The modification of Joulfaian and Wilhelm (1994) opens up for the inheritance to be unanticipated, thus denoting the significance of the expectation operator in the general set-up. If an individual does not anticipate either the timing or the amount of his inheritance (implying $E(I) = 0$), an inheritance at time τ will cause a downward revision in the marginal utility of wealth and thus a reduction in labor supply at age τ and older.

It follows that the magnitude of labor supply responses of donees depend on a how unexpted the inheritances are and to what extent the beneficiaries are liquidity constrained. Moreover, there is a number of other factors which influence the size of the possible labor supply effect. As already noted, an inheritance is likely to affect the reservation wage through its increase of nonlabor income, which means that the distribution and the size of the reservation wage influence results. Recipients with market wages close to the reservation wage may withdraw from the labor market (effect on the extensive margin). Next, effects depend on the marginal propensity to consume from the wealth increase, and how much of the additional consumption that is directed towards increased consumption of leisure.

In that respect, the change in labor supply as a result of a wealth shock, like an inheritance, is similar to studying the income effect of the standard labor supply literature.

3 Taxation of intergenerational transfers

Taxation of intergenerational transfers is controversial and opponents criticize the inheritance tax for being inefficient, for lacking legitimacy and for being unfair. Correspondingly, tax rates have been cut in several OECD countries, such as the US, the UK, Italy, and France (Piketty, 2010), and some countries (as Sweden) have recently abolished the inheritance tax. However, the dominant picture, see for instance OECD (2012), is that one find schedules for a majority of OECD-countries. Norway is one of the few countries which tax both wealth and inheritance.

A normative analysis of the issue, see Kaplow (2001), may start from the theorem of Atkinson and Stiglitz (1976), which states that in the case of no externalities, taxation of bequests is a particular tax on one specific type of consumption, and unless this taxation is useful in order to discriminate between high and low ability individuals, there is no reason for a tax on bequests. Kopczuk (2010) argues that there may be other exogenous individual differences that may make a case for special tax treatment of wealth, such as luck. If welfare weights for the top end of the distribution approaches zero, the potential tax revenue has some size, and the labor income and wealth are not too closely linked, there is a case for taxing intergenerational transfers. Moreover, Kopczuk (2010) argues that there may be externalities from extensive wealth concentration, which an inheritance tax can correct. Also, from a perspective of social justice, one may find it strange to tax people on money they have earned, while exempting from taxation money that comes to them through no effort (Mirrlees et al., 2011).

The present analysis focuses on a potential advantageous effect of inheritance taxation that usually do not capture a key position in the argumentation, which partly may be explained by the lack of empirical information about the effects involved. As there usually are different constraints (such as a progressive tax system), which prevent society from achieving enough work, we assume that policies which encourage labor supply is wanted. How much value that should be attached to this particular argument depends on how large the effect is, which is the issue we discuss in the present paper. The relevance of this issue is also spurred by expactions of wealth growth and wealth transfer growth in the next decades, in Norway [reference] and probably in several other countries too.

A major complication in the assessment of the inheritance tax, from a tax normative perspective, is that the tax affects both donors and donees, and we are not sure how the different generations are linked together, or what motivates

transfers. Models of intergenerational linkages include the altruism model (Barro, 1974; Becker, 1974) and the strategic exchange model (Bernheim, Shleifer and Summers, 1985). Altruism means that the parent take the child's well-being into account when making decisions, whereas the strategic model focuses on bequests as payments for services the donee delivers to the donor. Motivations for leaving bequests also have implications for interpretation of the empirical transfer patterns; we will return to the bequest motives below.

4 Previous literature

As parents under altruism are expected to adjust transfers to children according to differences in endowments of children, Tomes (1982) discusses labor supply effects of children as an alternative explanation for the inverse relationship between transfers and incomes of recipients, but finds no support for such effects in data. Holtz-Eakin, Joulfaian and Rosen (1993) design a closer examination of the Carnegie conjecture, i.e., that inheritance reduces labor supply. Using a one percent sample of estate tax returns, they compare the labor market outcomes (as a binary: work/not work) of 4332 beneficiaries in 1982 (before receipt) and in 1985. The results provide a clear indication of large inheritances reducing labor supply. However, effects when measuring labor earnings are smaller though. And though controls are made for age differences between heirs receiving large and smaller inheritances, controls for i.e. educational differences are lacking. Still, the study suggests that a single person who inherits more than \$150,000 is four times as likely to stop working as a single person that inherits less than \$25,000.

