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The Probability of Receiving an Equal Bequest

Empirical evidence from Sweden

by

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Abstract

Economists have for a long time tried to explain the motivations behind bequests, why they exist and how they are divided. In Sweden, most bequests are equally divided, which raises the question of what motivates this decision even if there is a will written. This study aims to empirically examine if the Swedish decedents divide their bequests to make up for economic differences among their heirs. Using a linear probability model, I attempt to determine if the probability to divide a bequest equally is affected by the difference in siblings' lifetime labor income, lifetime individual wealth, and lifetime household wealth. I find that economic differences may explain the probability of equal division of bequest when the estate is divided between two siblings. For three or four siblings, the economic differences may not explain the probability of equal bequest; instead, the probability is better explained by the age of the heir and the decedent.

Keywords: *equal bequest, linear probability model, altruistic theory, economic differences*

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1 Introduction

Bequests have for a long time been a puzzle to many economists. It is essentially strange that bequests exist at all, considering the lifecycle model where the main idea is that a person should spend all his or her assets during his or her lifetime (Ando & Modigliani, 1963). Even more peculiar is the fact that most bequests are equally divided, when people should be utility maximizing and, therefore, have preferences over how their estate is divided between their heirs. There exist several theories regarding the division of bequests. They differ in the sense that the preference of division depends on altruistic motives or strategic motives. However, they are similar in the sense that there should be a difference in the size of the bequests.

For economic reasons, the motivation behind the division of bequests is important to study for a number of reasons. It is necessary to understand savings patterns, especially retirement savings, determinants of wealth, and to obtain an optimal tax system design, just to provide a few examples.

Researchers have identified that it is more common to divide bequests equally and inter vivos gifts unequally (Slavik & Wiseman, 2018). Inter vivos gifts are intergenerational gifts while both the parent and the child are alive. This could be because bequests are considered public information while inter vivos gifts are considered private information. Could this be why the decedent chooses to divide the bequest equally? In Sweden, most bequests are divided equally as this is the law if there is no will, even the ones who are divided according to a will are divided equally. This raises the question of what factors lay behind this reasoning. Why are a majority of the Swedish estates divided equally among the heirs? What factors increase the probability of receiving an equal bequest among Swedish heirs? Are the motives behind the equal division altruistic or are they strategic? The motives driving the division of bequest may affect policies regarding saving, retirement, and taxes if identified properly.

The purpose of this study is to examine if these factors could be connected to the economic situation of the heir in comparison to his or her siblings. The economic situation is defined as differences between heirs in lifetime labor income, lifetime individual wealth, and lifetime

household wealth. If this is negatively correlated with the probability to receive an equal bequest it could provide evidence for the altruistic theory of bequests. This leads up to my research question:

Are bequests divided unequally to make up for differences in the heirs' economies?

This study will be carried out using Swedish data. I test for an exactly equal division of the bequests as this is the way the bequests would have been divided by default in Sweden (by law if there exists no will).

Using a linear probability model, it is calculated how the probability of receiving an equal bequest varies with the differences in the lifetime income labor of the heirs and in the lifetime wealth of the heirs or the household of the heirs. The age of the heir, the age of the decedent, and the sex of the heir are used as control variables.

The complete dataset used in this study contains panel data over the years 2000-2008, but I have chosen to limit the data used in this study to the years preceding the bequest (2000-2003) and 2004 which is the year that the decedent passed away. Nevertheless, the subsample used in this study is large and especially reliable as it contains tax authority data. The dataset used contains direct heirs (and decedents) who have on average a higher labor income than the rest of Sweden, so the findings in this study might not apply to all inhabitants of Sweden. Nevertheless, as it is mostly people with a higher labor income who receive bequests, and pay higher taxes, it is still interesting to investigate from a social point of view.

This study has found that economic differences have a negative relationship with the probability to receive an equal bequest when two siblings share the estate. When three or four siblings share the estate, there is no clear relation between economic differences between siblings and the probability to receive an equal bequest. This means that I find some evidence for the altruistic theory when two siblings share the estate. However, I cannot confirm the theory of altruistic motives behind the division of bequests for more than two siblings. Instead, the division of bequests is motivated by other characteristics of the heirs and the decedents. These characteristics include the age of both the heir and the decedent.

The study is structured in the following way: First, the research topic and purpose of this study is presented. In section 2 theories and previous research regarding the division of bequests are presented. Section 3 describes the institutional context concerning bequests in Sweden. Then follows a description of the data used. Section 5 provides descriptive statistics of the sample. This is followed by the empirical method used to analyze the division of bequests. In section 7 the empirical results are presented. Section 8 concludes this study.

2 Theoretical background

In this section, the theoretical background and relevant previous research will be presented. This is to provide a picture of the research that has been done, and how this study can bring new light to the question of equal bequests. This section will make it evident that the central question of this study has not been studied before.

