Inheritance tax evasion: Spousal bequests and under-reporting of inheritances in Sweden*

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November 13, 2017

Abstract

This study estimates the extent of estate size under-reporting. It uses a regression discontinuity design that compares the estates of individuals passing away just before and after the repeal of the Swedish tax on spousal bequests, in 2004. That is, it compares estates for which there were incentives to under-report with estates for which there were no such incentives. The results show that, on average, estate sizes were 17 percent lower, and the share of estates completely evading tax payments was 26 percent larger, due to under-reporting. As a consequence, government revenues from the tax were only half of what they would have been without under-reporting. Moreover, preferences and means for under-reporting were widespread and prevalent also among those receiving relatively small inheritances, but the people receiving the largest estates under-reported the most. The study contributes to the literature on inheritance taxation as well as a growing literature on tax evasion by providing credible evidence on the extent of estate size under-reporting.

Keywords: Estates, intergenerational transfers, inheritance taxes, tax evasion

*I would like to thank Margareta Brattström, Mikael Elinder, Per Engström, Oscar Erixson, Wojciech Kopczuk, Erik Lindqvist, Jacob Lundberg, Katarina Nordblom, Oskar Nordström Skans, Martin Nybom, Henry Ohlsson and Håkan Selin, as well as seminar participants at Uppsala University, Department of Economics, IFN and the SAMF-ECON Inequality and Tax Evasion conference in Copenhagen for valuable comments and suggestions. Some of the work was conducted when I enjoyed the hospitality of the Economics Department, Columbia University. Financial support from the Jan Wallander and Tom Hedelius foundation is gratefully acknowledged.

1 Introduction

The growing interest in wealth and wealth inequality has created new attention to the inheritance tax.[1] The tax is often seen as a means of promoting equality of opportunity and raising revenue. It can also contribute substantially to the overall progressivity of taxes (Piketty and Saez 2007). However, there is no consensus on whether or not the tax is desirable. Recent studies show that the inheritance tax may increase relative wealth inequality (Elinder, Erixson, and Waldenström 2016). It may also distort labor supply and savings (Joulfaian 2006). The relative importance of these benefits and drawbacks depends largely on whether or not people comply with the tax. The findings of this paper suggest that people do not. In the studied setting, inheritance tax evasion through under-reporting is widespread and extensive.

In general, estimating the extent of evasion is made difficult by lack of data. People are reluctant to reveal evasion, and there are no records on the amount of taxes withheld from the tax agency. The problem is not specific to studies on inheritance taxes but present in studies on evasion with respect to other taxes as well. To overcome the problem, it is common to look for traces of specific evasion strategies, or to try to determine what the tax payments and the tax base would have been in the absence of evasion (see, for instance Pissarides and Weber (1989) and Engström and Hagen (2016)). An expanding branch of the literature does this using quasi-experimental designs or randomized field experiments (see for instance, Slemrod, Blumenthal, et al. (2001), Gorodnichenko et al. (2009), Kleven et al. (2011), and Pomeranz (2015)).[2]

This study follows the methodological development of the tax non-compliance literature and uses a regression discontinuity (RD) design. The design exploits variation in the incentives for under-reporting created by the repeal of taxes on spousal bequests in Sweden, a repeal effective on January 1, 2004. Before the repeal, spousal bequests larger than SEK 280,000[3] were taxed according to a progressive tax schedule with tax rates of up to 30 percent. Thus, there were strong incentives to under-report before the repeal. After the repeal, however, no such incentives remained. This setting, with a sudden and immediate change in incentives, is suitable for estimation using a RD design. The design compares the reported estate size of individuals passing away just before and just after the tax repeal—i.e., with and without incentives for under-reporting—and whether or not

1. Studies on wealth and inequality include Kopczuk and Saez (2004), Roine and Waldenström (2009), Piketty (2014), and Saez and Zucman (2016).

2. See Slemrod and Weber (2012) for further discussion on this literature.

3. Approximately USD 32,000, with a conversion rate of 8.75 SEK/USD.

an individual passes away just before or just after the repeal is assumed essentially random. Other factors possibly affecting the reported estate size, including the decedent's actual wealth, are accounted for under that assumption, meaning that differences in the estate come only from the changed incentives for under-reporting.

The identification strategy is likely to capture evasion through under-reporting and under-reporting only, because by focusing on individuals passing away close to the tax repeal long-term planning is kept constant. The reason for this is that decedents passing away closely before the repeal were unsure as to which tax regime that would apply to their estate, and therefore unlikely to make any last minute changes in their planning. Similarly, those passing away closely after the repeal had little time to adapt to the new regime, and were therefore also unlikely to make any last minute changes. The surviving spouse, on the other hand, who can carry out evasion first after the donor's demise, knows which tax rules apply and can thus respond to them. Given the institutional setting, under-reporting was also the only mean through which the surviving spouse could reduce the estate size. I carry out several tests which support this interpretation of the results.

By identifying the non-compliance carried out by the heir and by separating the extent of evasion from other forms of tax non-compliance, this study complements earlier studies on inheritance taxation. Earlier studies have generally focused on avoidance carried out by the decedent (Kopczuk 2007) or not taken a stand on the nature of the non-compliance (Wolff 1996; Eller and Johnson 1999; Poterba 2000; Eller, Erard, et al. 2001; Poterba and Weisbenner 2003). However, the nature of the non-compliance is important, as the policy and welfare implications of evasion may differ from those of avoidance (Chetty 2009).

The analysis is made possible by individual level registry data on estate inventory reports. The data cover the universe of estates in Sweden during the studied period and contain essential information on the estate, such as its value and the existence of a written will or a marital agreement. The information allows me to measure the extent of under-reporting, as well as to carry out a number of tests for heterogeneity across heirs and to support the validity of the identification strategy.

The results show that estate size under-reporting was extensive; reported estate sizes were, on average, 17 percent lower, and about 26 percent more people reported estate sizes to be below tax liable values (SEK 280,000). In addition, I estimate that the under-reporting reduced the government's revenues from the tax by up to 55 percent.

Further exploring the tax and the under-reporting behavior, the study shows that the preferences and means for estate size under-reporting were widespread in the population; both those receiving large and small inheritances under-reported. However, comparing the distribution of estate sizes, before and after the repeal,

suggests that under-reporting of large estates drives the results, and, in particular, the under-reporting in the top 1 and top 0.1 percent of the estate size distribution. By providing this evidence on the distribution of under-reporting, the study complement the findings of the previous studies in the inheritance tax planning literature, which tend to concern a small and very rich share of the population. To do this is possible because of the institutional setting, in which inheritance taxation starts at comparably small amounts; almost half the estates were liable to taxation.[4] The broad liability of the tax also means that I am able to test for other heterogeneities in under-reporting. These tests show that heirs with children under-report more than heirs without children. This could suggest that there is a bequest motive for under-reporting, because to under-report when one inherits implies that there is more to leave for the child when you yourself pass away. It is also possible that the surviving spouse, who is usually the sole heir of a married decedent, received help from the children in carrying out the under-reporting, which thereby became more successful. Additional results on heterogeneity show that heirs with high wealth appear to under-report more than other heirs.

The fact that people are able to evade large tax payments through under-reporting may suggest that the tax has small adverse effects on people's savings, because when the tax is easy to evade, the effective price of transferring wealth is lower and distortions on savings are smaller. This is not to say that the tax is without problems: large estates being under-reported more than other estates suggests that the redistributional properties of the tax are weakened. In addition, given how widespread the under-reporting is, we risk to only tax honest individuals.

The outline of the paper is as follows. Section 2 describes the institutional setting. Section 3 describes the data, and Section 4 describes the empirical strategy. Section 5 presents the results, which are discussed in Section 6. Finally, Section 7 summarizes the conclusions.

2 Institutional setting

This section presents the institutional setting of this study. The purpose is to provide the background necessary for understanding the results and conclusions of the paper. It provides a short description of the Swedish succession rules and the Swedish inheritance tax. It also describes how the tax on spousal bequests was repealed and the means available to the decedent and the heirs to reduce tax payments.

4. The figure is based on the post-reform estate sizes, as the pre-reform estates are under-reported.

2.1 Succession rules

According to the Swedish default rules of succession, the joint property of the decedent and the surviving spouse is divided in equal parts when a married person passes away.[5] Half of the property becomes the property of the surviving spouse, without being part of the estate. The other half of the joint property as well as the decedent's separate property constitute the estate. The estate is then transferred in its entirety to the surviving spouse. The spouse does not inherit the estate with full ownership, only with the right of free disposal. This implies that the spouse can consume the estate, but never testate it. The reason for this is that other default heirs of the decedent (primarily his or her children) receive a postponed right of inheritance at his or her demise, meaning that what remains of the estate when the surviving spouse eventually passes away is to be transferred to them.

A written will may set aside the default rules regarding the transfer and division of the estate. The decedent can impose another division between his or her heirs, or include other heirs to the estate, through a will. It is also possible to stipulate that a spouse should inherit with full ownership, and thus be able to give away or testate the received inheritance. However, the default heirs, typically the children, are always entitled to half of what they would have received in the absence of such a will. To enforce this rule, gifts that the decedents have made before passing away are considered inheritances in advance and deducted from the inheritance lot. Note that wills could be written for other reasons than to circumvent the default succession rules, for instance to determine that an heir should receive a certain asset.

2.2 The tax on spousal bequests

Before the Swedish inheritance tax repeal on January 1, 2004, bequests between spouses were liable to taxation. Tax liability was determined based on the date of death. This means that a bequest was liable to taxation as long as the decedent leaving it passed away before January 1, but not if the decedent passed away on or after that date. The tax was an inheritance tax, and thus based on the inheritance received by the spouse. However, it was similar to an estate tax as the default rule was for the estate to be transferred in full to the surviving spouse.

The inheritance tax schedule was progressive. It had a basic deductible exemption that varied with the heir's relationship to the decedent. For spouses, the exemption was SEK 280,000. The inheritance received by the spouse, net of this

5. For a more detailed description of Swedish succession rules and inheritance tax law, see Brattström and Singer (2011) and Elinder, Erixson, Escobar, et al. (2014).

exemption, was taxed at a rate of 10 percent for amounts up to SEK 300,000, at 20 percent for amounts up to SEK 600,000 and at 30 percent for amounts larger than that.

The basic rule for valuation of estates was that all assets and debts should be taxed at their market value. However, the rule had several exceptions. For instance, small businesses were taxed at 30 percent of the value of their assets and inventories, net of debt, to simplify the transition of family firms. Real estate was targeted at 75 percent of its market value. A stock traded on the Stockholm stock exchange main list was taxed at 75 percent of its market value, whereas Swedish stocks traded on other lists were taxed at only 30 percent of their market value.[6] The estate was reported in tax values to the tax agency.

The tax was calculated by the tax agency, using the estate inventory report. The heirs were responsible for writing and filing the report and were required to do so within three months of the decedent's passing away. The filed report had to be signed certified by two estate executors, verifying the truthfulness of its content. Anyone could be an executor to the estate, except the decedents wife, children or other heirs to the estate. The estate report had to be filed to the tax authority regardless of whether tax liability applied. The reason for this was that the tax authority had, and continue to have, a responsibility to archive the estate reports, which are legally binding documents verifying the heirs ownership of its assets.[7]

The tax on spousal bequests generated incomes of approximately SEK 430 million in 2003—an average tax payment of about SEK 15,000 per estate. Approximately 37 percent of the inheriting spouses paid taxes in that year.[8]

2.3 The tax repeal

The tax on spousal bequests was repealed on January 1, 2004, implying that no spousal bequest left by an individual who passed away on or after that date was taxed. The repeal followed a relatively short political process. It was first suggested in an interim report presented by the Property Tax Committee in January 2003 (Egendomsskattekommittén 2004). It was then submitted to Parliament as part of the budget proposal, on October 22 (Regeringens proposition 2003/04:14), and voted into law on December 17.

Note that other heirs—for instance, children—had to pay taxes on inheritances

6. Table A1 of Appendix A gives more details on valuation principles.

7. For instance, banks required the estate report to transfer wealth from the decedents bank accounts to the heirs.

8. The numbers on total revenue and average tax payments, as well as the share of inheriting spouses paying taxes, are based on my own calculations.

until December 17, 2004, when inheritance taxes were abolished altogether. The second reform was the result of a decision separate from the repeal of the tax on spousal bequests. It has been studied by, for instance, Erixson (2014) and Elinder, Erixson, and Waldenström (2016).

2.4 Strategies to avoid or evade the inheritance tax

The focus of this study is on estate size under-reporting. However, there were several ways for both the decedent and the surviving spouse to reduce the taxable value of the estate and thereby avoid or evade the inheritance tax. In addition to under-reporting, this section discusses the strategies tested for in Section 5, the purpose of which is to support that the observed reduction in estate size is indeed the result of estate size under-reporting.

The discussion does not cover all possible responses to the tax; people could, for instance, also reduce their savings or transfer wealth through a series of small inter-vivos gifts over several years.[9] However, they are the tax planning strategies most likely to be carried out in proximity to death.

