

Working title: On the relationship of wealth and inheritance in Austria

Master thesis, preliminary version. Please do not cite.

It is still work in progress, so please forgive my mistakes.

**The paper includes the final results. Some written parts have to be
improved as well as the conclusion has to be written as whole.**

Michael Ertl

September 25, 2015

Supervisors:

Dr. Wilfried Altzinger,

Dr. Stefan Humer

Contents

1	Introduction	4
2	Wealth, inheritance, gift and taxation	5
2.1	Bequest behaviour: Theoretical motives	5
2.2	Economic reasons for and against inheritance taxation	6
2.3	Inheritance Tax in Austria, 1955 – 2008	7
2.3.1	Assessment basis	8
2.3.2	Tax classes and tariffs	9
2.3.3	Additional exemptions and of the Inheritance tax	10
3	Relationship between wealth and inheritance	11
3.1	Historical development	11
3.2	Accounting Equation	12
4	Relevant Data Sources	14
4.1	Wealth data	14
4.2	Demographic Data	15
4.2.1	IIASA	15
4.3	Inheritance Tax Data	17
4.3.1	Coverage, Measurement accuracy and other issues	17
5	Methodology and Results	20
5.1	Computation of the inheritance flow	21
5.1.1	Attempt of transforming the rateable to market values	21
5.2	Computation of intergenerational transfers	26
5.3	Computation of average wealth	26
5.3.1	Troubles of the plains	27
5.3.2	Age-(Education)-Wealth-Profiles	30
5.3.3	Computation of μ_t^*	35
5.4	Computation of private wealth	37

6	Conclusio	39
7	Appendix	40
7.1	Concrete numbers of dead and living	41
7.2	Age-Education Wealth Profile: weighted	41
7.3	List of inheritance categories	41
7.4	Age-Wealth-Profiles	41
7.5	Austrian Education System	41
7.6	Richest households in the HFCS	41
8	Bibliography	47

1 Introduction

“When a man tells you he got rich through hard work, ask him: Whose?”

Don Marquis, 1878 - 1937

The aim of this work is not to answer this question. But there is a certain relation between inheritance and wealth which was subject to major fluctuations over the past centuries. Over the vast period from 1820 to 2050 Thomas Piketty (2011) discovered a U-shaped relation between the annual inheritance flow and the national income. During the whole 19th century the share was roughly around 20 to 25% and decreased rapidly during World War I and II to a small fraction of the previous levels. After the 1950s he observed an vast increase and concludes: *“modern economic growth did not kill inheritance”* (Piketty 2011: 1071).

Only in the last few years a survey by the European Central Bank made it possible to get insights into the wealth distribution among households within the Euro-Area. So far, 2010 marks the first year where reliable data on wealth is available in Austria whereas countries like France or Great Britain offer statistics for centuries. The poor data availability for Austria – especially for wealth – made me curious whether there are possibilities or attempts to reconstruct the private wealth for years before 2010.

Finally, an approach which the literature calls *mortality multiplier approach* allowed me to see the light at the end of the tunnel. It creates linkages between inheritance and wealth based on an accounting equation and for most of the time is used to reconstruct the bequest volume based on wealth. Like Kopczuk and Saez (2004a) I go a different way and try to estimate the total private wealth on the basis of inheritance tax.

But the course of lacking data does not halt before the recordings of gift- and inheritance tax¹ in Austria. Therefore it is only possible to investigate on the years 2003, 2006, 2007 and 2008. There may be data in the archives of the statistical offices for previous years, but this has to be subject to further research in the future.

¹For the rest of the paper the correct term gift- and inheritance tax is shortened to inheritance tax only for reasons of convenient reading, expect for cases where it is made explicit what is meant.

2 Wealth, inheritance, gift and taxation

The common literature differs between two main approaches for calculating annual inheritance flows:

- **Macro-based approach** : This estimation relies on macro-economic aggregates (e.g. National accounts) and is combined with mortality tables and age-wealth profiles. Piketty (2011) also calls the result of the estimation the **Economic flow** or **indirect** way of measurement.
- **Micro-based approach**: The estimation relies on gift and inheritance tax statistics and are supplemented with micro-based data (Houben and Maiterth 2013: 151). Piketty (2011) calls it **Fiscal flow** or **direct** way of measurement.

Being able to do both approaches, Piketty (2011: 1073) calls the gap between those two results a measure of tax evasion and other measurement errors. In his calculations, the gap appears to be rather small and constant over time.

This work is based on the indirect, but reversed way: As the aim is to calculate the wealth instead of the aggregate flow of inheritance and gifts, I use micro-data from gift and inheritance tax statistics which I have to aggregate for reasons which are explained below.

2.1 Bequest behaviour: Theoretical motives

There are several explanations for bequest behaviour and the literature has condensed these into four main motives: First, a very straightforward explanation is *altruism*. The model which was mainly developed by Barro (1974) and Becker (1974) represent dynastic preferences, where the utility function contains the welfare of the subsequent generation. A slightly lighter version of altruism is termed *joy of giving* or *warm glow* (Andreoni 1990). This motive leaves the economic conditions of the donee aside; the act of giving itself increases utility.

A second explanation is based on an *exchange* motive. In a model by Bernheim et al. (1985) and Cox (1987), transfers of wealth do not solely base on altruism but contain

also an element of exchange. Promised bequests are exchanged for elder-care, house work or similar services. Concerning the utility function, in addition to the recipient's utility the own utility of the services in exchange are also considered in the function.

Third, an *insurance* model represents a *quit pro quo* motive. In this case, the transfer does only take place because the donee expects something in return in the future. In the model developed by Cox (1990) and Cox and Jappelli (1990) the donor's utility function is not effected by the donee's.

Forth, there is an unintended motive: inheritance by *chance*. In this case, people did not formulate a concrete will about their transfer, but they died earlier than expected, without spending all of their savings.

A more comprehensive overview of these motives can be found in Brunner (2014), Boadway et al. (2010) or Wolff and Gittleman (2014).

2.2 Economic reasons for and against inheritance taxation

The ownership of economic wealth as well as the transfer of wealth can be subject of taxation when there is societal consensus to keep inequality at certain levels. Under these circumstances, (Berghuber et al. 2007: 3-7) offer several economic aspects why taxation is reasonable.

- **Economic Power:** Wealth entitles the owner with economic and political power, which she can use to influence decision-making processes.
- **Security:** Another argument is the fact that wealth is accompanied by security. In general, it is risk-less and keeps its value or even increases it. This is also called an "unemployment income" which arises solely due to appreciations, dividends, interest payments and other forms of capital income.
- **Employment Income:** Additionally, in some circumstances, wealth provides also employment income. Just think of agriculture: Whoever owns enough land is able to gain income from producing vegetables or other things based on the fact that she owns the land.
- **Equivalence:** The more one owns, the more one gains from the services from the sovereign like national defence and the enforcement of legal rights.

Exchange equality can only be reached if all participants have identical chances, otherwise the market output would end up with unjust distribution results (Reding and

Müller 1999). Taxation of inheritances would lead to more exchange inequality. Another argument by Nowotny (1999) is, that an inheritance tax has the means to at least stop the growing inequality of wealth distribution, depending on the concrete design of the tax framework Nowotny (1999).

A common argument against taxation of inheritances is the fact that transaction costs are involved. Essentially, these include the costs of information, of agreement and of enforcement. Berghuber et al. (2007: 5), based on a study by Loeffelholz and Rappen (2003) for Germany in 1997, roughly estimate the costs in relation to the total tax volume of about 5% in Austria, which is quite higher than the overall ratio of about 1.7%. Another issue when it comes to inheritance is the problem of companies and that taxing them could lead to disclosures of some of them. Against this background, wealth of firms is either totally excluded or equipped with (huge) exemption limits (e.g. in Austria, the tax exemption limit was 365,000 €. For those who were above these limits, there was the possibility to deferred or instalment payments up to ten years).

The flight of capital is the third argument against taxation of inheritance (and wealth in general). Capital owners would escape to other countries where the taxes are lower or non-existent. But this argument does not hold for every type of capital. Obviously, bank deposits, shares and other liquid capital (financial capital) is easily transferred abroad. It is becoming more difficult when it comes to property.

2.3 Inheritance Tax in Austria, 1955 – 2008

There are two possible ways to tax the transfer of wealth from a dead person to a living one: the first is the so-called inheritance tax. This tax is on the beneficiaries of an estate. Opposed to this is the estate tax where the tax is applied to the decedent's estate prior to the distribution among the beneficiaries. This difference can have severe impacts, depending on the tax exemption limits². Whereas the latter is more common in the Anglo-Saxon countries, the former is the widespread approach in Europe, and therefore also in Austria.

The inheritance tax in Austria was introduced after the period of occupation which followed World War II and was terminated on the 31st of July, 2008 (Bundeskanzleramt 2015). The Constitutional Court of Austria (*Verfassungsgerichtshof(VfGH)*) decided that the inheritance- and gift tax (*Erbschafts- und Schenkungssteuergesetz 1955, Erb-StG*) is against the constitution. Its reasoning depended on the fact that different kind of assets had different assessment criteria (see section 2.3.1). The Constitutional Court

²see for instance calculations in Altzinger and Humer (2013: 83, table 37)

granted a deadline to the legislator for the correction of the defects, otherwise the tax would be abandoned (which finally happened due to inaction of the legislator)³.

2.3.1 Assessment basis

The overall tax basis for assessing the value was the net value (*Reinvermögen*), which consists of assets minus liabilities. As mentioned above, the different types of assets which enter the tax basis have different ways of valuation, which is described in detail in BewG (*Bewertungsgesetz*). Although the market value (*gemeine Wert*) is the default way of valuation, there are some types of assets where the so-called rateable value (*Einheitswert*) is the basis of valuation.

Rateable value The rateable value is set by the legislators and its value is derived from the BewG. There are basically two types of assets where the valuation basis is the rateable value, but the calculation of the value differs⁴. The first category is agriculture and forestry and the second is real estate (*Grundvermögen*) and business properties (*Betriebsgrundstücke*). In general the rateable value should be adapted every nine years, but due to the massive workload the last accurate determination for real estate and business property was done in 1973 and after that just linearly increased in three steps: 1977 it was increased by 10%, 1980 by 20% and 1983 by 35% (Berghuber et al. 2007: 16). A similar situation occurs when it comes to the last main assessment of the assets of agriculture and forestry, where the last (relevant) one was done in 1988 (BMF 2015). Nearly 20 years later, in 2014, the next main assessment took place but could not be used for the purposes of this work.

As we will see later, for the aim of the paper it is required to estimate the market value for assets where only the rateable value exists. Under that circumstances it raises several questions. First, what is the average way of conversion between the rateable value and the market value? And second: even if we would know this conversion factor, it only holds for the year in which the rateable value was set (let's say, for the sake of simplicity, 1983, although already this factor is just a linear increase and not based on an actual valuation). How did this conversion factor develop over the period between 1983 and now? An attempt of an answer will follow in the next sections. A short example should give a grasp of the problem.

³For detailed discussions about that see e.g. Bruckner (2007), Fraberger (2006) or Puchinger (2006)

⁴The details of the calculation are described in BewG. Because the way the valuation is done is not necessary for the results of this work the detailed description is avoided. For more information see e.g. (Nowotny 1999: 54-62)

The fundamentals of the Constitutional Court's concern about the constitutional conformity were raised by a complaint from October 2005 (B 3391/05). In the formulation of the court a case is described which provides insights in the problematic approach of valuation: It was about a property with three times the *Einheitswert* of 6,322.53 €. Based on a valuation report, the market price of that property was around 3,528,030 €. The ratio between the market price and the *Einheitswert* corresponds to roughly 1,674, whereas a flapsy saying is that the average factor is about 1:10. This may be an extreme case, but for sure not the only within the border of Austria. In any case, it emphasises the fact the the flat multiplication does not represent the actual price developments (Berghuber et al. 2007: 18).

Table 1: Overview: Assessing value

Type of asset	Assessing value
Agriculture and Forestry	
Real Estate	3 x <i>Einheitswert</i>
Business Properties	

Source: Berghuber et al. (2007: 16)

Market value All other assets are rated with their market value respectively the nominal value. Typical assets which belong to that kind of valuations are. Some of them are excluded from the tax basis (they are listed in section 2.3.3).

There are general tax exemptions for individuals, depending on the degree of relatedness and depending on the height of the tax basis the progressive tax rate is set according to table 2.