There are two main theories considering the idea of bequests; intentional and accidental bequests. The accidental approach is based on the life-cycle consumption framework (Ando & Modigliani, 1963) which aims to describe the consumption patterns of an individual over the lifetime. The life-cycle framework implies that an individual should spend all his or her assets within his or her lifetime, and thereby not leave an inheritance unless he or she was to die suddenly. An individual would then have the incentive to maximize his or her own utility over anyone else's utility. So, for there to be a will a bequest needs to be intentional. Intentional bequests can, in turn, be divided into two sub-theories; altruistic bequests and strategic bequests. Both theories are important to attempt to determine the motives behind the division of bequests.

2.1 Altruistic Bequests

The theory that this study is primarily focusing on is the altruistic bequest theory. According to the altruistic bequest theory by Becker (1974), family members within a family act as if they love each other even if they, in reality, are selfish. They act in this way to maximize the family's combined utility and thereby the family's combined income and/or economic means. This way of acting means that bequests could be used to maximize a child's utility. For example, it could be that if one sibling has a smaller labor income than the other sibling, then the lower income child could get a higher bequest as the parent thinks that that child will get a higher utility from a bequest than his or her sibling would get. Barro (1974) wrote simultaneously a similar article about how the different generations within a family are

intertwined with intergenerational transfers (both inter vivos gifts and bequests). This means that the current generation lives as if it had infinite life through his or her children. Barro suggests that the bequests are compensatory for a child's low income and that the parent cares about the child's utility.

Several studies have previously been conducted to examine the relevance of the altruistic theory. Slavik and Wiseman (2018) find that bequests alone do not make up for the income difference between siblings although poorer children receive larger bequests. Even so, they conclude that inter vivos gifts from parents to children completely offset the difference in income between the children. They also find that the difference in an equal division between inter vivos gifts and bequests (gifts are more frequently unequal while bequests are in general equally divided), may arise from a moral hazard problem where the parents are unsure of the children's incentives. The parents then have the power to affect these incentives with the timing of their gifts and the size of the gifts and the bequest. They also find that equal division in their model of private information is the most optimal policy. This could be an explanation of why equal division is the most prevalent result. This will be taken into account in this study.

McGarry (2016) found a strong negative correlation between intergenerational transfers (inter vivos gifts and bequests) and current income. She found that transfers were distributed unequally between siblings and that the distribution got more skewed the longer the time they were examined over. She found that this could be due to when looking at transfers at just a single point in time there is no clear correlation between life events for the child and incentives to transfer to the parent. This implies that the economic situation over the heir's lifetime is essential when understanding the motives that drive the division of bequests, as a higher income would mean a smaller intergenerational transfer.

Most studies concerning bequests and the motives behind them have been conducted using US data. This may result in a US-centric view of the motives behind the division of bequests. There has not been much research on the equal division of bequests using Swedish data. Laitner and Ohlsson (2001) did a comparison between Sweden and the United States using data from LLS (The Department of Law, Languages and Economic Statistics) for Sweden and from PSID (The Panel Study of Income Dynamics) for the United States. They found that there was evidence for both the strategic and the altruistic model, and concluded that the most

fitting model would probably be a mixture. Also using Swedish data, there has been made research on how an inheritance affects the heir's economic situation. It was found that the receiving of an inheritance had a negative impact on labor income and the impact on lifetime labor income was large in relation to the size of the inheritance (Elinder, Erixson & Ohlsson, 2012). Hence, the central question in this study has previously not been studied using Swedish data.

Another way to confront the question regarding unequal bequests is to think of bequests as a signal of the parent's altruistic preferences. This is due to the fact that, as mentioned previously inter vivos gifts are divided unequally while bequests are in general divided equally. Bernheim and Severinov (2003) find that this is due to the difference in private and public information between different intergenerational transfers. Bequests are usually public (or at least common) information for the siblings; meanwhile inter vivos gifts are private information until someone chooses to reveal the gift. In a similar manner, the probability of receiving an equal bequest may depend on how public and well-known the economic differences among the siblings are for the decedent. Thus, the explanatory variables used in this study are selected with the public information aspect in mind.

2.2 Strategic Bequests

Less relevant for this study, but still important as it may give an alternative explanation for the division of bequests is the strategic theory of bequests. Bernheim et al (1985) built a model concerning bequest motives that suggests bequests are a result of services to the decedent performed by the heir during the decedent's lifetime. This means that the bequests are a sort of strategic compensatory for the heir's behavior. Therefore, the decedent could trigger some behavior and/or service from his or her heir while the decedent was still alive in return for a larger share of the estate. There is a so-called exchange between services and the bequest. In this model, the Ricardian equivalence does not hold. Bernheim et al constructed this model as a complement to the ad hoc bequest models and the intergenerational altruistic model. It provides a more complex model for motives as it allows for the decedent to affect the incentives of the heir to behave in a certain way as to get at larger bequest. This model implies that the heirs who show greater attention to the later decedent will receive more financial support (in terms of inter vivos gifts or bequests). This theory is however fairly hard

to find evidence for as it requires information on which services the heir performed and/or how much attention the heir provided the decedent.