In contrast, Joulfaian and Wilhelm (1994) find that inheritances have only a small effect on consumption and an even smaller effect on labor supply (measured as hours worked). They use a life-cycle labor supply, where utility is assumed to be separable in consumption and labor within each year and across time, and employ two datasets in the estimation of the model: the Michigan Panel Study of Income Dynamics (PSID) which include both inheritors and non-inheritors; and the Treasury's Estate-Income Tax Match Sample (EITM), which is a sample of wealthy descendents and their heirs. Several controls and robustness checks are employed, but the authors do express some concerns whether they are fully able to control for the wage profiles' effect on the estimates. Their conclusion is that inheritances do not lead to substantial reductions in labor supply.

In Joulfaian (2006), the income tax returns of 819 heirs are followed from 1988 through 1989 (year of receipt) to 1991. Though the main focus is on the consumption and savings choices of heirs, the paper also estimates a logit model of labor force participation. The larger the inheritance, the less is the probability that the inheritor remains in the labor force in 1991.

Brown, Coile and Weisbenner (2010) focus on the binary work/retire decision. Using 1994–2002 American survey data from the Health and Retirement Study, they find a significantly increasing probability of retirement amongst those who receive inheritances. They have the possibility to split inheritances in expected and unexpected, and find higher responses to unexpected inheritances. The HRS is a panel dataset of self-reported information on wealth, income and health for individuals 53 years and older (in 1994) and their spouses. It is thus not a representative sample for the whole population of heirs.

Elinder, Erixson and Ohlsson (2011) use information on the heirs of a sample of 232 persons, and find a substantial decrease in labor income, increasing two to three years after receipt. The deceased in the sample were all from Stockholm, passed away in 2004, had a positive estate worth, a will existed, and all had more than one child. The analyzed sample consists of 374 heirs, who are followed over 9 years; 2000–2008. Due to the requirements for being included in the sample, it is likely that the heirs are wealthier and have higher incomes and education than the overall population, which available descriptive statistics seem to confirm. It also seems likely that the heirs in the sample are wealthier, and have better education and higher income, than the average heir.

Further evidence on the income effect on labor comes from a related kind of data that is not attenuated by anticipation: winners of lotteries. Winners of large prizes in the lottery see large increases in their incomes, and, as a result, large outward shifts in their budget constraints. However, because the winners' wages have not changed, the slopes of their budget constraints remain the same. There is, therefore, no substitution effect. By examining the behavior of lottery winners we can isolate the income effect on labor supply. The results from studies of lottery winnings are that they do reduce labor earnings. Imbens, Rubin and Sacerdote (2001) estimate the propensity to earn, and find propensities that range from -0.1 to -0.25, but on average approximately -0.11, and significantly more for those close to retirement age.

In an earlier study, Kaplan (1987) found that of those winners who won more than \$1 million, 23 percent stopped working. None of those winners who won less than \$50,000 stopped working, and the same pattern was found among their spouses. Kaplan also found that age close to retirement was important for the choice of leaving the labor force, with 39% of working winners 65 or older opting to retire. Furthermore, he found that the lower the educational level of the winners, the higher the number of quits and retires, and the greater the reduction in work hours. Likewise, those people that had been in their jobs less than four years when they won, and who worked less than 20 hours a week exhibited the greatest amount of job quitting.

Kimball and Shapiro (2008) use hypothetical lottery winners (e.g. they ask a

sample of people what they would do in the event of winning the sweepstakes) and arrive at estimates close to -0.3. As pointed out by Kimball and Shapiro, if the income effect on labor supply is large, and we are to maintain that changes in wages only have a small effect on labor supply, the substitution effect must be large as well.

