The Effect of Inheritance Receipt on
Labor and Capital Income:
Evidence from Swedish Panel Data

*Mikael Elinder, Oscar Erixson and Henry
Ohlsson*

UPPSALA
UNIVERSITET

The Effect of Inheritance Receipt on Labor and Capital Income: Evidence from Swedish Panel Data

Mikael Elinder, Oscar Erixson and Henry Ohlsson

The Effect of Inheritance Receipt on Labor and Capital Income:

Evidence from Swedish Panel Data[*]

Mikael Elinder[1], Oscar Erixson[2] and Henry Ohlsson[3][#]

April 27, 2010

Abstract

In this paper we study the effects of inheritances on labor and capital income of heirs. We use unique register based Swedish panel data to estimate both short run and medium run responses. The few existing studies have mainly focused on short run responses, using data from the U.S. Models of life cycle consumption stress that anticipated and unanticipated income changes have different impacts on the optimal consumption path. In Sweden, as in other countries with extensive public insurances and succession rules that prohibit decedents from bequeathing the entire estate to others than their children, inheritances are likely to be anticipated to a higher degree than in the U.S. Our estimates suggest that there is a negative effect of inheriting on labor income in the year of the receipt and the year after, and that the negative effect is even larger two to three years after receiving the inheritance. Moreover, we find that capital income increases by an amount corresponding to wealth increasing at least by the amount inherited.

Keywords: inheritances, bequests, windfall gains, labor supply, capital income, uncertainty

JEL Codes: D10, D80, D91, J22

[1] Uppsala Center for Fiscal Studies, Department of Economics, Uppsala University and Research Institute of Industrial Economics (IFN).

[2] Department of Economics, Uppsala University.

[3] Department of Economics, Uppsala University and Uppsala Center for Fiscal Studies, Department of Economics, Uppsala University.

[#] Correponding author: Henry Ohlsson, Department of Economics, Uppsala University, Box 513, SE–751 20 Uppsala, Sweden, email: henry.ohlsson@nek.uu.se, phone: +46 18 471 11 04, fax: +46 18 471 14 78.

1 Introduction

Most people receive an inheritance at some point in life. In many cases, the inheritance provides the heir with substantially increased wealth. Unfortunately, there are very few empirical studies on behavioral responses to inheritance receipt. Theoretical models suggest that behavioral responses of the heir depend critically on whether the inheritance was anticipated or not. If people rationally calculate when and how much they will inherit, behavioral effects are likely to take place gradually during life. If, on the other hand, inheritances are largely unanticipated, they are essentially windfall gains from the perspective of the heirs. Consequently, the behavioral responses will follow after the actual receipt of the inheritance. Similar results are expected if individuals are liquidity constrained.

The purpose of this paper is to study the dynamic effects of receiving inheritances on labor income and capital income. The distributional and individual effects of inheritances are crucially important for a wide range of economic problems. For instance, the distributional effects of intra-family wealth transfers, and corresponding taxation, depend on how labor supply decisions are affected by inheritances.[4] Inheritances may also affect savings behavior. Ignoring effects of anticipated and realized inheritances on savings behavior may lead researchers to conclude that people are saving too little for retirement. Furthermore, responses to inheritances may shed light on how unearned income affects labor supply, entrepreneurial and consumption decisions. To properly understand the behavioral effects of inheritances, it is crucial to know when responses are likely to take place.[5]

In this paper we estimate effects of receiving inheritances on labor income and capital income in the years following the receipt of inheritances. For this purpose, we have a collected unique panel data set covering individuals, who lived in the city of Stockholm, Sweden, and who passed away in 2004, and their heirs. The data are collected from administrative records and include, among other things, information on the estate, inheritances, family characteristics, and labor income and capital income from 2002 to 2007.

If inheritances are perfectly anticipated, we do not expect to find any effects on labor income, as the rational individual has adjusted its labor supply decision already before the receipt of inheritances. If on the other hand, there is substantial uncertainty about the size and timing of the inheritance, we expect economically significant responses in labor income. Likewise, if the inheritance is perfectly anticipated, we expect to see a one-to-one increase in wealth – and corresponding capital income – as the individual will not adjust its consumption, but save all inherited wealth. If inheritances are unanticipated, we expect the individual to consume an equal part of the inherited wealth in each of her remaining years in life. Consequently, we would see smaller than one-to-one increase in capital income. If individuals are liquidity constrained or do not rationally optimize life cycle consumption, we expect substantially lower responses to capital income.

A serious concern regarding the estimation of effects of inheritances arises because inheritances often are correlated with unobservable characteristics, such as taste for leisure and risk aversion, that affect labor supply and saving. We employ fixed effect models to estimate the

---

[4] See Kopczuk (2010) for a discussion on the implications of transfer taxes.
[5] The size of inheritance receipts is expected to be negatively correlated with the number of children (Blomquist, 1979; Laitner and Ohlsson, 2001). Hence, a wealthier population with fewer children is likely to increase importance of the effects of inheritances in society.

individual effects of receiving inheritances on labor income and capital income. This approach makes it possible to control for unobserved individual heterogeneity and get consistent estimates under plausible assumptions.

Unlike lottery winnings, and many other wealth shocks, receiving inheritances also means that someone in a close relation to the recipient, typically a parent, has died.[6] This has several implications for when and how behavioral responses take place. First, the parent has often been sick some time before dying, and the children may have spent substantial time caring for the parent.[7] Second, heirs may mourn immediately after the parent has passed away and, hence, not work as much or as hard as they would otherwise.[8] And, even less so, think about how to optimally incorporate inheritances into their investment portfolio. Third, heirs may need to devote substantial time and effort arranging with funeral, preparing the estate inventory report, dividing the estate, and related tasks. Taken together this implies that we should not be surprised if we see responses in the year in which the parent died, or the year after, that cannot be rationalized by stylized models of rational agents. Furthermore, as changes in hours worked and effort may take time to materialize in labor income, we expect it to take a few years before a new optimum has been reached. Similarly, the re-optimization of the investment portfolio, to incorporate inherited assets, may take some time and result in realization of capital gains, yielding short-run responses that are not representative of a new optimum.

The extent to which inheritances are anticipated is likely to depend on the institutional context in which the decedent and the heirs lived. In Sweden, as in many other European countries, expenses related to health shocks for elderly people are covered by public insurances, making it easier for potential heirs to estimate the value of the estate before the parent has passed away.[9] In addition, the succession rules state that the legal heirs (typically the children of the decedent) have the right to receive at least half of the estate.[10] Together this implies that contrary to in the U.S. children are certain to receive an inheritance in many European countries, conditional on a positive estate. In consequence, behavioral responses following receipt of inheritances are likely to vary between different institutional contexts. To our knowledge our study is the first to estimate responses to labor and capital income outside the U.S.

Our results indicate substantial disincentive effects on labor income. The responses are stronger two to three years after the receipt of inheritances than the responses in the year of the receipt and the year after. The estimated responses suggest that there are large disincentive effects

---

[6] For studies of lottery winnings see Kaplan (1978, 1987), Lindh and Ohlsson (1996), Imbens et al. (2001). See Coronado and Perozek (2003) for a study of windfall gains in the stock market and Krueger and Pishke (1992) for shocks in social security wealth.

[7] Studies have found a negative relation between the provision of informal care to elderly parents and labor market outcomes, such as labor force attachment, earnings, and hours, of the children (see Ettner, 1995; Bolin et al., 2008; Fevang et al., 2009).

[8] Studies in sociology have found that the death of a close relative is associated with severe grief among adult children and also, that the death of a close relative causes psychological stress (Umberson et al., 1992; Umberson and Chen, 1994; Kessler, 1997). Schultz et al. (2003) study a sample of individuals who provided informal care to their dying parents. The results show that depressive symptoms as well as consumption of antidepressant medicines increased immediately after the bereavement. However, a year after the demise the symptoms had returned to levels lower than those prior to the death.

[9] In Sweden, Denmark, Finland, Norway and Germany around 80 percent of the total health expenditures are publicly funded through taxation, while the corresponding shares in e.g. the U.K., France and the Czech Republic are even larger (European Commission).This compares to the U.S. were approximately one third of the population is covered by the tax-financed programs Medicare and Medicaid (U.S. Census Bureau). See Bolin et al. (2008) Table 2 for fractions of public-spending on long-term care as share of GDP in the European countries.

[10] For fractions in other European countries, see Angelini (2009), Table 2.

of inheritances. Capital income increases by an amount corresponding to an increase in wealth of at least the inherited amount. Capital income responses are, just like labor income responses, higher two and three years after the receipt of the inheritance. The results are consistent with substantial uncertainty surrounding the inheritance. As our sample of decedents and heirs are wealthier than the average Swedish citizen, liquidity constraints are not likely to be a main explanation for our results. The results suggest that that heirs both decrease their labor supply and increase their disposable income. Moreover, our results indicate behavioral responses, that are of interest for analyses of wealth inequality or effects of estate or bequest taxation, should be measured at least two years after the receipt of inheritances.