In an extension of the theory by Bernheim et al, Perozek (1998) finds that not only the strategic behavior of a child determines the share of the bequest but the child's other characteristics also play a large part in how much attention a child pays the parent. These characteristics include being a daughter, married, and having fewer siblings. Individuals with these characteristics tend to pay relatively more attention to their parents. This could imply that these characteristics may be used as a proxy for how much attention a child gives his or her parent. Hence, the control variables used in this study are linked to these characteristics.

Norton and Taylor (2005) concluded in their article using US data that they could not find any evidence that the child that provided more attention to his or her parent received a larger bequest. One implication for this was that if the child lived with the parent or not at the time of the bequest had no effect on the division of the bequest. They did, however, find that the more children an individual had the more likely an unequal division of bequest became. This may imply that the children differ more in caregiving and attention toward their parents, and could thereby provide support for the strategic bequest theory of unequal bequests. This gives a reason for this study to be divided into separated studies based on how many children the decedent has.

Less relevant to this study, yet interesting as it may give support to why the results are not so strong is the research done on inter vivos gifts. There has been found evidence that inter vivos gifts are more correlated with strategic motives while bequests are more correlated with altruistic motives (Cox & Rank, 1992). This result may be a consequence of inter vivos gifts generally being more of a private information problem while bequests are public information. This means that the parent could reward "good" behavior with inter vivos gifts and then simply divide the bequest according to the child's economic situation.

3 Institutional context

In this section, some background regarding the institutional aspects of bequests in Sweden will be provided. This will bring a more juridical perspective to the complex question of the division of bequests. It will also provide historical details concerning motives behind the majority of equal division of bequests in Sweden.

The Swedish inheritance law is very old and has progressed rather slowly, the current law being from 1988. The purpose of the law has developed from the eldest child inheriting the ownership of the earth to more a question of wealth and more complex family ties. The prime aspect of inheritance in Sweden is the biological bond between the decedent and the heir. Due to this reason, it is not possible to disown your children from inheriting a certain part of the bequest. The only exception is when the heir kills the person he or she will inherit (Brattström & Singer, 2015).

In Sweden the succession rules distinguish between direct and indirect heirs, direct heirs are heirs who are in a direct order to inherit the decedent. This is most often children of the decedent but may also be grandchildren if their parent has passed away. Swedish succession rules, as in many other European countries, follow a Roman tradition where testamentary freedom is restricted (Pestieau, 2003). This means as previously mentioned that parents are prohibited from disowning a child completely. This may influence the anticipation of an inheritance of the children and thereby influence their behavior towards their parents. In Anglo-Saxon countries, such as the United Kingdom and the United States, it is more common with full testamentary freedom. This implies that children are affected by the anticipation to receive a bequest in a different way than the children in countries with restricted testamentary freedom. Therefore actions and motives for bequests may differ between for example Sweden and the United States.

Before 2005 there was a tax on inheritances and inter vivos gifts in Sweden, if the size of the inheritance or gift was over the very low threshold (70 000 SEK for direct heirs over the age of 18), this was abolished on January 1st, 2005 (Skatteverket, 2013). Before 2004 the Swedish

Tax Authorities reported statistics on the size and division of bequests. This means that the dataset used in this study is the last observable data on bequests with the tax authorities as a source. This may also imply that bequests transferred after 2004 have different underlying motives as there was a tax to pay and or avoid.

In Sweden, inheritances are optional to receive. It is possible for the heir to abstain the inheritance if the heir does not, for example, want to pay the debts of estates in deficit. Abstaining from an inheritance was also a way for direct heirs to receive the most optimal total bequest from the heirs' parents; this was an approach to avoid taxes on large bequests. This reason behind abstaining was justifiable up until the removal of the inheritance tax in 2005.

Inter vivos gifts are often regarded as inheritances in advance, so this is another reason for the unequal division of bequests. The inheritance law defines under which circumstances inter vivos gifts should be taken into account when dividing an estate. This is to be certain that succession rules are not circumvented by such transfers.

Hence, the inheritance law provides some explanation for the division of bequest. However, it is still not clear what motivates the clear majority of equal division.

4 Data

In this section, the data sample used in this study will be elaborated. The other usages of the dataset will be discussed and also what differentiates it from datasets used in previous studies. Variables used in the study will be presented and motivation will be provided. Finally, a subsection on the limitations of the data will be discussed to conclude this section.

Many papers concerning bequests and the division of them are based on US data. US data usually based upon surveys such as PSID meanwhile, the register-based panel dataset used in this study is based on tax authority data, which makes it more reliable and more comprehensive. The kind of data used in this study is also preferred as it is direct data, with much less biasedness. However, there is a threshold for how large the bequest needs to be for it to be taxable, in Sweden this threshold was as previously mentioned very low. This tax on inheritances was removed in 2005. The dataset used in this study contains 36 variables concerning both heirs and decedents. The dataset contains information concerning decedents who had their permanent residence in the City of Stockholm and passed away in 2004. Since the purpose of the dataset is to study how bequests are divided, the data is limited to descendants who had a will and two or more children. Since the data used is limited it is not entirely representative of the Swedish population.