5 Empirical Analysis

5.1 Data Description

In this analysis we use register data for the whole Norwegian population. All inheritances are reported to tax authorities and included in the data set (it might be that not all small inheritances, i.e. those below the threshold for inheritance taxation, are put down on record; our data includes few inheritances of less than 5000 kr).² Earnings data are also taken from tax records. Our data covers the years 1998–2006. We limit the population to those between age 18 and 58 in 1998 (26 and 66 in 2006), to avoid children of school age and old age pensioners. Early retirement is one of the outcomes we are interested in, but not normal retirement; the standard retirement age in Norway is 67. We also exclude anyone not present in the data for all nine years. We then leave out those who were self-employed³, as we look at wage income. Also, to avoid outliers influencing the results too much, we truncate the data at the 1th and 99th percentile of total gross income for the years 1998 and 1999. This leaves us with 1,747,713 persons followed over nine years. In comparison to earlier studies of the labor supply effects of inheritances, we have a much larger sample, both of heirs and of controls, and follow them for a longer period.

As we want to see the progression of labour income and wealth, we want all of our subjects to have at least two years of income observations both before and after inheritance. Thus, our “treatment group” will include all persons having inherited in the years 2000–2004. We will also, as a second and third treatment group, look at persons who have inherited more than 300,000 NOK (which is roughly the mean inheritance) and more than 1 million NOK.⁴ For comparison, the mean and median wage income in the sample are both around 230,000 NOK. This is to get a clearer view of how larger inheritances affect employment, as these are more likely to have an effect. Receiving e.g. a sum of one monthly wage might not change behaviour

²It should be noted that the death of a spouse does not lead to an inheritance for the surviving partner.

³We define that as persons having higher business income than wage income in the years 1998 and 1999, i.e. the years before treatment.

⁴All sums are deflated using the consumer price index, and given as 1998-kr.

Table 1: Mean values in 1998

	Non- inheritors	Inheritors	Inheritors $I > 300,000$	Inheritors $I > 1,000,000$
Age	39.4	43.8	44.2	43.6
Wage	209,679	229,448	242,165	255,022
Net wealth	-43,717	42,874	60,280	151,925
Male	.467	.462	.464	.461
Family size	1.63	1.77	1.77	1.72
No of children	.845	.820	.826	.844
High School level	.469	.481	.470	.414
University level	.266	.315	.362	.463
No of persons	1,576,288	171,425	63,552	8,321
Inheritance (Std)	.	323,483 459,451	669,569 605,699	1,668,878 1,201,343
(Median)	.	203,868	500,302	1,357,576

much. For a married couple where one of the partners receives an inheritance, it seems unreasonable to think that only that person's income might be affected. An advantage of our paper compared to Elinder et al. (2011) and Joulfaiian (2006) is the ability to look at the changes in household income, as we can connect heirs to their spouses. We assume that only couples have a common economy, so persons who are living in a multiple-person household, but are classified as single, are excluded⁵.

Table 1 shows that inheritors do not have the same characteristics as non-inheritors. It gives descriptive statistics for the two groups for 1998, that is, several years before the inheritors have received any bequests. Recipients of inheritance are likely to have received other, unobservable, transfers from their parents, in the form of "human wealth". Human wealth is derived from favorable educational and environmental opportunities, as well as connections due to family background and marriage. For example, wealthy parents who are successful at creating and managing businesses, managing financial assets, and fostering professional contacts are often in better positions to model ways of accumulation and managing wealth for their children. At the same time, these characteristic may be inherited by the child and therefore may influence the child's own earnings and ability to manage financial assets. This is confirmed by Table 1, which shows that inheritors

⁵This will mostly be grown children registered as living in their parents household.

have on average higher educational level, and higher earnings and wealth prior to inheritance. Because of the natural timing of inheritances, inheritors are on average older than the rest of the population and this will of course also contribute to higher pre-inheritance earnings and wealth.

On average the recipients are 44 years old in 1998, which means that they are on average 46-50 years old at the time of inheriting. The fraction of inheritors that has high school as the highest level of education is about the same as for non-inheritors, 48 percent in the former group and 47 percent in the latter. However, there is a larger fraction of inheritors (31 percent) that have attained college or university degrees than non-inheritors (26 percent), and this fraction is increasing with the size of the inheritance. For those who have received inheritances above three times their annual income, 46 percent of the recipients have a college or university degree. Pre-inheritance wage income and net wealth is also increasing in the level of inheritance. How to account for this selection bias in the analysis will be discussed in the following section.