Our results can be related to previous studies on behavioral effects of receiving inheritances using U.S. data.[11] Holtz-Eakin et al. (1993) test Carnegie's century old conjecture in their study on the possible detrimental effect of inheritance on work effort three years after the decedent passed away. They use estate tax register data covering very wealthy decedents and their heirs, to examine labor supply responses before and after the receipt of inheritances. They find that inheritances tend to decrease labor force participation and earnings. Joulfaian and Wilhelm (1994) primarily use PSID panel data. They find small disincentive effects of inheritances. In their study, unobserved individual heterogeneity is dealt with by using fixed-effects estimation. Brown et al. (2006) use data from the Health and Retirement Study to investigate effects on retirement. When controlling for a range of background characteristics they find a positive effect of inheritance receipt on retirement. The effect is larger when the inheritance was unexpected. Joulfaian (2006) uses administrative data on tax returns of donors matched to individual income tax returns of the heirs. He estimates effects of inheritances on capital income and labor force participation two years after the decedent passed away. He presents evidence that capital income increases by less than what an increase in wealth, of the size of the inheritance, would yield. He also finds a negative effect on labor force participation.

2 Theoretical framework

In this section we give a formalized theoretical description of how labor supply, consumption, and savings could be affected by an inheritance. The theoretical framework closely resembles those presented in Weil (1993) and Joulfaian (2006), but we extend the model to include endogenous labor supply responses and a bequest motive. Inheritances increase the beneficiary's wealth and we are interested in how this increase in wealth affects the optimal path of labor income and savings. It is, therefore, important to know how the responses differ depending on whether the inheritance is anticipated or not.[12] If inheritances are unanticipated, they will impact labor supply (and labor income), consumption and savings (and capital income) only after they

---

[11] Lindh and Ohlsson (1996) estimate the effect of inheritances on self-employment, using Swedish data.

[12] Carroll and Kimball (1996) show that the introduction of uncertainty causes marginal propensity to consume out of wealth rise at any given level of wealth. Concerning inheritances, Weil (1993) argues that modeling consumption out of expected inheritances, as if there were certainty about the receipt, will tend to overstate the effects of inheriting. Weil (1994) finds that households that expect to inherit a large amount consume more than those households who a priori did not expect to receive an inheritance. Similarly, in a study of the effect of inheritance receipt on retirement Brown et al. (2006) find that heirs who do not anticipate either the size or timing of the inheritance have a significantly higher probability of retiring earlier than expected compared to heirs who expect the inheritance.

are received. If inheritances are anticipated, labor supply, consumption and savings responses will be smoothed over the entire life. We assume that the individual begins her economic life in period 1 and lives for T periods of time. Furthermore, we assume that the individual wants to pass over wealth to her descendents when she dies, i.e., that there is a bequest motive.[13] An alternative interpretation is that the individual has preferences for being wealthy at the time of death. We introduce a bequest motive as all individuals in our data have a will, which we interpret as an indication of a bequest motive. The inheritance is received in period n were $n<T$. Moreover, each individual operates in an environment of perfect certainty concerning wages, prices, and life expectancy. The individual chooses a combination of consumption and leisure, as well as level of wealth to leave as a bequest, in order to maximize lifetime discounted utility. We assume that consumption and leisure generates utility according to the following concave function, $u(c_t, l_t)$, where c_t is the amount of market goods consumed at time point t and l_t represents leisure. The function is separable and strictly increasing in both of its arguments. Assuming that H is maximum hours worked, labor, n_t, in period t is given by $H - l_t$. Moreover, $v(k_{T+1})$ represents the individual's utility from knowing that wealth would be passed on when she dies, v is concave and strictly increasing in k, and k represents the individual's wealth. The problem can then be formulated as:

$$\max_{\{c_t, n_t, k_{t+1}\}_{t=1}^{T}} \sum_{t=1}^{T} \beta^{t-1} u(c_t, n_t) + \beta^{T-1} v(k_{T+1})$$

where β is the intertemporal discount rate. Utility is maximized subject to a sequence of intertemporal wealth constraints:

$$c_t + k_{t+1} = k_t(1 + r) + n_t w_t + I_t,$$

where r is the interest rate, w is the wage rate, n is the number of hours worked, k is the individual's wealth. In addition, I_t is the inheritance receipt which is received in period n, or stated differently:

$$I_t = \begin{cases} I \ if \ t = n \\ 0 \ if \ t \neq n \end{cases}$$

Furthermore, we assume that $I > 0$. Maximizing with respect to consumption, labor and wealth yields the following first order conditions:

(1) $c_t: \beta^{t-1} u_c(t) = \lambda_t$
(2) $n_t: \beta^{t-1} u_l(t) = \lambda_t w_t$
(3) $k_{t+1}: -\lambda_t + \lambda_{t+1}(1 + r) = 0 \quad 0 < t \leq T - 1$
(4) $k_{T+1}: \beta^{T-1} v_k(T) - \lambda_T = 0,$

where λ_t is the Lagrange multiplier in period t. Combining (1) with (3) and (1) with (2) gives, under the simplifying assumption that $\beta = \frac{1}{(1+r)}$, the following equations:

Omitting the bequest motive does not change the analysis other than that the individual optimizes on a higher consumption path.

$$(5) \quad u_c(t) = u_c(t+1)$$
$$(6) \quad u_l(t) = w_t u_c(t)$$
$$(7) \quad c_t + k_{t+1} = k_t(1+r) + n_t w_t + I_t$$
$$(8) \quad u_c(t) = v_k(T)$$

Consequently, the corresponding consumption path is:

$$c_1 = c_2 = \cdots = c_n = \cdots = c_T$$

This implies that, if the inherited amount is perfectly anticipated and if capital markets are perfect, we expect the inheritance to cause a one-to-one change in wealth and, therefore, that the inheritance receipt is consumed evenly over the whole lifetime. This implies that the marginal propensity to consume out of the inheritance is zero. With a similar reasoning, and the assumption that leisure is a normal good, (6) implies labor supply response will be incorporated already at t=1 and hence, leave the optimal labor supply path unaffected by the inheritance.

On the other hand, if the inheritance is completely unanticipated it can be considered a windfall gain from the perspective of the heir. Its arrival will then create a shock to wealth in period n with the result that neither (5) nor (6) will hold ex post. This creates a discontinuity in the consumption and labor supply paths at period n since the individual now realizes that wealth is higher than she previously anticipated. The corresponding maximization problem, therefore, gives that the inheritance is consumed evenly over all subsequent periods, i.e. $\frac{I}{T-n}$, were T-n is the remaining lifetime. Formally, wealth in the end of period n is given by:

$$k_n = k_{n-1}(1+r) + n_{n-1}w_{n-1} - c_{n-1} + I_n - \frac{I_n}{T-n}$$

This implies, in contrast to the case where the inheritance was perfectly anticipated, that the individual's marginal propensity to consume is positive and that the corresponding optimal consumption path is given by:

$$c_1 = c_2 = \cdots = c_{n-1} < c_n = \cdots = c_T$$

Moreover, since the inheritance receipt has made the individual richer, she will increase her leisure implying that there will be a downward revision of labor supply for all periods after n. The larger the inheritance is, both in absolute terms and as a share of lifetime income, the larger the corresponding responses.

In practice, inherited assets may not fit optimally into the heir's portfolio. She may therefore have an incentive to realize inherited assets and use capital gains to move towards an optimal portfolio of assets. We assume that the agent will incorporate the change in wealth and re-optimize her saving and consumption decision in the vicinity of the inheritance. Hence, we expect to see an increase in the capital income of the heir the year when the decedent passed away or in the year after, as individuals may need to realize some inherited capital gains to re-optimize their portfolios. However, it is important to note that, even if inheritances are perfectly anticipated, people may not always be able to borrow against future inheritance receipts. If borrowing constraints are binding the inheritance will not raise consumption or lower labor supply until the time period in which it is actually received. With borrowing constraints, there will as a consequences be no differences in responses between individuals that anticipate and do not

anticipate inheritance receipts. This is also the case if individuals are risk averse or prudent, because expected utility of an uncertain inheritance will be lower than in the case of certainty (Kimball, 1990; Weil, 1993). Deaton (1991), however, argues that liquidity constraints interact with precautionary motives, because the inability to borrow when times are bad provides an additional motive for accumulating assets when times are good.[14] Additionally, even if they anticipate the inheritance, heirs with low pre-inheritance saving are less likely to consume out of the inheritance before it is received, since these heirs have no wealth to run down.

3 Swedish succession rules

3.1 Rules governing the deceased

The default succession scheme in Swedish civil law is based on consanguinity. This means that relatives in a closer relationship to the deceased inherit before more distant relatives. Civil law categorizes relatives to the deceased into three inheritance classes. The succession scheme makes use of *succesio ordinum* which means that each class has to be empty of heirs before continuing to the next. The succession scheme also makes use of *jus repraesentationis*, which means that if the heir is deceased, her descendents inherit her share of the estate. The first inheritance class in the succession scheme contains the deceased's descendants, i.e., children, grandchildren and so on, were children are defined as legal heirs and the first in line to inherit.