The dataset used in this study has previously been used in an article by Elinder, Erixson, and Ohlsson (2012) and a working paper by Ohlsson (2007). The complete sample contains 232 decedents and 820 heirs. The estates were divided up in inheritances transferred to 573 children, 176 grandchildren, 8 partners, 45 relatives, and 18 other individuals and charities. Few lots go outside the family. This suggests that testators tend to follow the principles of the default succession rules. In the subsample used in this study, there are only 767 heirs, which mean that the 8 partners and 45 relatives have been excluded; this is because the bequests going from parent to direct heirs are primarily studied. The few grandchildren in the sample are direct heirs and do not affect the empirical results in this study. Due to integrity issues, the dataset used in this study has been censored in the sense that all income and inheritances have been rounded to the closest hundred.

Another reason for using Swedish data instead of US data is that although the two countries are similar in the sense that they are both OECD countries with the same basic values, the countries differ in the sense that Sweden is historically more social democratic and the United States is more conservative. Sweden is also considered to be more equal, both between genders and between socioeconomic groups, there is larger social mobility in Sweden (Lawson & Martin, 2017). Also, as previously mentioned, in Sweden it is illegal to disinherit your children, therefore it is more under concern that parents might choose to divide the inheritance unequal to compensate for different characteristics among the heirs. This might be the reason for why it is much more the norm to divide bequests equally in Sweden than in the United States. Apart from these reasons, it is always good to empirically test hypotheses on data from different countries to get more of an overview of what the motives behind bequests look like.

As the current economic situation of the heir is a very important factor when determining the motives behind bequests and this is a factor that changes constantly, the permanent income or lifetime income of the heir has been calculated. As a proxy for lifetime yearly labor income, lifetime yearly individual wealth, lifetime yearly household wealth, and lifetime yearly capital income, the average yearly income, individual wealth, household wealth, and capital income the four years preceding the bequest was calculated. This is a method used to calculate the lifetime measures in a number of papers (McGarry, 2016; Elinder, Erixson & Ohlsson, 2012).

Both lifetime household wealth and individual wealth of the heir are variables measuring the economic situation of the heir. The household wealth is the wealth the heir shares with his or her spouse and/or children. I believe it is more likely that the lifetime household overall wealth is more “public” information than how much wealth the heir and his or her spouse have separately. Nevertheless, this is compared with lifetime individual wealth as a control.

There is no data on the household’s total labor income so this cannot be controlled for when examining the marginal effects of labor income on the probability of receiving an equal bequest. With regard to this, no assumptions regarding the household’s completely shared economy have to be made. Slavik and Wiseman (2018) also find that savings in terms of household wealth are a perfect substitute for bequests in the perspective of the parents. This

means that the parent should adjust the size of a child's bequest to the size of the child's household wealth.

4.1 Limitations with Data

One downside of the dataset is that there is no information on when the will was created and thus no information on how the lifetime labor income and/or lifetime wealth of the heir influenced any changes in the will. For this reason, it has been assumed that the decedent is financially literate and healthy enough to make conscious decisions about their will up until the year that they passed away.

There are some variables which could have been complimentary when studying bequest behavior; education level of both the heir and the decedent, this could have been a good proxy for financial literacy (the ability to understand and make well-established decisions about one's economy), which is essential when it comes to both writing a will and administer personal wealth. Other interesting variables could have been income level of the decedent, how much contact the decedent and the heir have had in the past 10 years, and wherein Sweden the heir and the decedent resided. Another interesting factor would have been to know when the will was conducted, as this could have given more of an indication of what life event the decedent may have reacted to.

5 Descriptive Statistics

This section will provide descriptive statistics over the data used in this study; these descriptives may give an implication on what the empirical results will show. All numbers in this study are presented in the 2004 price level.

5.1 The Heirs

The average bequest is 244 000 SEK, with a standard deviation of 322 000 SEK, and a maximum value of 2 568 000 SEK. This average is much smaller than bequests studied in previous papers. However, the average bequest in the sample is about twice as large as the average net worth in the Swedish population (Berg, 2006). This means that although the size of the bequests studied in this study is smaller than those studied previously, it may still be misleading as an indicator for bequests in Sweden. The average size of a bequest received by the heir preceding the bequest examined in this study is 63 000 SEK, which is considerably smaller than the size of the bequest received in 2004. As was found when looking at the bequests in 2004, the standard deviation of this previous bequest is very large compared to the mean (134 000 SEK compared to 58 000 SEK), in this situation it may be explained by outliers. The average share of a bequest received by an heir is 30.4 %; the standard deviation is equal to 18.4 %, which means that the dispersion in this sample is quite large.

The average lifetime labor income of the heir (calculated as a proxy, using the years 2000-2004) is 295 000 SEK per year, with a standard deviation of 297 000 SEK and a maximum of 5 007 000 SEK. This large standard deviation may also be explained by the occurrence of outliers. This means that this sample has a higher income than the average of Sweden, 167 000 SEK (SCB, 2018). The average lifetime household wealth of the heir (also calculated as a proxy, using the years 2000-2004) is 774 000 SEK, with a standard deviation of 3 149 000 SEK and a maximum of 73 000 000 SEK. Again, the large standard deviation may be explained by outliers in the sample. The average individual lifetime wealth of the heir (calculated as a proxy, using the years 2000-2004) is 425 196 SEK, with a standard deviation

of 1 160 000 SEK. This large standard deviation may again be explained by the occurrence of outliers in the sample. The average lifetime capital income of the heir (calculated as a proxy, using the years 2000-2004) is 54 000 SEK, with a standard deviation of 171 000. This large standard deviation may again be explained by outliers, as the minimum value is a negative number and the maximum value is 2.6 million SEK larger than the average.