6 Empirical Specification

Ideally, we would like to compare persons who are similar in most respects except that one person comes from a family that has inherited and the other not. To achieve this, we have chosen the propensity score matching (PSM) method. Our data set includes a rich set of observable characteristics for each person, which makes it suitable for matching. We have explored other methods of normalization on initial values and exact matching on a few observables, but since they proved to be less convincing methods and yet provided quantitatively the same results, we do not discuss them here.

The matching task consists of finding a corresponding subject that is identical or at least very similar on the shared covariates (e.g. age, education, and previous earnings and wealth). The propensity score method creates a single composite score from all observed baseline covariates \mathbf{X} . Units are then matched on the basis of that one-dimensional score alone. The propensity score (PS) is defined as the conditional probability of inheritance receipt in the period 2000-2004 given the observed covariates \mathbf{X} , that is, $e(\mathbf{X}) = \Pr(D = 1|\mathbf{X})$. This is not necessarily the true selection probability since the strong ignorability assumption does not require all constructs determining treatment selection being measured. Strong ignorability necessitates only those covariates that are correlated with both inheriting and potential outcomes. Rosenbaum and Rubin (1983) showed that if treatment assignment is strongly ignorable given observed covariates, it is also strongly ignorable given the propensity score, $Y(0), Y(1) \perp D|e(\mathbf{X})$. This implies that instead of the overall set of covariates, we may use a single composite for balancing baseline

differences in covariates and multivariate matching techniques can be replaced by univariate PS matching techniques.

Thus, the two main identification assumptions are unconfoundedness and overlap, or common support (Imbens, 2004). The assumption of unconfoundedness means that, conditional on the propensity score, the potential outcomes are independent of treatment. That is, there are no unobservable variables influencing both the assignment to treatment and the outcome. Common support is defined as $0 < \Pr(D = 1|\mathbf{X}) < 1$. The overlap assumption ensures that over the whole range of \mathbf{X} , there is the possibility for matches, i.e. similar persons with different treatment status.

The propensity score in our case is the estimated probability that a person lives in a household that receives an inheritance, given the values of the confounding variables. Matching involves pairing inheritors and non-inheritors that are similar in terms of their observable characteristic. One important matching variable is initial earnings. It is important that we compare families that have the similar pre-inheritance earnings, as earnings is our measure of labor supply. Furthermore, as indicated in table 1, inheritors are older and have higher education than non-inheritors. Being in a couple also increases the probability of inheriting since two are more likely to inherit than one. Consequently, the propensity score is estimated with a logit procedure using earnings, age dummies, sex, a dummy for marriage/cohabitation, and dummies for high school and university education as explanatory variables.⁶ The results for the participation model is presented in Appendix A. The matching is done in 1998, the earliest year in our data.