Marital agreements. The estate value could be reduced by the use of marital agreements. As described, a division of a couple's joint property is carried out upon the death of the first spouse, and a marital agreement can ensure that as much property as possible is owned separately by the surviving spouse, instead of being owned jointly. Separate property of the surviving spouse was not part of the decedent's wealth and was not, during the tax regime, liable to inheritance taxation. A marital agreement must be written before the decedent's demise, but not necessarily before entering a marriage.

Asset shifting. The asset valuation principles of the inheritance tax created an opportunity to reduce the estate's tax value and thereby the tax payments through asset shifting. Assets with high tax values could be shifted into assets with low tax values; for instance, by selling stocks on the Stockholm main list (taxed at 75 percent of their market value) to instead buy Swedish stocks not traded on that list (taxed at 30 percent of their market value). This strategy had to be carried out by the decedent.

Under-reporting. The estate's reported tax value could be reduced through estate size under-reporting. There were many ways to illegally under-report the value of assets or to completely withhold assets from the estate report, as all assets of the estate were self-reported. However, even though all assets were self-reported in the estate report, the tax agency did have third-party information on some of

9. People were allowed to receive gifts from one person of up to SEK 10,000 per year, tax exempted.

the decedent's wealth. Banks, other financial institutes and, for some assets, the national land agency, reported wealth holdings in shares, bonds, bank accounts and real estate to the tax agency for collection of wealth and property taxes. Thus, the tax agency had more possibilities to detect under-reporting of such assets. Under-reporting of other assets, however, was not as easy to detect. For instance, cash holdings, inventories (e.g., art, jewelry, etc.) and consumer durables (e.g., cars) were self-reported also with regard to the wealth tax, and therefore more difficult to observe.[10] Note that this is the only strategy that may be carried out after the demise of the donor. Note also that the heir is the only one who can carry out under-reporting; the donor cannot under-report, as under-reporting is by definition carried out in relation to the estate value at the time of the donor's demise. The donor could, however, to some extent help the surviving spouse's under-reporting, by keeping wealth in assets that were easy to conceal.

3 Data

This section describes the data used in the empirical analyses. It presents and discusses the key variable used for measuring estate size under-reporting, it defines the relevant study population and describes the decedents of this population.

3.1 The Belinda database

The analyses use information from the Belinda database. The Belinda database is a population-wide, individual level register, covering the universe of estates in Sweden over the period from 2002 to 2004.[11] It was collected by the tax agency and contains information from the estate reports. In particular, it lists the value of the estate, which is necessary for estimating the amount of under-reporting. It also lists all heirs to the estate, reports the value of separate and joint property, as well as indicates the presence of wills and marital agreements. The decedent and heirs are identified by a public identification number, which makes it possible to obtain information on these individuals from other databases.

Data quality deteriorates after December 17, 2004. The inheritance tax was repealed for all heirs on that date, meaning that the tax agency no longer had any incentives to compile the data.

10. See Seim (2017) for a discussion on the wealth tax and under-reporting.

11. The database has been used before by, for instance, Erixson (2014), Erixson and Ohlsson (2014) and Elinder, Erixson, and Waldenström (2016). For a more detailed description of the data, see Elinder, Erixson, Escobar, et al. (2014)

The Belinda database contains a variable for the main outcome of the study: *Estate size*. It is obtained from the estate report and captures the decedent's net worth at death. In the Belinda database, estate size is reported in tax value, which is also the relevant valuation principle for the outcome, as the tax value is what matters for inheritance taxation. When used as an outcome for the RD design it has first been transformed using the inverse hyperbolic sine transformation, which approximates the logarithm, but accounts for zeros.[12]

3.2 Study population

I restrict the Belinda database to the relevant population of study: the population affected by the tax repeal. It is thus restricted to married individuals who passed away before and after the repeal (in 2003 or 2004), a total of 61,201 observations.[13] The population is further restricted to individuals whose surviving spouses' had incentives to under-report (i.e., individuals with wealth exceeding the tax threshold), when they passed away. To construct an exogenous measure of this, I use the decedent's wealth in 2002, information on which is obtained from the Swedish registry of wealth (*Förmögenhetsregistret*).[14] An estate is considered taxable (there were incentives for tax evasion) if a decedent had net wealth in 2002 that would have implied inheritance tax payments for the spouse had the decedent died in that year. In other words, it is considered taxable if the decedent's wealth in 2002 was larger than SEK 280,000.[15] This restriction to individuals with incentives to under-report leaves 29,923 observations.[16]

12. The obtained results are robust to the use of the logarithm of *Estate size*.

13. The full population of married individuals passing away in 2003 and 2004 was 62,296 individuals. However, for 976 observations, the date of death is missing, and for another 119 observations, information on the cause of death is missing. Information on the cause of death is required for some of the tests to determine how people planned.

14. Note that wealth in the wealth register is measured at December 31, each year. Thus, wealth in 2002 is measured approximately one year before death, both for individuals passing away just before and just after the tax repeal.

15. Note that as opposed to the variable estate size, which is given in tax value, wealth in 2002 represents the market value of all the decedent's assets. Furthermore, the wealth in 2002 reflects the individual's wealth before the division of the estate that is carried out at the passing away of the first spouse. For these reasons, the wealth in 2002, as captured by the wealth variable, may deviate from what the estate size of that individual would have been had he or she actually passed away in 2002. Thus, it is not a perfect measure of individuals' tax incentives and wealth before death, but it provides an approximation of these factors. For more discussion on this, see next subsection.

16. I use the 10,486 individuals fulfilling these criteria, who passed away in 2002 as well as a sample of non-married decedents for placebo analyses. More details on these populations are provided in Appendix C.

3.3 Descriptive statistics

This section presents descriptive statistics for decedents passing away before and after the tax repeal. The purpose is to provide a picture of the studied individuals. In particular, I want to show how the decedents' wealth while alive relates to their reported estate size and also provide points of reference for the discussion of the results. Note that the economic variables—income and wealth—are measured on December 31, 2002 (i.e., one year before the demise of individuals passing away close to January 1, 2004).

The descriptive statistics are presented in Table 1. The average estate size among the studied decedents is about SEK 570,000 before the reform, and about SEK 700,000 after the reform. It being lower before the tax repeal is probably to some extent due to the under-reporting I study. The average wealth is about SEK 1,100,000. It is important to note that the estate sizes are given in tax value, whereas the wealth is given in market value. This is likely to explain some of the difference between estate size and wealth. Using the wealth portfolio of the decedent to translate the estate's assets into their tax values results in the decedent's wealth instead being about SEK 900,000. This is still larger than the estate size, which is probably due to some, or all, of the wealth captured by the variable being marital property and that the wealth variable does not take into account the division of joint property, carried out upon death of a married individual.[17]

Some additional statistics are presented in Table 1. The decedents passing away in 2003 are, on average, 77 years old, whereas those passing away in 2004 are, on average, 76 years old. The difference follows from age being measured in the same year for both groups, 2002, which means that an individual, on average, is younger at that time, the later he or she passes away. The share of females is about 25 percent, which also follows from the restriction to married decedents. Wives tend to outlive husbands and there are therefore fewer women than men in this population. Income (including retirement income) is SEK 160,000–170,000

17. It is impossible to perfectly translate wealth into what the estate size would have been had the individual passed away in 2002, as the tax value of some assets in the estate report (small business and co-operative building society housing) is not related to their market value, making it impossible to say what their tax value would have been. In addition, wealth is measured before the division of joint property, and as we do not know whether the decedent's wealth would have been separate or joint property. However, if we assume that all wealth of both the decedent and the surviving spouse is joint property, and then convert the value of assets from market to tax value, then the wealth of decedents in both 2003 and 2004, assuming the default equal division of joint property, is about SEK 785,000. This suggests that the estate value is more or less the same as the pre-period wealth for those passing away in 2004.

Table 1: Descriptive statistics of the decedents

	Before repeal	After repeal
Age	76.69	75.67
University education	15.55	16.64
Female	23.76	24.13
Wealth	1,108,607	1,144,610
Income	160,694	166,594
Estate size	571,617	702,718
Observations	14,902	15,021

Note: Female and university education are in percent. Wealth is in market value. Wealth and income are in SEK, nominal values, and measured in 2002. Income includes retirement income. Estate size is in taxable value and measured in SEK, nominal values. Age is measured in 2002. The first column, Before repeal, includes decedents in 2003, and the second column, After repeal, includes decedents in 2004.

for decedents passing away before and after the repeal. The average income is low compared to the national average, as many decedents are retired. The share with university education is about the same in both years, approximately 16 percent.[18]

4 Identification strategy

This section describes the identification strategy. First, it describes the RD design and how it is used to quantify the extent of under-reporting. Then it describes its implementation. It also discusses the identifying assumptions.

4.1 How evasion is estimated: The RD design

The main issue in studies on tax evasion and under-reporting is observing it. Under-reporting is illegal, which makes people reluctant to reveal it to the tax agency or report it to surveys. Instead, to measure it, I compare the estates of individuals passing away before the inheritance tax repeal of January 1, 2004, to estates of individuals passing away on or after that date. That is, I compare estates for which there are incentives to under-report with estates for which there are no

18. University education is an indicator variable taking the value one if an individual has any university education.

such incentives, and infer the extent of under-reporting from how their reported size differ.

To identify the extent of under-reporting, and the extent of under-reporting only, requires that the compared individuals are similar, so that the estate size of those passing away before and after the repeal would have been the same had the estates before the repeal not been under-reported. To ensure this, the extent of under-reporting is estimated using a RD design. The RD design accounts for possible differences between the studied estates by comparing individuals passing away close to the repeal. It accounts for such differences, because if people are unable to perfectly control the date on which they die, then it is essentially random whether an individual passing away close to the reform dies before or after it, and this randomness ensures that the differences in estate size and probability of paying taxes are due to under-reporting only.

Simply described, estimating the extent of under-reporting using a RD design implies that the relationship between estate size and date of death is estimated separately for individuals passing away before and after the tax repeal. Both of these estimations provide predictions with regard to the estate size of individuals passing away on the date of the repeal, and the difference between the two predictions is the estimated extent of estate size under-reporting.

Going into the specifics of the RD design, I implement it using a non-parametric approach. This means that I apply local linear regression and estimate the relationship using observations relatively close to the reform. Using observations close to the reform—or in RD terminology: narrowing the bandwidth—results in the relationship becoming more likely to be approximately linear. However, robustness checks of the results to higher order polynomials are provided in Appendix B. The observations are weighted using a triangular kernel, which means that weights are assigned to each observation that are linearly decreasing with the distance between the demise and the reform date. This implies that the estimation gives less importance to an estate the farther away from the reform decedent leaving the estate passes away. The triangular kernel has been proved optimal for local regression at boundary points (see, for instance, Lee and Lemieux (2010) for a discussion on this).

Presented estimates are obtained using bandwidths selected according to the criteria of Calonico et al. (2014b) and the software RD-Robust (Calonico et al. 2014a). For completeness, I also show estimates obtained using other bandwidths and polynomial degrees. The presented results are estimated without control covariates.[19]

19. However, they are generally robust to the inclusion of controls such as age, sex, education and income of the heir or decedent.

4.2 Identifying assumptions

Identification of the extent of under-reporting rests on two crucial assumptions: that the reported estate sizes after the repeal reflects the correct values of the estate, and that the reported estates of individuals passing away before and after the repeal would have been the same in the absence of under-reporting.

The first assumption would be violated if, for instance, estates were reported to higher than actual values after the tax repeal. This could be the case if individuals put less effort into the estate reports when they do not matter for taxation. However, this is rather unlikely given the institutional setting. First of all, the estate report was not only filed for tax reasons. The tax authority had a responsibility to register the estate reports as they were legally binding documents, supporting the heirs' ownership to the assets they contained. Thus, failing to declare assets, or declaring them to lower values, meant that the heirs right to them was less protected. In addition, the content of the estate report had to be signed by two estate executors. The executors, who must not be heirs to the estate, were supposed to verify the correctness of the report. Rather than being over-reported, it is in fact more likely that large estates continued to be under-reported also after the tax was repealed, as the wealth tax (repealed first in 2007), meant that individuals had incentives not to reveal wealth they received to the tax authority. If they continued to under-report, then the estimates I obtain are to be seen as a lower bound on the extent of under-reporting during the tax regime.

There are several possible reasons as to why the second assumption—estates being the same in the absence of under-reporting—may be violated. For instance, the reported estate sizes of those passing away just before and after reform would differ regardless of under-reporting if wealthy individuals tend to pass away early in the year and less wealthy individuals tend to pass away late in the year. It would also be the case if the valuation principles of assets changed or were adjusted close to the repeal. Any differences of this kind would lead me to estimate an effect of the tax repeal on reported estate size not due to changed under-reporting. I therefore test for such possible differences using placebo tests on estates not affected by the reform, and by estimating the effect in previous years, when there was no tax reform. These tests support the identifying assumption and are presented in Section 5.2

One of the main threats to the second assumption, however, is sorting, or people's ability to control their date of death. Consider, for instance, individuals who are wealthy and mortally ill close to January 1, 2004. They have strong incentives to survive until after the repeal and thereby avoid taxation. If they do so, people passing away just after the reform will be wealthier than people passing

away just before it, and their estate sizes will differ for reasons other than under-reporting. The problem may seem unlikely, but it has been established in several studies (see, e.g., Kopczuk and Slemrod (2003) and Gans and Leigh (2006)), and Eliason and Ohlsson (2008, 2013) find evidence of some sorting for the reform at hand.[20] However, the sorting does not necessarily invalidate the identification strategy. Lee and Card (2008) show that a RD design can produce unbiased estimates in the presence of sorting, as long as individuals are unable to *perfectly* control their date of death (i.e., as long at the sorting is partial). In Section 5.2, I study the extent of sorting to see whether or not it should be deemed partial, and thus whether or not it is likely to bias the estimates on under-reporting. The results suggest that the sorting is partial, and that the estimates I present on the extent of under-reporting are causally identified.