Among the heirs, 51 % are women and 47 % are men (some missing values). A majority of the heirs have between zero and five children. The average age when the heirs received their bequest is 49 years and the standard deviation is 15 years.

Table 1 Descriptive of the Heirs

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
Sex	6,858	0.525	0.573	0	3
Number of Children	6,552	1.632	1.226	0	7
Sons	6,552	0.861	0.867	0	4
Daughters	6,552	0.771	0.818	0	4
Size of Bequest	6,903	244,318	322,304	0	2.568e+06
Size of Previous Bequest	6,903	62,816	134,187	0	1.147e+06
Lifetime Wealth Individual	3,685	451,929	1.178e+06	-33,060	1.348e+07
Lifetime Wealth Household	3,685	794,647	2.865e+06	0	6.351e+07
Lifetime Labor Income	3,685	295,048	296,764	-656,320	5.007e+06
Lifetime Capital Income	6,660	53,699	171,320	-192,289	2.737e+06
Age	755	49.05	14.97	1	93
Share of Bequest	763	0.304	0.183	0	1

All descriptive statistics of the heir have a large dispersion. This indicates that the regressions will not be very precise, as a high R-squared will be received. However, the large dispersion is also good as it may give a fair description of how bequests (both large and very large) are divided in various living situations.

5.2 The Decedents

Table 2 Descriptive of the Decedents

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
Sex	6,903	0.319	0.466	0	1
Number of Children	6,903	2.628	0.736	2	5
Sons	6,903	1.206	0.934	0	4
Daughters	6,903	1.417	0.973	0	4
Age	767	86.47	8.504	50	106

A clear majority of the decedents are women (68 %) and the remaining 32 % are men.

The number of children of the decedents (in other words, the number of direct heirs per decedent) range from two to five. However, there is only one decedent who has five children. On average a decedent has 1.2 sons and 1.4 daughters. The decedents passed away at the fairly high average age of 86.5 years (the youngest decedent was 50 and the oldest was 106 years old). This is older than the average life expectancy of Sweden in 2004 which was 82.7 years for women and 78.4 years for men (SCB, 2005).

5.3 The Occurrence of Unequal Bequests

Table 3 Probability for Unequal Bequest for Different Sibling Groups

	(1)	(2)	(3)	(4)
VARIABLES	2 Heirs	3 Heirs	4 Heirs	5 Heirs
Constant	0.459*** (0.0488)	0.471*** (0.0748)	0.340** (0.141)	0 (0)
Observations	394	261	103	5
R-squared	0.000	0.000	0.000	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The table shows the division of bequests, the constant is the probability to receive an unequal bequest. This description is shown for the different number of siblings. When two siblings share the bequest, the probability to receive an unequal bequest is 0.459 (or 45.9 %). When three siblings share the bequest, the probability to receive an unequal bequest is 0.471 (or 47.1 %). When four siblings share the bequest the probability to receive an unequal bequest is 0.340 (or 34 %). The case of five siblings is not up for analysis as there is only one family of five children. All intercepts are significant at a 1 % level. The R-squared is very low which means that the data is subject to very high variation, but the variables may still be considered to be significant although hard to predict.

It is clear that the data observes a variety of families, with varying lifetime labor income and wealth. It is also clear that there exists a probability to receive an unequal bequest. However, it remains a mystery if the two facts are related. A more econometric analysis to examine this relationship between economic differences and the probability to receive an unequal bequest is necessary.

6 Empirical Model

In this chapter, the model used to examine how the probability to receive an equal bequest, depending on how many heirs share the estate and what economic differences the heirs have will be explained. The independent variables will be introduced as well as the creation of them. Some limitations of the model will also be discussed.

The model used to study the probability is a linear probability model with the dependent variable *Equal bequest*. A linear probability model is a linear regression model where the dependent variable is an indicator variable. As the explanatory variables are exogenous, the OLS estimates of a linear probability model are consistent and unbiased. The error terms will be heteroscedastic and robust standard errors are therefore used. In this model, clustered robust standard errors are used as effects within a family are examined; this means that the standard errors have been clustered based upon the decedents. Clustered standard errors are used as the individuals are not completely independent. The linear probability model will be run on four different groups based on how many siblings there are sharing the bequest. This will enable a clearer analysis of what factors may motivate equal bequests, and how these may differ depending on how many heirs the decedent has. This could imply different patterns for different numbers of heirs sharing the estate. Another motivation for doing separate regressions for different numbers of siblings is that previous research has found that there more children a decedent has, the more likely he or she is to have strategic motives behind the division of the estate.