2.3.2 Tax classes and tariffs

Table 2: Overview: Assessing value

Tariff class	Beneficiary	General exemptions
I	Children, spouse	
II	Grand and great-grand children	2,200 €
III	Siblings, parents and grandparents	
IV	Nieces, nephews, parents and children in-law	440 €
V	All others	110 €

Source: Erbschafts- und Schenkungssteuergesetz 1955

Table 3: Tax tariffs as % of acquisition by tax classes

Amount, in €	I	II	III	IV	V
0 - 7,300	2	4	6	8	14
7,3001 - 14,600	2.5	5	7.5	10	16
14,601 - 29,200	3	6	9	12	18
29,201 - 43,800	3.5	7	10.5	14	20
43,801 - 58,400	4	8	12	16	22
58,401 - 73,000	5	10	15	20	26
73,001 - 109,500	6	12	18	24	30
109,501 - 146,000	7	14	21	28	34
146,001 - 219,000	8	16	24	32	38
219,001 - 365,000	9	18	27	36	42
365,001 - 730,000	10	20	30	40	46
730,001 - 1,095,000	11	21	32	42	48
1,095,001 - 1,460,000	12	22	34	44	51
1,460,001 - 2,920,000	13	23	36	46	54
2,920,001 - 4,380,000	14	24	38	48	57
and above	15	25	40	50	60

Source: Erbschafts- und Schenkungssteuergesetz 1955

2.3.3 Additional exemptions and of the Inheritance tax

There are several exemptions from the inheritance tax and the

- General exemptions (already mentioned in Table 2)
- Final-taxed Financial assets (*Endbesteuerte Finanzanlagen*): Financial assets whose returns are already taxed (e.g. deposits at bank accounts) are excluded from the inheritance tax, but not from the gift tax. (*Kapitalertragsteuer, KEST*) siehe (Berghuber et al. 2007: 16f)
- Private foundations (*Privatstiftungen*): Donations to private foundations are taxed with a specific tax called *Einbringungssteuer*
- Household goods (*Hausrat*)
- Moveable tangible property (*Bewegliche körperliche Gegenstände*)

The basics are set for understanding the functionality of the inheritance tax and especially the issues concerning the rateable value will appear later on when it comes to the data. Further details on the gift- and inheritance tax can for instance be found Farny et al. (1997).

3 Relationship between wealth and inheritance

There exists a long history of the attempt of building a relation between wealth and inheritance, but a necessary prerequisite for these trials is data. In the following sections there is a historical summary of these attempts which finally leads to the most present one which is among others used by Thomas Piketty. Based on his elaborations the empirical study will be deepened which forms the subsequent chapter.

3.1 Historical development

The subject of the article has a historical connection the the so-called estate multiplier literature which was published around the end of the 19th century. The method for computing national wealth estimates was mainly used in France as well as in the United Kingdom, especially because in these countries the national statistics where already quite matured and developed. One of the famous proponents of this approach was the French economist , who – as a representative for a whole group of economists – concluded, that inheritance is the main source of wealth and therefore the average length of a generation determines the estate multiplier.

“Since the time of Herodotus, three generations have always been held to cover a century” (Foville 1893: 602) and he adds that – based on the statistics he had at his disposal – the accurate duration (the estate multiplier) is now about 35 to 36. But, as Piketty (2011: 1082) states, the formula has several assumptions about growth, saving behaviour and wealth accumulation. He concludes from informal discussions of the French and British economists, that their model assumptions were that there was no growth and no savings. Under these circumstances, it is intuitive that the generation length (the average age at parenthood) determines the relation between inheritance and wealth.

Around World War I British and French economists started to realise that estate multiplier approaches were too simplistic, because the ratio between wealth and bequests increased up to 50 and more whereas the generation length was still about 30. They then focused on so-called mortality multiplier approach. In the centre of this attempt is

the wealth-at-death by age groups which was re-weighted by the inverse mortality rate of the specific age group, which resulted in age-wealth profiles for the living. The huge advantage compared to the estate multiplier version is that the formula is an accounting equation and does not require any assumptions (Piketty 2011: 1082f).

The life-cycle hypothesis (LCH), mainly developed by Modigliani in the 1950s (e.g. Modigliani (1986), was the subsequent theoretical model with a very different approach. Assuming the consumption smoothing over the whole life of an individual, it suggests that they die with very little or even zero wealth. As Piketty (2011: 1083) aptly notes, is that the role of inheritance did not play a significant role during the 1950s and 1960s, they were about 4% of national income, which is in sharp contrast to the situation during the time were the estate multiplier economists were at work; they faced ratios of 20% to 25% and he adds – which makes perfectly sense – that both groups may have been influenced by the empirics experienced.

Thomas Piketty developed an accounting equation, on which the thesis is built on and the following section is dedicated to this model.

3.2 Accounting Equation

The starting point of this approach is equation 3.1. As earlier approaches it attempts to put the flow of inheritances and wealth in a formalized relation. Iterating the several components of the already mentioned formula should help to get a feeling for that relation.

$$B_t = \mu_t^* m_t W_t \quad (3.1)$$

with:

B_t = aggregate inheritance flow

$\mu_t^* = \mu * (1 + v_t)$, gift corrected ratio between decedents' wealth and wealth of the living

μ_t = ratio between average wealth of the deceased and average wealth of the living

v_t = inter-vivo gifts (as a ratio between gifts and inheritance)

m_t = mortality rate, grown ups (20+)

W_t = aggregate private wealth

The first variable of the equation, B_t , represents the total inheritance flow of a given year t . The centre of the formula is μ_t . It represents the average wealth of the decedents divided by the average wealth of the total population. The extension μ_t^* incorporates

the fact, that gifts during lifetime⁵ should also be considered as part of the decedents' wealth. Ignoring that fact would substantially underestimate the wealth at death and subsequently, μ_t would be far too low. By applying the inter-vivo-gift ratio $(1 + v_t)$ the gifts are added to the average wealth at death (as if all of the wealth during life is accumulated and just at the end past over to the next generation).

Some simple examples Let's first, for the sake of simplicity, assume, that there are no gift transfers during the lifetime of a person; all wealth of a person will be transferred at the end of life. In this case the inter-vivo factor v_t is, by definition, 0. Further, if μ_t is 100%, which means that the average wealth of decedents is equal to the average wealth of the living, then the mortality rate m_t determines exactly the total flow of inheritance. In this case, if 2% of the population die then also 2% of the total private wealth W_t changes ownership.

Another example, inspired by the life cycle approach, is, that the average wealth at death is 0 (remember: people are very smart in this case, they can calculate their death date and then smooth the consumption in order to pass away with nothing left on the banking account). Under these circumstances, there is no transfer of wealth. Never.

Until now the focus was on the formula 3.1 because it is more intuitive, but for the purpose of this work we use a modification of the formula, which leads us to the following transformation, which will accompany us during the rest of the paper:

$$W_t = \frac{B_t}{\mu_t^* m_t} \quad (3.2)$$

We get the total private wealth by dividing the total inheritance flow with the overall mortality rate and the gift-corrected μ_t . Until now, there is just a corpus but it is necessary to breathe life into it. This will be done in the next chapter, where possible data sources are trying to be matched with the individual variables.

⁵As also mentioned in (Piketty and Zucman 2015: 1327): Normally, only formal gifts are taken into account, informal presents and in-kind gifts (e.g. catering or school/university expenses by parents during childhood) are generally left aside.

4 Relevant Data Sources

In the following chapter the main sources for data are described which are potentially relevant for the components of equation 3.2. In the first section the (rarely) available wealth data in Austria will be described, followed by demographic data in section 4.2. Although there is no systematized way of documentation, there is some data out there about the inheritance flows, which is described in section 4.3. The National Accounts data marks the end of the chapter.

4.1 Wealth data

The Household Finance and Consumption Survey (HFCS) is a complex survey with survey weights and multiple imputations and is coordinated by the European Central Bank. The aim is to collect micro-level data on wealth, income and consumption and gain insights in the socio-economic structure of households within the countries. It is the first attempt to collect wealth data in a harmonized way across the Euro area and due to the detailed questions about the different kind of wealth components the main focus is on wealth and it opens the space for research on that topic on a broad scale. The sampling unit is mainly the household although data was also collected on personal level⁶.

In Austria the field work was conducted by the Austrian National Bank (OeNB) from September 2010 and May 2011. The net sample contains 2,380 households with 5,014 persons. Applying the survey weights based on households leads to 3,773,956 households respective 8,021,944 persons which means, that on average one household in the data represents on 1,585 ones. The number of households differs to Statistics Austria because of diverging definitions of households (e.g. in the HFCS people in institutions like prisons or abbeys are excluded from the target population (Albacete et al. 2012: 64)). The median of net wealth within the Austrian households is 76,400€ and the mean is 265,000€ which already indicates a skew distribution of wealth. The average

⁶Further details on the methodology can be found here: Eurosystem Household Finance and Consumption Network (2013), Albacete et al. (2012)

household size is 2.1. For more details about the distribution and other characteristics see e.g. Fessler, Mooslechner, and Schürz (2012) or Humer et al. (2014).

However, a major drawback is that very wealthy households are not included in the sample because of several reasons. First, they are more unlikely to be reached by phone which is a necessary precondition in order to make an appointment for the residence-based personal questionnaire. The richest household in the HFCS has on average about 14 Mio. € net wealth⁷ whereas the bottom of the Top100 richest households in the Trend⁸ list have to have at least 100 Mio. to be part of the ranking. There are attempts which take this drawbacks into consideration (Eckerstorfer et al. 2013) but the results are not suitable for the approach taken in this article, because detailed micro data would be required.

As the HFCS is the first comprehensive survey data available on wealth it will be an essential part of the calculations later on. The fact that only observations from 2010 exist is a problem but due to the lack of better data, this topic will be picked up later on.

4.2 Demographic Data

The availability of demographic data is by far better and therefore there are several sources. Two main institutions offering such data are the Statistics Austria and the IIASA. As later on will be made clear, the latter suits more to the needs of the approach taken in this article. Therefore we will only focus on the IIASA.

4.2.1 IIASA

The International Institute for Applied Systems Analysis (IIASA) offers data for the population in general and the the probability of survival by age groups, sex and – most important – by education up to 2060. Even though the prognosis represents a great feature, this work only focusses on the first available year, which is 2010. The main advantage of IIASA compared to the Statistics Austria is the fact that education is not available. This information enters variable μ_t^* in the accounting equation 3.1, but more on that in section 5.3 where the computation is done.

Table 4 gives an overview of the mortality rates by education, age and sex. It will enter calculation of the age-wealth-profiles, but more on that later.

⁷depending on the implicate, the net value varies between 11 and 20 Mio.€, see Appendix for more details

⁸Austrian magazine, <http://www.trendtop500.at/die-reichsten-oesterreicher/>

Table 4: Raw mortality rates

Mortality rates, 2010										
Age	No Education	Female			Tertiary	No Education	Male			Tertiary
		Primary	Secondary	Primary			Primary	Secondary	Primary	
0-4	0,00073841	x	x	x	x	0,00077826	x	x	x	x
5-9	0,00047182	x	x	x	x	0,00056824	x	x	x	x
10-14	0,00082805	x	x	x	x	0,00150231	x	x	x	x
15-19	0,00176268	0,00150024	0,00108025	0,00075671	0,00420279	0,00365468	0,00275616	0,00204041	0,00275616	0,00204041
20-24	0,00181395	0,00173364	0,00130186	0,000969	0,00478016	0,00455126	0,0035318	0,00271852	0,0035318	0,00271852
25-29	0,00204205	0,00198613	0,00150062	0,00112598	0,00448716	0,00435131	0,0033968	0,00263396	0,0033968	0,00263396
30-34	0,00299125	0,00289555	0,00218559	0,00163696	0,0053057	0,00516741	0,00404263	0,00314159	0,00404263	0,00314159
35-39	0,00493088	0,00472433	0,00355731	0,00265337	0,00808688	0,00786141	0,00615607	0,0047851	0,00615607	0,0047851
40-44	0,00821997	0,00779832	0,00586176	0,00435609	0,01362311	0,01320998	0,01036261	0,00806013	0,01036261	0,00806013
45-49	0,01324275	0,01248232	0,00938517	0,00696269	0,0231627	0,02241252	0,0176435	0,0137496	0,0176435	0,0137496
50-54	0,02002917	0,0187991	0,01416527	0,01050897	0,03667293	0,03546631	0,02808852	0,02197644	0,02808852	0,02197644
55-59	0,028809	0,02689563	0,02033562	0,01509352	0,05458905	0,05279225	0,04219564	0,03322581	0,04219564	0,03322581
60-64	0,04330024	0,04029132	0,030684	0,02285275	0,08296607	0,08057343	0,06539219	0,05211094	0,06539219	0,05211094
65-69	0,07278014	0,06784782	0,05248067	0,03950584	0,1287262	0,12595698	0,10465595	0,08507412	0,10465595	0,08507412
70-74	0,13221366	0,12409047	0,09875189	0,07603001	0,20433994	0,2008609	0,17249935	0,14449683	0,17249935	0,14449683
75-79	0,22839802	0,21771864	0,1815142	0,14586523	0,31079719	0,30768893	0,27576915	0,24131833	0,27576915	0,24131833
80-84	0,36536709	0,35565351	0,3152776	0,27048042	0,44523536	0,44430389	0,41655699	0,38374896	0,41655699	0,38374896
85-89	0,5339426	0,52806312	0,49674581	0,45781932	0,59619421	0,5967566	0,57968681	0,5578959	0,57968681	0,5578959
90-94	0,7064189	0,70428726	0,68922725	0,66867913	0,74094927	0,74156245	0,73480604	0,7256528	0,73480604	0,7256528
95-99	0,83233939	0,85662382	0,85319095	0,84817446	0,84245023	0,86428397	0,86292318	0,86101621	0,86292318	0,86101621

Source: IIASA, own calculations

4.3 Inheritance Tax Data

The availability of data about the inheritance tax in Austria is in bad shape. Only due to the interpellation of dedicated representatives there is at least some data available. In table 5 is an overview of the all inheritance-tax-related inquiries and answers which were raised in the Austrian Parliament.

