Abolishing the Wealth Tax -
a Case Study of Germany

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Abstract

Since the 1990's several countries abolished the wealth tax, but surprisingly few scholars investigated the effects empirically. Motivated by the theoretical literature, this thesis estimates the effect of the abolition of the net wealth tax in Germany in 1997 on the household saving rate. The use of the Synthetic Control Method allows using variables on aggregate level instead of microeconometric panel data, to estimate the effect of abolishing the net wealth tax. As a result, the analysis shows that the abolition of the net wealth tax had a clear positive effect on the German household saving rate. After 3 years, the saving rate was found to be about 3 percentage points higher than it would have been without the treatment. Robustness checks support the results. These findings suggest that empirically the substitution effect dominated.

Contents

1 Introduction

What links Austria, Italy, Germany, Denmark, France, Finland, The Netherlands, Spain and Sweden? All of these countries abolished the net wealth tax at one point in time - some of them have reintroduced it later again.

The list of countries in Europe that have abolished the net wealth tax is not a short one. Interestingly, there exist very few studies that address the effect of such an abolition. It seems that it was discussed rather in politics than in academia. This thesis looks closer at the case of Germany that abolished its net wealth tax in 1997. Back then opponents of the abolition of the net wealth tax argued that it is an essential tool to redistribute wealth. However, it needed to be adjusted, such that assets were correctly evaluated. The proponents, on the other hand, claimed that it prevents capital accumulation and growth and hence should be abolished. [1]

Since the call for a wealth tax by Piketty in his famous book Capital in the 21st Century (Piketty, 2014) capital taxation has gained new attention. This debate has been intensified by the indebtedness of countries throughout Europe, as eventually ways to consolidate the budget needed to be found (e.g. Iara et al., 2015). Again, it seems that the taxation on wealth has been discussed more by the media and politicians, than in academia.

This thesis studies, for the first time, the effect of the abolition of the German net wealth tax on the household saving rate. It thereby contributes to the scarce empirical literature on the effects of a wealth tax. The remaining part of the thesis is structured as follows. It first gives an overview of the theoretical and empirical literature that covers capital and net wealth taxation in general. Chapter 3 explains the German net wealth tax and the channel through which it affects households. Afterwards, the synthetic control method that is used to estimate the effect of the abolition is explained. The structure of the data and the results are then described in chapters four and five.

[1] For an overview of the public debate see Die Zeit, 1996

2 Literature Review

2.1 Theoretical Literature

In most of the theoretical papers, a wealth tax is treated as equivalent to a tax on capital income and in many of these theoretical studies, the question whether capital income should be taxed is answered negatively. The underlying argument for zero taxation on capital is that a tax on capital changes the after-tax interest rate, which leads to a highly distortive effect on savings and capital accumulation (Eckerstorfer et al., 2013). For a long time capital taxation with a rate of zero has been seen as optimal. Famous early proponents of this result are Atkinson and Stiglitz (1976), Chamley (1986) and Judd (1985).

Atkinson and Stiglitz (1976) show that a capital tax rate of zero is optimal if an optimal non-linear labour income tax is implemented. This result is based on the assumption of weak separability of the utility function between labour and consumption, and if individuals have the same preferences for consumption. Here inequality can only result from differences in labour skills and thus there is no desire to redistribute between different types of savers. Hence, it is optimal to implement a non-linear income taxation and no additional tax on capital income(Piketty and Saez, 2012).

Chamley (1986) examines the optimal capital taxation problem in a general equilibrium model with infinitely lived individuals. He also concludes that the optimal rate is zero, at least in the long run. Thus, the only income that should be taxed is labour income. This result is mainly based on the key property of the model that the social and private discount rates are identical in the long run (Chamley, 1986).

Judd (1985) and Chamley (1986) investigate independently in a very similar setting the optimal rate of capital taxation. Both come to the same conclusion, namely that the optimal rate of taxation on capital income is zero. In contrast to Chamley (1986), Judd (1985) models two different types of individuals, the workers and the capitalists. If all types of individuals have the same rate of time preferences and the economy approaches the steady state than none of the agents chooses a positive rate of the long run taxation on capital income, not even the workers - independently of their level of wealth. (Judd, 1985)

Chamley's (1986) result also holds when some assumptions are relaxed (Atkeson et al., 1999). Instead of homogeneous consumers Atkeson et al. (1999) model two types of agents with different utility functions, but identical discount factors and find that the optimal taxation rate is still zero. The zero optimality result also holds in the following specifications: in a model with an economy that grows at a endogenously given rate, in an open economy, as well as in a model with overlapping generations. (Atkeson et al., 1999)

Later several authors have criticised the zero-optimal capital taxation result (e.g. Piketty and Saez 2012, Piketty and Saez 2013, and Diamond and Saez (2011)). Piketty and Saez 2012 model an economy in which inequality can result not only from differences in labour skills, but also from different bequests from the elderly generation. The individuals in this model have heterogeneous preferences for bequests and for accumulation of capital by itself. The authors find that in their model the Atkinson-Stiglitz result does not hold, because inequality is now bi-dimensional and therefore the optimal capital taxation is not zero, even if an optimal labour income tax is implemented. The authors also find finite long run elasticities of inheritance to tax rates and claim that consequently the Chamley-Judd result does not hold. Using realistic parameters the optimal tax rate on capitalised bequest is estimated to be 50%-60%.

Diamond and Saez (2011) also heavily criticise the Atkinson-Stiglitz and Chamley-Judd results. The authors examine whether the key assumptions that are necessary for the zero-optimal result are realistic. They claim that the theoretical models are not robust enough to be implemented. Further, they argue to implement a positive taxation on capital income. Their arguments are i) the indistinguishability of income stemming from labour or from capital, ii) that higher earning opportunities are associated with a higher tendency to save, iii) the existence of borrowing constraints, and iv) the influence of lower savings on future labour supply.

Conesa et al. (2009) use an overlapping generation model with agents that have different labour productivities, and idiosyncratic income risks. This set up motivates a redistribution policy. The authors find a 23 % flat tax on labour income with a deduction of $7.200 and a taxation on capital income of 23 % to be optimal.