Apart from the inheritance classes, there are also specific laws governing the surviving spouse. The surviving spouse is by definition not related to deceased by blood, but through marriage.[15] According to civil law, the surviving spouse inherits before the children, or to be more precise; the surviving spouse has the right of free disposal of the estate for the remainder of her life. This means that legal heirs who are children to a surviving spouse are defined as secondary heirs. They will have to wait for their surviving parent to die before they can take possession of the inheritance. If the deceased have children from a previous marriage or relation, these are exempted from this rule and will inherit in connection to their parent's death.

The second inheritance class begins, according to *succesio ordinum*, if there are no legal heirs in the first class. This class consists of the deceased's parents and their descendants. The third class includes grandparents and their children, i.e., aunts and uncles.[16] If there are no heirs in any of the three inheritance classes and there is no surviving spouse, the estate goes into possession of a public fund, The Swedish Inheritance Fund (*Allmänna Arvsfonden*).

The default succession scheme can be set aside by a will. A will is a legally binding document declaring the deceased's last wish of how the estate should be divided. The testator can bequeath up to half of the estate, while the remaining part is divided among the legal heirs. Before 1988, it was common practice that couples established a mutual will in order to assure and serve the

---

[14] Carroll (2001) suggests that limited borrowing opportunities might be an explanation for the observation that consumption follows household income closely over the life cycle.

[15] A surviving partner does not inherit the deceased. If the surviving partner and the deceased have common children, these children will inherit. A surviving partner can always chose to declare division of property. Such procedure is not affected by the heirs, and gives the surviving partner right to half of the cohabitation property.

[16] Note that the third class does not include the deceased's cousins.

economic status of the better half.[17] However, as discussed previously married couples do no longer need to institute a mutual will to assure the surviving spouse's right of inheritance. Today this procedure is mostly frequent among cohabitants, and this has resulted in a low frequency of wills in Sweden compared to other countries.[18] Beside a will it is possible to institute a writ of beneficiaries to life- and pension insurances. This is usually done in order to secure and guarantee the economic maintenance of surviving relatives.

3.2 Rules concerning valuation, division, and taxation of inheritances

Inheritances change from being expected by the heir to become realized when the donor passes away. At this time, unless there is a surviving spouse, the deceased's assets passes over to be governed by the estate and the heir can then refer to her legal share of the estate. This also implies that this is the point in time, from which the heir must address her share of the estate as an asset. In presence of a will, the inheritance is not reified when the testator passes away, but rather when the will is accepted. Information about the deceased's net assets by the time of her death is given by an estate inventory report.[19] The estate inventory serves as a basis valuation and taxation. The inventory can either be established by the relatives or, due to its sometimes complicated character, by lawyer, bank or a mortician.

The valuation of the estate is based upon market values of assets and debts, in order to as accurately as possible reflect the estates real value. Its value must be confirmed by those in charge of the estate. Concerning real estates, the valuation is based upon its tax value, which until year 2004, on average, was supposed to be 75 percent of the market value[20]. Securities, such as stocks and bonds should be declared according to their market value of the day the deceased died, and their values should be confirmed by fund management. However, any assets that are realized by the estate are valued to their full market price. For this reason, heirs have incentive to postpone realization of assets until the estate is closed and the assets have been transferred to them. One should note that all inheritances in Sweden are weakly positive by law. This implies that the estate is solely responsible for all existing debts and consequently that heirs do not inherit debts carried by the estate.

For equitable treatment, Swedish civil law states that the estate should be divided equally between heirs in a given inheritance class. This procedure can be set aside by a will, in which the testator declare a division of the estate different from the equal sharing principle. However, the legal heir can always claim her right to the statutory share of the inheritance, which is fifty percent of the property left. Due to the ambition to treat heirs equal, the law defines *inter vivos* gifts as advance inheritance. And, that the value of such gifts should be added in the valuation of the estate.[21]

---

[17] Since a surviving partner does not inherit the deceased, it is also common that cohabitates establishes mutual wills (Brattström and Singer, 2007).

[18] McGranahan (2006) reports that between 30 and 50 percent of Americans write wills before they die. Eliason and Ohlsson (2010) report a frequency of 23 percent for Sweden. In France, the equivalent fraction is only 10 percent (Pestieau, 2003). In addition, McGranahan (2006) finds that age and fortune (land holding) are positively correlated with will writing, while Pestieau (2003) finds that the incidence of wills is increasing rapidly with income.

[19] The estate inventory report should be established within three months after the deceased has died and be sent in to the Swedish Tax Authority within a month after its completion.

[20] From 2005 the tax value is 100 percent of the market value.

[21] This is the case for legal heirs, concerning other heirs gifts should not be added to the valuation.

All assets received from the estate were subject to inheritance tax if the deceased died before December 17, 2004.[22] However, the surviving spouse was exempted from tax already from January 1, 2004. The inheritance tax was progressive in two dimensions; first, larger shares are taxed more heavily than smaller shares. There were three tax rates: 10, 20, and 30 percent. Secondly, relatives in a genetically closer relationship to the deceased face lower taxes than more distant relatives in the sense that the bracket limits were at lower amounts for more distant relatives. The inheritance tax exemption also differed between heirs in different classes, e.g., the exemption for heirs in the first inheritance class was SEK 70,000, whereas it was SEK 21,000 for those in the second and third class.[23]

4 Data

The starting point is a sample of decedents selected from the Swedish Tax Authority's *Inheritance Tax Register* on the premises that: the deceased passed away in 2004 and was registered in the City of Stockholm, there was a will, the net worth of the estate was positive, the deceased had more than one child and that there was no surviving spouse. These restrictions resulted in a sample of 232 decedents. From the tax register we have information about the actual net worth of the estate and demographic information such as sex and year of birth. Moreover, there is information about the heirs and their relationship to the decedent. There is also data on taxable *inter vivos* gifts made by decedent during the last ten years. The estates are divided up in 820 lots transferred to 573 children, 176 grandchildren, 8 partners, 45 relatives, and 18 other individuals and charities.[24] One can see that few lots go outside the family. This implies that even when there is a will; donors tend to apply the succession scheme default.[25]

We have collected annual data on labor income, net capital income, net business income, taxable wealth, and real estate wealth for decedents and heirs from the Tax Authority's *Register of Final Tax on Income*. For the decedents this concerns the three years 2002-2004, for the heirs the six years 2002-2007. Taxable wealth is measured on a household basis whereas the other variables are measured on an individual level. Demographic characteristics, such as sex, marital status, year of birth, number of children, place of residence etc, have been collected from the Tax Authority's *Total Register of the Population*.

We analyze responses to inheritance receipt in a sub-sample of heirs aged between 21 and 59 years old in year 2004, to account for the fact that people tend to consume out of wealth after retiring, resulting in negative saving, and to separate labor supply changes from retirement and

---

[22] It was decided that the inheritance tax should be abolished from January 1, 2005. However, as many Swedes died in the Asian Tsunami on December 26, 2004, the government changed the date of abolition ex post. The gift tax followed that was repealed in connection to the inheritance tax. However, before the abolition, gifts receipts amounting to less than SEK 10,000 yearly were exempted from taxation. Gifts that amounted to SEK 10,000 or more were integrated in the taxation of inheritances.

[23] The 2004 exchange rates were 9.12 SEK/EUR, 7.35 SEK/USD, and 13.46 SEK/GBP.

[24] See Ohlsson (2007) for more detailed discussion about the data.

[25] People write wills for different reasons and these are not necessarily reflecting the testator's intentional desire to deviate from the intestate succession default. Instead, the testator might have emotional preferences regarding how particular assets of the estate should be divided among the heirs which in most cases not affect the relative magnitudes of inheritance receipts within the family. Also, the testator might institute a will with a testamentary clause in order to make sure that the handling of received property is conducted in a specific way.

education decisions.[26] By restricting the sample in this way we make sure that we include heirs that are above legal age throughout the whole sample period. However, we lose 48 heirs that are younger than 21 years old and 251 heirs that are older than 59 years. In order to not confound the analysis with respect to inheritance expectations we also restrict the sample to legal heirs. By doing so, we only include those who are certain of receiving an inheritance conditional on a positive estate.[27] As consequence we lose another 130 heirs. The resulting balanced panel gives us in total 2,340 observations for 390 heirs with income data for 6 years.

Ideally we would like to obtain data on hours worked, effort, and wage rates. As we do not have this possibility at hand, we make use of taxable labor income, as it captures aspects of all three components. Furthermore, effects on tax revenues come via taxable income. Labor income includes salaries, social insurance system benefits (such as sickness benefits and parental benefits), and unemployment benefits. Costs for commuting to work are deducted. But labor income also includes public pensions and occupational pensions.[28]

Net capital income includes interest received on financial assets, dividends, and realized capital gains minus interest paid on loans and realized capital losses.[29] Our main explanatory variable is the inheritance receipt, which is constructed, following Swedish civil law, as the value of the inheritance net of *inter vivos* gifts and taxes.