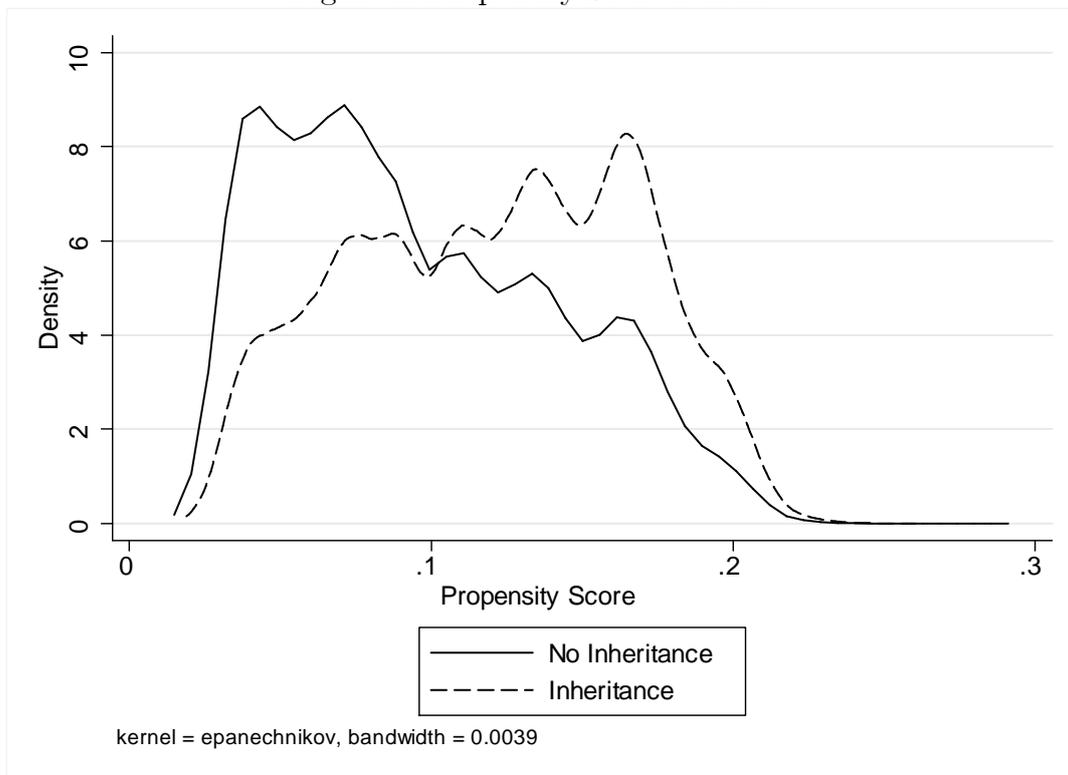
In figure 1, the propensity score densities of inheritors and non-inheritors are displayed.⁷ As can be seen, the distribution is massed at higher levels of propensity score for inheritors than for non-inheritors, meaning that the propensity score does have some predictive power. There also seem to be common support for all treated observations. Common support for the treatment group is sufficient to estimate average treatment effect on the treated (ATT) (Caliendo and Kopeinig, 2008). After working out the propensity score for each person, the next step is to compare persons with similar propensity scores to estimate the effect of an inheritance on earnings. Figure 2 shows the propensity score densities of the inheritors and their matches. It seems like we are able to find good matches.

We use nearest neighbor matching, without replacement. This is due to the need to assign year 0 to the controls depending on the year of inheritance receipt, which would be problematic if one control was matched to several treated observations. We have lots of control observations compared to treated observations, so

⁶The matching is implemented in Stata 11 with the package `psmatch2` (Leuven and Sianesi, 2003).

⁷Similar figures for the other matches are available at request. They all share roughly similar characteristics.

Figure 1: Propensity Score Densities



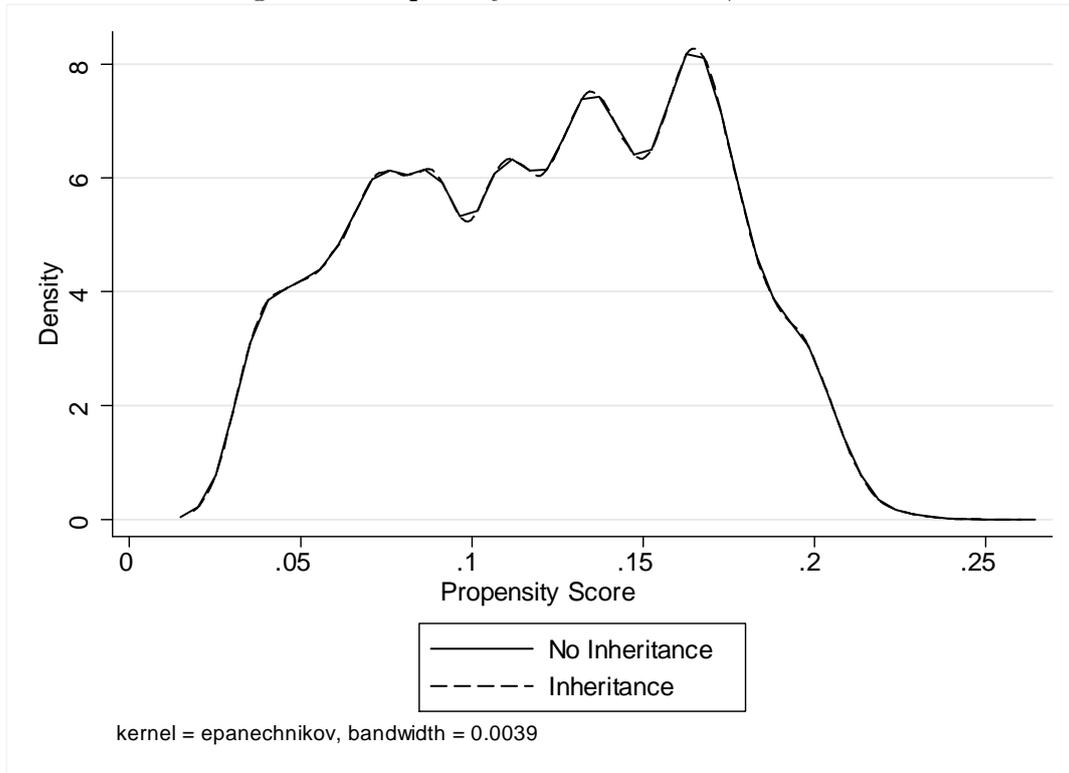
not using replacement should be unproblematic (Caliendo and Kopeinig, 2008).