Table 5: Interpellation on Inheritance Tax Data

Year(s)	Inquiry	Date	Answer	Date
2003, 2006	270/J XXIII. GP	17.01.2007	256/AB XXIII. GP	16.03.2007
2003, 2006 ⁹	1393/J XXIII. GP	21.09.2007	1441/AB XXIII. GP	21.11.2007
2007	3568/J XXIII. GP	18.02.2008	3577/AB XXIII. GP	18.04.2008
2008	2758/J XXIV. GP	10.07.2009	2801/AB XXIV. GP	10.09.2009

Source: <http://www.parlament.gv.at/PAKT/VHG/>

Only the years 2003, 2006, 2007 and 2008 are publicly accessible. All items¹⁰ in the parliamentary answers are summarized by category and tax classes and the total amount by the assessment basis as well as the total number of cases. These lists also contain similar information on gifts and also on the total amount on new contributions to private foundations. In table 6 is an example about the general appearance of the list.

4.3.1 Coverage, Measurement accuracy and other issues

It is important to note that all values in the data source are before deductions, thanks to the thoughtful formulations of the inquiries against the Austrian Parliament, where all questions have the appendix “before deductions”, see for instance 3577/AB XXIII. GP, e.g. in the example there is “*Household goods including laundry*” which is explicitly excluded from inheritance tax but is still part of the list.

This is a necessary precondition to get the market value of the aggregate bequests and gifts. Summing up all the values would necessarily lead to wrong numbers, because of the already mentioned items which are only assessed at their rateable value and not the market value. The circumvention of this issue is discussed in section 5.1.1.

Another aspect should be remarked: The total number of cases does not correspond to the total number of decedents of a given year because of two reasons: First, we only know the total cases by items but we do not know the items on an individual level, so one cannot figure out how much an individual bequested onto their heir(s). Second and even

¹⁰An exhaustive list is attached, see table 16 in the Appendix

Table 6: Inheritance Data: Example from 2007

Taxable acquisition	Wealth category	Tax class	Cases	Assessment basis
0 - 1	Cash money	1	2.581	2.176.715,89
0 - 1	Cash money	2	148	89.015,07
0 - 1	Cash money	3	395	230.160,99
0 - 1	Cash money	4	401	186.209,22
0 - 1	Cash money	5	527	405.559,20
..
1 - 7.300	Rateable value of the remaining properties	1	8.719	86.139.500,10
1 - 7.300	Rateable value of the remaining properties	2	351	3.481.756,38
1 - 7.300	Rateable value of the remaining properties	3	742	5.242.327,34
1 - 7.300	Rateable value of the remaining properties	4	993	5.245.240,45
1 - 7.300	Rateable value of the remaining properties	5	1.319	5.951.389,31
..
> 4.380.000	Bank deposits	1	1	603.974,31
> 4.380.000	Household goods incl laundry	1	1	1.976.428,00
> 4.380.000	Estate planning	1	1	56.347,00
> 4.380.000	Other receivables	1	1	49.013,78
> 4.380.000	Other liabilities	1	2	364.229,53
> 4.380.000	Bank liabilities	1	1	2.664,11
> 4.380.000	Securities, free of inheritance tax	1	1	9.434.040,09
> 4.380.000	Right of housing	1	1	6.728.003,27

Source: <http://www.parlament.gv.at>, 3577/AB XXIII. GP, own translation

more important, the year of notification (*Bescheiddatum*) indicates the finalisation of the official decision and not the actual year of death. Schinke (2012) reports (for Germany), based on Statistisches Bundesamt (2012), that only about 10% of all tax incidents (the date of death) coincide with the year of tax assessment. Legal proceedings and delays due to the taxing process itself are arguments for this circumstance. At least half of the tax incidents are being reported in the subsequent year (Schinke 2012: 27f).

The categories related to business assets (*Betriebsvermögen*) could not be classified into the different assessment basis (market and rateable values) because the information was simply not available (“*..liegen meinem Ressort keine statistisch auswertbaren Daten vor*”, XXIII. GP.-NR 256/AB zu 270/J). A rather strong but conservative assumption is that all business assets are rated at their market value. This leads to aggregate values in those categories which are for sure underestimated except someone would argue that business properties like agricultural and real estate does only play a minor role.

The column “Details” of table 16 in the Appendix shows the two types of categories: assets and deductions(=liabilities). As we are interested in the total flow of assets we completely ignore the deduction because they are only relevant for the possible reduction of the inheritance tax itself (e.g. is it possible to claim the costs of the funeral (reported as *Bestattung*) as deductions to reduce the financial burden of the heir.

What is not covered? Albeit the seemingly comprehensive list of categories there are many remaining loopholes. Considering the findings of Zucman (2014) it is obvious that there are many asset classes which are more or less easily hideable from the tax authorities, which may also play a major role especially for wealthier people. Everything which can be transferred between two parties where no legal action is required like land registration (*Grundbucheintragung*) is possible without letting know the responsible notary who is by law required to report all assets to the tax authorities.

The main aspects are now clarified and the issues are identified. Some of them can be resolved, some of them remain because of lack of information. However, the these attempts are done and elaborated in chapter 5.

5 Methodology and Results

Based on equation and on the data which we identified in section 4 we are now able to focus on the computation of each of the elements of the formula. Some adaptations and modifications are necessary in order to be able to integrate the different data sources which are mentioned in the previous chapter. These and other main steps are explained in the following sections.

$$W_t = \frac{B_t}{\mu_t(1 + v_t)m_t}$$

Recalling the equation from the previous chapter makes it clear what we need in order to compute the private wealth out of the bequest data. The following list is not only a enumeration but also deals as a check-list which is the basis for the order of the sections.

B_t : The total inheritance flow valued at market prices can be derived from the gift- and inheritance tax data. It is necessary to compute the market values for those categories where only the rateable value is available. This is done in section 5.1.

v_t : The inter-vivo gifts are highly relevant. Ignoring them would substantially underestimate the wealth of decedents. Section 5.2 will take care of that.

μ_t : In plain words this is just the ratio of the average wealth of decedents and the average wealth of the population. As the word *wealth* already indicates: It is necessary to have information about the wealth. The HFCS serves as the data source but several tweaks are necessary in order to compute this simple-looking ratio. These steps are is discussed in section 5.3.

(m_t) : The overall mortality rate for adults¹¹ can be derived from the demographic data from IIASA. Specifics are explained in section 4.2 and no further investigations are necessary.

¹¹Piketty (2011) calls it m_t^{20+} but as we do not use the general mortality rate at all it is more convenient to work with the shorter notation

5.1 Computation of B_t

Those assets which are already rated at market values can just be summarised, but there is still the issue of the rateable values. Those values have to be transformed in such a way that they represent – at least on average – approximate true market values. Before continuing, it shall be made clear, that it will be only an approximation and we do not claim that this relation fits in the true value.

5.1.1 Attempt of transforming the rateable to market values

As already mentioned in section 2.3.1 the last main assessment of the rateable value (*Hauptfeststellung der Einheitswerte*) for real estate and business property was the last time done in 1983 and for assets in agriculture and fishery the relevant rateable values were last assessed 1988; therefore regional developments are not considered but as the aggregate is relevant, this does not play a major role.

Now, there are essentially two steps for an estimate for a current ratio between the rateable values and the market values. First, it is necessary to get an estimate from that ratio as close to the last time the rateable values were assessed, which in our case is 1983 and 1988. For that given year, we have a rough ratio between these two figures. But since the market values developed, it is clear that also the ratio must increase. The second part will be to find a price index or something similar to have a grasp how the market values developed since the last estimation about the ratio was done.

Ratio from 1986 Luckily, there are few attempts in the literature for the first part: Nowotny et al. (1990) were able to estimate ratios between rateable and market values. Basis of their study was a sample survey. The data source was built on all real estate transactions from 1986 and they worked with a 5% sample, which represented in total 6353 cases. From about 40% of these cases it was possible to extract the selling price, the *Einheitswert* and other details about the transaction like the category and size of the property, the seller and buyer and about their legal status (natural person or corporate identity). These 2755 cases (533 were in agriculture and forestry) were checked for consistency. There are huge differences between the states (*Bundesländer*) but the weighted average is as follows:

The main two numbers in table 7 are on the national level, for agriculture and forestry it is about 30 times the *Einheitswert*, for real estate it is about 4.1 times the *Einheitswert*. This ratio holds for market values which are collected in 1986.

Different figures are offered by Heidinger (1992-11-01: 298) although his numbers lack

Table 7: Market values and *Einheitswerte*

Agriculture and forestry									
Austria	Burgenland	Corinthia	Lower A.	Upper A.	Salzburg	Styria	Tyrol	Vorarlberg	Vienna
30	11	33	22	26	61	38	101	127	45
Real Estate									
4.1	2	3.4	3.2	4.2	5.7	3.7	3.7	3.7	5.6

Source: Nowotny et al. (1990: 48)

of further explanations or sources. Nevertheless he states the ratio concerning real estate to about 5 to 10 times the rateable value and concerning the agriculture and forestry of about 50 to 100 times. These figures are not considered in the subsequent calculations because they do not seem to have any basis.

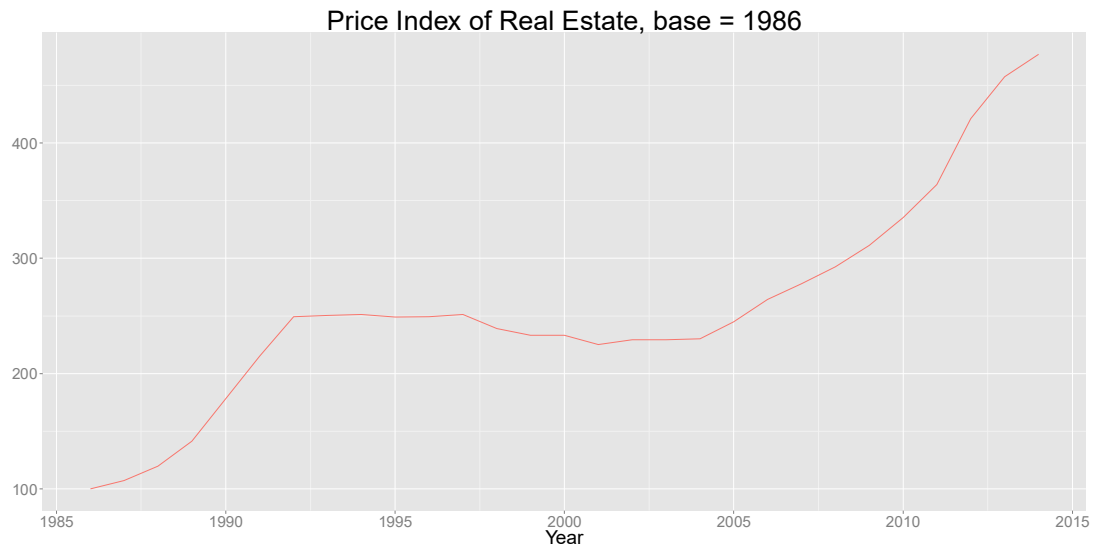
Updating the ratio The basis for the relation is now set, now it comes to the point where these ratios should somehow be adapted in order to fit the current level of property prices. Since the collection of data does not seem to be one of the top priorities in Austria we have to deal with limited information. The Austrian National Bank (*OeNB*) offers a price index of residential properties, beginning in 1986 (see figure 1). The disadvantage of this index is the regional limitedness to Vienna, for Austria the index only exists since 2000.

Using the index values and keeping in mind that these are only rough indicators for the overall developments on the real estate and agricultural sector, the following values in table 8 are relevant for the years where data exists.

Assumption 1: We assume that the development of the price index of the real estate properties in Vienna can be applied to Austria as a whole as well as on the property prices in the agricultural sector. With reference to the values of Heidinger (1992-11-01) this would not be such a major issue because we would still be below the figures that he suggested for 1992 (or even before).