4.1 The decedents

We start by describing some characteristics of the decedents. Table 1 presents summary statistics.[30] We see that the average age at the time of death within the sample is almost 83 years. This is about 6 years higher than the life expectancy for Swedish men and 2 years higher than the life expectancy for Swedish women. This finding suggests that the decedents were healthier than the overall Swedish population.[31] As expected, men constitute a small part of the decedents. This is expected since women have a higher longevity than men and we have sampled households where the deceased was widow(er), divorced, or unmarried. The number of children of the deceased varies between 2 and 5 with an average number of 2.45. A smaller number of children

---

[26] The legislated default retirement age in the studied period was 65. The retirement age differ depending on the particular kind of pension agreement the worker has. For the so called general public pension, the retirement age varies between 61 and 67. The public guarantee pension, on the other hand, is only paid out once the worker has reached the age of 65. Occupational pension and private pensions can be withdrawn at the earliest at age 55. However, the actual average retirement age in year 2004 was 63.5 and 62.6 for men and women, respectively. It should be noted that some might have sufficient amount of wealth to leave the work force earlier while others have financial incentives to continue to work even though they have passed the legislated pension age (The Swedish Social Insurance Agency: *Genomsnittlig pensionsålder i de nordiska länderna*). By imposing the age restriction on the sample, we prevent ourselves from including heirs older than 63 in the sample period.

[27] We should emphasize that, even though legal heirs are certain about the incidence of inheritances there might be substantial uncertainty regarding the timing and size of the inheritance per se.

[28] The Swedish income tax is progressive with three successive tax brackets. Income from employment is liable to a municipality specific tax rate and to national tax for amounts exceeding SEK 291,800 in year 2004. On average the Municipal income tax rate is 31 percent.

[29] Net capital income is subject to capital income taxation. The tax rate has been 30 percent throughout the sample period.

[30] Because estates are stated in 2004 years prices   all prices in the paper are deflated to 2004 price level. Inflation was low during the studied period. The CPI increase from 2002 to 2007 was 6.5 percent. The year by year CPI increases were: 1.9 percent (2003); 0.4 percent (2004); 0.5 percent (2005); 1.4 percent (2006); 2.2 percent (2007).

[31] Source: Statistics Sweden.

will, *ceteris paribus*, yield a larger inheritance receipt per heir. We also note that about 20 percent of the decedents in the sample paid wealth taxes in year 2003. The corresponding number for the total population of Swedes aged 60 years and above was 6.3 percent in 2004. Furthermore, we see that the average estate in year 2004 amounts to SEK 958,977 with a median value of SEK 600,064.[32] This indicates that the estate distribution is skewed. The corresponding P90:P10 ratio is 12 indicating that there is a large variation in the size of the estate within the sample. Berg (2006) reports that the average individual wealth of people older than 75 years in the Swedish population was SEK 735,000 in year 2004. If we compare this with the average estate in the sample it, yet again, reveals that the decedents were wealthier than the overall population. We do not have information on asset holdings at the individual level, except for taxable real estate. However, according to Berg (2006), approximately one third of net worth of people older than 75, was made up of stocks, funds and other financial securities. The average value of labor income amounts to SEK 216,753 in 2003. Since the mean age in the sample is high we can expect that the majority of deceased were retired in the last year of their lives and hence, that the greater part of labor income is made up of pension payments. Moreover, we have information on the sample share with self-employment income. Self-employment income can be a good proxy for whether the estate constitute of a small business. However, Table 1 reveals that the share of decedents with self-employment income is negligible.

Table 1: Descriptive Statistics for the Decedents

	Mean	St. Dev	Median
Age in Year 2004	85.33	8.78	86.5
Males, percent	31	0.46	-
Widow(er)s, percent	81	39	-
Number of Children	2.45	0.69	2
Labor Income in 2003, SEK	216,753	139,522	188,178
Net Capital Income in 2003, SEK	27,674	100,567	5,259
Fraction with Taxable Wealth in 2003, percent	22	42	-
Value of Taxable Wealth in 2003, SEK[1]	2,608,057	1,300,046	2,116,874
Fraction with Taxable Real Estate in 2003, percent	26	44	-
Value of Taxable Real Estate in 2003, SEK[2]	858,306	763,672.4	669,833
Fraction with Self-Employment Income in 2003, percent	0.5	7	-
Age of Will	17.61	12.36	18
Estate in 2004, SEK	958,977	978,133	600,064
Number of Observations		194	

Notes: [1] Value is conditional on having wealth, [2] Value is conditional on having taxable real estate.

---

[32] The exchange rate has fluctuated around 7 SEK/$ and 9 SEK/€. One U.S. dollar bought more SEK in the beginning of our sample period and fewer in the end, while the exchange rate with respect to the Euro was comparably stable.

It is clear that the sampling strategy has resulted in a sample of deceased that were both healthier and wealthier than the deceased Swedes in 2004 in general. This is as expected, given the sampling criteria. However, we believe that the sampling strategy has advantages in terms of costs per observation and in that we obtain a sample with larger variation in inheritances than alternative samples of the same size would contain. We also note that the lack of representativity of our sample appears to be less serious than for the samples employed by, for instance, Holtz-Eakin et al. (1993), Joulfaian and Wilhelm (1994), and Joulfaian (2006).

4.2 The heirs

Table 2: Descriptive Statistics for the Heirs

	Mean	St.dev	Median
Inheritance in 2004, SEK	299,110	313,110	192,151
Age in Year 2004	49.97	7.88	50.00
50 Years and Older, percent	56	50	-
Males, percent	47	50	-
Married, percent	52	50	-
Number of children	1.75	1.10	2.00
Children to the Deceased, percent	96	20	-
Living in Stockholm County, percent	75	43	-
Labor Income in 2003, SEK	293,780	236,109	260,926
Net Capital Income in 2003, SEK	-1,236	62,690	-2,134
Fraction with Taxable Wealth in 2003, percent	16	37	-
Taxable Wealth in 2003, SEK[1]	2,467,997	1,973,582	2,114,258
Fraction with Taxable Real Estate in 2003, percent	63	48	-
Taxable Real Estate in 2003, SEK[2]	970,130	1,339,501	701,319
Fraction that have received Taxable Gift(s), percent	8	28	-
Value of Gift(s) in 2004, SEK [3]	240,689	270,051	170,000
Number of Observations		390	

Notes: [1] Value is conditional on having taxable wealth, [2] Value is conditional on having taxable real estate, [3] Value is conditional on having received a gift.

Table 2 provides sample attributes for the heirs. Concerning inheritance receipts we find that they vary between zero and SEK 2,623,056 with an average value of SEK 299,110. However, the median value is SEK 192,151 which equals about three thirds of the sample mean indicating that the distribution is positively skewed. Moreover, the P90:P10 ratio reveals that those in the top of the distribution inherit around 20 times more than those in lowest decile. On average, the heirs in our sample are about 50 years old at the time of inheriting. This is somewhat higher than in previous studies.[33] The share of heirs older than 50 years tells us that the age distribution is skewed to the left. This is expected, given the average age of the sampled decedents. Furthermore, we find that men are somewhat underrepresented and that 52 percent of the

---

[33] The average heir in Joulfaian and Wilhelm (1994) is 42 years old, while Joulfaian (2006) report an average age of 39.

recipients are married. The number of children varies between 0 and 6 with an average of 1.75 children. As expected, we find that the great majority (96 percent) of inheritors in the sample are children of the decedents. Furthermore, we note that 75 percent live in the county of Stockholm. Figure 1 show that there seems to be a positive correlation between inheritance receipt and age of the recipient. We observe that the unconditional average inheritance receipt is maximized for heirs who are about 42 years old. The relation seems to be non-linear and fairly well-approximated by a cubic function.
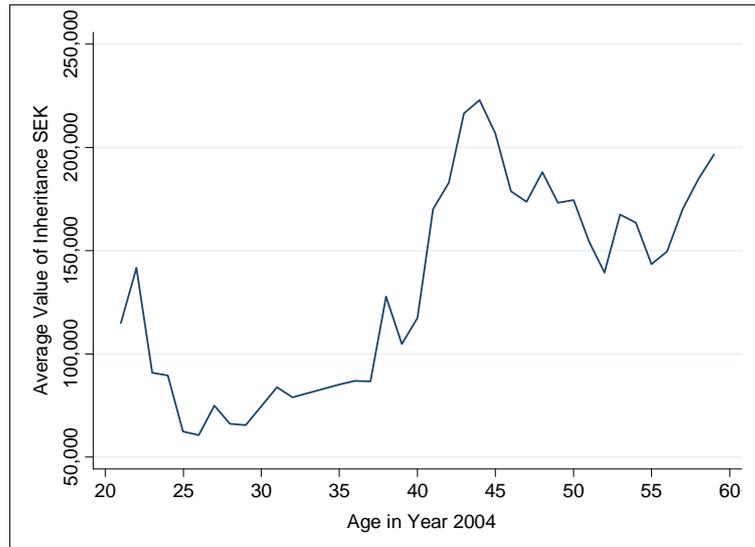
Figure 1. Average Value of Inheritance Receipt per Age Group

As we are interested in how the receipt of inheritances affects economic behavior it is informative to relate the size of the inheritance to the heir's financial status in the pre-inheritance period. Since taxable wealth is only available for a small share of the sample (16 percent in 2003) we instead calculate the ratio of the average inheritance receipt to average disposable income in 2003.[34] We find that the ratio is about one. This, in turn, suggests that the inheritances are substantial with respect to the financial status of the recipients and thus, potentially have important influences on economic behavior.