Atkinson (1971) analyses a life cycle model with lifetime utility maximising individuals with a utility function that is additively separable in consumption and bequest made at death. He considers three different types of taxation on capital: a capital levy, a wealth transfer tax, and a net wealth tax. As stated by the author, in a one asset model a wealth tax can be seen as a reduction in the rate of interest. In this model savings can then rise or fall due to a reduction in the rate of interest. The author shows that implementing a net wealth tax leads to a reduction in the bequest. The effect on savings, however, is not predictable, and depends on whether the income or the substitution effect dominates.

2.2 Empirical Literature

So far, very few scholars have tried to evaluate the effects of a wealth tax empirically. Even less have investigated the consequences of abolishing the wealth tax empirically. To my knowledge, only one paper (Hansson, 2008) has estimated the effect of the abolition of a wealth tax on economic variables.

Hansson (2008) uses aggregate data to estimate the effect of abolishing a net wealth tax on the rate of self-employment, as a measure for entrepreneurial activity. She uses difference-in-difference analysis and examines 4 countries, namely Austria, Denmark, Germany and the Netherlands, which abolished their net wealth tax in 1994, 1997, 1997 and 2000. Additionally, she considers France and Italy. France abolished its net wealth tax 1986 and reintroduced it in 1988 and Italy introduced it in 1993, but abolished it again in 1998. She finds a small positive effect of the abolition of a net wealth tax on self-employment. The author also points out that the results should be interpreted carefully, as the available data are very limited and the crucial random-assignment assumption of the difference-in-difference analysis might be violated, as the treatment group might not be chosen randomly.

In an earlier study Hansson (2002) analyses data for 20 EU countries during the period 1980 to 1999, of which 11 had levied a net wealth tax. She investigates the effect of the net wealth tax on the five-year-average yearly growth rate. Hansson finds a negative influence of taxing wealth on growth, but the estimated effect is quite small.

More attention has been paid to the analysis of countries that still levy a wealth tax. Pichet (2008) analyses the French wealth tax and concludes that it leads to capital flight of about € 200 billion since 1998. According to the author, the wealth tax is likely to decrease GDP growth by 0.2% each year.

Edson (2012) investigates whether the wealth tax has a capital constraining effect on small privately held firms. To analyse this question the author uses panel data of small privately hold firms between 2005 and 2009 in Norway. He groups firms a priori based on whether the primary owner needs to pay a wealth tax or not. Surprisingly, the author finds that firms held by wealth tax paying owners are less constrained than non-taxed firms. He gives two possible explanations for this result. First, it can be due to a bad fit of the used model. Second, the owner's status and financial situation (paying the wealth tax can here be used as a proxy) can help a small private firm to take out an external loan.

Seim (2012) considers the effect of a wealth tax on reported wealth in Sweden in 1999-2006. The estimated elasticity of taxable net wealth is around 0.3 %. He compares third-party reported wealth to self-reported net wealth. Bunching at the kink point can only be observed in self-reported wealth, not in third party reported wealth. Therefore the author concludes that the observed effects are mainly due to evasion and not so much to a change in the saving behaviour.

Zoutman (2015) studies the effect of the Dutch 2001 capital-income tax reform on wealth accumulation and share of financial wealth in a panel data from the Netherlands. The results show that the share of income that is invested in financial assets decreases in response to an increase of the tax on financial wealth. Further, he observes that wealth accumulation increases when the after-tax return on wealth rises. The estimated effects are rather modest. Thus, the author concludes that capital taxation is less distortive than estimated so far.

Brülhart et al. (2017) analyse aggregate data for all Swiss cantons as well as individual data for Bern. In both data sets the authors find that capital accumulation reacts strongly to wealth taxation. They estimate a 3.4 % reduction in wealth holding in the aggregate data and a 2.3 % reduction for the individual data as a reaction to a 0.1 % percentage point increase in wealth tax. Their results are higher than previous estimates of elasticity of taxable income.

Both the theoretical and the empirical literature give no definite answer concerning the consequences of a net wealth tax. This thesis aims to estimate empirically the effect of the abolition of the net wealth tax in Germany on the household saving rate. Thereby, the thesis adds to the very small body of literature on the effects of the abolition of the net wealth tax.

3 The (German) Wealth Tax and the Household Saving Rate

3.1 The Impact of the Wealth Tax on the Household Saving Rate

A tax on capital leads to a decrease in the expected return. Thus, it also can be seen as a reduction of the after-tax rate of return. The consequences of a change in the after-tax rate for savings depend on their interest elasticity. This elasticity can be either positive or negative, depending on whether the substitution or the income effect dominates. Hence, savings can either rise or fall after a tax on capital has been introduced. In theory, this is mostly demonstrated in a two period model. The model assumes that earnings are fixed and are earned exclusively in the first period. Furthermore, everything that is not consumed during the first period is saved for the second period. Therefore, within this model savings are equivalent to consumption in the second period. Hence, a decrease in after-tax rate of return leads to an increase in the price of second period's consumption. Here, a substitution effect implies a decrease in savings - as savings are now more costly than before. Consequently, this leads to a higher consumption in the first period. The income effect on the other hand leads to a decrease in consumption of both periods, thereby increasing savings. (Bernheim, 2002) Thus, theory delivers an ambiguous answer to the question which effect in general dominates. This thesis attempts to answer this question empirically, by evaluating the response of the household saving rate to abolishing the net wealth tax in Germany in 1997.

3.2 The German Wealth Tax

Germany abolished its net wealth tax in 1997, after in 1995 the federal constitutional court declared the net wealth tax in its current form unconstitutional. This verdict was justified by the non-updated standard values for real estate properties, which led to a different valuation of immoveable property compared to other assets taxed at their market values.