5 Results

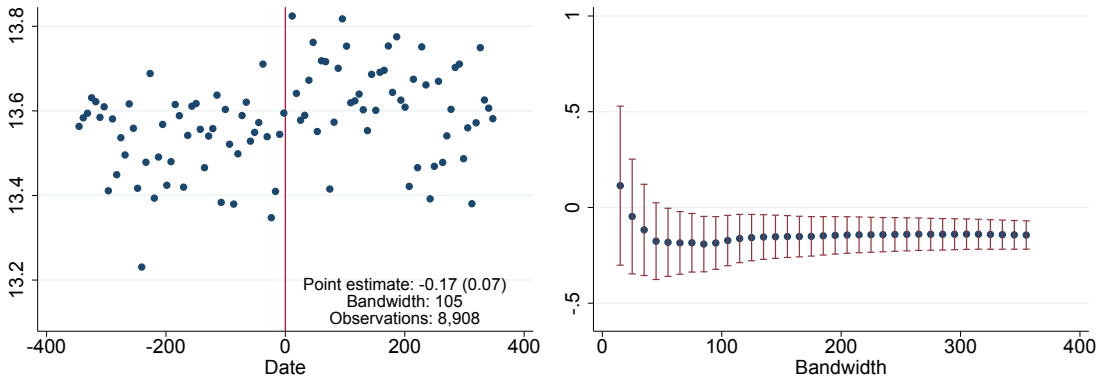
This section presents the estimates of estate size under-reporting. It then presents the results from a number of robustness and specification tests, which show that the main findings are relatively robust to the choice of bandwidth and local polynomial degree, and also that possible sorters are unlikely to invalidate the identification strategy. Then follow a number of tests to ensure that the lower reported estate values are due to under-reporting, and not to other inheritance tax planning strategies.

To understand the implications of the inheritance tax and the tax evasion, estimates are also presented on how under-reporting affects the government revenues from the tax, and how the extent of under-reporting is related to the estate size and characteristics of the under-reporting heir.

5.1 Main results: the extent of under-reporting

The extent of under-reporting is captured by the change in reported estate size due to the tax repeal. We see the relationship between estate size and the date of the donor's demise in Figure 1a. The figure suggests that reported estate sizes were substantially lower before than after the repeal. The estimate of this difference, obtained using the RD design, is also presented in the figure. The estimate is -0.17, implying that estate sizes were under-reported with about 17 percent, on average, as a result of of the inheritance tax. Figure 1b plots the estimates regarding estate

20. This could be achieved not only through actual prolonged survival, but also through falsely stating the timing of death in the death certificate.



(a) Estate size

(b) Estimates by bandwidth

Figure 1: Subfigure a) shows the relationship between reported estate size and date of death around the tax repeal, along with the point estimate of the extent of under-reporting, obtained using the bandwidth suggested by Calonico et al. (2014b). Estate size is averaged at week level. Date is relative to January 1, 2004 (Date=0). Subfigure b) shows the estimates on the reported estate size by bandwidth. Point estimates and 95 percent confidence intervals on y-axis and bandwidth in days on x-axis. Bandwidth ranges from 15 to 350 days. Estimates are obtained using local linear regression.

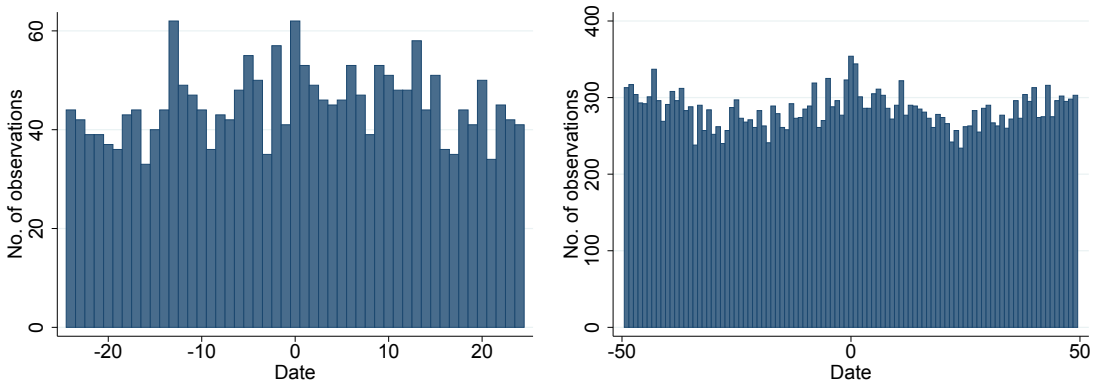
size by bandwidth for the local linear regression. Most estimates are between -0.15 and -0.2. The effect is significant at the 5 percent level for all estimation bandwidths larger than 30 days. The estimates obtained using a second order and a third order polynomial are similar to those obtained using the linear specification (see Figure B1 of Appendix B).

5.2 Tests of the identifying assumptions

This section presents the results of a number of tests of the identifying assumptions.

Evaluating the possible impact of sorting. As mentioned in Section 4, previous research has reported evidence of some sorting around the reform date (Eliason and Ohlsson 2008, 2013). I evaluate the extent of this sorting and its possible impact on my estimates using three strategies.

First, I evaluate the number of decedents per day at dates close to the tax repeal. The number of decedents at different dates around January 1, 2004, is shown in Figure 2. The figure show no clear over-density to the right of the reform



(a) +/- 25 days

(b) +/- 50 weeks

Figure 2: Number of decedents by day. Subfigure a is binned at a daily level. Subfigure b is binned at a weekly level. Date is relative to January 1, 2004 (Date=0)

date, which suggests that the possible sorting is small. To test for the presence of sorting more formally, I employ the test of McCrary (2008). In essence, it applies an RD design on the date of the reform, using the number of deaths per day as outcome. Reassuringly, the test is unable to estimate a statistically significant difference in the number of individuals passing away before and after the reform; the estimated log difference in density is -0.017 (0.038).[21] This does not contradict the finding of Eliason and Ohlsson (2008, 2013), showing that there was sorting. It only means that the sorting was not extensive enough to be captured by the tests, which in turn suggests that the sorting is partial.

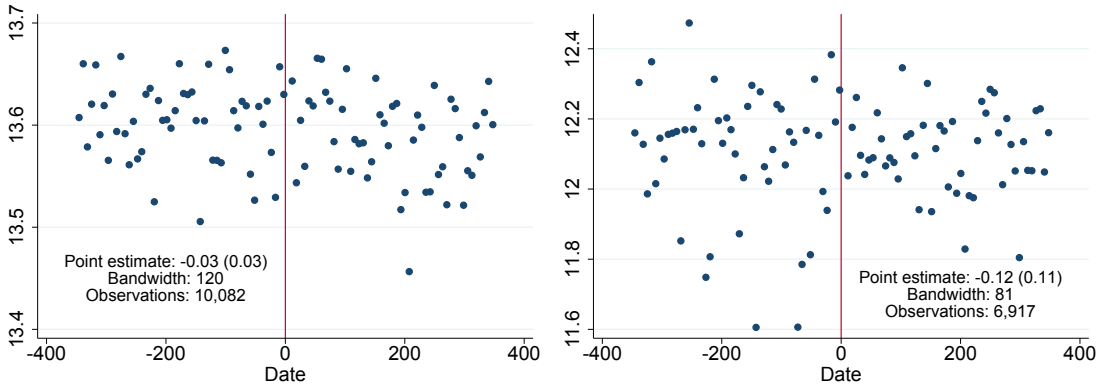
Second, I test for differences in predetermined characteristics among the decedents using the RD design. This strategy acknowledges that individuals who are able to postpone death are likely to differ from individuals who are unable to do so. In particular, the individuals are likely to be wealthier, as being wealthier gives them stronger incentives to survive the tax repeal, and if they are wealthier, their wealth may translate into higher estate values and bias the estimates on underreporting. It is thus useful to test for differences in predetermined characteristics directly. To do this, I apply the RD design on the population of study, but with predetermined characteristics as outcomes. The predetermined characteristics include wealth, income, education, sex and age. Reassuringly, Figure 3 show little evidence to suggest level shifts in the predetermined characteristics on January 1, 2004, and the point estimates, also presented in the figure, indicates no effects of

21. Result not reported in table. For robustness of estimate to the choice of bin-size and bandwidth, confer Figure B2 of Appendix B.

economic or statistical significance. Again, this does not necessarily mean that there is no sorting, but it suggests that the sorting is partial and unlikely to bias the estimates on under-reporting to any larger extent.

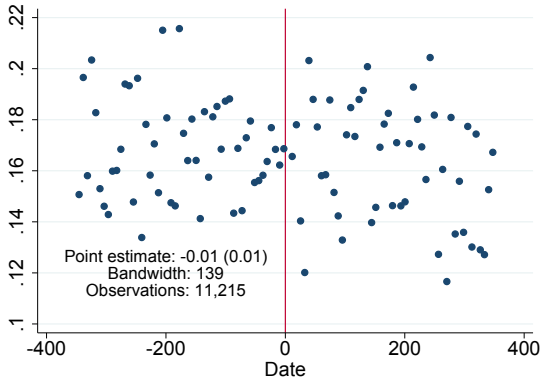
Third, I test for whether or not possible sorters bias the main estimates by removing individuals who passed away in the days close to the reform. This approach is commonly referred to as a RD-donut design.[22] Its logic is that sorters are likely to pass away close to the reform, and removing all individuals passing away in days close to the reform thus removes the possible sorters from the estimations. Guided by Eliason and Ohlsson (2008, 2013), I remove individuals passing away within two weeks before the repeal and one week after. This has little effect on the estimates. As seen in Figure 4, the main difference is that the point estimates of the donut design are less precise than the main estimates and that they, for small bandwidths, tend to be more negative than the main estimates. The latter, however, is contrary to what we would expect of the possible bias from sorters. For bandwidths of approximately 100 days, which is the bandwidth used for the main estimate, the donut design estimate is relatively close to the one of the regular RD design. This suggests that possible sorters have little influence on the estimates.

22. The same approach has been used by, for instance, Dahl et al. (2013) for avoiding bias from strategic timing of births.

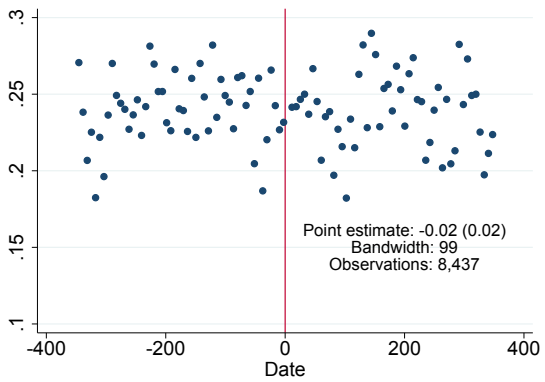


(a) Wealth

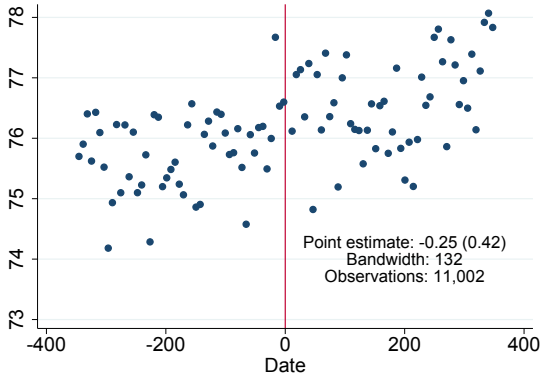
(b) Income



(c) University education



(d) Female



(e) Age

Figure 3: Relationship between predetermined characteristics and date of death around the tax repeal. The outcomes are aggregated at weekly level. Date is relative to January 1, 2004 (Date=0). Wealth and income are transformed using the inverse hyperbolic sine transformation. Age is in years. Female and university education are in shares. The robustness of the RD design point estimates to the choice of estimation bandwidth are provided in Figure B3 of Appendix B. The indicated bandwidth is obtained using the approach of Calonico et al. (2014b).