Furthermore, we have information on gifts received in the last ten years. According to the rules that govern the division of the estate, gifts should be added to the heir's lawful portion of the estate. Our data reports that, about 8 percent of the heirs have received a taxable gift from the deceased in the last ten years. A problem is that, neither have we information on the years in which the gifts were received, nor have we information about gifts below the tax threshold. It might be that some heirs have received substantial unreported gift receipts or that some have received considerable number of gifts that have amounted to less than the tax exception of SEK 10,000 annually. However, for those who have received a gift, the average receipt is SEK

---

[34] Disposable income is defined as the sum of incomes from labor, capital and self-employment. In year 2003 it amounted to SEK 299,888 for the average heir in the sample

240,689. Similarly to the distribution of inheritances, the median value indicates that the gift distribution is skewed to the right.

As with the sample of decedents, our sample of heirs is not perfectly representative of all heirs in Sweden during this time. First of all it is worth noting that the restrictions on the donor sample make the recipient sample non-random. About 63 percent of the heirs have taxable real estate wealth. This compares to 40 percent in the Swedish population aged 25 to 55 in year 2004 (Berg, 2006). Even though we do not have information on the donors level of education we can expect that they are better educated than the overall population and hence that the same is valid for the greater part of the heirs. We find that average labor income is around SEK 293,780 in year 2003. This compares to an average of SEK 231,000 for the Swedish population in 2003, and SEK 266,000 for Stockholm.[35] In addition, the fact that most of the heirs live in Stockholm give us reason to believe that the heirs are wealthier and have a better financial knowledge than the overall population. While our sample of heirs is not perfectly representative of the total population of heirs, an advantage is that we observe large variations in inheritances and that the heirs are sufficiently wealthy for us to assume that it is unlikely that liquidity constraints will be affecting the results.

4.3 Visual inspection and empirical challenges

For each heir in the sample, we observe labor income for the two years before the year of inheriting, for the year of the receipt (2004), and for the three following years. Figure 2 displays labor income for the years 2002-2007. The dashed vertical line points out the year in which the deceased passed away. As our main interest is in the dynamic effects of inheritance we divide our time series of six years into three sub periods. The first period is given by the two years prior to the inheritance (2002 and 2003), the second period, denoted short run, consists of the year of the receipt and the year after (2004 and 2005), the third period, denoted medium run, is given by the second and third year following the receipt (2006 and 2007). The two vertical solid lines represent the division of the three time periods.

The labor income path for our working sample is illustrated by the solid graph in Figure 2. We observe that labor income have increased by approximately 7 percent over the sample period. However, as we have no information on hours worked or wage rates we cannot tell whether the increase in labor income is caused by a raise in wage rates, by an increase in hours of work, or a simultaneous increase in both. It should be noted, however, that the overall evolvement of wage rates in Sweden was moderate for the sample period.[36]

---

[35] Source: Statistics Sweden.

[36] The wage increase from 2002 to 2007 was 16 percent. The year by year increases were: 3.5 percent (2003); 3.3 percent (2004); 3.1 percent (2005); 3.1 percent (2006); 3.3 percent (2007). (Statistics Sweden)
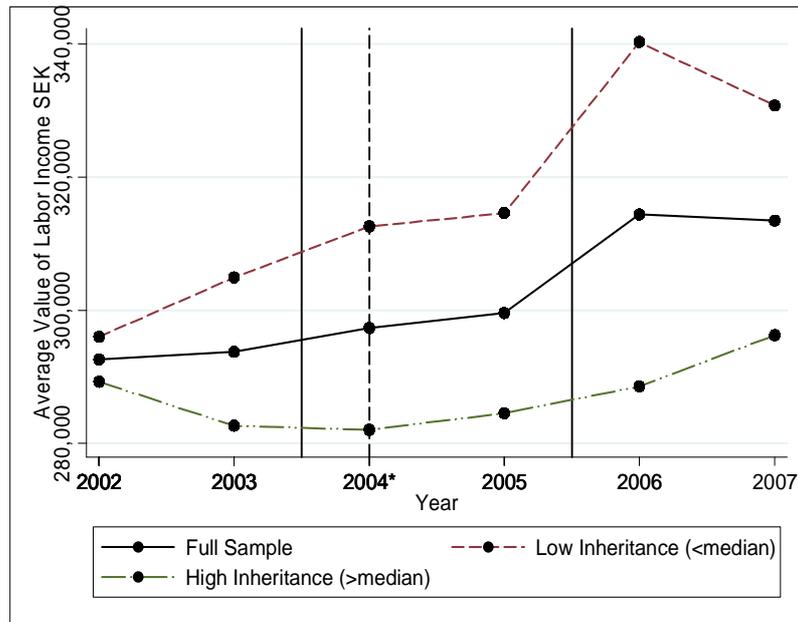
Figure 2. Average Labor Income 2002-2007
Note. * indicates year when inheritance is received

We note that there is a modest increase in labor income in the pre-inheritance period, from SEK 292,620 to SEK 293,780. Concerning period 2, the labor income trajectory indicates that there is no significant deviation from the pre-inheritance trend. This suggests that by making a visual aggregate before-after analysis we see no sign that the receipt of inheritances would affect labor income in the short run. However, in period 3 labor income increases from SEK 299,562 to SEK 314,422. The observed pattern is suggestive of a positive effect of inheriting on labor income in the medium run. However, this pattern may not reflect the causal effect of inheritance receipt. Several other plausible explanations may explain this pattern. For instance, the findings might reflect that the heirs have spent time caring for the deceased in the pre-inheritance period and thus that labor income is lower than otherwise would have been the case.[37] In addition, the heirs might have devoted substantial time and effort taking care of practicalities related to death in the years immediately after the inheritance receipt and hence, that they have not work as much or as hard as they would otherwise.

In order to see if there is a visual indication that responses in labor income might differ depending on the size of the inheritance receipt, we divide the sample according to whether the heir has received an inheritance that is higher or lower than the sample median (SEK 192,151). The two dashed lines, in Figure 2, show that, for the group with high inheritances, labor income declined, while it increased for the group with low inheritances in the pre inheritance period. In period 2, labor income grew modestly in both groups, and in period 3 it rose dramatically in the low inheritance group. A possible explanation for this might be that, those in the high-inheritance group inherit older donors and hence that they have devoted more time taking care of the donor in the years prior to the receipt. Notable is that, those with small inheritance receipts on average

---

[37] Fevang et al. (2009) evaluate dynamics in labor market outcomes before and after the death of parent. They establish a causal negative relation between informal care to a terminally ill parent and labor supply of the child. Having a lone parent holds back earnings and causes labor force participation to decline. The results show that earnings start to increase suddenly after the bereavement, suggesting that the child has been restrained for a relatively long period prior to the death of the parent.

have higher labor income. This is somewhat counterintuitive since one can expect inheritance receipt to be positively correlated with the income of the recipient. However, the reason for this might be that these heirs are, on average, younger and have a more dynamic wage path than their high-inheritance counterparts. According to the graphics it seems like, labor income for the low-inheritance group deviates from the pre-inheritance trend at the year of the receipt. For those with high receipts, on the other hand, the graph indicates that labor income gradually increases for all years following the inheritance. Taken together, this visual inspection stresses the importance of isolating exogenous variation in inheritances to credibly estimate causal effects on labor income. In our econometric analysis, we aim at this by making use of the variation over time, within individuals, in labor income and inheritances to estimate the responses in labor income. This fixed effects approach is similar in spirit to a difference-in-differences approach, in which individuals receiving different amounts in inheritances serve as counterfactuals for each other.

The identification of causal effects on capital income has to deal with the same confounding factors, as discussed above. Figure 3 shows that the average value of capital income is close to zero in the pre-inheritance years. However, in the year of the inheritance receipt, capital income increases to almost SEK 48,000. The dramatic increase can, of course, be explained by the inheritance receipt itself, as people may capitalize their inheritances by, for example, selling stocks or real estate in order to re-optimize their portfolios. However, if we compare the increase in net capital income to the average inheritance receipt it implies, *ceteris paribus*, a rate of return of 16 percent. This compares with the Swedish stock market which increased by 42 percent between 2003 and 2004. Furthermore, we see that net capital income continues to increase even in the subsequent years.[38] The increase in the level of net capital income in the medium run suggests that the heirs have successfully re-optimized their portfolios and reached a higher wealth level and capital income.
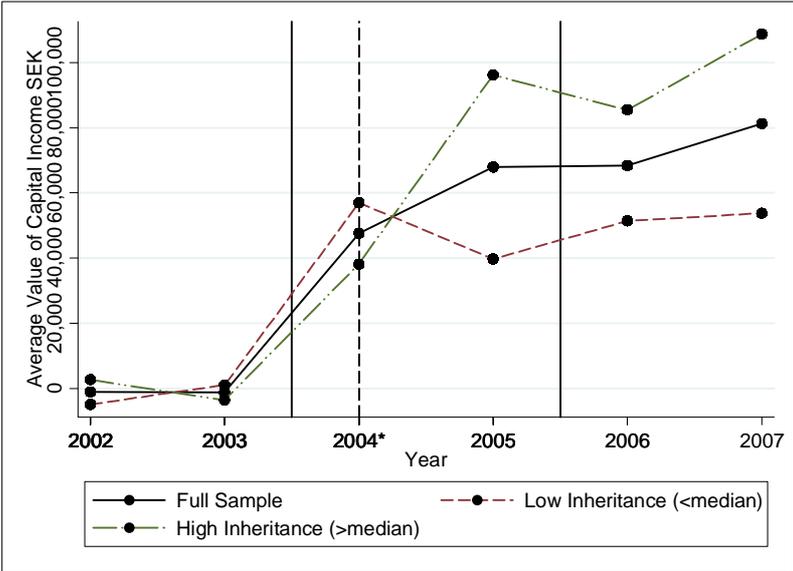