The German net wealth tax that was introduced in 1893 in Prussia and underwent a major revision in 1923 was a personal net wealth tax, i.e. the assessment basis included total financial and non-financial wealth minus liabilities. The tax base also included owner-used residential property and business assets. Legal persons were subject to a separate net wealth tax.
Since 1978, legal persons were subject to a net wealth tax rate of 0.7% and natural persons with a tax rate of 0.5%. In 1995, the tax rate was raised

to one percent.(Bach and Beznoska, 2012b)

Throughout the decades in which the net wealth tax was collected the revenues decreased heavily. It yielded 0.5 percent of GDP in the late twenties, but the revenues fell to only 0.2 percent of GDP in the mid-90's.(Bach and Beznoska, 2012b)

In 1995 67.1% of revenues of the net wealth tax stemmed from natural persons and 3.1% of all private households were affected by the net wealth tax. The personal allowance was 61 355 Euro (120000 DM).(Bach and Beznoska, 2012a)

The gradual long-term reduction of the revenues was mainly caused by the non-updated standard values for real estate properties that had not been re-evaluated since 1964. Consequently, the net wealth tax treated real-estate property and other assets differently. Thus, the federal constitutional court declared the net wealth tax unconstitutional in 1995. Until 1997 no solution was found how to update the assessed property values; therefore the net wealth tax was not levied any more from 1997 onwards. (Bach and Beznoska, 2012b)

Germany is the focus of this thesis as it abolished the net wealth tax after the decision that the tax in the design applied until 1997 was unconstitutional. This policy intervention was not, as in other countries (e.g. Austria or Italy), part of a larger reform of the existing tax system. As far as I am aware of, there were no other changes in 1997 that could have affected the household saving rate and thereby distort the estimated effects. Thus, Germany is a rare case where the net wealth tax was not abolished in the course of a comprehensive reform and is therefore an interesting case to study the "isolated" effects of the elimination of a net wealth tax.

4 Methodology

This thesis attempts to evaluate the effect of abolishing the net wealth tax in Germany in 1997 on the private saving rate. To achieve this, I use the “synthetic control method for comparative case studies”, a fairly new method which has been established by Abadie and Gardeazabal (2003), and Abadie et al. (2010, 2015).

The synthetic control method (SCM) applies in a setting where one observes one (or more) treated unit(s) affected by a treatment (typically on an aggregate level), and a set of untreated units. The SCM forms a convex combination of the possible control units in order to build a synthetic control unit. The combination is chosen in a way that it best mimics the treated unit during the pre-treatment periods. The objective is to simulate the trajectory of the affected outcome variable of the treated unit during the post-treatment periods in absence of the treatment. (Abadie and Gardeazabal, 2003) Therefore, the SCM estimates how the outcome variable of the treated unit should have developed if it had not received the treatment.(Campos et al., 2014) The effect of the intervention can then be detected by comparing the treated unit and its synthetic counterfactual.

Recently, the method has been used a lot to estimate economic effects of various policy interventions. Abadie and Gardeazabal (2003) investigate the consequences of terrorism in the Basque country on GDP and Abadie et al. (2015) examine the response of West Germany’s GDP on the re-unification of Germany. Abadie et al. (2010) estimate the effect of Proposition 99 (a tobacco control program) on the number of cigarettes smoked in California. Campos et al. (2014) study the effect of becoming a member of the European Union on the evolution of the GDP. Jinjarak et al. (2013) investigate the impact of capital controls on capital inflows, and Sanso-Navarro (2011) the effect of the UK’s decision to not adopt the Euro as national currency for foreign direct investment on FDI inflows.

Compared to the difference-in-difference (DID) method, the SCM relaxes the often-called common trend assumption. This assumption assures the unbiasedness of the DID estimation.(O’Neill et al., 2016) The common-trend assumption requires that the effects of the unobserved cofounders are time-invariant and that every time effect mutually affects the treatment groups. Basically, this assumption means that the treated and non-treated groups would follow the same path if no treatment occurred. Unfortunately the common-trend assumption is often not met. (Kreif et al., 2016) When comparing household saving rates among various countries, as I do, it does not seem to be fulfilled, which also supports the idea of using SCM as alternative method.

4.1 Synthetic Control Method (SCM)

In the following section the method is described in more detail. The notation used follows Abadie et al. (2011).
Suppose that one observes $J + 1$ countries. The first country received a treatment. A treatment can be either a policy intervention or a historic event. Hence, J control units are available. This set of countries is also called the donor pool. Every country must be observed for T periods. The time-periods are grouped into pre-treatment and post-treatment periods. Say, T_0 is the year when the intervention took place, then the pre-treatment periods are $1...T_{0-1}$, and the post-treatment years are $T_{0+1}...T$.

For each unit i at time t the outcome variable Y_{it} can either be treated Y_{it}^I or non-treated Y_{jt}^N. The treatment effect can be discovered by $\hat{\alpha} = Y_{jt}^I - Y_{jt}^N$. Thus, the effect is the difference between the country's outcome in the presence and in the absence of an intervention. Note that for the treated unit Y_{jt}^I the trajectory in the presence of the treatment is observed, whereas Y_{jt}^N the outcome variable in the absence of the treatment effect is not. The SCM solves this problem by using a convex combination of the control units and forming an artificial non treated unit. In order to construct a synthetic control unit that is as similar as possible to the treated unit it is necessary to define predictor variables (covariates). Let's call a $(K \times 1)$ vector of the pre-treatment predictors for the treatment-unit X_1. The $(K \times J)$ matrix X_0 consists of the same variables for the control units.
W is a $(J \times 1)$ vector of positive weights that sum to one $\sum_{i=1}^{J} w_i = 1$. W reflects the relative weights for each control unit of the donor pool. These weights are chosen in a way that the predictors' pre-treatment difference between the treated unit and the synthetic control unit is minimised. V is a weight matrix that weights the relative importance of the predictor

variables. These weights can either be chosen by some previous knowledge of it, or by a data-driven approach. The latter one optimises V such that the synthetic control unit best mimics the treatment unit. I follow Abadie and Gardeazabal (2003) and estimate V empirically.

The optimal weight matrix W^* is chosen by minimising the distance between X_1 and the weighted X_0:

$$\begin{gathered} \min\ (X_1 - X_0W)'V(X_1 - X_0W) \\ \text{s.t. } w_i \geq 0 \text{ for } j = 1...J \text{ and } \sum_{i=1}^{J} w_i \end{gathered} \tag{1}$$

Subsequently, the synthetic control unit is calculated as follows $X_1^* = X_0W^*$ and $Y_{it}^N = Y_{jt}^0 W^*$, where Y_{jt}^0 is a $(T \times J)$ matrix consisting of the values of the outcome variable for all periods and all control countries. V^* is calculated by

$$\text{argmin}_{V \in V}(Z_1 - Z_0W^*(V))'(Z_1 - Z_0W^*(V)) \tag{2}$$

where V is the set of all non-negative diagonal $(K \times K)$ matrices. Z_0 and Z_1 contain the pre-treatment treated variable for the treated unit and non-treated unit, respectively.