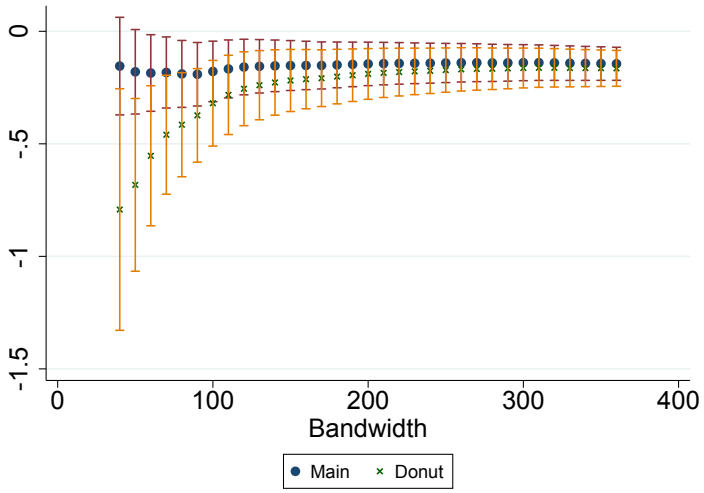
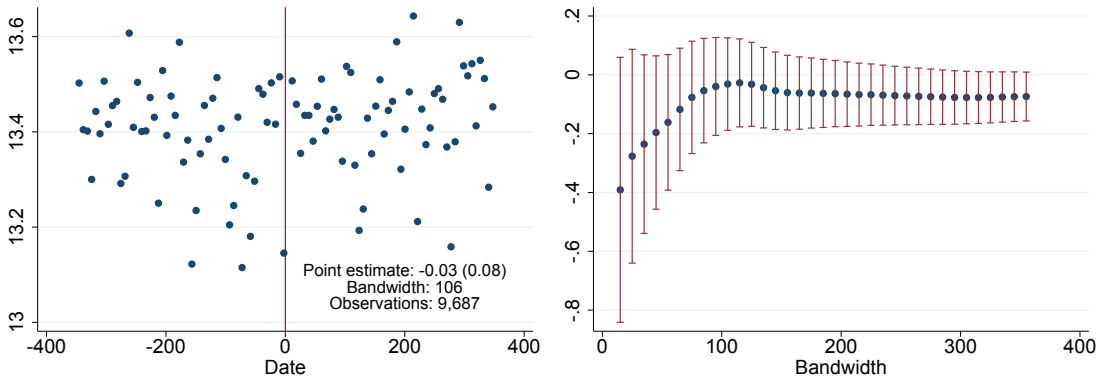


Figure 4: RD donut design estimates—Robustness to bandwidth choice. Displaying both main and donut estimates. Bandwidth ranges from 40 to 350 days. Point estimates and 95 percent confidence intervals. Estate size and tax payments are transformed using inverse hyperbolic sine transformation.

Testing for effects in previous years. As mentioned, there is a risk of estimating an effect of the tax repeal when there is no effect if wealthy individuals tend to pass away early in the year and less wealthy individuals tend to pass away late in the year. To ensure that this is not the case, I implement a placebo reform pretending that there was a tax repeal on January 1, 2003.[23] Finding an effect of this placebo reform would indicate that there are mortality patterns, such as the one described above. However, as seen in Figure 5, the tests show no difference in reported estate size, which suggests that there is no general tendency of wealthy individuals passing away early in the year.

Testing for other events possibly affecting the outcomes. There is also a risk of estimating an effect of the tax repeal when there is no effect, if the identification strategy captures changes other than the one studied close to January 1, 2004, which also affect the estate size. This could be legislation, tax reforms or changes in tax valuation principles. I look for such changes by estimating the effect of the tax repeal on two populations of decedents not affected by the tax repeal. The first population consists of non-married decedents and the second

23. For a description of the placebo population, see Appendix C.



(a) Estate size by date

(b) Estimates by bandwidth

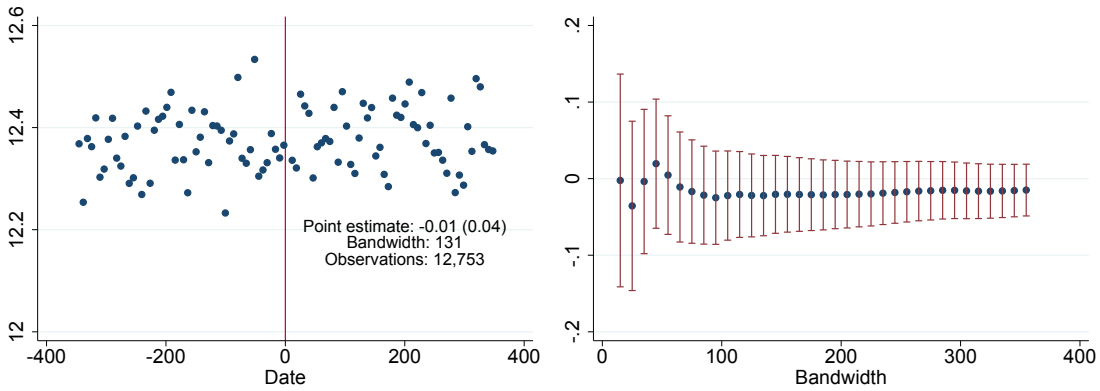
Figure 5: Subfigure a) shows the relationship between (inverse sine) estate size and date of death around the placebo tax repeal (1 January, 2003), along with the RD point estimate obtained using the bandwidth suggested by the approach of Calonico et al. (2014b). The outcome, (inverse sine estate size) is aggregated by week. Date relative January 1, 2003 (Date=0). Subfigure b shows the point estimate for bandwiths ranging between two weeks and 350 days. Bandwidth size on x-axis. Point estimate and 95% confidence interval on y-axis.

consists of decedents whose wealth in 2002 was lower than SEK 280,000.[24] The first population is unaffected by the reform, as its decedents have no surviving spouses to be concerned by the repeal. The second population is unaffected by the reform as its decedents had wealth lower than the tax threshold and their heirs thus lacked incentives to under-report. Finding an effect in these populations would indicate that the identification strategy captures more responses than under-reporting, and that the estimates are biased. The tests on the population of non-married decedents, seen in Figure 6, show no such effects and thus speak in favor of the validity of the research design. Similarly, the test on the population with non-taxable wealth, in Figure 7, shows no effect on estate size either, which also supports the research design.

5.3 Testing for other tax planning strategies

The main estimates show that, as a consequence of the inheritance tax, people under-reported estate sizes with on average 17 percent. This section continues by testing for other margins of tax planning to show that the captured response

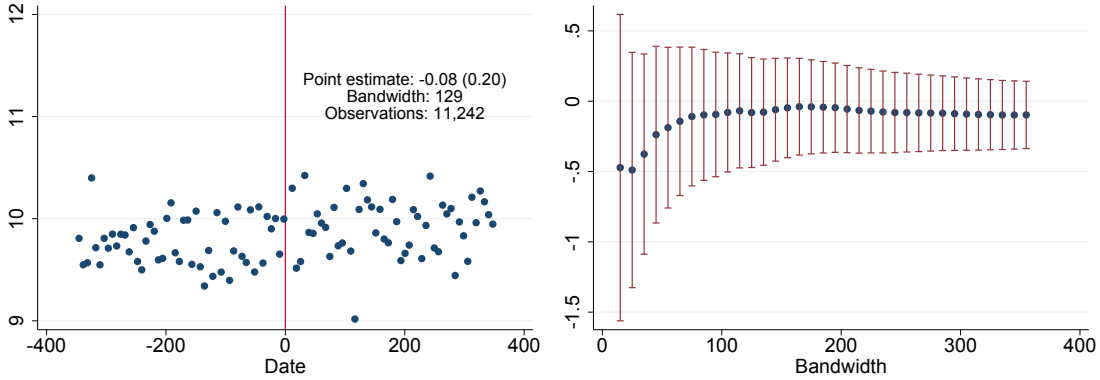
24. For a description of the placebo populations, see Appendix C.



(a) Estate size by date

(b) Estimates by bandwidth

Figure 6: Subfigure a) shows the relationship between (inverse sine) estate size and date of death around January 1, 2004, in placebo population (estates of non-married decedents), along with the RD point estimate obtained using the bandwidth suggested by the approach of Calonico et al. (2014b). The outcome, (inverse sine estate size) is aggregated by week. Date relative January 1, 2004 (Date=0). Subfigure b shows the point estimate for bandwiths ranging between two weeks and 350 days. Bandwidth size on x-axis. Point estimate and 95% confidence interval on y-axis.



(a) Estate size by date

(b) Estimates by bandwidth

Figure 7: Subfigure a) shows the relationship between (inverse sine) estate size and date of death around January 1, 2004, in placebo population (estates of lower than taxable value), along with the RD point estimate obtained using the bandwidth suggested by the approach of Calonico et al. (2014b). The outcome, (inverse sine estate size) is aggregated by week. Date relative January 1, 2004 (Date=0). Subfigure b shows the point estimate for bandwiths ranging between two weeks and 350 days. Bandwidth size on x-axis. Point estimate and 95% confidence interval on y-axis.

indeed is under-reporting. The purpose of these tests is to exclude the possibility that the decedent had time to respond to the reform and reduce the taxable value of the estate in a way that is captured by the identification strategy. In a sense, these tests can therefore also be seen as tests of the identifying assumption, as they test for factors other than under-reporting that may affect the reported estate size.

5.3.1 Reducing wealth

The first test looks for responses with an impact on the value of the decedent's wealth at death. As opposed to responses reducing the reported estate size, these responses reduced the actual wealth transferred to the surviving spouse. This could be real responses, because even though changes in wealth accumulation are unlikely to be captured, people could react to imminent death through consumption, as consumption becomes less costly relative to leaving bequests when there is an inheritance tax.

To test for such responses, I estimate the RD design using the wealth of the surviving spouse in the years following the inheritance as outcomes. If there is no increased end-of-life consumption, or other similar responses, due to the inheritance tax, we should expect no difference in the wealth of the heir in the subsequent years. We see the results of this in Figure 8. The point estimates are negative and about -0.05, suggesting that the surviving spouses of those passing away before the repeal had five percent lower wealth than the surviving spouses of those passing away after the repeal. However, the estimates are not statistically significant in any of the years. Thus, I cannot establish any important responses of this kind.[25]

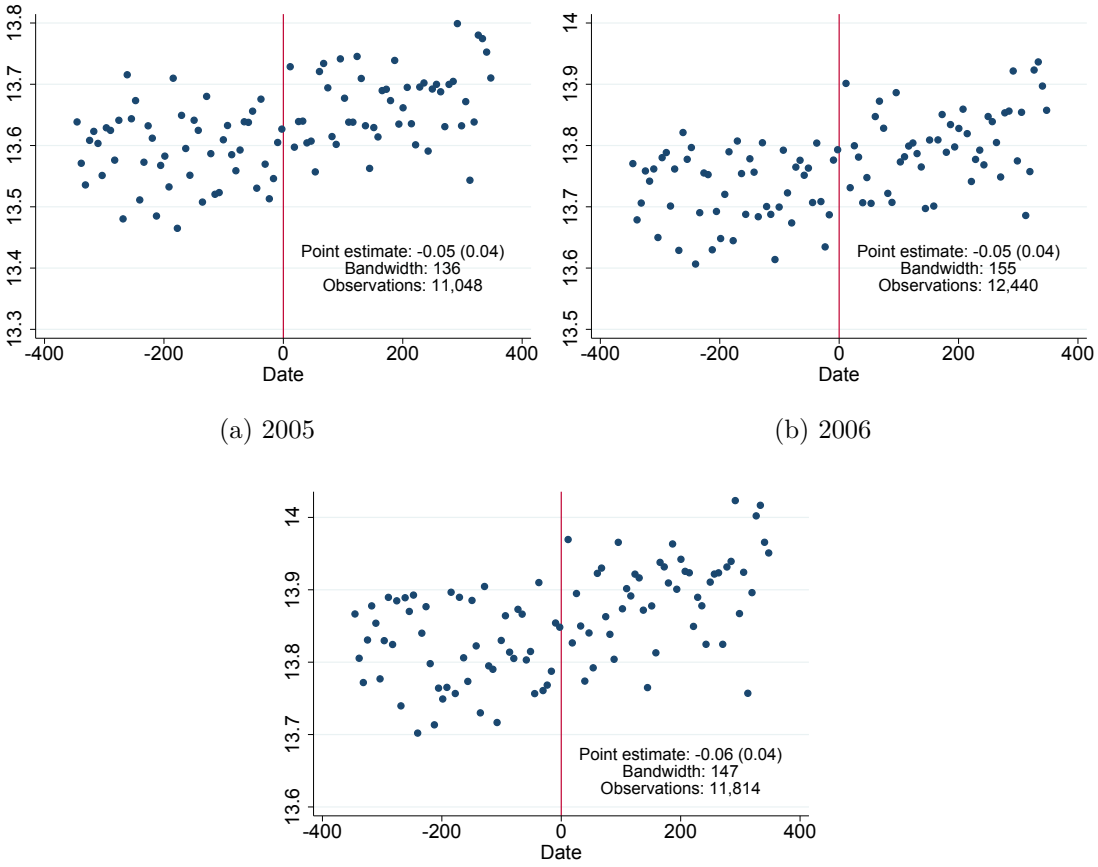
5.3.2 Reducing the estate size through marital agreements

The second test looks for tax planning through marital agreements. A marital agreement may lower the reported estate size, as it converts assets owned by both the decedent and the surviving spouse into assets owned separately by the surviving spouse. In other words, marital property is turned into separate property of the surviving spouse, which is not part of the estate and therefore not taxed.