Figure 3. Average Value of Net Capital Income 2002-2007
Note. * indicates year when inheritance is received

---

[38] The Swedish stock market increased by 72 percent between 2002 and 2007. The year by year changes for the post-inheritance period were: 11 percent (2004-2005); 34 percent (2005-2006); 26 percent (2006-2007). (OMX)

In order to see if our visual inspection reveals differences in the evolution of capital income between individual who received low and high inheritances, we employ the same division of the sample as we used for labor income. We see that capital income evolves similarly for the two groups in the pre-inheritance period. Between 2004 and 2005, the low-inheritance group experiences a decline in capital income, while capital incomes for heirs with large inheritance receipts rise. These findings indicate that those with large receipts seem to reach a much higher level of capital income, than those in the low inheritance group. Whether the observed differences in responses depend on differences in risk aversion, financial knowledge or inheritance expectations between the two groups, is difficult to answer without a more thorough econometric analysis, to which we will now turn.

5 Empirical Strategy

Our objective is to study how labor income and wealth changes as a result of receiving inheritances. The change in wealth can be approximated by the change in capital income as this reflects peoples return to wealth while labor income captures central aspects of labor supply. The data vary in two dimensions: there are a certain number of heirs, indexed i. For each heir, we have repeated observations over time, indexed t. Observation time is equally spaced and we have a balanced panel. It is reasonable to assume that individuals differ in taste for leisure, risk aversion, early family upbringing, ability, etc. The problem is that such factors are unobservable and create a difficulty when estimating wealth effects. Our data allow us to control for individual fixed effects to account for such individual heterogeneity. The individual fixed effect is also supposed to capture the time invariant demographical characteristics we discussed in Section 4.

To explore the dynamic effects of inheritance receipt on our dependent variables we start by running the following regression, which we denote, Specification 1:

$$y_{it} = \gamma_1 + \theta_1 d2 + \theta_2 d3 + \gamma_2(d2 \cdot I_{i2004}) + \gamma_3(d3 \cdot I_{i2004}) + \beta X_{it} + a_i + u_{it}, \quad (1)$$

where y_{it} is individual i's labor or capital income in year t, (t=2002, 2003,…,2007).[39] These are both measured in SEK. In order to capture time effects such as changes in wage rates etc., we include period indicators $d2$ and $d3$ that equal one for 2004 and 2005, or 2006 and 2007, respectively, and zero otherwise. The main variable of interest is the inheritance receipt, I_{i2004}, measured in SEK, which equals zero in the pre inheritance period and the deflated inherited amount in the following years. The inheritance receipt is interacted with the period indicators in order to enable us to estimate the short-run response, γ_2, and the medium-run responses, γ_3 to our dependent variables. We also include X_{it} which is a vector of individual characteristics that are allowed to change across both i and t. Moreover, a_i captures individual fixed effects, including factors that are assumed to be constant over time and correlated with inheritance

---

[39] Alternatively one could specify the model with the natural logarithm of labor income, as the distribution is positively skewed. However, as ten percent of the heirs in our sample have no labor income, we would either have to exclude them from the analysis or deal with this problem in another way. In addition to the results below we have also estimated the models with the natural logarithm of labor income as dependent variable. The results are similar to those presented below both in terms of economic and statistical significance, and available upon request.

receipt and the dependent variable. The fixed effect parameter also includes factors such as marital status, number of children, etc that are expected to be roughly constant over a six year period. u_{it} is the idiosyncratic error which is assumed to be uncorrelated with I_{i2004}, X_{it} and a_i. Moreover, we assume the error to be serially uncorrelated, and have constant variance for all t. Under these assumptions the F and t statistics are valid and we can consistently estimate, γ_2 and γ_3 as the marginal causal effects of receiving an additional unit of inheritance.

In an additional specification which we denote Specification 2, we include interaction terms for each year following the inheritance. This gives us the opportunity to more precisely study how responses to inherited wealth evolve over time. We specify the model as follows:

$$y_{it} = \gamma_1 + \theta_t + \sum_{s=2004}^{2007} \partial_s I_{i2004} + \beta X_{it} + a_i + u_{it}, \ (2)$$

where θ_t is a full set of year dummies. The expression in the summation represents the yearly inheritance interaction terms. We are primarily interested in estimating the ∂_s's, which represent the responses to the inheritance for the year of the receipt (*2004*) and the subsequent years (*2005, 2006, 2007*).

6 Main results

In this section we present our empirical findings. We start by estimating Specification 1 for labor income and capital income, respectively, and after that we continue by estimating Specification 2 for the two dependent variables. The parameters of prime interest are the coefficients on the inheritance-time period interaction variables. By including a third order polynomial in age, we hope to avoid the possibility that other age related factors are confound our estimates of interest (e.g., because of differences in human capital, labor market experience etc). Since we employ a fixed effect model, including age linearly would not be fruitful as the year-to-year change is constant. Instead, we include a third order polynomial to approximate for the relationship between age and inheritance size displayed in Figure 1. Moreover, we cluster the standard errors at the family level in order to correct for any correlation between recipients from the same decedent.

6.1 Specification 1

The regression results of Specification 1 for labor income are given in Table 3. The estimated coefficient on the interaction term for period one is negative implying that inheriting has a depressing effect on labor income in the short run. Accordingly, the result suggests that inheritance receivers use some of their new obtained wealth to increase their consumption of leisure. Regarding the economic interpretation of the results these imply that, for every additional SEK received labor income decreases by approximately SEK 0.03. The coefficient on the second period interaction term shows that the inheritance disincentive is more than twice as large two to three years after the receipt of the inheritance. Finally, we see that the coefficients on the age variables are individually imprecisely measured. However, by making use of a Wald-test we find

that they are jointly significant at the ten percent level and hence, that they together contribute to the explanatory power of the model.

Table 3: Labor Income, Fixed Effects Estimates of Specification 1

Indicator, 2004-2005	10,525
	(9,088)
Indicator, 2006-2007	37,667*
	(21,061)
Interaction, Inherited amount*(2004-2005)	-0.029**
	(0.012)
Interaction, Inherited amount*(2006-2007)	-0.076***
	(0.021)
Age^2	226.4
	(168.1)
Age^3	-2.752
	(2.122)
Constant	84,008
	(157,882)
Within –R^2	0.016
Number of Observations	2,340
Number of Groups	390

Notes. Clustered standard errors within parentheses. * significant at the 10 percent level, ** significant at the 5 percent level, *** significant at the 1 percent level

We can conclude that receiving an inheritance seems to have implications on the recipient's labor income both in the short and medium run. However, unlike the result in Joulfaian and Wilhelm (1994) we find that the inheritance disincentive is lasting and actually increases in magnitude over time. Related to our theoretical framework, our findings suggest that – despite an institutional context that provides the heirs with substantial information about the inheritances – inheritance may be largely unanticipated. That the responses increase over time is plausible given that hours worked and effort take time to materialize in labor income. Other studies have suggested that small disincentives observed are due to the possibility that heirs do not want to signal laziness to future potential donors (Holtz-Eakin et al., 1993; Joulfaian and Wilhelm, 1994). Regarding the age structure in our sample and the fact that the heirs inherit their last parent and hence, the last important bequeather, we expect this to be of little importance for our estimates.