4.2 Inference

In a typical setting of a comparative case study the number of control units is often very small, which does not allow for the use of large sample inference. (Abadie et al., 2010). SCM addresses this problem by conducting placebo tests. There are several placebo tests available. One possibility is to iteratively reassign the treatment to control units, i.e. to assign the treatment to units that have not experienced a treatment. The comparison of the estimated effect and the placebo effect can help to understand the significance of the effect. Here, the estimated effect should differ from the placebo effects. In a similar way the in-time placebo test is conducted. The treatment is now reassigned to the treatment unit at different points in time at which no treatment occurred. If the treatment effect is relevant the estimated effect of the treatment year should be larger than the estimated placebo effects.(Abadie et al., 2011) As pointed out by Abadie et al. (2011), the inferential methods for SCM depend on the number of available controls.

5 Data

5.1 Data on the Household Saving Rate

The abolition of the German net wealth tax took place in 1997. While SCM works well with few data, the longer the pre-treatment period is the better. The data used for the Household Saving Rate covers the time period from 1980 to 2015. Data for 13 OECD countries are available: Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, The Netherlands, Norway, Spain, Sweden, and the USA. Several of these countries have abolished their net wealth tax during the pre-treatment period and thus received the treatment by themselves, which led to their exclusion. This group of excluded countries comprises Austria (which abolished the net wealth tax in 1994) and Denmark (which abolished the net wealth tax in 1997). Also France, which abandoned its net wealth tax in 1986 and reintroduced it in 1989, and Italy, which introduced it in 1992 but abolished it again in 1995, are excluded. Hence, the control pool consists of 8 OECD countries, namely Belgium, Canada, Finland, The Netherlands, Norway, Spain, Sweden, and the USA. The Data on Household Saving Rate is taken from the OECD and Eurostat - the data is described in more detail in the Appendix.

5.2 Choice of Predictors

Before applying the SCM one needs to define the predictor variables according to which an artificial or synthetic Germany should be found. The choice of the predictors in this analysis is motivated by the empirical literature on the determinants of the private saving rate (e.g. Hüfner and Koske (2010), Muradoglu et al. (1996), and De Serres and Pelgrin (2002)).

Inflation can serve as proxy for the uncertainty on saving decisions.(De Serres and Pelgrin, 2002) The inter-temporal consumption argument states that an increase of inflation can increase expenditures on durables. On the other hand, it also suggests that inflation leads to lower real values of financial wealth fixed in nominal values, and in order to prevent the wealth-income relation households increase savings.(Muradoglu et al., 1996)

The theory about inter-temporal consumption decision states that an increase in the **interest rate** leads to an increase in savings - but through the income effect it can as well be followed by a reduction in savings. (Muradoglu et al., 1996)

Data on **housing prices** has been used as a proxy for wealth trends, which is also used by Hüfner and Koske (2010). Muradoglu et al. (1996) argues that **demographic variables** also influences saving decision. The old and the young consume typically more from savings, while the working individuals are expected to accumulate savings. The demographic measure that is used in this analysis is the percentage of persons in the working age (i.e. inhabitants aged between 15 and 64).
Additionally to these variables also other measures are included, namely **national income, GDP, unemployment rate, investments**, **saving rate**, and **stock market index**.

6 Results

6.1 Estimations

The aim of SCM is to obtain a synthetic Germany which shows the level of the German saving rate if the net wealth tax had not been abolished. The donor pool is the set of possible control countries, i.e. the countries which have not abolished their net wealth tax during the observed time span. The SCM minimises the distance between Germany and its synthetic counterfactual according to various predictors. The predictors used in this analysis are CPI, GDP, Working age, Investments, Saving Rate (National), Unemployment Rate, Interest Rate, National Income and Housing Price Index and stock market index.

Table 1 compares the mean of Germany (Treated) and the synthetic Germany (Synthetic) for every predictor over the pre-treatment periods. The means for the synthetic control country are fairly similar to the means of "real" Germany. Furthermore, one can compare these values to the means of all countries in the sample (Sample Mean).

	Treated	Synthetic	Sample Mean
CPI	2.95	3.35	5.07
GDP	17771.90	18689.62	17326.03
Workingage	68.77	67.42	66.35
Investments	1.75	3.02	2.64
National_Saving_Rate	7.59	8.52	7.36
Unemployment_rate	44.58	38.84	30.23
InterestRate	7.42	8.28	9.85
National_Income	15055.77	15824.45	14433.74
Housing_Price_Index	117.90	52.91	52.38
Stock_Market	1487.10	1120.81	1048.17

Table 1: Comparison for the means of Germany and Synthetic Germany over the pre-treatment periods for all possible predictors

Table 2 presents the weight matrix W^*. It reflects the best (smallest distance) combination of weighted countries among all possible weight matrices W. It specifies the weight that is addressed to each country. The optimal synthetic Germany consists of 9 % Belgium, 62 % The Netherlands, and 29 % USA. Thus, The Netherlands is the country that contributes most to the synthetic Germany.

w.weights	unit.names
0.09	Belgium
0.00	Finland
0.62	Netherlands
0.00	Spain
0.00	Sweden
0.00	Norway
0.29	USA
0.00	CAN

Table 2: Country specific Weights

As described in the method section, a data-driven method has been used to estimate the optimal weighted combination of predictors, the weight matrix V. Table 3 illustrates the weights that are assessed to all possible predictors. The optimal predictors are (in declining priorities): Unemployment Rate (0.31), Interest Rate (0.26), National Saving Rate (0.17), CPI (0.16), Housing Price Index (0.05), Stock Market Index (0.02), Working Age (0.02), Investments (0.00), and GDP (0.00). The resulting predictors are not very surprising, and are mostly in line with the empirical literature described above.

	v.weights
CPI	0.16
GDP	0.00
Workingage	0.02
Investments	0.00
National_Saving_Rate	0.17
Unemployment_rate	0.31
InterestRate	0.26
National_Income	0.00
Housing_Price_Index	0.05
Stock_Market	0.02

Table 3: Weights for predictors

Figure 1 shows separately the mean household saving rate for countries levying a net wealth tax and those not levying one between 1980 and 1994. In 1994 the first countries in the sample have abolished their net wealth tax. As shown in Figure 1, the mean household saving rate of countries that levied a net wealth tax in the past is higher than the mean of countries that did not levy such a tax. This difference might be due to the possible negative incentive to save induced by a wealth tax.