I test for this strategy by implementing the RD design on an indicator for marital agreements, which is obtained from the estate reports.[26] Figure 9 shows the relationship between date of death and the frequency of marital agreements.

25. This also suggests that the tax had small effects on the surviving spouses' reported wealth in years after the inheritance.

26. If the decedent had a marital agreement, it was required to report this to the tax authority along with the estate report.



(a) 2005

(b) 2006

(c) 2007

Figure 8: Relationship between heir's wealth and date of death around the tax repeal. Outcomes are averaged at weekly level. Dates relative January 1, 2004 (Date=0). Subfigure a shows the relationship between date of death and (inverse sine) wealth in 2005. Subfigure b shows the relationship between date of death and (inverse sine) wealth in 2006. Subfigure c shows the relationship between date of death and (inverse sine) wealth in 2007. Point estimates, presented in the graphs, are obtained using the RD design with the bandwidth suggested by the approach of Calonico et al. (2014b). For robustness to the choice of estimation bandwidth, see Figure B4 of Appendix B.

The RD design estimations do not show any effects along this margin, which suggests that the lower reported estate sizes found were not due to this strategy.

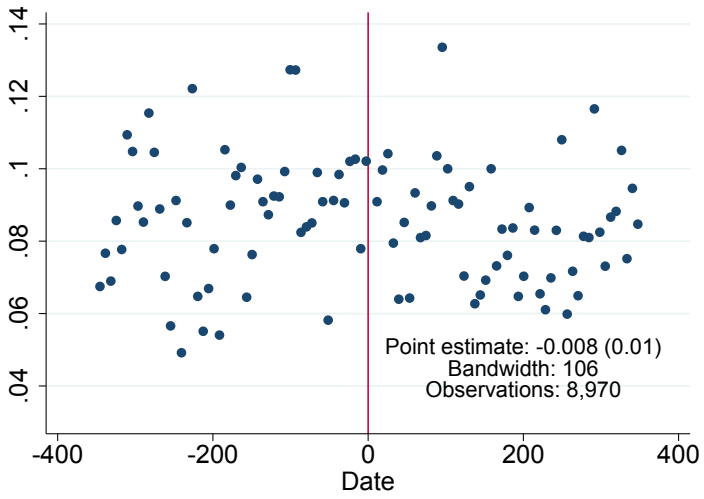


Figure 9: Relationship between the presence of marital agreements and date of death around the tax repeal. The outcome is averaged at week level. Date is relative to January 1, 2004 (Date=0). The point estimate, presented in the graph, is obtained using the RD design with the bandwidth suggested by the approach of Calonico et al. (2014b). For robustness to the choice of estimation bandwidth, see Figure B5 of Appendix B.

5.3.3 Reducing the estate size through asset shifting

The third test looks for planning through asset shifting. Asset shifting was legal and could be carried out by the donor. It reduced the reported value of the estate, as the tax value of some assets in the estate was lower than their market value. Ideally, a test for this strategy would use the asset composition of the estate, but the Belinda database does not contain that information.[27]

Instead, I implement a test acknowledging that asset shifting had to be carried out before the donor passed away. Thus, with little or no time to plan, asset shifting was unlikely. Also, as pointed out by Kopczuk (2007), there is a large body of literature showing that people tend to postpone decisions concerning their death for as long as possible. It is thus less likely that people carried out this strategy when their death was not imminent.[28] The test splits the population into two groups, based on whether or not the decedent passed away suddenly, and estimates the RD design separately on each group. Deaths are considered sudden if the decedent was not diagnosed with the same illness he or she died from, before death.[29] The relevant outcome is the estate size, as it captures asset shifting. The test assumes that individuals who passed away suddenly did not have time shift assets. Or rather, that individuals passing away suddenly had less time to respond to the tax repeal, and that the extent of asset shifting therefore is more likely to be accounted for by the RD design. If the estimated effect on estate values is lower among individuals passing away suddenly, then some of the effect is likely to come from asset shifting rather than from evasion carried out after the donor's demise.

We see in Figure 10 that the point estimate in the population of sudden deaths is larger, but less precise, than the effect in the non-sudden population. This is the opposite of what we would expect if asset shifting explained the main results.

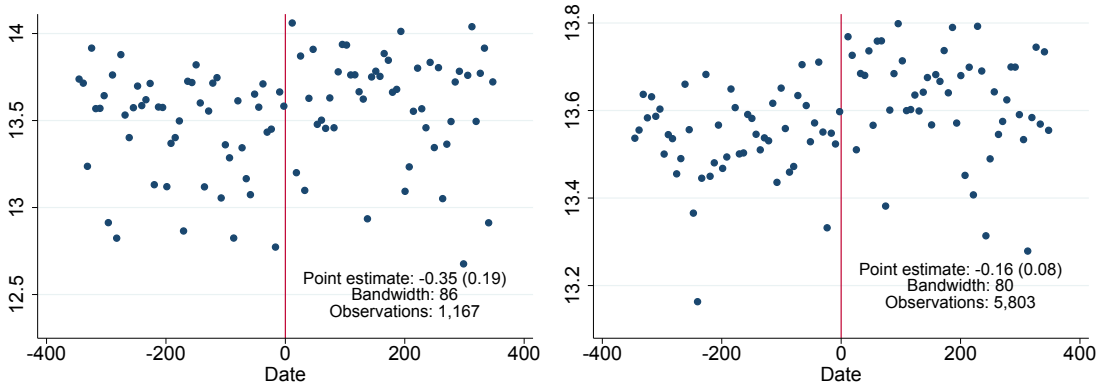
5.4 The impact of under-reporting on tax payments and government revenues

In this subsection I estimate the effect of the under-reporting on the tax payments and government revenues. As the tax schedule was progressive, this effect depends on who it was that under-reported and to what extent the under-reporting implied that individuals reached lower tax brackets.

27. The information exists for a sample of estates in 2004 and 2005, which unfortunately is to small to be used for this test.

28. In an unpublished paper, Oscar Erixson and I find little evidence of planning carried out by the decedent.

29. For details on the definition, see Appendix D.

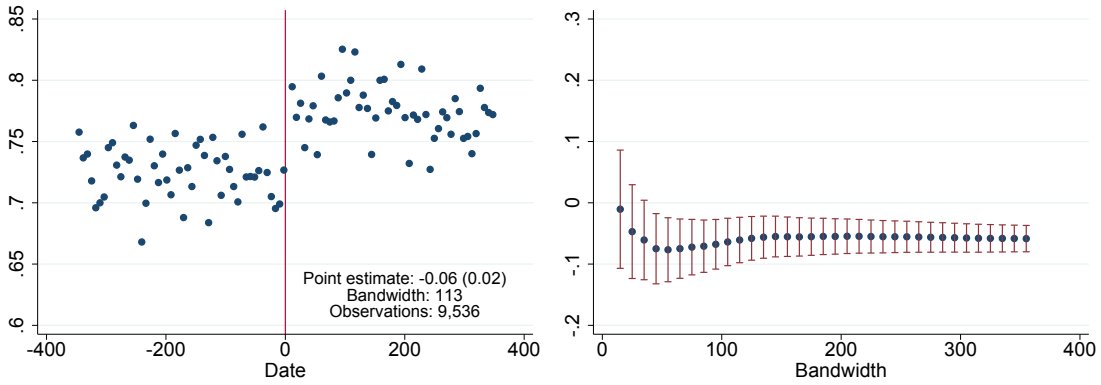


(a) Sudden (b) Non-sudden

Figure 10: Relationship between (inverse sine) estate size and date of death around the tax repeal for sudden and non-sudden deaths. Estate size is averaged at weekly level. Dates relative January 1, 2004 (Date=0). The point estimates, presented in the graphs, are obtained using the RD design with the bandwidth suggested by the approach of Calonico et al. (2014b). For robustness to the choice of estimation bandwidth, see Figure B6 of Appendix B.

I therefore start out by estimating the effect of the under-reporting for the extensive margin, i.e., the extent to which individuals were fully able to evade the inheritance tax through under-reporting. I estimate this by creating an indicator for whether or not the reported estate size was larger than SEK 280,000, and then estimating the regression discontinuity design with this indicator as the outcome. The result of the estimation is seen in Figure 11. Subfigure a) shows the relationship between date of death and the probability of completely evading the inheritance tax. The estimate reported in the figure suggests that the probability of reporting estates to taxable values was 6 percentage points lower during the tax regime. This translates into a relative change of 26 percent. Subfigure b) shows that the point estimate was robust to the choice of estimation bandwidth.

Second, I estimate the effect of the under-reporting on the tax payments and government revenues by creating a variable representing the tax payments for the spouses inheriting the studied estates, I then use this variable as an outcome when employing the RD design. Note that the tax payments for those receiving inheritances after the tax repeal are hypothetical and calculated as if the tax would still have been in place. Estimating the RD design on the (inverse sine) of this outcome gives an estimate of how much the estate size was reduced in relative terms. As the change in tax payments translates directly into the change



(a) Taxable estate by date

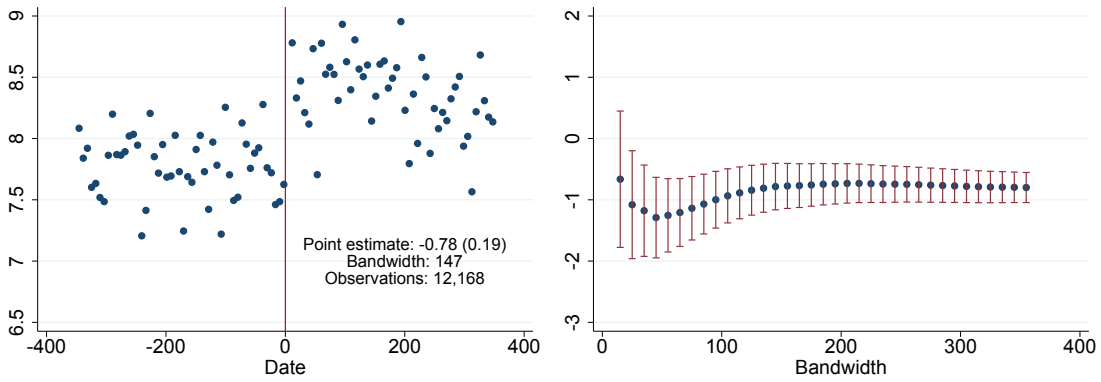
(b) Estimates by bandwidth

Figure 11: Subfigure a) shows the relationship between the probability of filing an estate of a taxable value and date of death around January 1, 2004, along with the RD point estimate obtained using the bandwidth suggested by the approach of Calonico et al. (2014b). The outcome, (inverse sine estate size) is aggregated by week. Date relative January 1, 2004 (Date=0). Subfigure b shows the point estimate for bandwidths ranging between two weeks and 350 days. Bandwidth size on x-axis. Point estimate and 95% confidence interval on y-axis.

in revenues, it also gives an estimate on the government's loss of revenues from the tax.

Note that estimating the effect of the under-reporting on tax payments and government revenues in this way requires an additional assumption, namely that there were no other responses to the tax repeal, captured by the identification strategy, that affected the spouse's tax payments. I have already shown that there are no other planning responses affecting the reported estate size. However, it is possible that the decedent had planned to avoid inheritance taxation without reducing the reported estate size by including more heirs to the estate. If the number of heirs to estates decreased as a result of the repeal then the estimate on tax payments may depend on this rather than under-reporting. Consequently, I apply the RD design on an outcome indicating the number of heirs to the estate. The test, reported in Figure B7 of Appendix B, show no such response and thus suggests that a change in tax payments, captured by the RD design, only reflects the effect of under-reporting on tax payments and government revenues.

The estimate of the effect of under-reporting on tax payments and government revenues is presented in Figure 12. We see that the estimated effect of the reform is -0.78. This suggests that the tax payments and revenues from the tax were



(a) Tax payments by date

(b) Estimates by bandwidth

Figure 12: Subfigure a) shows the relationship between the spouse's (inverse sine) tax payments and date of death around January 1, 2004, along with the RD point estimate obtained using the bandwidth suggested by the approach of Calonico et al. (2014b). The outcome, (inverse sine estate size) is aggregated by week. Date relative January 1, 2004 (Date=0). Subfigure b shows the point estimate for bandwidths ranging between two weeks and 350 days. Bandwidth size on x-axis. Point estimate and 95% confidence interval on y-axis.

about 55 percent lower, as a result of the under-reporting. Figure 12b shows that the point estimates vary somewhat with the bandwidth. However, the estimate of -0.78, is by no means extreme compared to those at other bandwidths.

5.5 Distribution of under-reporting in the population

This section shows how the extent of estate size under-reporting varied in the population along a number of dimensions. The dimensions are based on the estate size, as well as characteristics of the under-reporting surviving spouse.