The bequest flow itself is the next challenge. Figure 2 represents the raw data and essentially shows structure of the documented gift- and bequest flows summarised by year. Generally, gifts only represent a minor positions compared to the flow of inheritances, although there is a not negligible variation in each year. Especially the in year 2007 there is a huge rise in gifts. The different types of wealth with their corresponding values (market values versus rateable values). With reference to the discussion about the

Figure 1: Price Index of real estate



Source: OeNB (2015), re-based to 1986

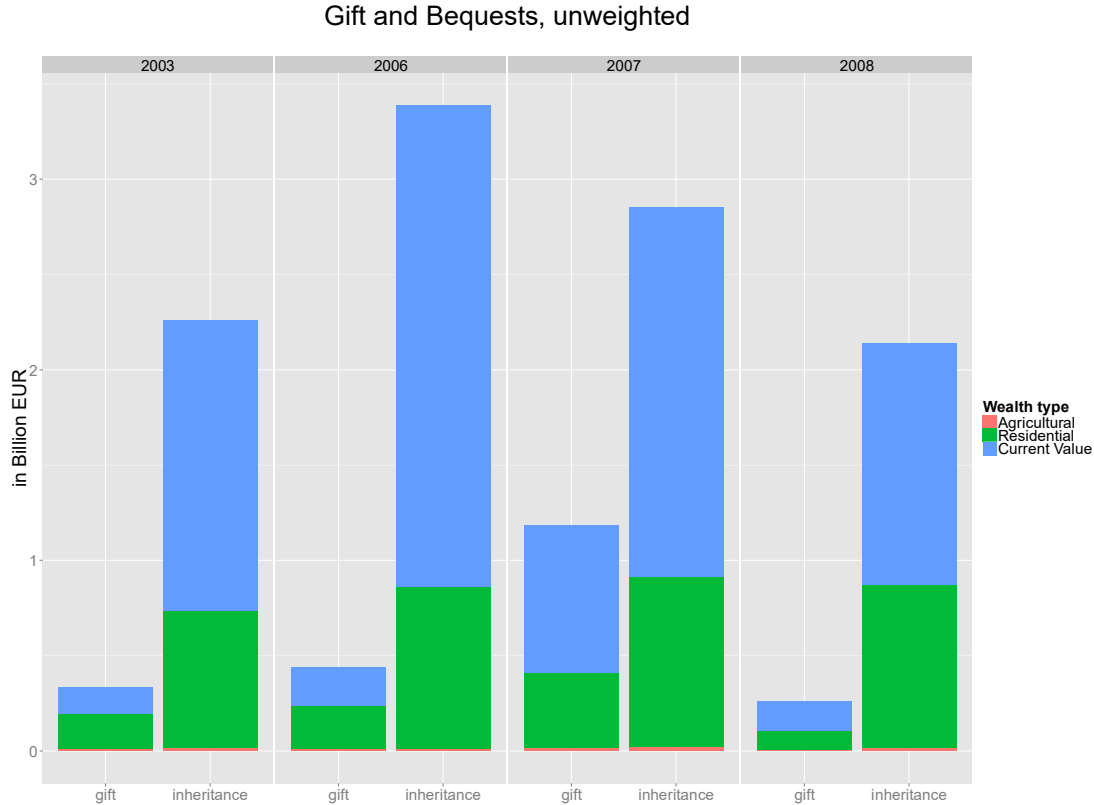
Table 8: Up-to-date rateable to market value

Year	Factor: 1986 to year x
2003	2.3
2006	2.6
2007	2.8
2008	2.9

Source: OeNB (2015), re-based to 1986

rateable values it is clear that assets which are measured with *Einheitswerte* represent only a small proportion within the total gift and inheritance volume.

Figure 2: Overview of gifts and bequests, unweighted

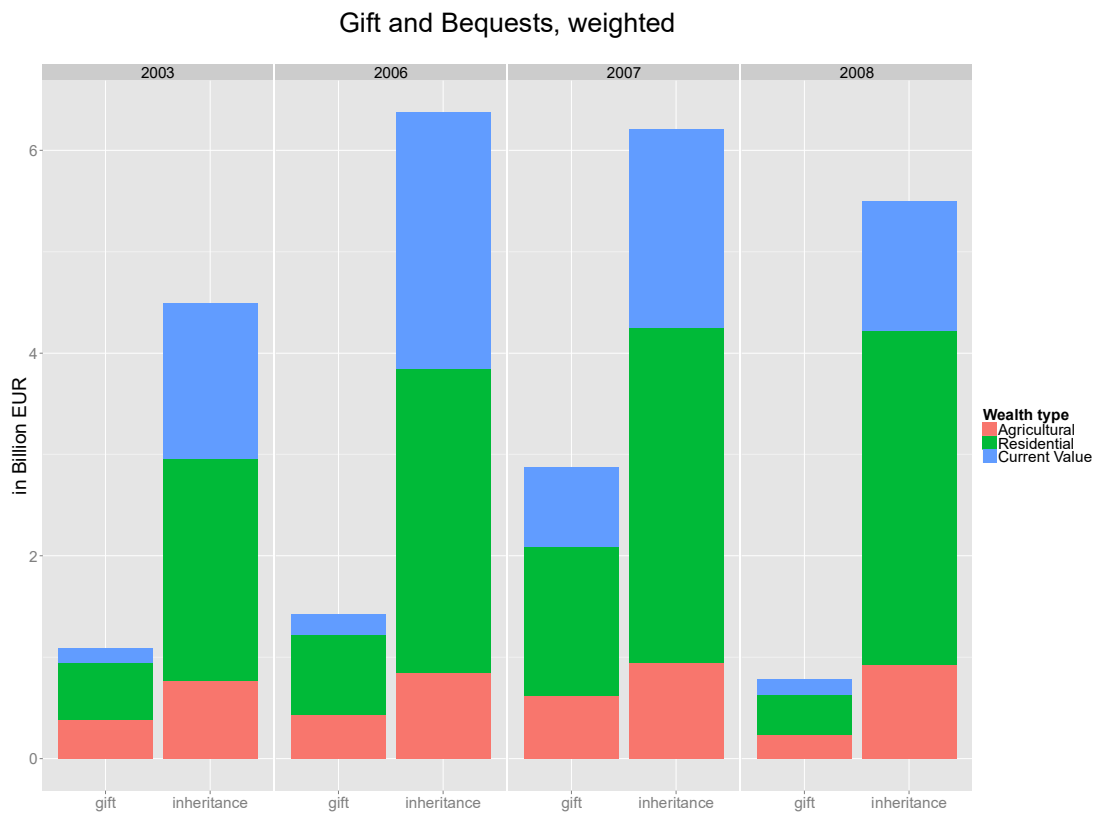


Source: Interpellations

Figure 3 considers the transformation from rateable values to market values, by incorporating both the developed ratio by Nowotny et al. (1990) and the update of the market values from 1986 to current ones.

One major pillar is established now and all available values are market-based. Regardless of the fact that the values are only rough figures they at least represent a first step towards the goal of creating a reliable ratio, which until now has not been established at all (as far as we know).

Figure 3: Overview of gifts and bequests, weighted like indicated



Source: Interpellations, own calculations

Table 9: Gift-Bequest Ratio

Gift-Bequest Ratio	
2003	0.242
2006	0.224
2007	0.463
2008	0.142

Source: Interpellations, own calculations

5.2 Computation of v_t

As in section 3.2 already mentioned, ignoring the gift transfers during lifetime would substantially underestimate the wealth at death of an individual. It is clear that only formal gift transfers can be addressed, in-kind gifts are excluded for several reasons. By computing the inter-vivo gifts they can be added as a factor $(1 + v_t)$ to the ratio of average wealth of decedents and average wealth of the living (μ_{2010}), which leads to μ_{2010}^* . A v_t of 0 would mean that for a given year t there are no recorded transfers of wealth and the correction by $(1 + v_t)$ would not have any effects. The more important inter-vivo gifts are compared to the total flow of bequests the higher v_t becomes.

What are typical values for inter-vivo gift ratios? There seems to be a wide range, and whereas Piketty (2011: Data Appendix) reports values around 0.8 for the 2000s in France Schinke (2012: 30) finds 0.59 for 2007, 0.58 for 2008 in Germany. Going back further in time these values generally decrease.

The ratios from Austria are reported in table 9.

These values are far below average values which the mentioned researchers found out. Despite the issue that there might be institutional differences which may effect the gift and bequest behaviour they would only be related to France. But also Germany indicates values which are – most of the time – far above the Austrian ones and different cultural settings are negligible.

5.3 Computation of μ_{2010}

As Piketty already states: *“This is the most challenging part, and also the most interesting part from an economic viewpoint”* (Piketty 2011: 1086). To compute the relation between the average wealth of decedents and the average wealth of the living population

we have to prepare the data (section 5.3.1) before we can continue to create a so-called age-wealth profile which represent centre of the work (section 5.3.2). For a given age-group it outlines the average wealth. We then just have to figure out the total number of living and dead people in that group and taking the average among the living and the dead and – voilà – we have the average wealth of the dead and the average wealth of the living, by dividing them this leads to μ .

The common way of estimation of μ is to use micro data based on estate tax files: this represents the wealth of the decedents. By applying the mortality multiplier method they use the inverse probability of death to compute the wealth of the living population (see for example Kopczuk and Saez (2004b) for the US from 1916 to 2000, but they only focus on the top wealth owner, because only a small proportion of the decedents were required to pay estate taxes). As we cannot refer to such individual data we have to fall back on the recent results of the HFCS where the wealth of the living is targeted. To get the wealth of the decedents, we just do it the other way round.

The major disadvantage is the circumstance that we only can refer to the wealth of the living – or to be more precise, the age-wealth-profile of the living – from 2010, there is no such survey in Austria before that date. Some assumptions are required in order to continue:

Assumption 2: We assume that there are no significant changes of the age-wealth-profile within the years 2003, 2006, 2007, 2008 and 2010, where the data was collected.

Some modifications have to be applied before starting the calculation of the age-wealth-profiles and afterwards μ_{2010} . They are described in the subsequent sections.

5.3.1 Troubles of the plains

Education

The conjunction of HFCS and IIASA makes it necessary to map education because they have different levels, see table 10. Luckily the levels are reported in a common standardisation which is called International Standard Classification of Education (ISCED)¹². This leads to three concrete types of education: primary, secondary and tertiary with the corresponding ISCED-levels reported in before-mentioned table.

¹²An overview of the levels in Austria and the connection with the several educational steps are attached in the appendix (figure 9)

Table 10: Mapping of education of different sources

IIASA	ISCED	HFCS	ISCED
No	0	1	0,1
Primary	1	2	2
Secondary	2,3,4	3	3,4
Tertiary	5,6	5	5,6

Mapped values	ISCED
Primary	0,1
Secondary	2,3,4
Tertiary	5,6

Source: HFCS 2010, IIASA

Intra-household wealth distribution

Due to the methodological focus on the household within the HFCS the different wealth categories are only collected on the household level. Although this makes perfect sense in a broader framework it is useless when it comes to combining mortality rates with wealth as it is necessary for computing μ because for this purpose it is required on the personal basis.

Other data sources like the Socio-Economic Panel (SOEP) in Germany have been augmented in specific years (Frick, Goebel, et al. 2007). They asked wealth-related questions on an individual level and were not forced to apply any assumptions about the distribution within households. There are studies about the distribution within households, but as far as we know they are only focused on couples (see e.g. Grabka et al. (2013)). Although the results of the mentioned survey confirm that the intra-household distribution is not equal among all household members the lack of data requires to make further assumptions, not only on the distribution of wealth among the members but also on which type of household members the wealth should be distributed:

Assumption 3: Household members with age below 20 normally did not contribute a considerable part to the household wealth and therefore are excluded when it comes to the distribution of the household's net wealth. This approach is quite common in the literature (see e.g. Piketty (2011), Schinke (2010)), but it is also useful for practical reasons because Piketty (2011) and Schinke (2010) as

two of the main references also use the same limit. For the sake of completeness it should be mentioned that in Austria the official grown-up status with all its legal rights and consequences is reached with the 18th birthday.

That assumption leads to minor changes in the composition of the relevant households, because there are 11 households where all members are below 20. The wealth of that group is ignored in the subsequent computations.

Assumption 4: Several possibilities are thinkable of how wealth could be distributed within households. The contribution could be in relation to

- the household member’s income,
- age,
- education level,
- gender or other socio-economic variables

but this imposes quite strong assumptions. It seems that the weakest assumption – the equal distribution assumption as Frick, Grabka, et al. (2007) call it – is the favoured way to split the total wealth among all household members with an age of 20 and above.

In some circumstances this leads to effects which can not be prevented but will effect the results: especially the younger generation (below 30) seem to be quite wealthy already.

Differential mortality

Differential mortality means that the different socio-economic status are taken into account. Persons with higher income (and wealth) have – on average – finished higher education levels and also have a higher life expectancy because they are able to afford better treatment and may also live healthier. To put it bluntly: Wealthy people – on average – live longer than poor ones. This leads to the fact that younger age-groups contain relatively more decedents which are worse off than others in economic terms. The older the people get the more this effect becomes blurred, because even with high expenditures which only the wealthy can afford, life expectancy can not be prolonged forever.