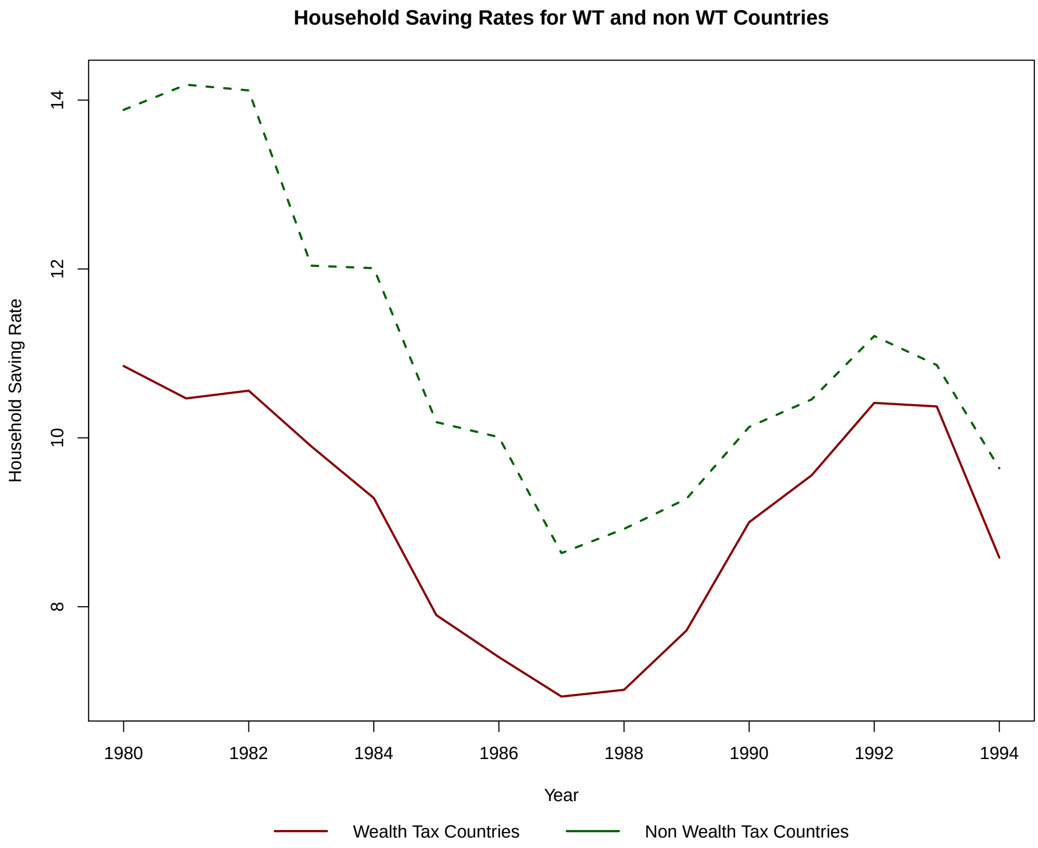

Figure 1: Mean of Wealth-Tax Countries and Non-Wealth-Tax Countries

Figure 2 provides a comparison of the saving rate of Germany, the chosen control countries (Belgium, The Netherlands, and the USA), and the sample mean. The dotted vertical line indicates the year 1997, the year in which the treatment – i.e. the abandonment of the net wealth tax - occurred. None of the control countries by themselves, nor the sample mean can mimic the trajectory of the German saving rate. Furthermore, one can observe that all countries experienced a decrease in the household saving rate during the 1990's. During the pre-treatment years the Dutch household saving rate showed similar fluctuations. It seems as if the fall of the household saving rate between 1997 and 2000 was much more pronounced in The Netherlands than it was in Germany. Even if the trajectories of Germany and the Netherlands are similar, they differ substantially in their levels.