Under-reporting and estate size. Unfortunately, the population of estates is not large enough for tests on the extent of under-reporting in different deciles of the estate size distribution. Instead, I compare the distributions of estate sizes in the years before and after the inheritance tax repeal. This should, of course, be seen as descriptive evidence. Figure 13 shows the reported size of estates in 2003 relative to the reported size of estate in 2004, for each decile of the estate size distribution. The top of the distribution is split further and the top 1 percent and top 0.1 percent are singled out as well. The figure shows indicative evidence of

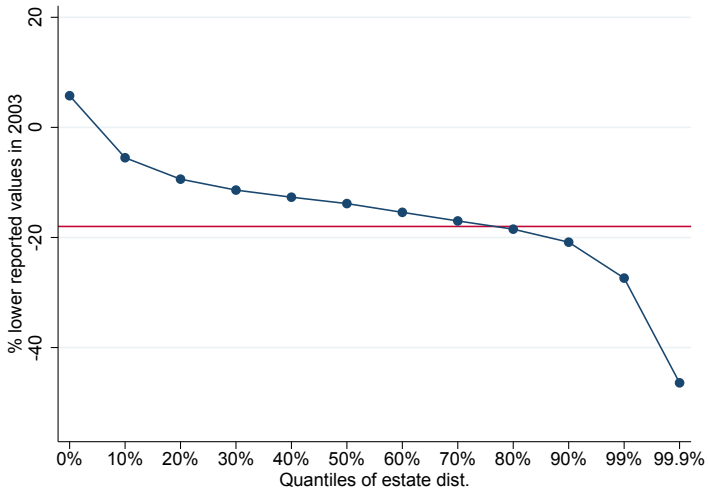


Figure 13: Difference in reported estate sizes 2003 and 2004, by decile, with the top percent and top 0.1 percent presented separately. Red line, indicates mean difference between the years.

under-reporting in all deciles but the first, and thus suggest that estate size under-reporting was not confined to the largest estates. However, it also suggests that the mean difference in reported estate sizes are mostly driven by the top decile, and in particular, by estates in the top percent and top 0.1 percent. In these two groups, the reported estate sizes during the tax regime were 25 percent and 45 percent lower, respectively, compared to the reported estate sizes after the tax was repealed.

Under-reporting and characteristics of the heir. A number of surviving spouse characteristics may affect the extent of estate size under-reporting. Figure 14 presents estimates on how under-reporting relates to the surviving spouse's wealth and to whether or not he or she has children.[30]

There appears to be some heterogeneity in the extent of under-reporting based on whether or not the surviving spouse has children. The estimates reported in Figure 14 suggest that surviving spouses with children under-report, but that those without children do not. As seen in Figure B8 of Appendix B, this finding appears to be robust to the choice of estimation bandwidth. The estimates could be the result of a bequest motive; that the surviving spouse cares about the welfare of

30. Additionally, I have tested for heterogeneity with respect to the heirs education and income, without finding any effects.

his or her children and therefore wants to withhold as much wealth as possible from taxation, because the more that is withheld from taxation, the more can be transferred to the children when the surviving spouse eventually passes away. This interpretation is in line with the reasoning of, for instance, Hurd (1987), who argues that having children is an indication of bequest motives.[31] Another explanation for the result may be that the child of the surviving spouse is involved in the under-reporting. The surviving spouse and the child have aligned motives for reducing the inheritance tax payment, and there is no conflict between how much the surviving spouse receives and how much the child will receive when the wealth is transferred to him or her upon the surviving spouse's demise. The combined effort of the surviving spouse and the children may lead to greater under-reporting.

The table also suggests that surviving spouses with high wealth under-report more than others. This finding is also robust to the choice of estimation bandwidth, as can be seen in Figure B9 of Appendix B. A possible explanation for the difference is the Swedish wealth tax, in place at the time, and that wealthier individuals have stronger incentives to under-report the estate due to that tax. There are clear incentives to conceal received wealth that would imply liability for the wealth tax, from the tax agency. In addition, Seim (2017) shows that there was under-reporting with respect to the wealth tax in Sweden, and it is possible that knowledge about how to under-report assets is more widespread among individuals who have under-reported to evade the wealth tax.

6 Discussion

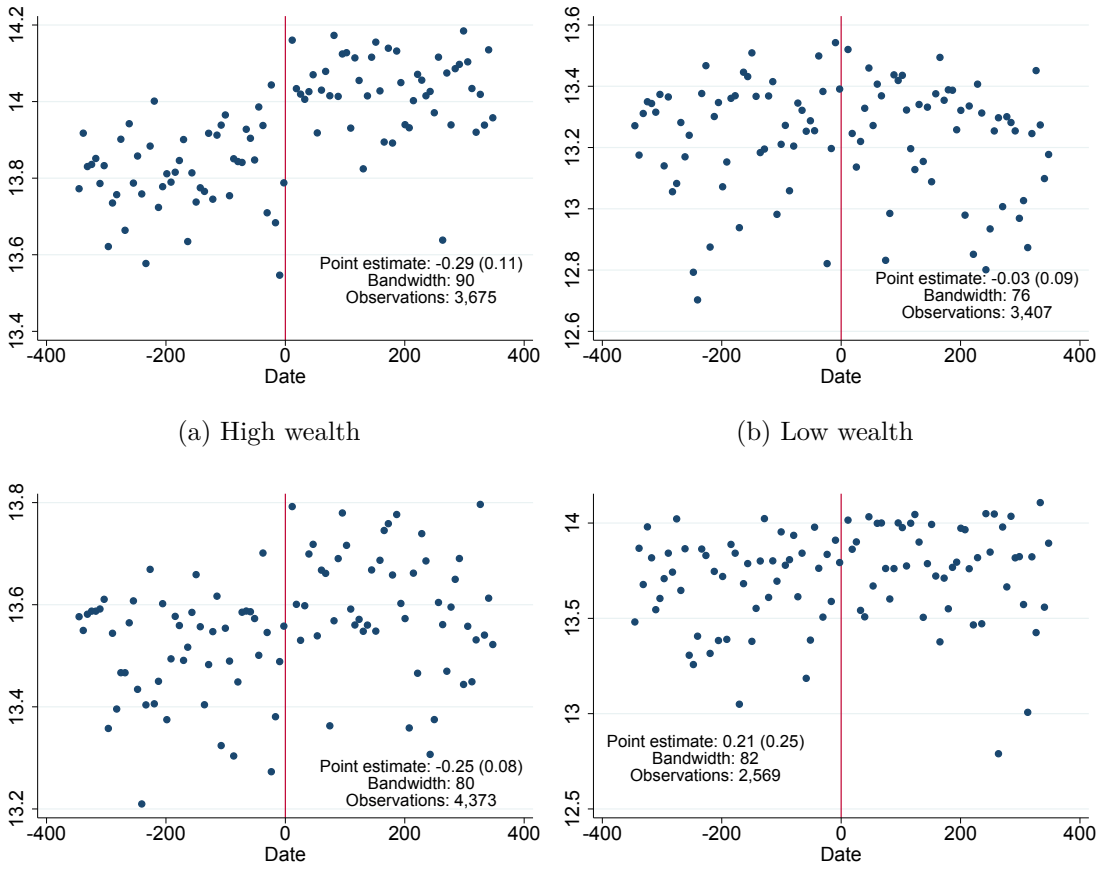
This section discusses some implications and interpretations of the results. First, it discusses the sensitivity of the tax base and what implications this has for the possibility to tax inheritances. Then, it discusses how the results can be generalized.

6.1 Implications for the possibility to tax inheritances

An important question in studies on taxation is on how much the tax base changes because of the tax rate. In this case, the question would be: how sensitive is the reported estate size to taxation?[32] The question matters, as it helps in determining

31. Kopczuk and Lupton (2007), however, show that bequest motives are common among individuals without children as well, thus making having children a weaker indicator for their presence.

32. Technically, the tax base in the Swedish setting is the inheritance size and not the estate size. However, the inheritance size depends directly on the estate size, and in the case of spousal



(a) High wealth

(b) Low wealth

(c) Children

(d) No children

Figure 14: Relationship between (inverse sine) estate size and date of death around the tax repeal for different sub-population, along with the RD point estimate obtained using the bandwidth suggested by the approach of Calonico et al. (2014b). Estate size is averaged at weekly level. Dates relative January 1, 2004 (Date=0). Robustness to the choice of estimation bandwidth is presented in Figures B8 and B9 of Appendix B.

how much revenues the tax can raise and how large the distortions of the tax might be. Estate sizes being under-reported with about 17 percent and tax payments being reduced by up to 55 percent suggest that it was comparably easy to evade the inheritance tax, and that the tax base was fairly sensitive. However, a few things should be noted.

First, the estimates I obtain does not say how sensitive individuals are to the

bequests, they are the same by the default rules.

tax rate. The estimated response is with respect to a tax repeal and not with respect to a change in the tax rate. Thus, the estimates tell us that people's under-reporting is sensitive to the inheritance tax, but not that a higher tax rate would imply more under-reporting.

Second, it should be stressed that the response I estimate is an under-reporting response among the heirs and not a real response in saving among the decedents. This means that the estimates I obtain have no direct implications for the literature on optimal inheritance taxation, which focus on the decedent's real responses to the tax rate.[33] However, it may have indirect implications for the literature, because the tax being easy to evade, or at least people being able to evade large amounts, may imply that the tax has relatively small distortions on wealth accumulation. The reason is that when tax evasion is easy to carry out for the heir, the effective price of transferring wealth is lower than the stated tax rate, which in turn makes the decedent's wealth accumulation closer to what it would have been in absence of the tax.

Of course, the tax having relatively small distortions does not mean that it is without problems. First, because of the extensive under-reporting, it raises less revenues; the estimates of this study suggest that the revenue could be reduced by as much as 55 percent. This casts doubts on the justification of the tax. Second, even though the tax may have little effect on the amount of wealth accumulated in a direct sense, it may still distort wealth holdings, as decedents may have enabled under-reporting by holding assets that are easy to under-report. Wealth would then be held in self-reported assets, which does not include stocks or bonds. In other words, wealth would be more likely to be held in low yield assets, such as cash or inventories. Third, and perhaps a greater concern is on how sensitive the reported estate size is to the tax in different parts of the estate size distribution. The results of Section 5.5 suggested that under-reporting was more extensive on larger estates. This means that those receiving large inheritances were able to evade more taxes and thus that the progressive and redistributive properties of the tax were undermined.

6.2 How general are the results?

The estimates on estate size under-reporting presented in this study concern spousal bequests and are estimated using the estates of individuals passing away close to January 1, 2004. Studying a specific group of individuals and a specific inheritance tax raises the question of how general the results are. For instance, are

33. See, for instance, Piketty and Saez (2013).

the estimates also telling for under-reporting of estates left by individuals passing away on other dates? And, are the estimates telling not only for under-reporting with respect to spousal bequests, but also for under-reporting of intergenerational transfers?

Estimates of RD designs are often interpreted as local average treatment effects, meaning that the estimates are specific for the individuals close to the treatment threshold, and that caution is needed when generalizing the results to individuals farther away from the threshold. But, as pointed out by Lee and Lemieux (2010), the localness of the RD design may be somewhat exaggerated, because the extent to which its estimates may be generalized depends on how the treatment effect relates to the running variable—in this case, date of death. They propose that, under heterogeneous treatment effects, RD design estimates should be seen as weighted average treatment effects, with weights proportional to an individual's probability of being close to the treatment threshold. The more similar individuals' probability to pass away close to the threshold, the closer the RD design comes to estimating an average treatment effect. The problem with this interpretation is that it is impossible to know ex ante how likely an individual is to pass away close to January 1, 2004. We only know when he or she actually passed away. However, in this setting, it is not unreasonable to assume that the weights should be relatively similar for all studied individuals, and that the estimates thus are closer to represent an average treatment effect.

There are important differences between spousal bequests and intergenerational transfers that affect the generalizability of the results. For instance, the wealth—or at least some of it—of a married decedent has been controlled by not only the decedent, but also by the surviving spouse, who has thus already had the opportunity to engage in tax planning. However, this is likely to influence tax planning strategies carried out before the decedent's demise and not strategies carried out after, meaning that it is less important for the generalizability of results on under-reporting. A second, and perhaps more important difference, is that there are seldom any conflicts of interest when the estate of a married decedent is transferred and under-reported; conflicts of interest that may be present in under-reporting with respect to many intergenerational bequests. With regard to intergenerational bequests, there are often several heirs, who all have an incentive to under-report as much as possible, while simultaneously wanting to ensure that all wealth they receive is listed in the estate report, so that their ownership of the asset is properly registered. When a married person passes away, on the other hand, the default rule stipulates that the spouse is supposed to inherit the full estate. There is thus only one heir, and no extra restriction on the amount that can be under-reported, coming from this split incentive. This difference between

spousal bequests and intergenerational bequests suggests that the estimates obtained in this study are less representative for settings in which there are several heirs. Thus, they are probably less translatable to under-reporting of estates to decedents with several children, than they are translatable to under-reporting of estates to decedents with only one child.

7 Summary

This paper studies the extent of under-reporting to evade inheritance taxes, in Sweden. It shows that estate size under-reporting was widespread and that people were able to reduce their tax payments to a considerable extent. Both large and relatively small estates were under-reported, but the value of larger estates was reduced more.

The paper provides several contributions to the literature on inheritance taxes and tax evasion. It provides evidence on the extent of estate size under-reporting, using a quasi-experimental research design, and shows that under-reporting is an important means of evading inheritance taxation. It also shows that the preferences and means for under-reporting was present and available to a large segment of the population.