There are several ways to take that into account: For example Kopczuk and Saez (2004b) and Piketty (2011) deal with that issue by taking estimates from Brown et al. (2002) and Attanasio and Hoynes (2000). They offer estimates of differential mortality

for different social subgroups which are built upon race, ethnicity, education and gender. Another way is the way we have chosen: Assuming that education is a proxy for the economic well-being of a person, we do not only build one age-wealth group by sex as e.g. Schinke (2010) does, but we are – based on the detailed information which is contained in the data of IIASA – building several age-wealth groups, not only by gender but also by the education level we obtained.

5.3.2 Age-(Education)-Wealth-Profiles

Before going into the details of the method, we have to mention that so far, only data from the HFCS was used and it should be repeated that due to the lack of the very wealthy within the survey data all age-wealth-profiles will be downward biased¹³. For numerical orientation, we would like to recall some major findings among Austria: the average net wealth of an household is about 265,000 € and the average household size is 2.1, therefore the average wealth per person (ignoring the age for a moment) is about 126,000 € (Fessler, Mooslechner, and Schürz 2012).

Plain Age-Wealth-Profile The first figure 4 should only give a grasp about how the age-wealth-profiles look like but does not enter the subsequent calculations because education is not considered so far. It gives an idea about the wealth structure for age-groups during the life-cycle and how it differs between men and women.

On the horizontal axis there are the age-groups in steps of ten¹⁴. On the ordinate you find the average net wealth per individual in €.

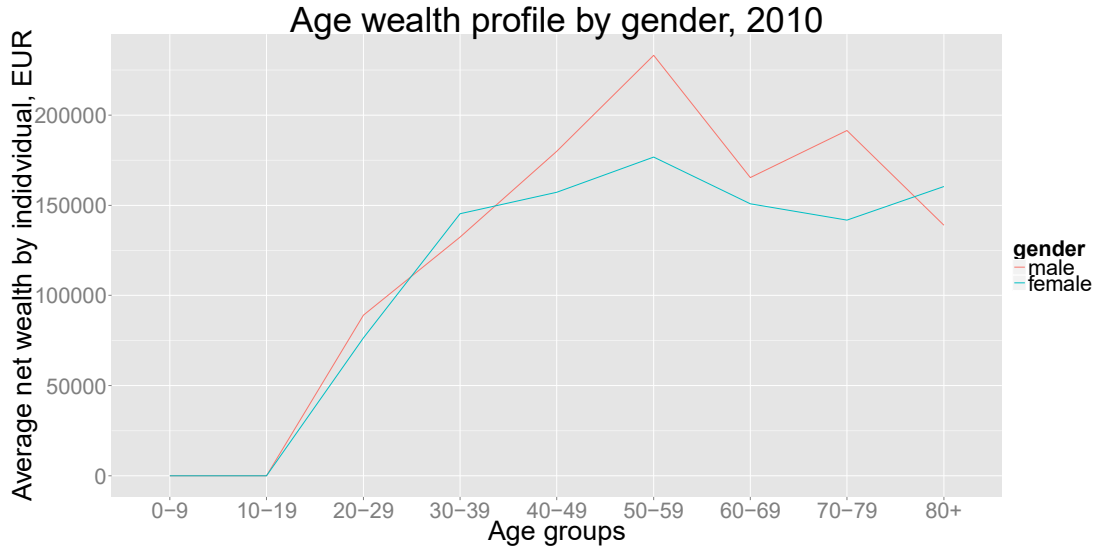
Following the assumption, that individuals younger than 20 do not owe wealth within a household, the first group (20-29) already owe about 80,000 €. This might seem high (at least for me as I am part of that group), but one has to keep in mind the the total wealth of a household was distributed equally among the grown-ups (older than 19). My explanation would be that that causes the relatively high wealth equipment in the earlier stages of life.

The development for both sexes proceed very similar until they are in their 40s. From that moment on their development differ. Whereas the females' curve flattens the male keep their steep rise and reach a average net wealth level of more than 200,000 € per

¹³As for the case of Austria, attempts of taking the very wealthy into account (see Eckerstorfer et al. (2013)) would lead to an overall increase of total private wealth of more than 200 Billion €, from 1,000 Billion € to 1,200 Billion € but unfortunately we can not – due to methodological incompatibility – consider these results.

¹⁴The steps are equal to Piketty's for comparison reasons, other steps would have been possible like steps of five like Schinke (2010); these results are in the appendix

Figure 4: Age Wealth Profile



Source: HFCS 2010, own calculations

man. Females are far beyond and reach about 175,000€. But the average wealth for men also decreases as fast as it was rising when they come in their 60s. For women in their 80s and above they finally have their chance to have a higher net wealth than their male age-group cohorts.

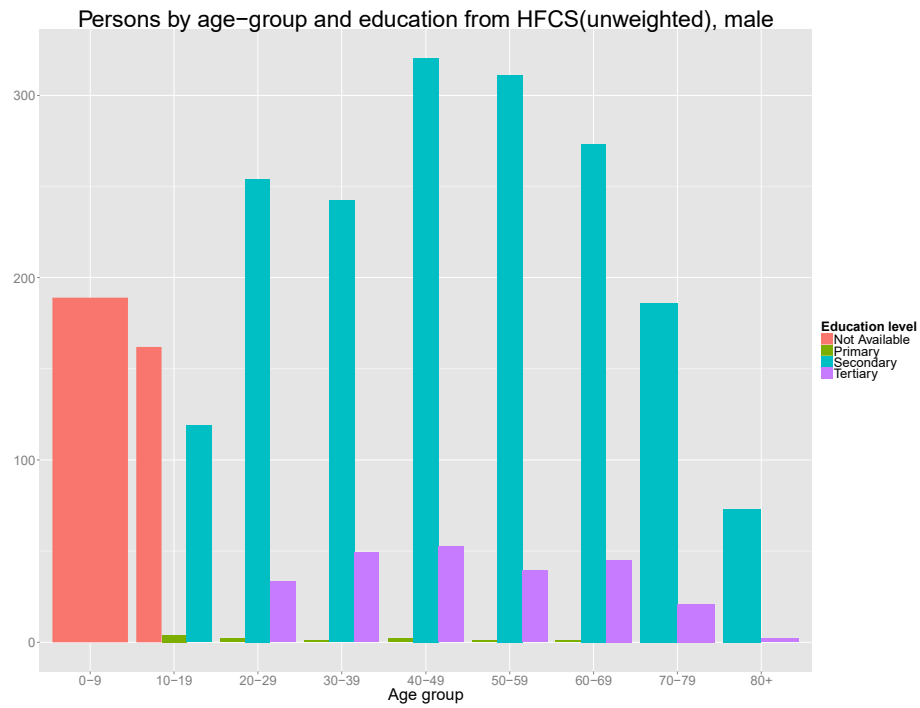
paragraphAge-Education-Wealth Profile The subsequent part represent the relevant data which enter directly the accounting equation. The sample size in each category is shown in figure 7, which will be relevant for the interpretations later on.

The figures about the Age-Education-Wealth Profile is similar to the pain Age-Wealth Profiles: both have the same axis, but the difference now is that the age-wealth-profile is now constructed for each education level (primary, secondary and tertiary; for details about the Austrian education system, see the appendix 7.5).

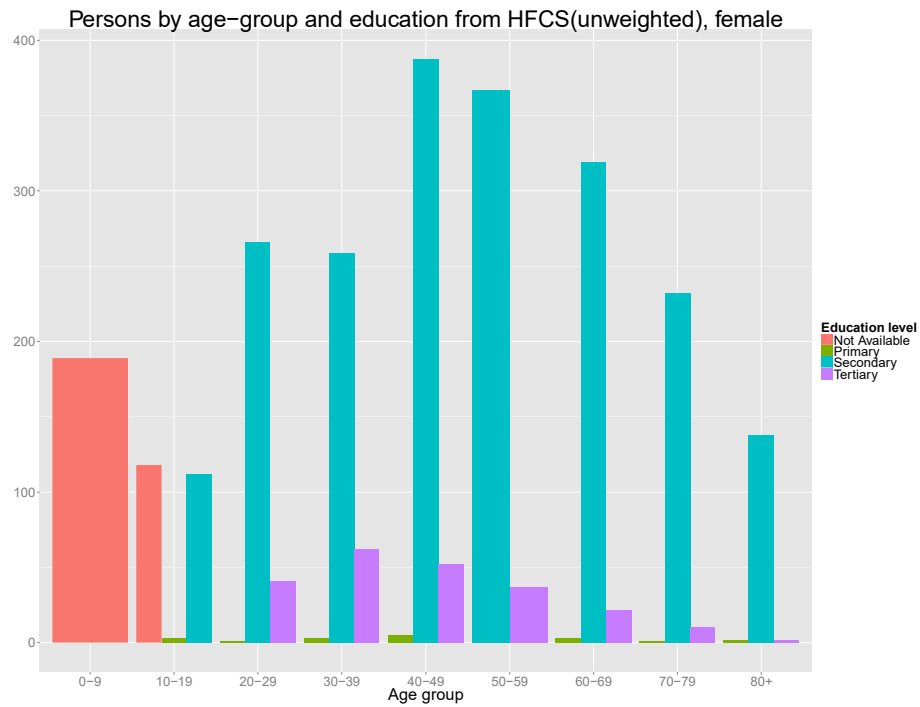
What is quite striking is the fact the the development of these different lines are by far more volatile and the highest observed level of average net wealth by individual has doubled, compared to the previous figure.

As the lowest formal education can be only be finished at the age of around 15, the age-groups start at 10-19. A similar issue represents the beginning of the tertiary education, which (under normal circumstances) cannot be finished before the age of 20, therefore the blue line begins from the age-group 20-29.

Figure 5: Age-Education-Wealth-Profile, sample size



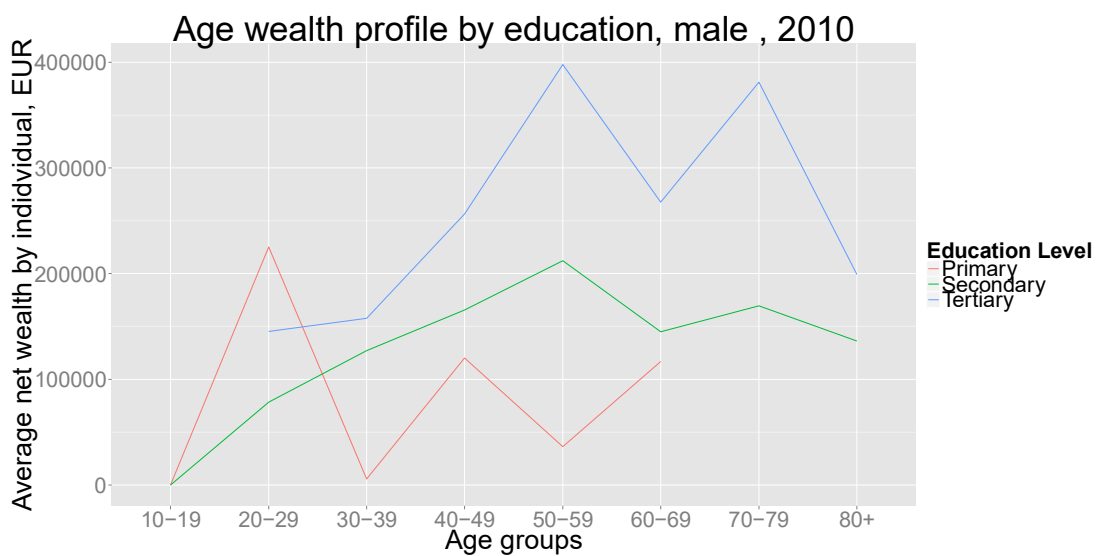
(a) male



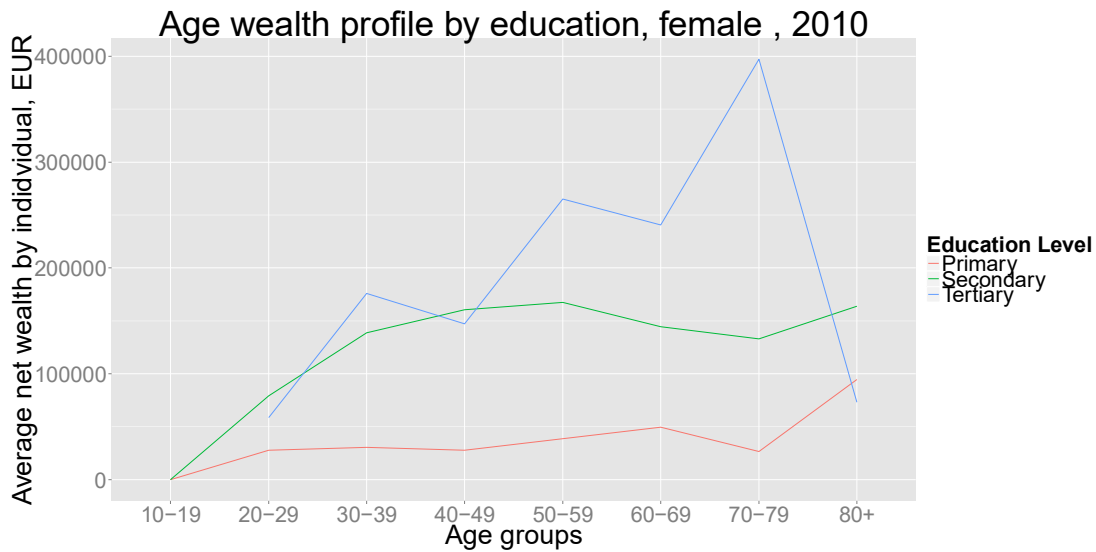
(b) female

Source: HFCS 2010, own calculations

Figure 6: Age-Education-Wealth-Profile by gender



(a) Male



(b) Female

Source: HFCS 2010, own calculations

What do these two figures have in common? First thing is that the higher the education level, the higher the average net wealth. The differences are huge. Another, but weaker commonality is that (ignoring the primary education) the or at least one peak for both is at around 50-59.