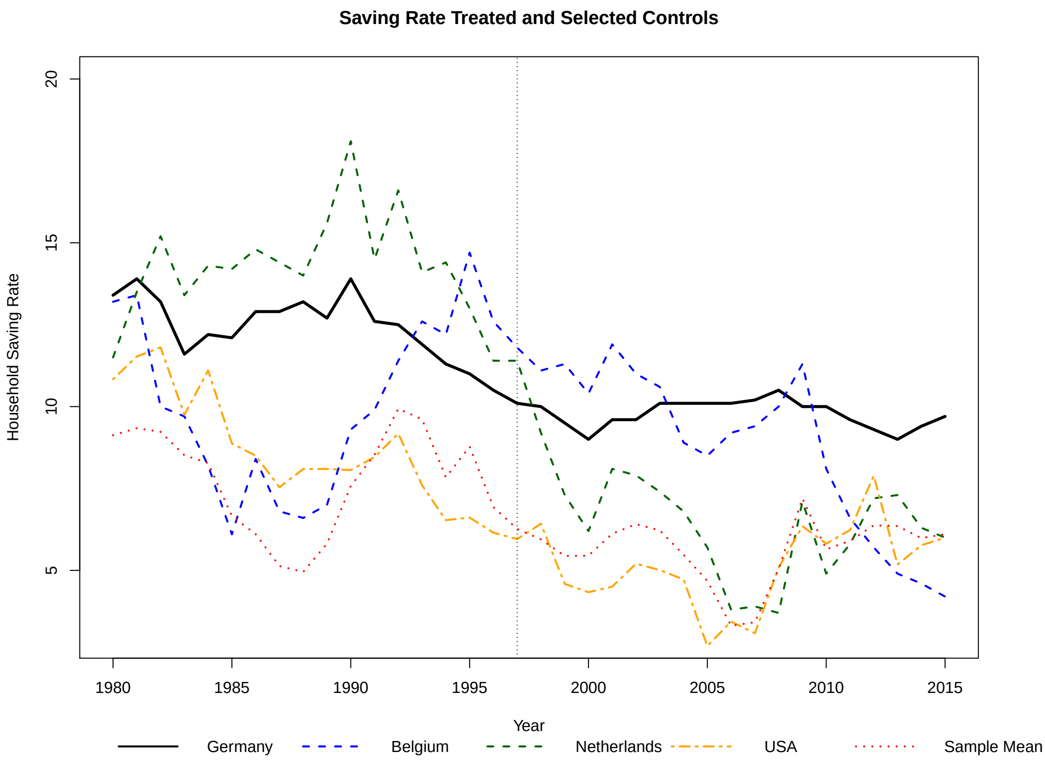

Figure 2: Time-plot Saving Rate of Germany and Sample Mean

The so-called Path Plot in Figure 3 presents the saving rate of Germany and its synthetic control country. The synthetic control country consists, as described above, of the convex combination of Belgium, The Netherlands and the USA. The dotted line refers to the synthetic control country. It mimics the trajectory of the German household saving rate in the absence of a treatment. In the pre-treatment period the synthetic household saving rate mimics the German household saving rate fairly good. However, from the year 1997 onwards Germany behaves very differently compared to its synthetic control country. Remember that the dotted line after 1997 answers the following question: What would have been the German household saving rate if it had not abolished the net wealth tax? The graph reveals that, according to the estimations, the German household saving rate should have decreased much stronger. Again, the vertical dotted line marks the year 1997.

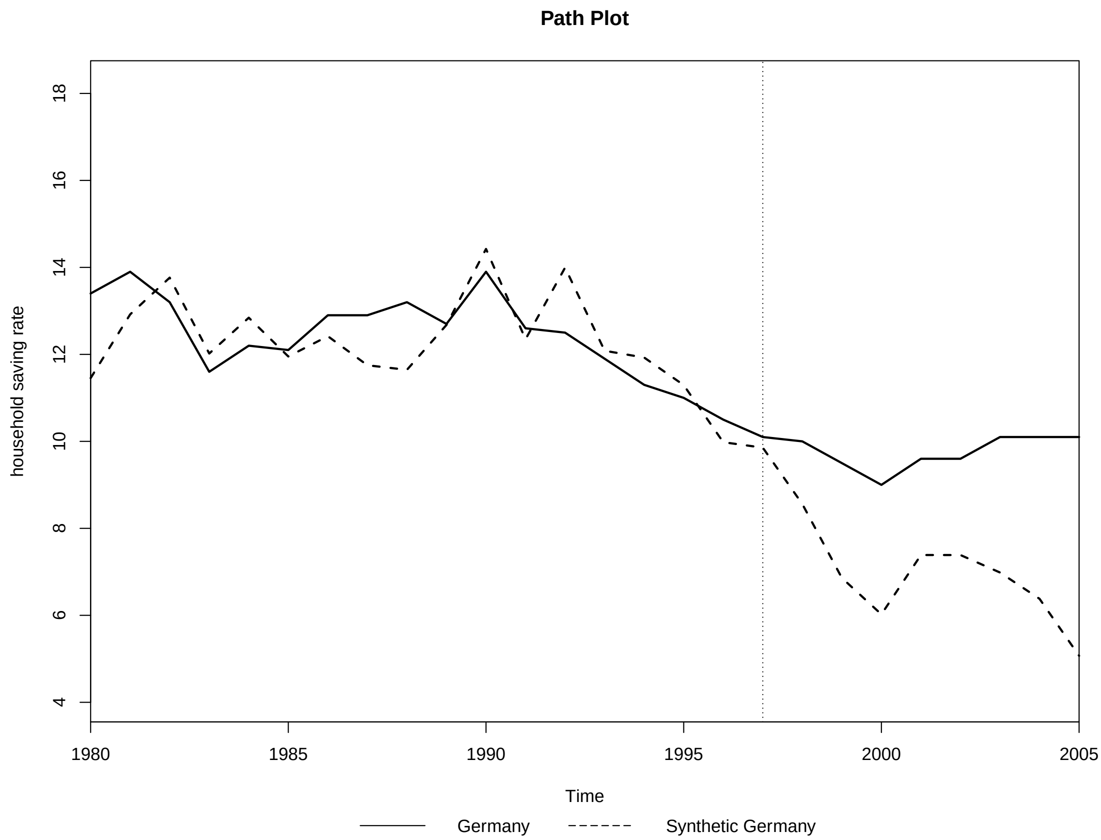

Figure 3: Time-plot Saving Rate of Germany and Synthetic Germany

Figure 4 shows the difference between the observed household saving rates of Germany and the estimated household saving rates of its synthetic counterpart. One can clearly see a cut in 1997. The graph suggests that the effect increased between 1997 and 2000 up to a difference of nearly 3 percentage points. The figure illustrates the gaps until 2015, even if the results of the later years are not that reliable anymore, as other policy changes have happened. For example did The Netherlands abolish the net wealth tax in 2001, which influences the estimates.