To conclude, the paper shows that the inheritance tax was evaded to a great extent, and in particular by those receiving the largest inheritances. This weakens the arguments for the tax, such as its ability to raise revenue and promote equality of opportunity. However, the tax being easy to evade also implies that it has less distortive effects on labor supply and savings. Thus, inheritance tax evasion—and in particular, estate size under-reporting—is important and its consequences have to be acknowledged when weighing the benefits and drawbacks of the inheritance tax against each other.

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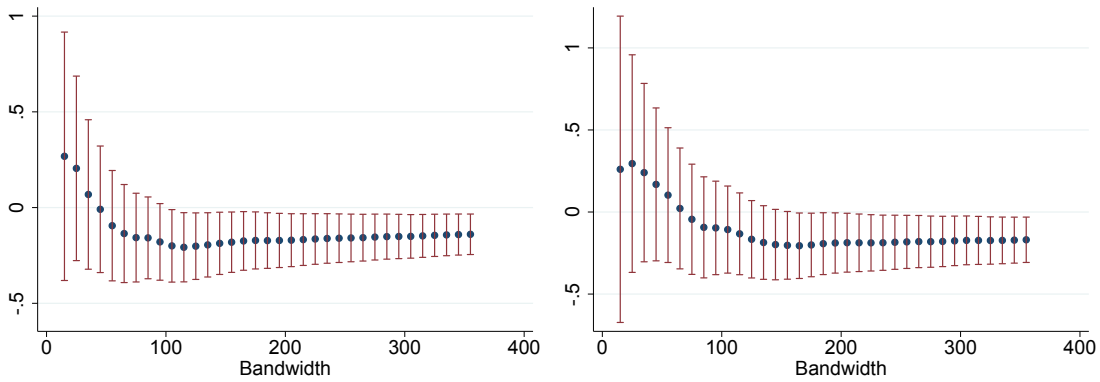
A Asset valuation

Table A1: Asset values

Asset type	Comment	% of market value
Real estate	Includes all real estate, but not co-operative building society dwellings	75
Apartments	This refers to co-operative building society housing, the most common form of apartments in Sweden	n.a.[1]
Cash etc.	Includes bank holdings, cash and bonds at the National Debt Office	100
Assets taxed at 75%	Stocks at Stockholm stock exchange's main list, stocks in foreign stock exchanges, bonds, etc.	75
Assets taxed at 30%	Stocks at other Swedish lists than the Stockholm stock exchange's main list, stocks at NASDAQ	30
Small businesses	Family firms, closely held corporations, partnerships, sole proprietorship etc.	n.a.[2]
Inventories	Inventories, consumer durables, etc.	100
Debt	All debt	100

Note: [1]The tax value of an apartment was not based on its market value, but on the net wealth of the housing society, which was only weakly, if at all, related to the market value of the apartment. [2]Firms were valued at 30 percent of their book value.

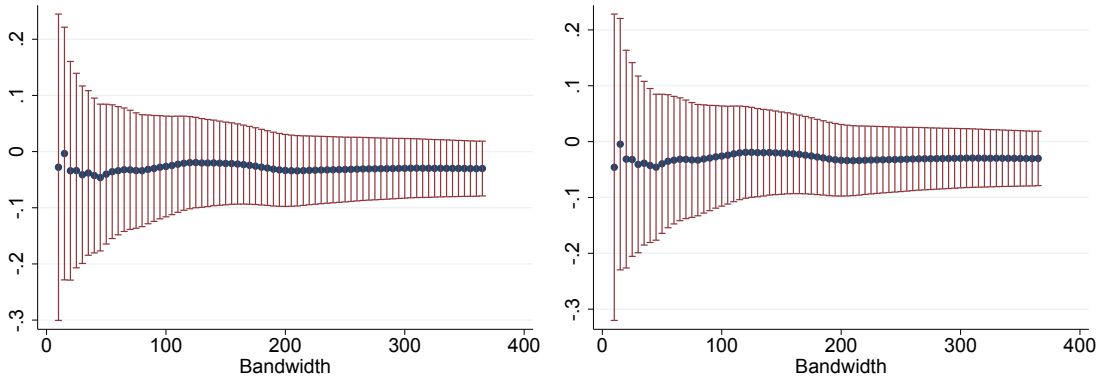
B Additional results and robustness checks



(a) 2nd order polynomial

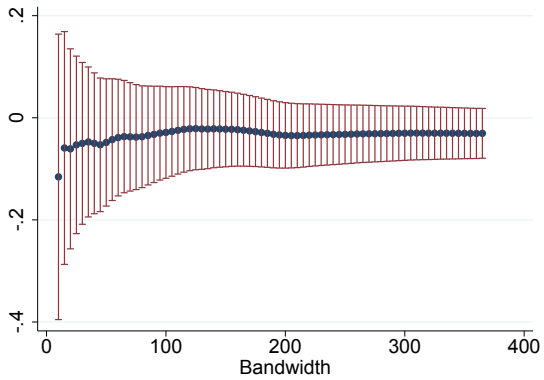
(b) 3rd order polynomial

Figure B1: Estimates with respect to (inverse sine) estate size—Robustness to bandwidth and polynomial choice. Point estimates and 95 percent confidence intervals on y-axis and bandwidth in days on x-axis. Bandwidth ranges between 15 and 350 days.

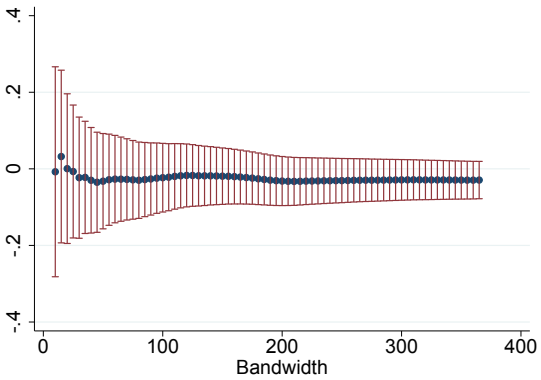


(a) Binsize: 1 day

(b) Binsize: 2 day

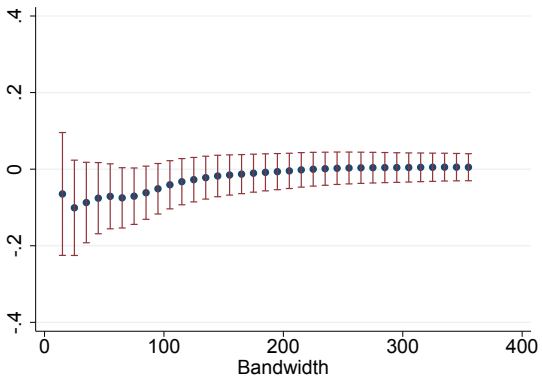


(c) Binsize: 3 day

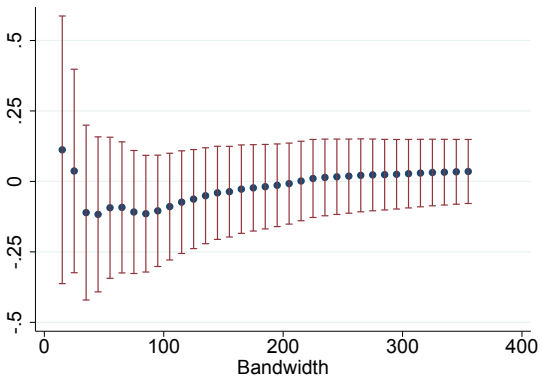


(d) Binsize: 4 day

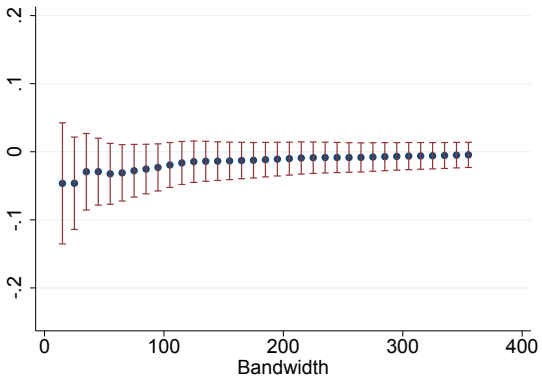
Figure B2: Test of McCrary (2008) by bandwidth and bin size. Estimate and 95 percent confidence intervals on y-axis. Bandwidth in days on x-axis.



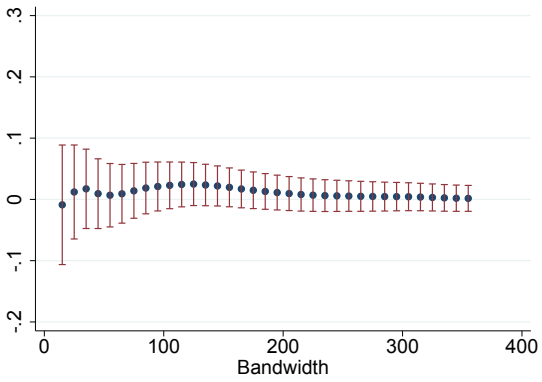
(a) Wealth



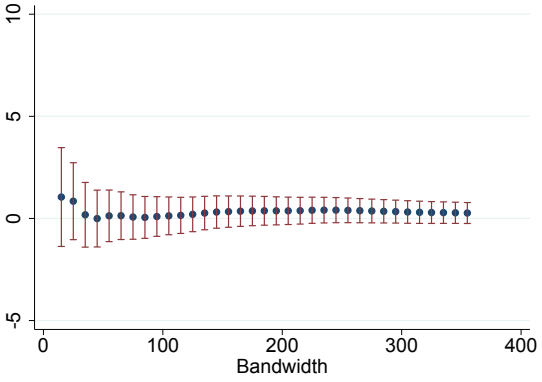
(b) Income



(c) University education

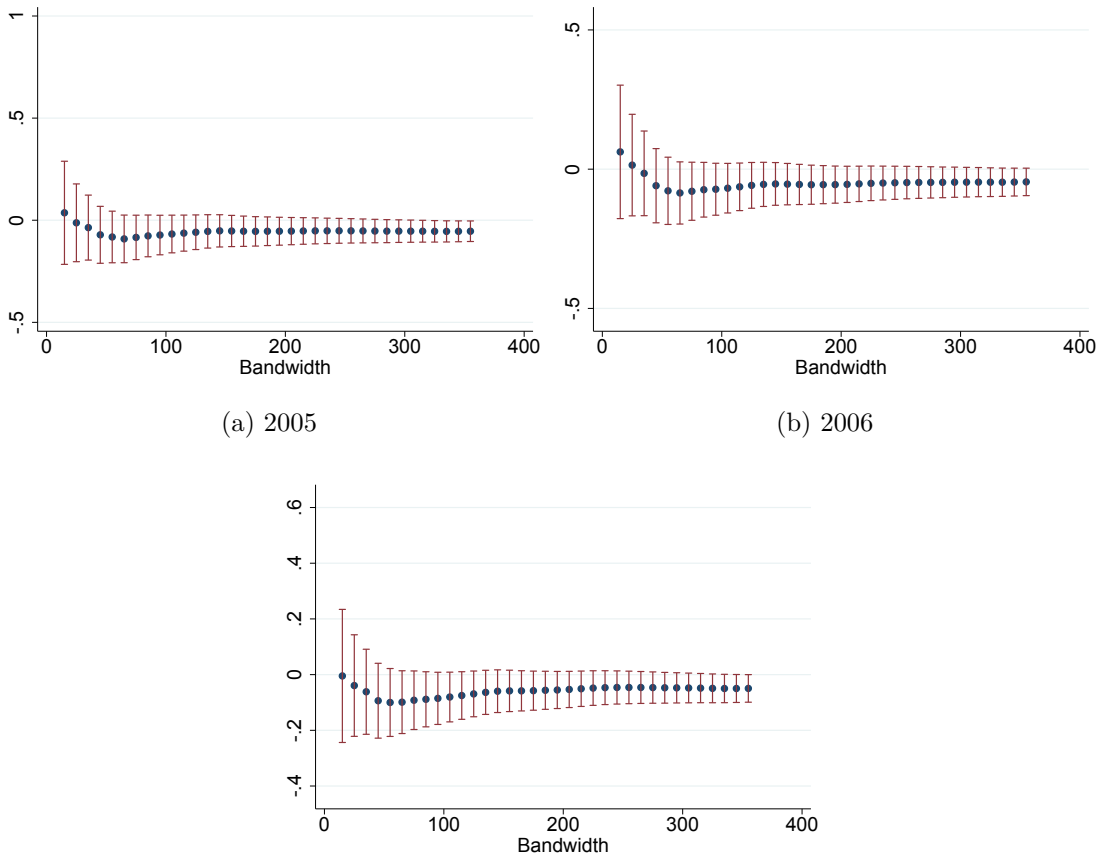


(d) Sex



(e) Age

Figure B3: Predetermined characteristics—Robustness to bandwidth choice. Point estimates and 95 percent confidence intervals on y-axis and bandwidth in days on x-axis. Estimates obtained using local linear regression. Bandwidth ranges between 15 and 350 days. Income and wealth are transformed using inverse hyperbolic sine transformation.