Where are the differences between the two figures? The interpretation of the development of the primary education curve won't be very useful in this context, because of the low number of cases ¹⁵ In the course of life-time, the secondary education takes a typical form with slowly increasing wealth and a peak at around 50-59. Whereas the average net wealth of men declines, there is a slight increase at the end of life for women. Tertiary educated women start their career with less than half of the financial endowment of men and it takes them longer to accumulate a net wealth of around 400,000 €. Men reach that ceiling in their 50s, women 20 years later. Towards the end of life, both end up in the same situation as at the beginning: the men, on average, has more than double of women.

Comparison with other studies

Comparisons with other studies is a challenge for several reasons. First, they are based on different countries and therefore it is not clear to what extent the age-wealth profile should be similar. Apparently, they should have a similar structure, but the levels could differ dramatically. Second, the relevant data for this approach is the age-**education**-wealth profile which is – as far as we know – unique until now among this approach. As a consequence, the figure about age-wealth only (figure 4) is the basis of comparison.

Germany For obvious reasons a comparison with Germany is useful, because the institutional background and culture is quite similar. Luckily we can rely on a study by Schinke (2012) who used the same approach with minor deviations. Some notes have to be made before starting the comparison: First, Germany has a much lower mean net wealth with 195,200 € and a median of 51,400 € (Eurosystem Household Finance and Consumption Network 2013: 76). The average household size is a bit smaller compared to Austria (2.04 in Germany compared to 2.1 to Austria). But there are also differences aside from the country-specific ones which rely on methodological deviations: Because Schinke (2012) discards observations with less than 200,000 € of debt and with more

¹⁵ Ignoring this fact for a moment would lead us to the interpretation that development during the life-cycle of women is quite plain and reaches the peak for women in their 80s and above with around 100,000 €. For men a reasonable interpretation is - due to the data - quite difficult, but at least one thing is striking: they seem to own much more net wealth on average.

Table 11: Gift corrected ratio of decedents' and living people's average wealth

Year	μ_{2010}	$(1 + v_t)$	μ_t^*
2003	1.032	1.242	1.282
2006	1.032	1.224	1.263
2007	1.032	1.463	1.509
2008	1.032	1.142	1.178

Source: Interpellations, HFCS 2010, own calculations

than 2,5000,000€ these modifications have to be applied as well (but only for the purpose of comparison)¹⁶. Another aspect is the differing years of observations: whereas the underlying values for Austria the basis is Austria in 2010, Schinke only has 2002 and 2007. We go for a comparison with the latter because of the narrower time difference, but the selected years come with historical specifics: whereas the first one represents the eve of the crisis the latter is right in the centre. But still: some insights may still be possible to see if we're on the right track.

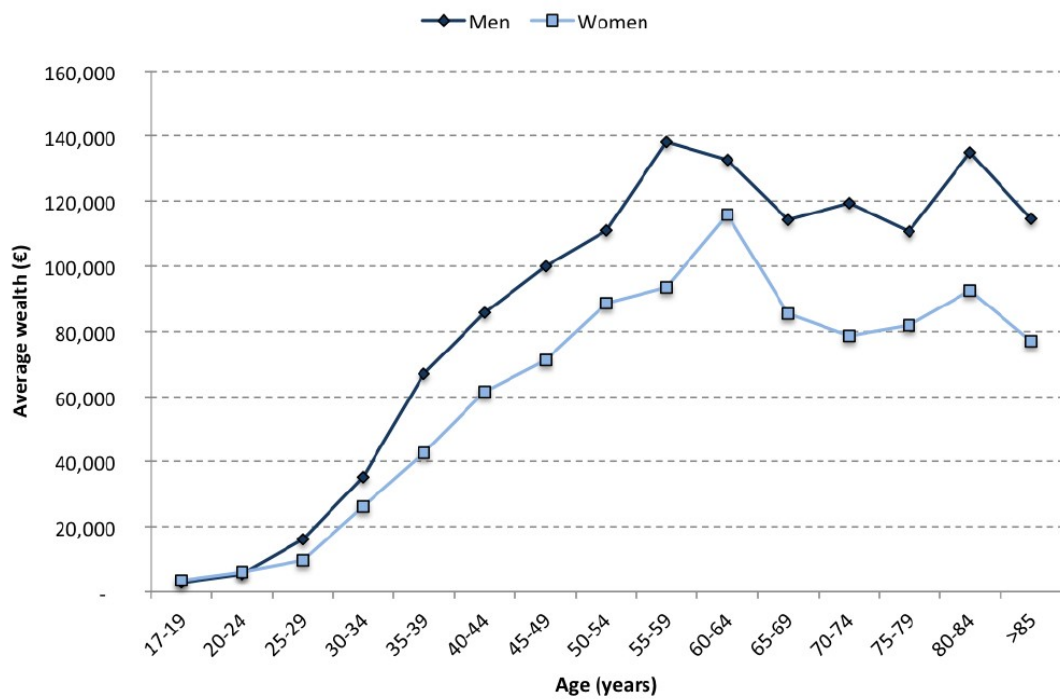
Going from left to right we observe a huge peak at the age between 20-24 compared to Germany but this due the equal wealth sharing of our assumption. Whereas in Germany the females always end up with less wealth regardless of the age-group this is not the case in Austria but this may be reducible to the same assumption. Actually, it is quite interesting that most of the time the wealth by women is lower than of men although by definition they share the wealth among the household by equal proportions. This facts may be driven by the single households. The peaks in both figures are rather similar and the evolution is quite comparable with the aforementioned differences which are mainly driven by the required assumptions.

5.3.3 Computation of μ_t^*

Based on the age-education-wealth groups in figure 6 we are now able to compute the ratio of average wealth of decedents and the average wealth of the living by interaction with the people in each education-age group by gender. Additionally, applying the gift-bequest-ratio $(1 + v_t)$ directly leads us to the μ_t^* , the gift corrected ratio between decedents' and living people's wealth.

According to the results in table 11, what does a high μ_t mean? If you recall that it

¹⁶The reader should be reminded that the data basis for Germany is the SOEP, therefore the comparability has limits



(a) Germany, 2007



(b) Austria, 2010 (truncations like Schinke)

Source: (a) Schinke (2012: 35), (b) HFCS 2010, own calculations for Austria

Table 12: Comparison of main results

Author	μ_t	$1 + v_t$	μ_t^*
2003			
Piketty	1.232	1.811	2.215
Estimated value	μ_{2010}	1.242	1.282
2006			
Piketty	1.236	1.816	2.228
Estimated value	μ_{2010}	1.224	1.263
2007			
Piketty	1.225	1.816	n.a.
Schinke	1.185	1.580	1.872
Estimated value	μ_{2010}	1.463	1.509
2008			
Piketty	1.226	1.816	n.a.
Estimated value	μ_{2010}	1.142	1.178
2010			
Piketty	1.224	n.a.	n.a.
Estimated value	1.032	n.a.	n.a.

Source: Piketty (2015), Schinke (2012), own calculations

is the average wealth of decedents divided by the average wealth of the living a ratio above 1 means that the average wealth at death is higher than that of the average living. Again, the benchmark is mainly Germany, where Schinke (2012: 38) reports a value of 1.185 for 2007¹⁷. For France, Piketty (2011) reports values which are even higher than those of Germany. For the relevant years, the values are always above 1.2 (see table 12.

These results raises suspicions, although it is hard to distinguish between the poorness of the data and actual existing differences between the countries. But at least the results are roughly comparable and some issues can be tackled down to the absence of the very wealthy in the HFCS, the probably incomplete tax statistics. Also the necessary assumptions within the paper may distort the results in one or the other way.

5.4 Computation of W_t

For the last time – recalling the formula makes it clear that all relevant data is collected and calculated so far in the sections 5.1, 5.3 and 5.2. Plugging the information into the

¹⁷the only time-wise intersection of his and the underlying studies

Table 13: Total private wealth

Year	W_t	B_t	μ_{2010}	$(1 + v_t)$	m_t
2003	288,786,752,931	4,487,544,612	1.032	1.242	0.012
2006	443,421,031,497	6,368,996,679	1.032	1.224	0.011
2007	361,705,190,969	6,203,156,451	1.032	1.463	0.011
2008	410,887,819,211	5,499,946,533	1.032	1.142	0.011

Source: Interpellations, HFCS 2010, own calculations

accounting equation leads to the results shown in table 13.

$$W_t = \frac{B_t}{\mu_t(1 + v_t)m_t}$$

The estimates of the total private wealth W_t are fluctuating quite strong from values of 289 Billion € to 443 Billion €. As these values heavily depend on the reported bequest data from the authorities (and of course also on the method of transforming rateable values into market values) it is clear that these variations are inevitable. Especially huge inheritance cases can substantially influence the results and the fact that not every year a member of the wealthiest Top 500 die has to be accepted.

Investigating a bit more on the values itself it seems that the results are – compared to the reference year 2010 where reliable wealth data exists¹⁸ – far below from the values of 2010. As GDP growth rates between the years under investigation and 2010 do not suggest that this huge increase until 2010 could be fulfilled during 2009 I have to admit that this can not provide the desired level of completeness. There is a gap between 2008 (around 410 Billion €) and 2010 (around 1,000 Billion €) of more than double and when considering the very wealthy like Eckerstorfer et al. (2013) did the gap widens to a triple of my estimations.

The reasons for deviations were already mentioned in the previous section, therefore nothing else can be said than that further attempts are necessary, especially the improvement of the data quality. If this improvement for already existing data is not possible (maybe it is in some circumstances?), the research community as well as the general public should demand for qualitative and comprehensive data. The continuing lack of data only leaves room for rumours, half-truths and even lies about major issues within a society. This can not be in the interest of 99% of the population.

¹⁸Also this estimations form the lower bounds of the total wealth in Austria

6 Conclusio

Work in progress.

	Female			Male		
	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary
0-9	47	0	0	55	0	0
10-19	51	40	1	112	106	2
20-29	3	94	40	9	274	76
30-39	9	212	81	13	385	146
40-49	41	769	195	51	1389	436
50-59	86	1484	252	117	2739	717
60-69	226	3350	325	239	5477	1353
70-79	694	8283	514	453	9357	1748
80+	1433	21083	1549	406	9686	2337

Table 14: Dead cases, 2010

	Female			Male		
	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary
0-9	409456	0	0	388316	0	0
10-19	285152	192718	5165	264800	186209	8140
20-29	9803	394629	142514	8184	336169	187174
30-39	9564	372569	183059	11381	360347	190742
40-49	14219	493888	201471	19754	502092	174804
50-59	13392	396793	134142	18886	434664	102493
60-69	11561	324156	99669	20500	402192	53803
70-79	9327	217479	47614	20937	305782	24554
80+	3955	98330	24882	15285	241431	19496