We will be estimating average treatment effect on the treated (ATT). As it is likely that the treated represent a normal distribution of heirs, and that the characteristics of heirs does not change much over time, we argue that the ATT will be informative also for those receiving inheritances in other years than 2000–2004, and of more interest than the average treatment effect on the whole population (ATE).

7 Results

Table 2 present the matching estimates with log earnings as the dependent variable. In the first column we present results for all inheritances. The results indicate that the labor supply does not respond so much in the year of receipt and in the next couple of years. Although statistically insignificant, there is a drop in the level of earnings around the time of inheritance. We find a negative effect on earnings in the third to sixth years after inheriting, but the effect is small and for all

Figure 2: Propensity Score Densities, Matched



inheritances only statistically significant (at a 5 % level) in the fifth year after inheritance. There is a clear sluggishness in the response, which indicates that there are adjustments along both the intensive and the extensive margin.

Since it is likely that labor force participation decrease with the level of bequests we run separate regressions for recipients of large inheritances. Small inheritances, for instance inheritances that are substantially smaller than the recipient's annual income, are not likely to have any large effects on labor supply. Therefore we do two separate analyses for large inheritances, one analysis for inheritances larger than 300,000 NOK (somewhat more than mean annual wage income), and one analysis for huge inheritances (more than three times mean annual wage income). For larger inheritances, the estimated coefficients are higher and more significant. The results in table 2 shows that for large inheritances the negative earnings response to inheritance is statistically significant for almost all years after the year of receipt, and increasing in the size of the inheritance. It is interesting to note that for larger inheritances the immediate effect is much higher than was the case with all inheritances (where the majority of recipients inherited amounts that are less than their annual income). Still, we find that the response shows the same pattern as

Table 2: Matching Estimates for Log Earnings

	All inheritances		Large inheritances ¹		Huge inheritances ²	
	ATT	SE	ATT	SE	ATT	SE
Year 1998	.0034	.0109	.0010	.0176	-.0253	.0492
6 years before	.0220	.0261	.0208	.0385	-.0117	.0999
5 years before	.0158	.0182	.0194	.0277	-.0344	.0750
4 years before	.0149	.0147	.0094	.0228	-.0286	.0634
3 years before	.0224	.0128	.0121	.0203	-.0466	.0555
2 years before	.0117	.0115	.0046	.0185	-.0597	.0513
1 year before	.0174	.0118	.0054	.0191	-.1043*	.0525
Year of receipt	.0108	.0123	-.0163	.0199	-.1554**	.0547
1 year after	-.0031	.0128	-.0627**	.0208	-.2227**	.0573
2 years after	.0016	.0134	-.0641**	.0217	-.2672**	.0600
3 years after	-.0145	.0151	-.0777**	.0250	-.3013**	.0705
4 years after	-.0299	.0177	-.1087**	.0297	-.2492**	.0840
5 years after	-.0550*	.0221	-.1614**	.0378	-.1405	.1082
6 years after	-.0472	.0317	-.1305*	.0560	-.4116*	.1652
No of matches ³	171,425		63,552		8,321	

¹ Inheritances larger than 300,000 NOK

² Inheritances larger than 1,000,000 NOK.

³ Maximum number of matches, i.e. in the year of receipt +/- 2 years.

*/** Significant at the 5 percent/1 percent level.

for all inheritances with an increase in the reduction of earnings over time, largest in the fifth to sixth year after inheriting.