I will mainly focus on if and how the probability of receiving an equal bequest may be explained by the economic situation of the heir in comparison to his or her siblings. The model is set up to see if a parent's decision to divide a bequest is driven by the will to maximize a child's utility by economic means, and thereby provide evidence for the altruistic theory of bequests. The economic differences are measured in three different ways; lifetime labor income difference, lifetime household wealth difference, and lifetime household wealth difference. The economic difference between the heirs is absolute and is calculated by subtracting the median income within the heirs sharing a bequest from the heir's personal

income. The difference in lifetime individual wealth and lifetime household wealth is calculated in the same manner as the difference in lifetime labor income. As previously mentioned, the household wealth is the wealth the heir shares with his or her spouse and/or children. Both the lifetime individual wealth and the lifetime household wealth are logarithmized as they follow a clear logarithmic distribution and will indicate false predictions if not logarithmized.

The three different linear probability models are regressed in the structure shown below:

$$\text{Equal Bequest} = \beta_1 + \beta_2(\text{Difference in Lifetime Labor Income})$$

$$\text{Equal Bequest} = \beta_1 + \beta_2(\text{Difference in Lifetime Individual Wealth})$$

$$\text{Equal Bequest} = \beta_1 + \beta_2(\text{Difference in Lifetime Household Wealth})$$

β_1 reveals the probability of receiving an equal bequest given the three different explanatory variables (this will be shown as "constant" in the regressions).

The three models are subsequently run one more time with the additional control variables Heir's Sex, Heir's Age, and Decedent's Age. The heir's sex is the legal sex of the heir, as the data is from the tax authorities and not survey data. This is an indicator variable expressing 1 if the heir is a woman. The sex of the heir is interesting as previous research conducted with US data found that daughters are more likely to receive a larger bequest. The heir's sex could thereby affect the probability to receive an equal bequest. The age of the heir is relevant as a control variable as the heirs may be in different stages of life, this could give the decedent different incentives for an equal bequest. A younger heir might be in more need of a bequest than an heir on the top of his or her income curve. The age of the decedent is interesting as a control variable in a similar way. It may be more common to conduct a will if the decedent is older, also there might be other incentives if he or she knows that he or she will die soon. A younger person would not have the same incentives as an older person and has not had as much time to finalize a detailed will. This could imply that the probability of an equal bequest would be higher if the decedent is younger, as he or she has not had the time to determine how the estate is best divided and thereby has chosen the default mode of an equal division.

There are some limitations with using a linear probability model. The probability of receiving an equal bequest is not restricted to $[0, 1]$ and neither is the estimate of the probability (β_1). The model assumes linear marginal effects of the x-variables, however using a probit or logit and thereby allowing for nonlinear marginal effects give approximately the same results as a linear probability model.

7 Empirical Results

In this section, the empirical findings of this study will be presented. The results will be divided into three sections concerning the three different linear probability functions used to examine if economic differences between siblings have an effect on the probability of an equal bequest. The results are, as previously mentioned, displayed in four different groups depending on how many siblings share the bequest. First the models without control variables are presented, and then control variables are added to see how the probability changes with other characteristics of the heirs. An interpretation of the results concludes this section.

Table 4 Model with Sibling Difference in Lifetime Income

	(1)	(2)	(3)	(4)
VARIABLES	2 Heirs	3 Heirs	4 Heirs	5 Heirs
Income Difference from Median	-1.22e-07***	-1.01e-07	-1.99e-07	0
	(3.06e-08)	(1.54e-07)	(1.97e-07)	(0)
Constant	0.533***	0.545***	0.680***	1
	(0.0492)	(0.0751)	(0.145)	(0)
Observations	381	249	98	5
R-squared	0.006	0.001	0.004	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

In table 4 the effect of a lifetime income difference among siblings on the probability to receive an equal bequest is seen. For two siblings the relation seems to be negative and a difference in income between the siblings appears to have a negative impact on the probability to receive an equal bequest. The relation between difference in lifetime income and the probability to receive an equal bequest is not significant when more than two siblings share the estate. When controlling for the difference in lifetime income among siblings, the probability to receive an equal bequest is 53 % when two heirs share the bequest. As predicted, the R-squared is very low, which means that the data is subject to very high variation, but the variables may still be considered to be significant although hard to predict. The interpretation of the significance does not change no matter the size of the R-squared. Even when R-squared is low, low p-values still indicate a real relationship between the significant independent and dependent variables.

Table 5 Model with Sibling Difference in Lifetime Individual Wealth

	(1)	(2)	(3)	(4)
VARIABLES	2 Heirs	3 Heirs	4 Heirs	5 Heirs
Ind. Wealth Difference from Median	-7.56e-08***	-1.29e-08	6.21e-08*	0
	(2.52e-08)	(3.56e-08)	(3.11e-08)	(0)
Constant	0.539***	0.545***	0.664***	1
	(0.0484)	(0.0758)	(0.150)	(0)
Observations	381	249	98	5
R-squared	0.019	0.001	0.015	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5 shows the effect of a difference in individual lifetime wealth among the heirs on the probability to receive an equal bequest. The relationship seems to be quite ambiguous. The relation is significant in the case with two heirs. Then the effect seems to be small and negative, similar to that of when controlling for the difference in income. In the case of four heirs sharing the estate, the effect seems to be the opposite, small but positive. However, this is only significant on the 10 % level, which may imply that the relationship is not very stable. When controlling for differences in lifetime individual wealth among siblings, the probability to receive an equal bequest is 54 %, which is similar to the probability when controlling for differences in lifetime income. As before, the R-squared are low, and dispersion is visible. However, the significant relation is still relevant.