Table 15: Population, 2010

7 Appendix

7.1 Concrete numbers of dead and living

7.2 Age-Education Wealth Profile: weighted

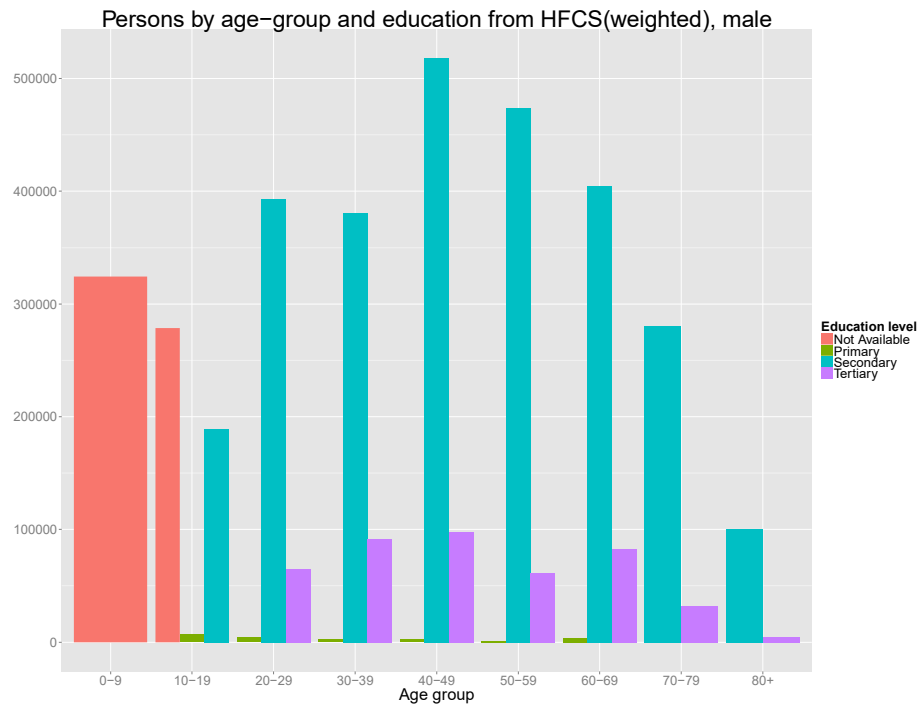
7.3 List of inheritance categories

7.4 Age-Wealth-Profiles

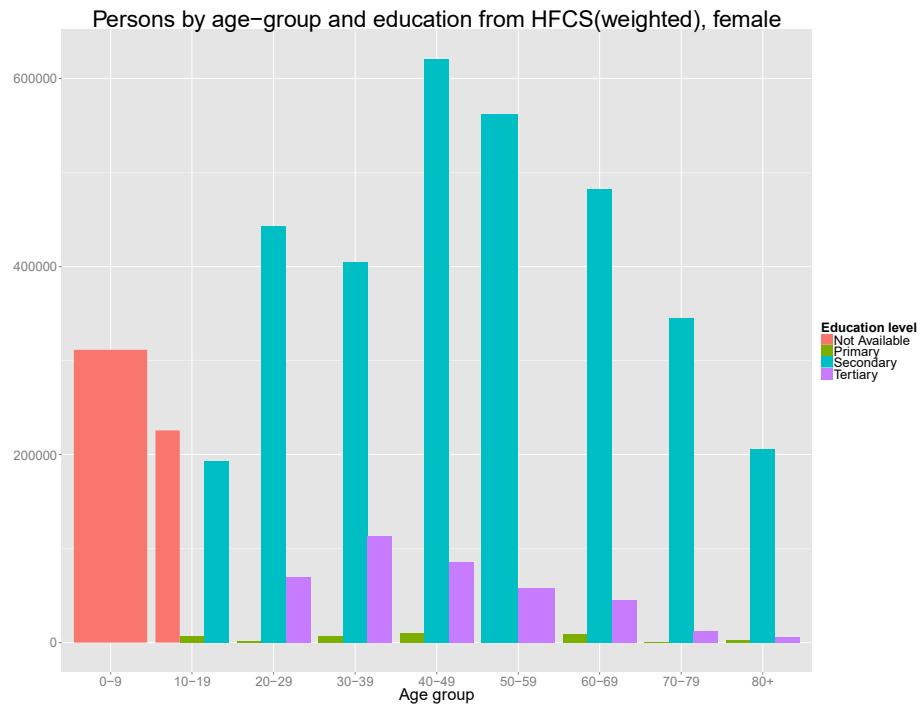
7.5 Austrian Education System

7.6 Richest households in the HFCS

Figure 7: Age-Education-Wealth-Profile, sample size



(a) male



(b) female

Source: HFCS 2010, own calculations

Table 16: Inheritance categories

Category	Details	Assessment basis
Einheitswert der übrigen Grundstücke	Asset	rateable value
Einheitswert des land- u. forstwirtschaftlichen Assets	Asset	rateable value
§15a ErbStG.	Asset	market value
Abfindung aus Verträgen	Asset	market value
Abfindung gemäß §2 Abs. 2 Z. 4 ErbStG.	Asset	market value
Aktien	Asset	market value
Ausländisches Asset	Asset	market value
Betriebsvermögen - Anteil an Kapitalgesellschaft	Asset	market value
Betriebsvermögen - Anteil an Personengesellschaft	Asset	market value
Betriebsvermögen - Einzelfirma	Asset	market value
Bezugsberechtigte Versicherung	Asset	market value
Darlehensforderungen	Asset	market value
Geld	Asset	market value
Guthaben bei Arbeitgeber	Asset	market value
Guthaben bei Banken	Asset	market value
Guthaben bei Finanzamt	Asset	market value
Lebensversicherung, Sterbegeld	Asset	market value
Legat	Asset	market value
Pflichtteil	Asset	market value
Sonstige Forderungen	Asset	market value
Verlags-, Patent-, Urheberrechte	Asset	market value
Wertpapiere ErbStfrei	Asset	market value
Wertpapiere ErbStpflichtig	Asset	market value
Wertpapiere KESTfrei, ErbStfrei	Asset	market value
Wohnungsrecht u.a.	Asset	market value
Andere bewegl. Gegenstände (z.B. Schmuck, PKW)	Asset	market value
Frei gem. §17 SchStG.	Asset	market value
Sonstiges Asset	Asset	market value
VW der übrigen Grundstücke	Asset	market value
VW des land- und forstwirtschaftlichen Assets	Asset	market value
Hausrat einschließlich Wäsche	Asset	market value
Übergabspreis	Asset	market value
Sonstige Kosten	Deduction	market value
Sonstige Verbindlichkeiten	Deduction	market value
Verbindlichkeiten betrieblich	Deduction	market value
Verbindlichkeiten Banken	Deduction	market value
Verbindlichkeiten Darlehen	Deduction	market value
Verbindlichkeiten Finanzamt	Deduction	market value
Bestattung	Deduction	market value
Begünstigung gemäß §21 ErbStG.	Deduction	market value
Nachlassregelung	Deduction	market value
Pflichtteilsanspruch	Deduction	market value
Rechtsstreit	Deduction	market value
Grabdenkmal	Deduction	market value
Grabpflege	Deduction	market value

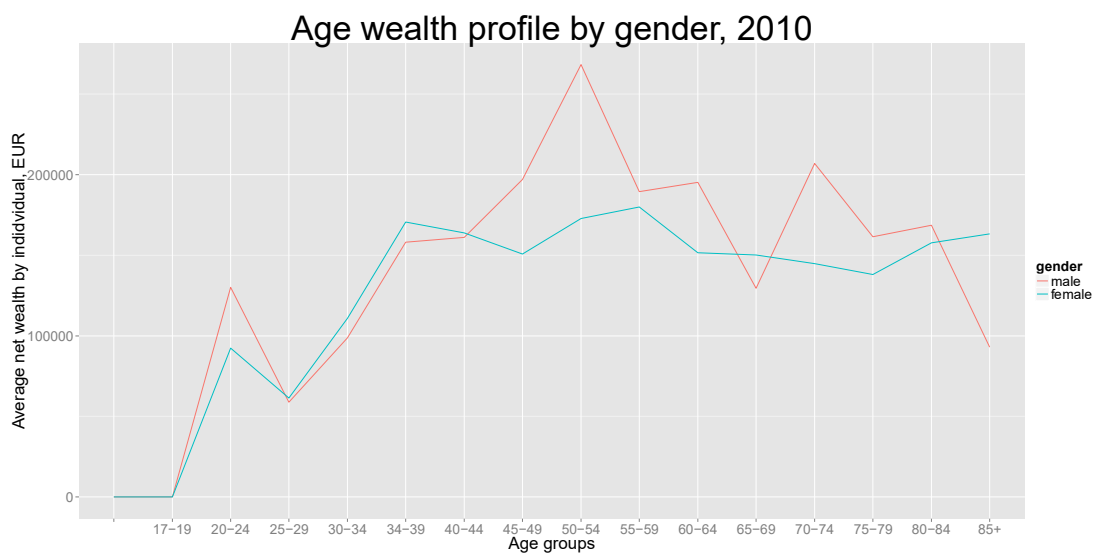
Source: <http://www.parlament.gv.at, 3577/AB XXIII. GP>

Table 17: Frequency of the Top 10 households in each implicate, combined

Household ID	Frequency	Average over implicates
AT1133812	5	14.330.820
AT1133401	4	11.583.575
AT1140512	4	9.638.000
AT1116410	3	5.136.310
AT1130903	2	4.917.475
AT1135701	2	4.503.850
AT1118903	3	4.467.000
AT1114203	3	4.542.170
AT1126402	1	3.993.110
AT1121003	1	3.985.000
AT1130705	2	16.792.550
AT1131005	1	19.928.600
AT1116908	1	17.946.800
AT1133808	1	17.426.800
AT1134004	1	16.720.500
AT1116211	1	14.767.500
AT1116805	1	13.655.300
AT1134005	1	13.433.600
AT1130902	1	12.380.000
AT1117911	1	6.369.090
AT1129901	1	5.773.000
AT1116901	1	5.603.580
AT1120103	2	6.584.175
AT1130805	1	19.710.300
AT1128807	1	12.814.600
AT1135008	1	7.170.010
AT1141101	1	5.700.860
AT1137403	1	5.502.650
AT1114402	1	6.006.660
AT1129401	1	5.729.660

Source: HFCS 2010, own calculations

Figure 8: Age Wealth Profile, five year steps



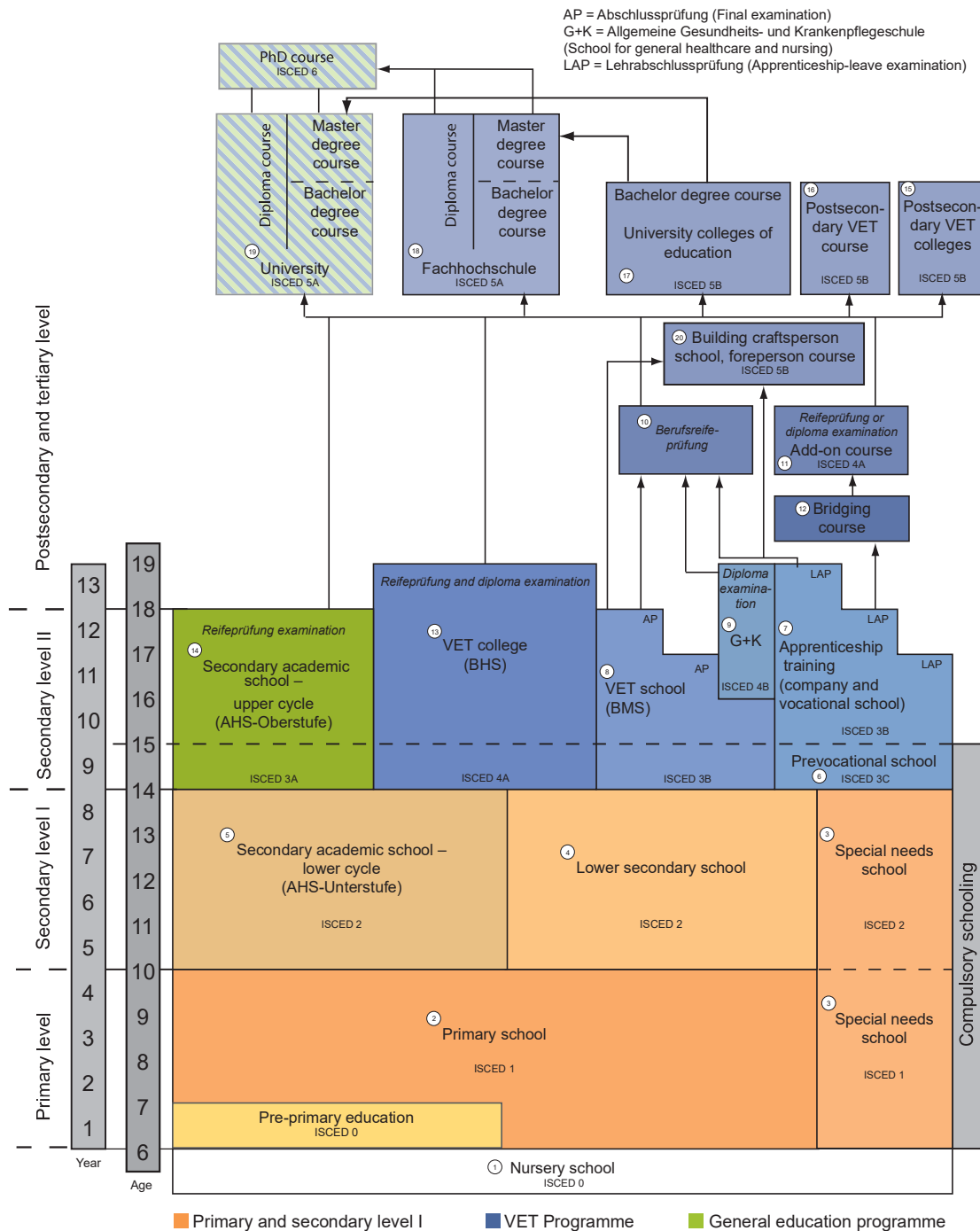
Source: HFCS 2010, own calculations

Table 18: The richest household of the HFCS 2010, in €

Implicate	Household-ID: AT1133812
#1	11,715,500
#2	12,913,400
#3	20,266,500
#4	13,408,800
#5	13,349,900