(a) 2005

(b) 2006

(c) 2007

Figure B4: Heir's wealth—Robustness to bandwidth choice. The outcome is the heir's (inverse sine) wealth in years following the inheritance. Point estimates and 95 percent confidence intervals on y-axis and bandwidth in days on x-axis. Estimates obtained using local linear regression. Bandwidth ranges between 15 and 350 days.

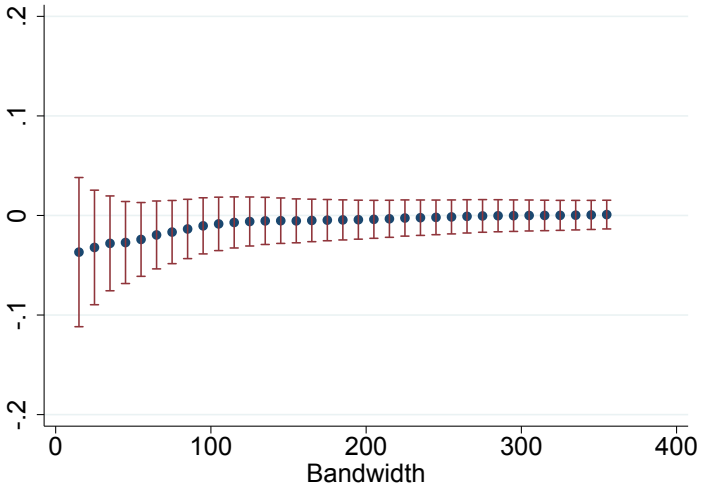
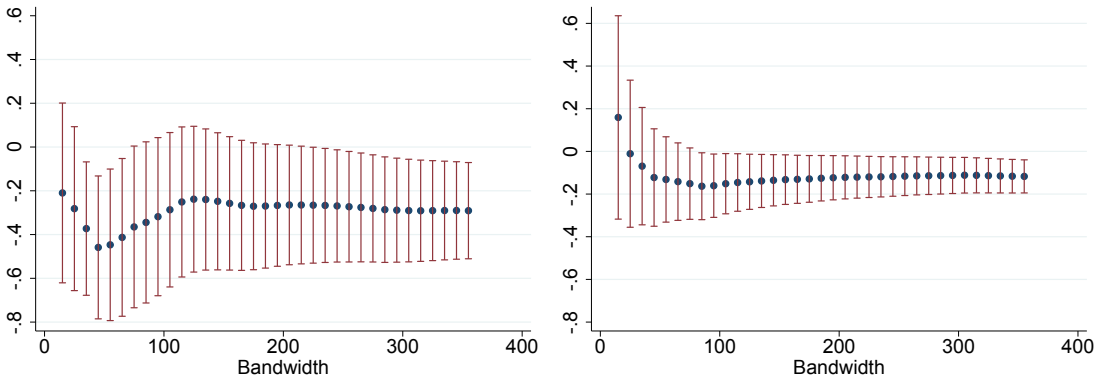


Figure B5: Marital agreements—Robustness to bandwidth choice. Outcomes indicated in subfigure title. Point estimates and 95 percent confidence intervals on y-axis and bandwidth in days on x-axis. Estimates obtained using local linear regression. Bandwidth ranges between 15 and 350 days.



(a) Sudden (b) Non-sudden

Figure B6: Sudden and non-sudden deaths—Robustness to bandwidth choice. The outcome is (inverse sine) reported estate size. Point estimates and 95 percent confidence intervals on y-axis and bandwidth in days on x-axis. Estimates obtained using local linear regression. Bandwidth ranges between 15 and 350 days.

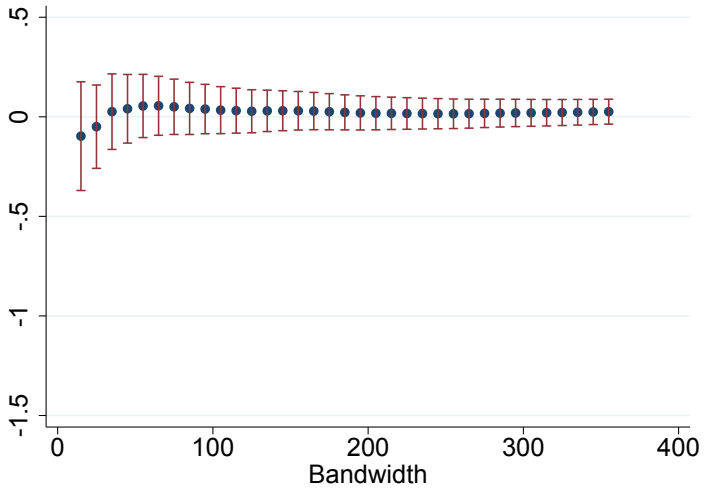
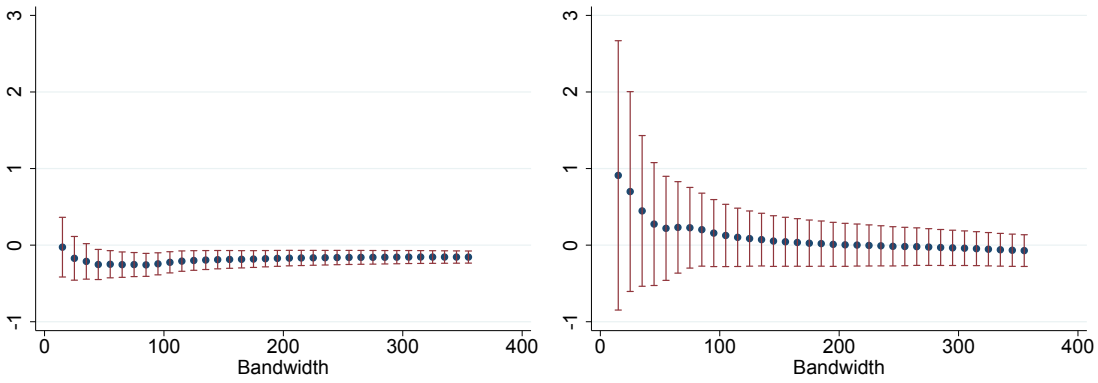
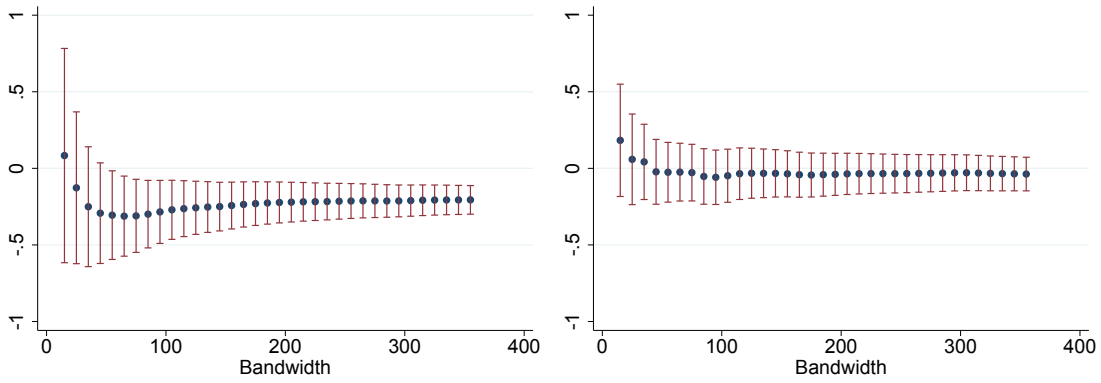


Figure B7: Number of heirs to the estate—Robustness to bandwidth choice. Point estimates and 95 percent confidence intervals on y-axis and bandwidth in days on x-axis. Estimates obtained using local linear regression. Bandwidth ranges between 15 and 350 days.



(a) With (b) Without

Figure B8: Heterogeneity with respect to whether or not the the surviving spouse has children—Robustness to bandwidth choice. The outcome is (inverse sine) reported estate size. Point estimates and 95 percent confidence intervals on y-axis and bandwidth in days on x-axis. Estimates obtained using local linear regression. Bandwidth ranges between 15 and 350 days.



(a) High (b) Low

Figure B9: Heterogeneity with respect to wealth of the surviving spouse—Robustness to bandwidth choice. The outcome is (inverse sine) reported estate size. Point estimates and 95 percent confidence intervals on y-axis and bandwidth in days on x-axis. Estimates obtained using local linear regression. Bandwidth ranges between 15 and 350 days.

C Placebo populations

C.1 Placebo population: decedents in 2002 and 2003

The first placebo test in Section 5 uses the population of married decedents in 2002 and 2003. All selection criteria that apply to this population are the same as for the main population of study, except for the years studied now being 2002 and 2003, and the exogenous measure for tax liability now being based on wealth in 2001. The restrictions leave 21,724 individuals, 10,486 of whom passed away in 2002 and 11,238 of whom passed away in 2003.

C.2 Placebo population: exit households 2003 and 2004

The second placebo test in Section 5 studies non-married decedents in 2003 and 2004. A set of restriction apply to this population. First, it is restricted to non-married decedents with children. This restriction makes it possible to calculate tax liability and tax payments. Second, to make the population comparable to the main population of study, it is restricted to decedents having wealth one year before death (2002) that would have implied tax payments had the decedent passed away in that year. This leaves 35,607 individuals, 17,542 of whom passed away in 2003 and 18,065 of whom passed away in 2004.

C.3 Placebo population: non-taxable estates in 2003 and 2004

The third placebo test in Section 5 studies married decedents who had no incentives to tax plan. To define the population, the same sample criteria as for the main population are used (described in Section 3), but instead of being restricted to individuals who in 2002 had more wealth than SEK 280,000, the population is restricted to those who in that year had less than SEK 280,000. Thus, it is restricted to individuals who had wealth of a value that made under-reporting to evade taxes unnecessary. The restriction leaves 31,272 individuals, 15,989 of whom passed away in 2003 and 15,283 of whom passed away in 2004.

D Definition of sudden death

Sudden death is defined using the cause of death and medical history of the decedent. Information on cause of death is obtained from the Swedish Cause of Death Register (*Dödsorsaksregistret*), and information on medical history is obtained

from the National Patient Register (*Patientregistret*). Causes of deaths and earlier diagnosed conditions are identified using WHO's International Statistical Classification of Diseases and Related Health Problems (ICD).

Deaths are defined as sudden if an individual had not been diagnosed with the illness he or she passed away from, in hospital, before the demise. The process to determine this is as follows: First, the main cause of death is identified in the cause of death register. Second, the patient register is searched through to see if there are any hospital admissions at which the decedent was diagnosed with the same condition. A death is considered non-sudden if there is such an admission and sudden otherwise. For some individuals, the Cause of Death Register lists contributory causes of death. In such cases, the same process as for the main cause of death is repeated.

A few caveats of the approach should be mentioned. First, the diagnose classification system changed in 1997, from ICD-9 to ICD-10, and it is not possible to perfectly translate all diagnoses between the two systems. However, the classification system contains letter categories capturing broader sets of illnesses such as cancer, circulatory conditions, infections, as shown in Table D1. These 21 categories are translatable between the systems, and I use them to match the cause of death with diagnoses from previous hospitalizations. This means that, technically, a death is considered as non-sudden if a person was diagnosed with a condition in the same category as his or her cause of death, but not necessarily the exact same condition. Second, as there are no data on hospitalizations before 1993, it is possible that a person was diagnosed with a terminal illness before that year, making his or her death falsely appear as sudden. However, that would require that the person did not seek hospital care for the same illness, or other illnesses in that category, during the 10 years in between initial diagnosis and demise.

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Table D1: Diagnose variables, corresponding ICD chapters, and ICD codes

Variable	ICD chapter	ICD-10	ICD-9
Infections	I. Certain infectious and parasitic diseases	A00-B99	001-139
Cancer	II. Neoplasms	C00-D49	140-239
Blood	III. Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	280-289
Endocrine	IV. Endocrine, nutritional and metabolic diseases	E00-E89	240-279
Mental	V. Mental and behavioral disorders	F01-F99	290-319
Nervous	VI. Diseases of the nervous system	G00-G99	320-389
Eye	VII. Diseases of the eye and adnexa	H00-H59	360-379
Ear	VIII. Diseases of the ear and mastoid process	H60-H95	380-389
Circulatory	IX. Diseases of the circulatory system	I00-I99	390-459
Respiratory	X. Diseases of the respiratory system	J00-J99	460-519
Digestive	XI. Diseases of the digestive system	K00-K94	520-579
Skin	XII. Diseases of the skin and subcutaneous tissue	L00-L99	680-709
Musculoskeletal	XIII. Diseases of the musculoskeletal system and connective tissue	M00-M99	710-739
Genitourinary	XIV. Diseases of the genitourinary system	N00-N99	580-629
Pregnancy	XV. Pregnancy, childbirth and the puerperium	O00-O99	630-676
Perinatal	XVI. Certain conditions originating in the perinatal period	P00-P96	760-779
Congenital	XVII. Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	740-759
Symptoms and signs	XVIII. Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	R00-R99	780-799
Injury	XIX. Injury, poisoning and certain other consequences of external causes	S00-T88	800-999
External	XX. External causes of morbidity	V00-Y99	E01-E99
Factors	XXI. Factors influencing health status and contact with health services	Z00-Z99	V01-V82