Table 6 Model with Siblings Difference in Lifetime Household Wealth

	(1)	(2)	(3)	(4)
VARIABLES	2 Heirs	3 Heirs	4 Heirs	5 Heirs
Household Wealth Difference from Median	-5.07e-08***	1.00e-09	4.83e-08*	0
	(1.42e-08)	(6.48e-09)	(2.33e-08)	(0)
Constant	0.537***	0.542***	0.659***	1
	(0.0484)	(0.0760)	(0.151)	(0)
Observations	381	249	98	5
R-squared	0.016	0.000	0.023	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table shows the relation between a difference in household lifetime wealth and the probability to receive an equal bequest. There is a significant relationship in the case with two heirs on the 1 % level. When four siblings share the estate the relationship is significant on the 10 % level. The effect of a difference in household lifetime wealth is quite ambiguous as with two siblings the effect seems to still be negative, but when four siblings share the estate the effect seems to be the opposite. In this case as well, the probability to receive an equal bequest is similar to when controlling for differences in lifetime income (54 % in comparison with 53 %) when two siblings share the estate. Here, low R-squared are again experienced and these are interpreted as before.

When adding the control variables the sex of the heir, age of the heir, and age of the decedent, it is clear that the age of both the heir and the decedent are significant explanatory variables in all models. However, the heir's sex does not have a significant effect on the probability to receive an equal bequest. This is rather surprising as it has previously been found that daughters are more likely to receive a larger part of the bequest. This may be explained by the fact that most of these studies were made with data from the United States, which is as previously stated less equal when it comes to income differences between the sexes. When using control variables (see Appendix A) the significance of income differences and wealth differences remain the same. This could mean that the results found without the control variables are robust.

7.1 Interpretation of Results

There are several patterns visible in the results shown above. There is a significant relationship between economic differences and the probability to receive an equal bequest in the circumstances where two or four siblings share the bequest. However, the significance is considerably higher in the case of two siblings. Lifetime labor income differences have a negative effect while lifetime household wealth and lifetime individual wealth differences have an ambiguous effect. Lifetime labor income difference is however only a significant factor when two siblings are concerned, and then the effect on the probability to receive an equal of bequest is again negative.

This means that when two siblings share the estate the altruistic theory seems to coincide as the probability to receive an equal bequest goes down as the economic differences among the siblings go up. However, the same conclusions cannot be drawn for more than two siblings. There seems to be a positive relationship between lifetime household wealth and the probability to receive an equal bequest when four siblings share the estate, yet the same is not true for lifetime individual wealth or lifetime labor income. The suspicion mentioned in section four, that household wealth would be more public information than individual wealth cannot be confirmed as the significance is the same in both these regressions.

This implies that if two siblings have different economic situations, they are less likely to receive an equal bequest to that of their sibling. In the results, economic differences between more than two siblings do not have a clear relation to the equal division of bequests. For four siblings, the only explanatory variable to have a significant impact on the equal division of bequests is lifetime household wealth differences. However, for four siblings the effect seen is the opposite compared to when two siblings share the estate. When three siblings share a bequest there is no significant effect of economic differences between siblings. As previously mentioned, this could be evidence that strategic motives play a larger part the more children a decedent has. This means that other characteristics than economic differences could be more relevant. It is possible to witness in the results (see Appendix A) that especially the age of the heir, and to some part the age of the decedent, are important factors explaining the probability of receiving an equal bequest.

The results for two siblings seem to confirm the altruistic theory that decedents are less likely to share the estate equally if the siblings are in different economic situations. This is in line with what previous researchers have found. Nevertheless, when four siblings share the estate, there seem to be an opposite effect. This is visible when regressing the probability of an equal bequest on the lifetime household and individual wealth differences. This shows that the altruistic theory may not explain all division of bequests. Also, for lifetime labor income differences the effect cannot be seen when more than two siblings share the estate. Therefore, it is not possible to confirm the altruistic theory for all divisions of bequests in Sweden.

These results may origin in the very low frequency unequally divided bequests in the sample. This could mean that the few decedents who share their estate from other preferences than that of the economic situation of the heirs. This low frequency could also be the explanation

for why it is hard to see a clear pattern in the case of three or more siblings. It may also be that in the sample used in this study the division of bequests is better explained by the strategic motives. If there was data on for example how many times an heir visited his or her parent, it might give a better explanation of why bequests are divided equally.