Table 4: Capital Income, Fixed Effects Estimates of Specification 1

Indicator, 2004-2005	-389.7
	(27,185)
Indicator, 2006-2007	-24,985
	(41,877)
Interaction, Inherited amount*(2004-2005)	0.132***
	(0.047)
Interaction, Inherited amount*(2006-2007)	0.201***
	(0.052)
Age^2	-160.6
	(236.2)
Age^3	3.426
	(2.918)
Constant	-33,000
	(275,471)
Within –R^2	0.045
Number of Observations	2,340
Number of Groups	390

Notes. Clustered standard errors within parentheses.** significant at the 5 percent level, *** significant at the 1 percent level

We proceed by estimating Specification 1 with net capital income as our dependent variable. Table 4 provides the results. We assume that the recipient will incorporate the corresponding change in wealth generated by the inheritance and begin to re-optimize the saving decision shortly after the receipt. Hence, we expect to see an increase in capital income in the short run as individuals may need to realize capital gains when transferring capital to assets of their own choice. The coefficient estimate on the first interaction term is positive and statistically significant at 1 percent level. The coefficient estimate suggests that inheriting is associated with a 12.7 percentage points return to capital in the short run. Turning to medium run responses, we see that the related coefficient is 0.183 and statistically significant on all conventional levels. This result implies, just like the labor income responses, that capital income responses are higher two and three year after the receipt of the inheritance. Furthermore, the result suggests that the inheritances appear to have a long lasting effects on capital income and hence, that the previous observed short-run response is not representative of a new optimum. Instead, it seems like re-optimization of the investment portfolio takes some time as the heirs continue to capitalize their inherited assets. Our results suggest that the heirs have increased their wealth by approximately twice the inherited amount. This result is surprising as we would expect at most a one-to-one increase in wealth, which would occur if inheritances were perfectly anticipated. We can come up with two possible explanations for this result. First, one possible explanation for the large

responses in capital income is that the estate is undervalued, either deliberately by those responsible for the estate inventory or because assessed values are poorly updated. According to civil law the valuation of the estate should be based on market values. However, it is likely that that the heirs have incentives to underreport assets in the estate in order to avoid large tax payments. Because any assets that are realized by the estate are valued to their full market price, one way to minimize tax payments is to postpone realizations until after the estate is closed. However, concerning the valuation of the estate, we can expect that values of financial assets, such as stocks and funds, are difficult to influence due to stock market regulations. Instead, real property and durable goods might be easier to underreport in the valuation of the estate. If so, the observed inheritances are smaller than their real values. Another explanation for the large increase in wealth is that, if housing constitutes a large share of the estate and if the corresponding assessed values are poorly updated, the realization of inherited properties yields returns that are larger than expected. Second, in the post inheritance years of our sample period, the rate of return was unusually high on the stock market. If some of the capital gains are reinvested rather than immediately realized, we may find estimates that are higher than we would find at other times. With these concerns in mind, our estimates nevertheless suggest that the heirs in our sample substantially increase their capital income, and more so if they receive larger inheritances.

6.2 Specification 2

The results in Table 3 showed substantial disincentive effects to labor income. However, in order to fully understand when responses are likely to take place we estimate Specification 2 to obtain estimates of the yearly effects. The regression results with respect to labor income are presented in Table 5 while the corresponding results for capital income are presented in Table 6.

Concerning the effect of inheriting on labor income we find no effect for the year of the receipt. We cannot observe the exact date when the estate closed and the inheritances are passed over to the recipients. As we noted in Section 3, the estate inventory report should be established within three months after the deceased has died and be sent in to the Swedish Tax Authority within a month after its completion. Therefore, one possible explanation for the imprecise estimate is that a large part of the inheritances are received late in year 2004 and hence, that they have little effect on the yearly average income in that year. The estimated coefficients for the subsequent years however, are statistically significant on all conventional levels. As we expected, the responses are negative for all years following the inheritance. We note that the disincentive to labor income is largest in the third year after the receipt. This suggests that changes in hours worked, or effort, take time to materialize in labor income. Concerning the coefficient estimate on the interaction term for 2007 it suggests that, for each SEK inherited annual labor income decreases by SEK 0.073. If we assume this response to reflect a new optimum, we can calculate an approximate effect on life time income. Since the average heir is 50 years old and receives an inheritance of SEK 299,000, the coefficient estimate implies that the annual net labor income decreases by approximately SEK 15,300.[40] If we assume that the heir retires at age 65, and that

---

[40] We assume the tax rate on labor income to be 30 percent, which is roughly rate that applies to most incomes of Swedes.

there is no discounting, the result suggests that the life time effect corresponds to 77 percent of the inheritance. The result points towards large disincentive effects (income effects) of inheritances.

Table 5: Labor Income, Fixed Effects Estimates of Specification 2

Interaction, Inherited amount*2004	-0.019
	(0.017)
Interaction, Inherited amount*2005	-0.040***
	(0.015)
Interaction, Inherited amount*2006	-0.080***
	(0.026)
Interaction, Inherited amount*2007	-0.073***
	(0.020)
Age^2	914.6
	(1,215)
Age^3	-7.584
	(8.804)
Year Dummies	Yes
Constant	-968,162
	(1,840,000)
Within –R^2	0.017
Number of Observations	2,340
Number of Groups	390

Notes. Clustered standard errors within parentheses. * significant at the 10 percent level, ** significant at the 5 percent level, *** significant at the 1 percent level

The regression results in Table 6 reveal that there is no statistically significant effect of inheriting on capital income in the year of the receipt. This is most likely due to the same argument as for labor income. Concerning the corresponding coefficients for the first to third years after the inheritance receipt we find that they are statistically significant. The estimated yearly changes suggest that capital income responses are increasing over time but at a decreasing rate. The estimated effects from year 2005 are large suggesting that the heirs realize much of the inherited assets immediately after they are received and reinvest them successfully. This is reasonable if housing constitutes a large share of the estate and if there are many heirs per lot that want to capitalize the house instead of keeping it as a common asset. The response in the fourth year after the receipt implies that, for each SEK inherited, annual capital income increase by SEK 0.188. With respect to the average inheritance receipt in the sample it implies that the average heir receive net of tax, SEK 39,300 more in capital income per year.

Table 6: Capital Income, Fixed Effects Estimates of Specification 2

Interaction, Inherited amount*2004	-0.006
	(0.029)
Interaction, Inherited amount*2005	0.273***
	(0.090)
Interaction, Inherited amount*2006	0.216***
	(0.060)
Interaction, Inherited amount*2007	0.188**
	(0.093)
Age^2	-1122
	(1,378)
Age^3	10.15
	(11.03)
Year Dummies	Yes
Constant	1,450,000
	(1,950,000)
Within –R^2	0.062
Number of Observations	2,340
Number of Groups	390

Notes. Clustered standard errors within parentheses. * significant at the 10 percent level, ** significant at the 5 percent level, *** significant at the 1 percent level

7 Concluding remarks

In this paper we shed some light on the behavioral effects of inheriting and, more specifically, when responses are likely to take place. We use a sample of Swedish decedents collected from administrative records, and their heirs in to study how labor and capital income evolves in the aftermath of an inheritance receipt. The data structure allows us to employ a fixed effects estimator to control for unobservable characteristics, such as taste for leisure and risk aversion, that are likely to be correlated with the inheritance receipt.

According to theory, behavioral responses of the heir depend on whether the inheritance was anticipated or not. If anticipated, behavioral effects of inheritances are likely to take place gradually during life. If, on the other hand, the inheritance is unanticipated from the perspective of the heirs, or if liquidity constraints are binding, behavioral responses will follow after the actual receipt of the inheritance. The institutional context in Sweden suggests that inheritances should be anticipated to a higher degree than for instance in the U.S. Two aspects are especially important here. First, conditional on a positive estate, Swedish legal heirs are certain to inherit. Second, medical costs for old people are covered by a public insurance, resulting in less risk of a negative wealth shock to the donors at the end of their lives.

We find that inheriting is associated with statistically significant disincentive effects to the heir's labor income in the period immediately after the receipt. In contrast to previous studies, we also show that the receipt of an inheritance has depressing effects on the heir's labor income up to three years after inheriting. The point estimates imply that the decrease in annual net labor income is large. Under simplifying assumptions, we also show that the corresponding life time effects from inheritances are of significant magnitude. The sampling restrictions on the decedents and the legal heirs have provided us with a sample that is wealthier than the Swedes in general. This, in turn, suggests that it is unlikely that liquidity constraints is the main explanation for the results. Instead, the findings suggest that, even though we have limited the analysis to legal heirs, there is substantial uncertainty regarding the inheritance receipt. Also, we note that the results suggest that the transition to a new optimum may take some time, either because the heirs have devoted time and effort to issues related to the death of the donor or that it may take time to make desirable adjustments to hours worked.

Concerning capital income, we find that responses are, just like labor income responses, larger two and three year after the receipt of the inheritance. The results suggest that the short-run response do not represent a new optimum but rather that re-optimization of the investment portfolio takes some time. The results are also consistent with substantial uncertainty surrounding the inheritance. The estimated responses imply that the heirs have reinvested inherited assets successfully as capital income increases by an amount corresponding to an increase in wealth of at least the inherited amount. Moreover, we show that the increase in capital income is sufficiently large to outweigh the corresponding loss in labor income. We speculate that the large responses to capital income may partly be due to possible undervaluation of the estate. This may occur deliberately to avoid bequest taxation, or due to the special rules governing the valuation of real estates. We also consider the high returns in the stock market throughout the studied period as a potential cause for the large responses. However, better information about

particular assets inherited, as well as information on individual rates of return is necessary in order to draw more refined conclusions.

The results in this paper contribute to the literature in several ways. First, because our results suggest that transition to a new optimum takes time, our analysis may be useful for policy makers who aim to account for behavioral responses of inheritances in the design of optimal estate or bequest taxation schedules. Second, our findings imply that only looking at responses to labor supply is insufficient when analyzing the role of inheritances in wealth accumulation. As capital income increases more than labor income fall, the effect on wealth accumulation may be larger than previous studies have indicated. Our results suggest that heirs increase both their leisure time and disposable income. Third, since our results differ from those of the previous literature, which has been based on U.S. data, this implies that it is important to analyze the effects of inheritances in different institutional contexts to fully understand the behavioral effects of inheritances. Why we find larger responses than has been found in previous studies from the U.S. remains to be investigated.