7.1 Heterogeneous responses

The average age of heirs (at receipt) is about 48 years. It seems probable that the sons that Andrew Carnegie had in mind when he was concerned about a general deadening of "talents and energies" were somewhat below the age of 50. Persons older than 40 years of age have normally attained a stable position in the labor market with education and work orientation based on their own ability and choosing. Thus, it is for beneficiaries younger than that, even as young as in their twenties, that we imagine that a large inheritance may have a substantial effect on their own work effort, though it is important to notice that most of the observed inheritances in this age group are rather small compared to life-time income. Another group of persons that tend to be more flexible in the labor market

are those close to retirement. It is very probable that the choice of when to retire may be affected by the sudden receipt of an inheritance. Although it may not be appropriate to term this as deadening of talents and energies, it is within the framework of thinking about how much more work effort a person will put in before he is satisfied with the accumulated wealth level. In other words, we assume that the Carnegie Conjecture is likely to be more valid for young persons and those close to retirement.

Table 3: Log earnings by age group

	Young recipients Ages 26-39 ATT	Middle-aged rec Ages 40-55 ATT	Older recipients Ages 56-67 ATT
Year of receipt	.007	-.081*	.037
1 year after	-.123*	-.123*	.008
2 years after	-.145*	-.096*	-.012
3 years after	-.163*	-.073*	-.017
4 years after	-.126*	-.075*	-.075
5 years after	-.115	-.089*	-.216*
6 years after	-.056	-.097	.073
No of matches			

¹ Max number of matches, i.e. in the year of receipt +/- 2 years

*/** Significant at the 5 percent/1 percent level.

Table 3 shows results by age groups, and for large inheritances only since table 2 demonstrated that inheritances need to be of some magnitude if we are to observe any sizeable behavioral effects. We find that young inheritors have significantly lower earnings in the four years following an inheritance. After that the effects on earning is still negative but not statistically significant and is becoming smaller. Thus it seems that the effect of the inheritance is exhausted after four years for young heirs. For mid-life recipients, a significant decline in earnings is manifest even in the year of receipt. They exhibit the largest decline in the first year after inheriting. After that the magnitude of the response is smaller than for younger recipients but on the other side more enduring. Older recipients are slower in their earnings response; the coefficients are insignificant in the first years.

As argued above, we expect older persons to be more responsive to an inheritance than younger ones along the extensive margin. Thus we analyze in particular the probability of early retirement. The findings are reported in table 4. They show a significant increase in the uptake of early retirement in the years after inher-

Table 4: Matching Estimates, Early Retirement

	ATT	SE	N
Year of receipt	.0003	.0014	24,715
1 year after	.0008	.0020	24,715
2 years after	.0050	.0026	24,715
3 years after	.0090**	.0031	21,084
4 years after	.0120**	.0039	16,947
5 years after	.0208**	.0050	11,838
6 years after	.0133	.0074	6,156

*/** Significant at the 5 percent/1 percent level.

itance receipt. Note that the reported outcome here is the difference in the share of inheritors and non-inheritors who have taken early retirement. As expected, it is a sluggish decision process so that the largest probability increase occurs in the fourth year after inheriting. Since the effect of retirement uptake might have a lagged effect on our measurement of earnings, this fits well with our finding of a decline in earnings in the fifth year after inheriting. All in all, the age specific results seem to support Carnegies conjecture in the short run as young heirs show the strongest decline in earnings in the first years. However, the effect on young people is only temporary, while for older recipients the effects are more gradual but at the same time more permanent.

Table 5: Log earnings by gender

	Male	Female
Year of receipt	-.002	-.033
1 year after	-.048	-.079*
2 years after	-.048	-.082*
3 years after	-.079*	-.079*
4 years after	-.131*	-.089*
5 years after	-.183*	-.144*
6 years after	-.182*	-.085

*/** Significant at the 5 percent/1 percent level.