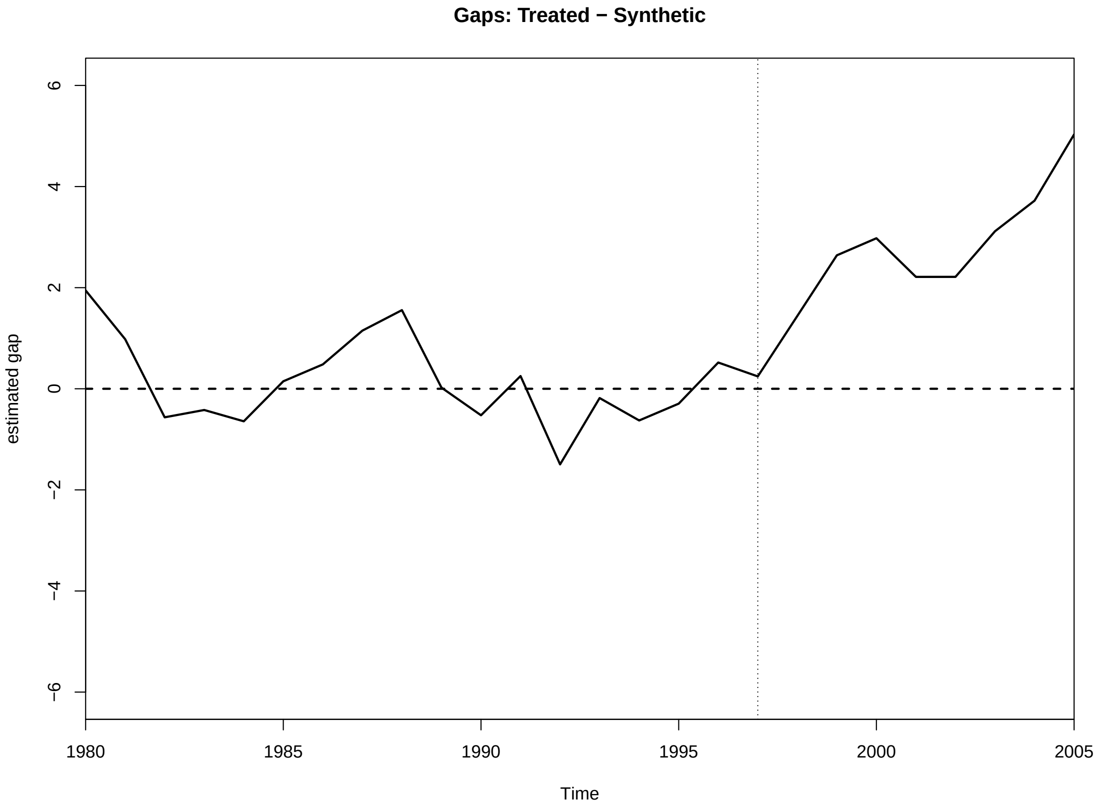

Figure 4: Gap Plot - Difference in Saving Rate between Germany and Synthetic Germany

6.2 Inference

As described in the methodology section, one cannot perform typical inference. Nevertheless, the question of significance of the results remains. It is necessary to evaluate whether the results could be driven by chance. A common method is to perform several placebo tests. The placebo in-unit test attempts to answer the question: How often would one observe results of that magnitude if other countries than Germany had been chosen. Thus, the in-unit placebo test addresses the treatment to control countries and estimates the difference between the country and its synthetic counterpart. If the placebo results have a similar magnitude as the estimates for Germany, the estimated negative effects of abolishing a net wealth tax are not relevant. If, in contrast, the placebo tests lead to smaller gaps than the

German results, this can be seen as evidence for a positive effect of abolishing the net wealth tax.(Abadie et al., 2010) Here, the treatment is assessed to all control units at the year 1997.

In Figure 5, 6, 7, and 8 the gaps for all control units are shown in grey and the gap plot of Germany is added in black. The magnitude of the German saving rate appears to be slightly higher than the gaps of most of the other countries. Moreover, it is observable that the gaps in the pre-treatment periods are larger for some control units. The larger gaps reflect poor fits. The mean squared predicted error (MSPE) of pre-intervention periods for Germany is 0.726 indicating a fairly good fit of the synthetic control country. The median of the pre-intervention MSPE of the control units is 6.007 suggesting that the fit of some of the control units is much worse than the fit of Germany. As described by (Abadie et al., 2010) a poor MSPE for the treated unit indicates that the estimated effect might not be due to a change in the outcome variable but rather due to the bad fit. Similarly, control units with a poor fit (poor pre-treatment MSPE) are not useful to estimate the significance of the estimated effect of Germany. Abadie et al. (2010) suggest to run the placebo test with different control units, depending on the pre-treatment MSPE. I used control units that have an estimated pre-treatment MSPE of size 20-, 10-, and 7-times the pre-treatment MSPE of Germany.