The results are in line with the expectations set in the introduction of this study; to be able to confirm the altruistic theory of bequest. This is when the parents want to strengthen the children's economic utility by compensating for economic differences between siblings with differently sized bequests. This was expected as previous research made with Swedish data showed evidence for the altruistic theory (Laitner & Ohlsson, 2001). However, in the same article, they also found evidence for the strategic theory and came to the conclusion that the best explanation for unequal bequests is a combination of the two theories.

Another reason for the differing results when regressing with three and four heirs could be that the heirs may have been compensated for economic differences with inter vivos gifts, yet this could not be tested using the sample in this study. This could also mean that the bequest was divided unequally since an inter vivos gift can be seen as an inheritance in advance in Sweden (depending on the size of the gift), and this thereby affects the division of bequests. As mentioned before the prevalence of unequal division as compensation for economic differences between siblings is higher for inter vivos gifts than for inheritances. This is true both for the United States and for Sweden (Cox & Rank, 1992; Ohlsson, 2007).

8 Conclusion

The purpose of this study was to see if the altruistic theory of bequests had any rationale in the Swedish division of bequests. This has previously been studied using US data, and this study thereby contributes to the existing literature with a Swedish perspective. This was performed by analyzing whether economic differences between siblings had a negative effect on the probability to receive an equal bequest. The research question was: Are bequests divided unequally to make up for differences in the heirs' economies? Three different measures of economic differences were used; lifetime labor income, lifetime individual wealth, and lifetime household wealth.

The main finding of this study is that economic differences between siblings (both concerning lifetime labor income and lifetime individual/household wealth) have a negative effect on the probability to receive an equal bequest when two siblings share the estate. This means that for two heirs, evidence for the altruistic theory has been found. When three siblings share the estate, economic differences between siblings have no relation with the probability to receive an equal bequest. In the case of four siblings sharing the estate, lifetime individual/household wealth has a positive effect on the probability to receive an equal bequest while lifetime labor income has no relation. There are various explanations for these results, including the minority of unequal division in the sample, the measurement of economic differences, or that the decedent may have compensated for these economic differences with inter vivos gifts previously.

Several questions remain to be resolved; in particular to see if a study of the probability to receive an equal inter vivos gift show similar results to this study. It would also be interesting to further investigate why the results differ depending on how many heirs the decedent has sharing his or her bequest.

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Appendix A

Appendix A1 Model with Sibling Difference in Lifetime Income with Control Variables

	(1)	(2)	(3)	(4)
VARIABLES	2 Heirs	3 Heirs	4 Heirs	5 Heirs
Income Difference from Median	-2.04e-07***	-2.37e-07	-5.13e-07	0
	(5.19e-08)	(1.61e-07)	(3.23e-07)	(0)
Sex of the Heir	0.0178	0.0142	0.0665	0
	(0.0452)	(0.0464)	(0.0585)	(0)
Age of the Heir	0.0158***	0.0137***	0.0210***	0
	(0.00152)	(0.00275)	(0.00242)	(0)
Age of the Decedent	-0.0111**	-0.0238***	-0.0202*	
	(0.00516)	(0.00683)	(0.00981)	
Constant	0.704	1.953***	1.386	1
	(0.428)	(0.617)	(0.930)	(0)
Observations	379	246	98	5
R-squared	0.208	0.272	0.418	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix A2 Model with Sibling Difference in Lifetime Individual Wealth with Control Variables

	(1)	(2)	(3)	(4)
VARIABLES	2 Heirs	3 Heirs	4 Heirs	5 Heirs
Ind. Wealth Difference from Median	-9.66e-08***	-4.11e-08	5.36e-08	0
	(3.17e-08)	(3.36e-08)	(3.26e-08)	(0)
Sex of the Heir	0.0131	9.66e-05	0.0616	0
	(0.0431)	(0.0451)	(0.0606)	(0)
Age of the Heir	0.0159***	0.0138***	0.0200***	0
	(0.00146)	(0.00248)	(0.00198)	(0)
Age of the Decedent	-0.0105**	-0.0236***	-0.0199*	
	(0.00525)	(0.00682)	(0.0110)	
Constant	0.652	1.936***	1.388	1
	(0.432)	(0.611)	(1.027)	(0)
Observations	379	246	98	5
R-squared	0.223	0.270	0.400	

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Appendix A3 Model with Sibling Difference in Lifetime Household Wealth with Control Variables

	(1)	(2)	(3)	(4)
VARIABLES	2 Heirs	3 Heirs	4 Heirs	5 Heirs
Household Wealth Difference from Median	-6.74e-08***	-6.47e-10	4.08e-08*	0
	(1.77e-08)	(6.64e-09)	(2.28e-08)	(0)
Sex of the Heir	0.00446	-0.00532	0.0633	0
	(0.0429)	(0.0449)	(0.0600)	(0)
Age of the Heir	0.0159***	0.0134***	0.0199***	0
	(0.00146)	(0.00250)	(0.00199)	(0)
Age of the Decedent	-0.0103**	-0.0237***	-0.0201*	
Constant	0.644	1.964***	1.408	1
	(0.431)	(0.617)	(1.026)	(0)
Observations	379	246	98	5
R-squared	0.220	0.264	0.406	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1