In the labor supply literature it is often found that females have a more elastic labor supply than men, especially married females. Thus, table 5 shows the earnings response to inheritance by gender. According to the results the decline in earnings appears without delay for females compared to men. While the effect on

men's earnings is negative from the year of receipt the coefficients are not significant in the first years. The size of the coefficients increases over time and become significant in the third and subsequent years. In other words, men are slower in their adjustment, but when they do adjust the effects are stronger. This indicates that men may be more responsive along the extensive margin in the long run, while females tend to adjust along the intensive margin by lowering hours of work in the short run. On the other hand, since many recipients are close to retirement, there may be some female recipients that are in a couple where the husband is already retired (as the husband is often somewhat older). An inheritance could therefore have a larger effect on the labor choices of women with recently-retired husband through coordination between spouses. The table in Appendix B examines this more closely as we do separate matches based on age, marital status and gender.

At the outset we would assume that single recipients are less likely to quit working, and more likely to leave hours unchanged than married recipients. Furthermore, we assume that among married recipients, single earners are less likely to quit than dual earners. However, the estimates in table in Appendix B show that singles reduce their labor supply more after inheriting than couples, especially young single men. On the other hand, it seems that married men do not reduce their earnings when inheriting at all. This confirms well with the commonly found result that the male breadwinner has a very inelastic labor supply. It is not apparent from the results that married women reduce their labor supply more than single women. This is rather puzzling, but we have to keep in mind that the data matching is done on characteristics in 1998, so some of the singles may have become couples over time (and vice versa).

8 Summary

Using panel data covering all registered inheritances in Norway, we have found that inheritance does have a negative impact on the recipient family's earnings in the years following the receipt of an inheritance. Recipients of inheritance are likely to have received other, unobservable, transfers from their parents, in the form of "human wealth". Human wealth is derived from favorable educational and environmental opportunities, as well as connections due to family background and marriage. Thus inheritors have on average higher educational level, and higher earnings and wealth prior to inheritance. In order to account for this selection bias, we use the propensity score method that matches families with the same propensity to inherit (derived from confounding factors) but with different outcomes with respect to receiving an inheritance (in the period 2000—2004).

Overall, we find that although the decline in earnings for inheritors is not statistically significant in analysis of all inheritances, the coefficients become significant

when we consider inheritances that are larger than an average person's annual income. Furthermore, we find that the effect on labor supply is stronger for women than for men, and stronger for recipients close to retirement. In a separate analysis of the propensity to retire early we find that this propensity increases after inheriting, with the highest increase in the fourth year after inheriting.

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A The participation model

	Coef.	Std.err
Earnings/100,000	.047**	.002
Male	-.115**	.005
Couple	.472**	.006
High school level	.205**	.006
University level	.359**	.007
Dummies for ages 19-58		yes
$\widehat{\Pr}[I > 0]$		
No of observations		1,747,713

The matching is done in 1998, the earliest year in our data.

*/** Significant at the 5 percent/1 percent level.

B Results by age, marital status and gender

Young recipients	Single		Couple	
	Male	Female	Male	Female
6-5 years before	.026	.030	-.015	-.033
4-3 years before	.059	.004	.002	-.110
2-1 years before	.033	.035	.049	-.113
Year of receipt	.130	-.102	-.071	-.263*
1-2 years after	-.036	-.179*	-.095	-.258*
3-4 years after	-.308*	-.129	.054	-.072
5-6 years after	-.284	.013	.137	.191
No of matches	1432	1705	1026	1915

Middle aged recipients	Single		Couple	
	Male	Female	Male	Female
6-5 years before	-.035	.049	.040	.012
4-3 years before	-.061	.126	.046	.003
2-1 years before	-.089	.041	.045	.001
Year of receipt	-.069	-.001	.055	-.006
1-2 years after	-.079	-.051	.033	-.040
3-4 years after	.016	-.012	.079*	-.026
5-6 years after	.066	.064	.138*	-.031
No of matches	3167	3435	10892	14004

Older recipients	Single		Couple	
	Male	Female	Male	Female
6-5 years before	-.050	.061	.030	.022
4-3 years before	.034	.023	.037	.015
2-1 years before	.018	.016	.008	.002
Year of receipt	.019	-.011	.012	.007
1-2 years after	-.107	-.147	.055	-.048
3-4 years after	.022	-.261	.018	-.101
5-6 years after	-.058	-.517*	.066	-.176
No of matches	2228	2862	10750	10136

¹ Max number of matches, i.e. in the year of receipt +/- 2 years

*/** Significant at the 5 percent/1 percent level.