Source: HFCS 2010, own calculations

Figure 9: The Austrian Education System



Source: https://www.oead.at/fileadmin/oead_zentrale/willkommen_in_oe/Bildungssystem/Education_System_WEB.pdf, last visited: 19/09/2015

8 Bibliography

- Albacete, N., P. Lindner, K. Wagner, and S. Zottel** (2012): “Household Finance and Consumption Survey des Eurosystems 2010: Methodische Grundlagen für Österreich”. In: *Geldpolitik und Wirtschaft* Q3/12 - Addendum.
- Altzinger, W. and S. Humer** (2013): *Simulation des Aufkommens verschiedener Erbschaftsbesteuerungen*.
- Andreasch, M., P. Fessler, and P. Lindner** (2013): “Verknüpfung der Informationen zum Finanzvermögen der Haushalte aus Mikro- und Makrodaten anhand des HFCS und der GFR für Österreich”. In: *Sektorale VGR in Österreich 2012. Integrierte Darstellung der Wirtschafts- und Finanzkonten für Haushalte, Unternehmen, Staat und Finanzsektor in den Volkswirtschaftlichen Gesamtrechnungen*. Ed. by **OeNB**. OeNB, pp. 14–23.
- Andreoni, J.** (1990): “Impure Altruism and Donations to Public Goods: A Theory of Warm-Glow Giving”. In: *The Economic Journal* 100.401, pp. 464–477. ISSN: 00130133.
- Atkinson, A. B. and F. Bourguignon**, eds. (2015): *Handbook of Income Distribution*. First edition. Vol. 2. Handbooks in economics.
- Attanasio, O. P. and H. W. Hoynes** (2000): “Differential Mortality and Wealth Accumulation”. In: *The Journal of Human Resources* 35.1, pp. 1–29.
- Barro, R. J.** (1974): “Are Government Bonds Net Wealth?” In: *Journal of Political Economy* 82.6, pp. 1095–1117. ISSN: 00223808. DOI: 10.1086/260266.
- Becker, G. S.** (1974): “A Theory of Social Interactions”. In: *Journal of Political Economy* 82.6, pp. 1063–1093. ISSN: 00223808.
- Berghuber, B., O. Picek, and M. Schratzenstaller** (2007): *Perspektiven der Erbschafts- und Schenkungssteuer in Österreich*.
- Bernheim, D. B., A. Shleifer, and L. H. Summers** (1985): “The Strategic Bequest Motive”. In: *Journal of Political Economy* 93.6, pp. 1045–1076. ISSN: 00223808.

- BMF** (2015): *Hauptfeststellung der Einheitswerte für die Land- und Forstwirtschaft 2014*. URL: https://www.bmf.gv.at/services/publikationen/BMF-BR-ST_Einheitswerte_Land_Forstwirtschaft_Folder_2014.pdf?4cxx82 (visited on 09/09/2015).
- Boadway, R., E. Chamberlain, and C. Emmerson** (2010): “Taxation of wealth and wealth transfers”. In: *Dimensions of tax design: The Mirrlees Review*. Ed. by J. A. Mirrlees. Oxford University Press, pp. 737–814.
- Brown, J., J. Pollet, and J. Liebman** (2002): “Appendix. Estimating Life Tables That Reflect Socioeconomic Differences In Mortality”. In: *The Distributional Aspects of Social Security and Social Security Reform*. Ed. by M. Feldstein and J. Liebman. University of Chicago Press and National Bureau of Economic Research, Inc, pp. 447–458.
- Bruckner, K. E.** (2007): “Ist die Erbschaftssteuer verfassungswidrig?” In: *Österreichische Steuerzeitung* 60(1/2), pp. 6–9.
- Brunner, J. K.** (2014): “Die Erbschaftsteuer – Bestandteil eines optimalen Steuersystems?” In: *Perspektiven der Wirtschaftspolitik* 15.3. ISSN: 1468-2516.
- Bundeskanzleramt** (2015). URL: <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen%5C&Gesetzesnummer=10003850> (visited on 05/21/2015).
- Bundesministerium für Soziales und Konsumentenschutz**, ed. (2009): *Sozialbericht 2007 – 2008*.
- Cox, D.** (1987): “Motives for Private Income Transfers”. In: *Journal of Political Economy* 95.3, pp. 508–546. ISSN: 00223808.
- (1990): “Intergenerational Transfers and Liquidity Constraints”. In: *The Quarterly Journal of Economics* 105.1, pp. 187–217.
- Cox, D. and T. Jappelli** (1990): “Credit Rationing and Private Transfers: Evidence from Survey Data”. In: *The Review of Economics and Statistics* 72.3, pp. 445–454. ISSN: 00346535.
- Eckerstorfer, P. et al.** (2013): “Bestände und Verteilung der Vermögen in Österreich: Verfahren zur Quantifizierung der Spitzenvermögen”. In: *Materialien zu Wirtschaft und Gesellschaft (AK Wien)* 122.
- Eurosystem Household Finance and Consumption Network** (2013): “The Eurosystem Household Finance and Consumption Survey - Methodological Report for the First Wave”. In: *ECB Statistics Paper Series* 1.

- Eurosystem Household Finance and Consumption Network** (2013): “The Eurosystem Household Finance and Consumption Survey - Results from the First Wave”. In: *ECB Statistics Paper Series 2*.
- Farny, O., F. Gall, and M. Predl** (1997): *Vermögen, Erben und Erbschaftssteuer in Österreich*. Vol. Nr. 63. Materialien zu Wirtschaft und Gesellschaft. Wien: Kammer für Arbeiter und Angestellte für Wien.
- Feldstein, M. and J. Liebman**, eds. (2002): *The Distributional Aspects of Social Security and Social Security Reform*. 2nd ed. University of Chicago Press and National Bureau of Economic Research, Inc.
- Fessler, P., P. Mooslechner, M. Schürz, and K. Wagner** (2009): “Das Immobilienvermögen privater Haushalte in Österreich”. In: *Geldpolitik & Wirtschaft*. Ed. by OeNB, pp. 113–134.
- Fessler, P., P. Mooslechner, and M. Schürz** (2012): “Household Finance and Consumption Survey des Eurosystems 2010: Erste Ergebnisse für Österreich”. In: *Geldpolitik und Wirtschaft Q3/12*.
- Foville, M. A. d.** (1893): “The Wealth of France and of Other Countries”. In: *Journal of the Royal Statistical Society* 56.4, pp. 597–626.
- Fraberger, F.** (2006): “Einheitswerte ade?! ErbStG – quo vadis?” In: *SWK* 18, pp. 746–754.
- Frick, J. R., J. Goebel, M. M. Grabka, O. Groh-Samberg, and G. G. Wagner** (2007): *Zur Erfassung von Einkommen und Vermögen in Haushaltssurveys: Hocheinkommensstichprobe und Vermögensbilanz im SOEP*.
- Frick, J. R., M. M. Grabka, and E. M. Sierminska** (2007): “Representative wealth data for Germany from the German SOEP: The impact of methodological decisions around imputation and the choice of the aggregation unit”. In: 672.
- Giffen, R.** (1878): “Recent Accumulations of Capital in the United Kingdom”. In: *Journal of the Statistical Society of London* 41.1, pp. 1–39.
- Grabka, M. M., J. Marcus, and E. Sierminska** (2013): *Wealth Distribution within Couples*.
- Heidinger, G.** (1992-11-01): “Ist die Vermögensteuer noch zeitgemäß?” In: *Österreichische Steuerzeitung* 1992.21, pp. 296–301.

- Help.gv.at** (2015). URL: <https://www.help.gv.at/Portal.Node/hlpd/public/content/79/Seite.792050.html> (visited on 05/26/2015).
- Houben, H.** and **R. Maiterth** (2013): “Erbschaftsteuer als Erbschaftsteuer als „Reichenbesteuerung“ mit Aufkommenspotential?” In: *Vierteljahrshefte zur Wirtschaftsforschung* 82.01, pp. 147–175.
- Humer, S., M. Moser, M. Schnetzer, M. Ertl,** and **A. Kilic** (2014): “Sozioökonomische Charakteristika der Vermögensverteilung in Österreich”. In: *Materialien zu Wirtschaft und Gesellschaft (AK Wien)* 125.
- Kavonius, I. K.** and **V.-M. Törmälehto**, eds. (2010): *Integrating Micro and Macro Accounts – The Linkages between Euro Area Household Wealth Survey and Aggregate Balance Sheets for Households*.
- Kopczuk, W.** and **E. Saez** (2004a): *Top Wealth Shares in the United States: 1916-2000: Evidence from Estate Tax Returns*.
- (2004b): “Top Wealth Shares in the United States, 1916-2000: Evidence from Estate Tax Returns”. In: *National Tax Journal* 57.2, pp. 445–487.
- Loeffelholz, H. D. v.** and **H. Rappen** (2003): *Kosten der Besteuerung in Deutschland*. Ed. by **Monatsbericht des BMF**.
- Mallet, B.** (1908): “A Method of Estimating Capital Wealth from the Estate Duty Statistics”. In: *Journal of the Royal Statistical Society* 71.1, pp. 65–101.
- Mirrlees, J. A.**, ed. (2010): *Dimensions of tax design: The Mirrlees Review*. Oxford University Press.
- Modigliani, F.** (1986): “Life Cycle, Individual Thrift, and the Wealth of Nations”. In: *The American Economic Review* 76.3, pp. 297–313. ISSN: 00028282.
- Mooslechner, P.** and **M. Schürz** (2009): “Verteilung der Geldvermögen”. In: *Sozialbericht 2007 – 2008*. Ed. by **Bundesministerium für Soziales und Konsumentenschutz**, pp. 276–286.
- Nowotny, E.** (1999): *Der öffentliche Sektor: Einführung in die Finanzwissenschaft : mit 35 Tabellen*. 4., neubearb. und erw. Aufl. Berlin [u.a.]: Springer.
- Nowotny, E., M. Marterbauer, E. Auer, W. Korber,** and **A. Rainer** (1990): *Öffentliche Wirtschaft und Bodenordnung*. Vol. 87. Kommunale Forschung in Österreich. Wien: Verlag für Jugend und Volk.

- OECD.Stat** (2015). URL: <http://stats.oecd.org/Index.aspx?DataSetCode=REV> (visited on 08/06/2015).
- OeNB**, ed. (2009): *Geldpolitik & Wirtschaft*.
- ed. (2013): *Sektorale VGR in Österreich 2012. Integrierte Darstellung der Wirtschafts- und Finanzkonten für Haushalte, Unternehmen, Staat und Finanzsektor in den Volkswirtschaftlichen Gesamtrechnungen*. OeNB.
- (2015). URL: <https://www.oenb.at/isaweb/report.do?report=6.6> (visited on 09/05/2015).
- Piketty, T.** (2011): “On the Long-Run Evolution of Inheritance: France 1820–2050”. In: *The Quarterly Journal of Economics* 126.3, pp. 1071–1131.
- (2014): *Das Kapital im 21. Jahrhundert*. C.H. Beck.
- (2015). URL: <http://piketty.pse.ens.fr/files/> (visited on 06/02/2015).
- Piketty, T.** and **E. Saez** (2013): “A Theory of Optimal Inheritance Taxation”. In: *Econometrica* 81.5, pp. 1851–1886. ISSN: 0012-9682.
- Piketty, T.** and **G. Zucman** (2015): “Wealth and Inheritance in the Long Run”. In: *Handbook of Income Distribution*. Ed. by **A. B. Atkinson** and **F. Bourguignon**. Vol. 2. Handbooks in economics, pp. 1303–1368.
- Puchinger, M.** (2006): “Erbschafts- und Schenkungssteuer vom dreifachen Einheitswert bei Grundstücken ade?” In: *Finanz-Journal* 6, pp. 205–206.
- Reding, K.** and **W. Müller** (1999): *Einführung in die allgemeine Steuerlehre*. Vahlens Handbücher der Wirtschafts- und Sozialwissenschaften. München: Vahlen.
- Schinke, C.** (2010): “Inheritance in Germany 1911 to 2009: A Mortality Multiplier Approach”. In: *Economic Policy* 25.63, pp. 437–482.
- (2012): *Inheritance in Germany 1911 to 2009: A Mortality Multiplier Approach*.
- Statistisches Bundesamt** (2012): *Finanzen und Steuern - Erbschaft- und Schenkungssteuer 2010*.
- Verfassungsgerichtshof** (2007). URL: https://www.vfgh.gv.at/cms/vfgh-site/attachments/8/4/0/CH0006/CMS1174295202378/erbschaftssteuer_g54-06.pdf (visited on 05/21/2015).

- Wolff**, E. N. and M. **Gittleman** (2014): “Inheritances and the distribution of wealth or whatever happened to the great inheritance boom?” In: *The Journal of Economic Inequality* 12.4, pp. 439–468.
- Zucman**, G. (2014): *Steueroasen: Wo der Wohlstand der Nationen versteckt wird*. 2nd ed. edition suhrkamp. Berlin: Suhrkamp.