References

Angelini, V. (2009). "The Strategic Bequest Motive: Evidence from SHARE," University of Padua, draft, November.

Berg, L. (2006). "Förmögenhetskällan: De svenska hushållens förmögenhetsutveckling. Rapport, Nordea, Stockholm.

Blinder, A.S. (1988). "Comments on Chapters 1 and 2." In Modelling the Accumulation and the Distribution of Wealth, ed Kessler, D. Masson, A. pp.68-76. New York: Oxford University Press.

Blomquist, S. (1979). "The Inheritance Function," *Journal of Public Economics*, Vol. 12, pp.41-60.

Bolin, K., Lindgren, B. and P. Lundborg (2008). "Your Next of Kin or Your Own Career? Caring and Working Among the 50+ of Europe," *Journal of Health Economics*, Vol. 27, pp. 718-738.

Brattström, M. and A. Singer (2007). "Rätt arv: Fördelning av kvarlåtenskap,". Iustus Förlag, Uppsala, 2 edition.

Brown, J.R., Coile, C.C. and S.J. Weisbenner (2006). "The Effect of Inheritance Receipt on Retirement," NBER Working Paper No. 12386.

Carroll, C.D. and M.S. Kimball (1996). "On the Concavity of the Consumption Function," *Econometrica*, Vol. 64, No. 4, pp. 981-992.

Carroll, C.D. (2001). "A Theory of the Consumption Function, With and Without Liquidity Constraints," *Journal of Economic Perspectives*, Vol. 15, No. 3, pp. 23-45.

Coronado, J. and M. Perozek (2003). "Wealth Effects and the Consumption of Leisure: Retirement Decision During the Stock Market Boom of the 1990's," Board of the Governors of the Federal Reserve System, Finance and Economics Discussion Series, No. 2003-20.

Deaton, A. (1991). "Saving and Liquidity Constraints," *Econometrica*, Vol. 59, No. 5, pp. 1221-1248.

Eliason, M. and H. Ohlsson (2010). "Timing of Death and the Repeal of the Swedish Inheritance Tax," Working Paper, No. 2010:5, Department of Economics, Uppsala University.

Ettner, S.L. (1995). "The Impact of "Parent Care" on Female Labor Supply Decisions," *Demography*, Vol. 32, No. 1, pp. 63-80.

Fevang, E., Kverndokk, S. and K. Røed (2009). "Labor Supply in the Terminal Stages of Parents' Lives," The Ragnar Frisch Centre for Economic Research, Oslo, mimeo.

Holtz-Eakin, D., Joulfaian, D. and H.S. Rosen (1993). "The Carnegie Conjecture: Some Empirical Evidence," *The Quarterly Journal of Economics*, Vol. 108 No.2, pp. 413-435.

Imbens, G. W., Rubin, D.B. and B.I. Sacerdote (2001) "Estimating the Effect of Unearned Income on Labor Earnings, Savings, and Consumption: Evidence from a Survey of Lottery Players." *American Economic Review*, Vol.91, No.4, pp. 778-794.

Joulfaian, D. (2006). "Inheritance and Saving," NBER Working Paper No. 12569.

Joulfaian, D. and M.O. Wilhelm (1993). "Inheritance and Labor Supply," *The Journal of Human Resources*, Vol. 29, No. 4, pp. 1205-1234.

Kaplan, H.R. (1978). "Lottery Winners: How They Won and How Winnings Changed Their Lives," New York: Harper and Row.

Kaplan, H.R. (1987). "Lottery Winners: The Myth and Reality," *Journal of Gambling Behavior*, Vol. 3. pp. 168-178.

Kessler, R.C. (1997). "The Effects of Stressful Life Events on Depression," *Annual Review of Psychology*, Vol. 48, pp. 191-214.

Kimball, M. S. (1990). "Precautionary Saving in the Small and in the Large," *Econometrica*, Vol. 58, No.1, pp. 53-73.

Kopczuk, W. (2010). "Economics of Estate Taxation: A Brief Review of Theory and Evidence," *Tax Law Review*, forthcoming.

Krueger, A.B. and J.S. Pischke (1992). "The Effect of Social Security on Labor Supply: A Cohort Analysis of the Notch Generation," *Journal of Labor Economics*, Vol. 10, No. 4, pp. 412– 437.

Laitner, J. and H. Ohlsson (2001). "Bequest Motives: A Comparison of Sweden and the United States," *Journal of Public Economics*, Vol. 79, pp. 205-236.

Lindh, T. and H. Ohlsson (1996). "Self-employment and Windfall Gains: Evidence from the Swedish Lottery," *The Economic Journal*, Vol.106, No. 439, pp. 1515-1526.

McGranahan, L. (2006) "Will Writing and Bequest Motive: Early 20th Century Irish Evidence," Working Paper 2006-18, Federal Reserve Bank of Chicago.

Ohlsson, H. (2007). "The Equal Division Puzzle – Empirical Evidence on Intergenerational Transfers in Sweden," Working Paper 2007:10. Department of Economics, Uppsala University.

Pestieau, P. (2003). "The Role of Gift and Estate Transfers in the United States and in Europe," in Alicia Munnel and Annika Sundén, eds., Death and Dollars: The Role of Gifts and Bequests in America. Washington, D.C.: Brookings Institution Press, 2003.

Schulz, R., Mendelsohn, A.B., Haley, W.E., Mahoney, D., Allen, R.S., Song Zhang, M.S., Thompson, L., and B.H. Belle (2003). "End-of-Life Care and the Effects of Bereavement on Family Caregivers of Persons with Dementia," *The New England Journal of Medicine*, Vol. 349, No. 20, pp. 1936-1942.

Umberson, D., Wortman, C.B. and R.C. Kessler (1992). "Widowhood and Depression: Explaining Long-Term Gender Differences in Vulnerability," *Journal of Health and Social Behavior*, Vol. 33, pp. 10-24.

Umberson, D. and M.D. Chen (1994). "Effects of a Parent's death on Adult Children: Relationship Salience and Reaction to Loss," *American Sociological Review*, Vol. 59, No. 1, pp. 152-168.

Weil, D.N. (1993). "Intergenerational Transfers, Aging, and Uncertainty," NBER Working Paper No. 4477.

Weil, D.N. (1994). "The Saving of the Elderly in Micro and Macro Data," *Quarterly Journal of Economics*, Vol. 109, No. 1, pp. 55-81.

WORKING PAPERS
Uppsala Center for Fiscal Studies
Editor: Håkan Selin

2009:1   Sören Blomquist and Håkan Selin, Hourly Wage Rate and Taxable Labor
              Income Responsiveness to Changes in Marginal Tax Rates. 31 pp.

2009:2   Luca Micheletto, Optimal nonlinear redistributive taxation and public good
              provision in an economy with Veblen effects. 26 pp.

2009:3   Håkan Selin, The Rise in Female Employment and the Role of Tax
              Incentives. An Empirical Analysis of the Swedish Individual Tax Reform of
              1971. 38 pp.

2009:4   Håkan Selin, Marginal tax rates and tax-favoured pension savings of the self-
              employed Evidence from Sweden. 32 pp.

2009:5   Tobias Lindhe and Jan Södersten, Dividend taxation, share repurchases and
              the equity trap. 27 pp.

2009:6   Che-Yan Liang, Nonparametric Structural Estimation of Labor Supply in
              the Presence of Censoring. 48 pp.

2009:7   Sören Blomquist, Vidar Christiansen and Luca Micheletto, Public Provision of
              Private Goods and Nondistortionary Marginal Tax Rates: Some further
              Results. 42 pp.

2009:8   Laurent Simula and Alain Trannoy, Optimal Income Tax under the Threat of
              Migration by Top-Income Earners. 26 pp.

2009:9   Laurent Simula and Alain Trannoy, Shall We Keep Highly Skilled at Home?
              The Optimal Income Tax Perspective. 26 pp.

2009:10   Michael Neugart and Henry Ohlsson, Economic incentives and the timing of
              births: Evidence from the German parental benefit reform 2007, 21 pp.

2009:11   Laurent Simula, Optimal Nonlinear Income Tax and Nonlinear Pricing:
              Optimality Conditions and Comparative Static Properties, 25 pp.

2009:12   Ali Sina Onder and Herwig Schlunk, Elderly Migration, State Taxes, and What
              They Reveal, 26 pp.

2009:13   Ohlsson, Henry, The legacy of the Swedish gift and inheritance tax, 1884-2004,
              26 pp.

2009:14   Onder, Ali Sina, Capital Tax Competition When Monetary Competition is
              Present, 29 pp.

2010:1   Sören Blomquist and Laurent Simula, Marginal Deadweight Loss when
          the Income Tax is Nonlinear. 21 pp.

2010:2   Marcus Eliason and Henry Ohlsson, Timing of death and the repeal of the
          Swedish inheritance tax. 29 pp.

2010:3   Mikael Elinder, Oscar Erixson and Henry Ohlsson, The Effect of Inheritance
          Receipt on Labor and Capital Income: Evidence from Swedish Panel Data. 28
          pp.