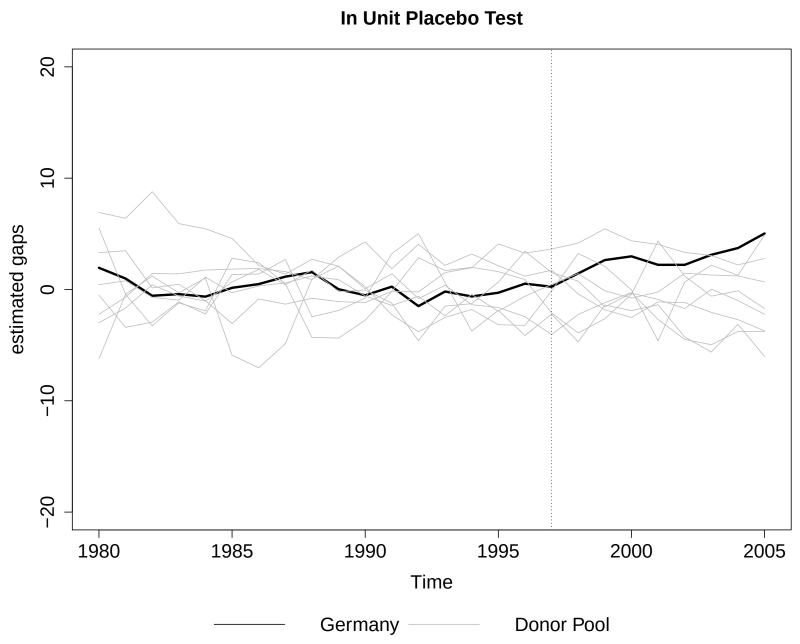

Figure 5: Gap Plot - Placebo in unit

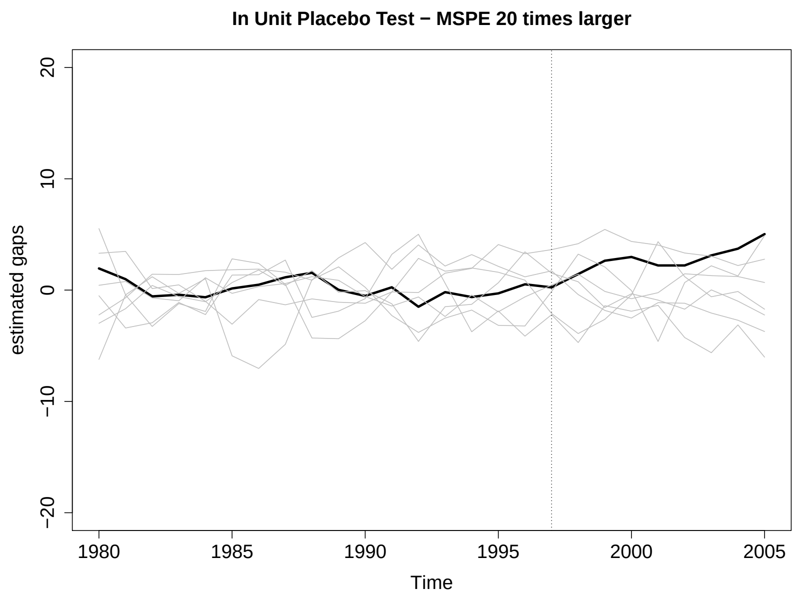

Figure 6: Gap Plot - Placebo in unit 20 times MSPE

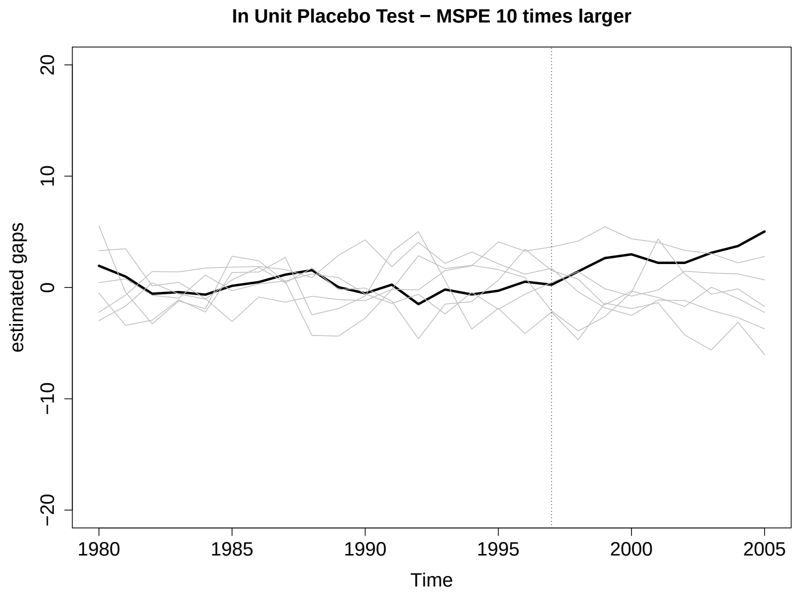

Figure 7: Gap Plot - Placebo in unit 10 times MSPE

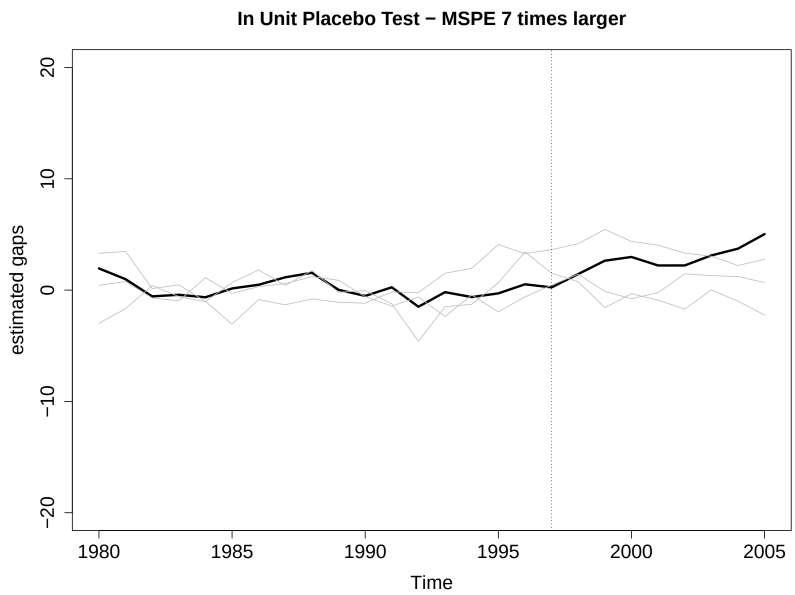

Figure 8: Gap Plot - Placebo in unit 7 times MSPE

Among all four placebo plots one can see that Germany seems to have a larger effect than the control countries. This becomes more visible in the last plot, which excludes all countries that had a pre-treatment MSPE 7 times larger than the German pre-treatment MSPE. In the other plots it is not that detectable, as also countries with poor fits are included. Typically, countries with larger pre-treatment MSPE also have a larger gap after the treatment year 1997.

As described above, the estimated effect depends also on the fit prior the treatment occurred. An alternative measure of the placebo test is proposed by Abadie et al. (2010). Abadie et al. (2010) use the ratio of the post-treatment MSPE and the pre-treatment MSPE to compare the placebo estimates with the German estimations. Thereby they overcome the problem of bad fits and can include all possible control units. The ratio reflects the change in MSPE induced by the treatment, i.e. the change in how good the synthetic control country can still mimic the country after the treatment occurred. I used the MSPE for seven years before the treatment and seven years after the treatment was executed. Figure 9 presents the ratio for Germany and all countries in the donor pool. The relation for the treated country Germany is much larger than for the control countries. The German MSPE for the 7 post-treatment years is around 11 times as large as the MSPE of 7 years before the treatment has occurred. The same procedure has been calculated for 4,3 and all periods before and after the treatment. The overall picture did not change.
As the constitutional court decided already in 1995 that the net wealth tax was unconstitutional, an anticipation effect might be detectable. I follow Campos et al. (2014) and control for anticipation effect by specifying the year of treatment to 1995. The estimated effect though remains similar. Therefore, one can conclude that the anticipation effect does not seem to matter. The additional calculations of the MSPE relation, as well as the detailed results of the optimization until 1995 are shown in the appendix.

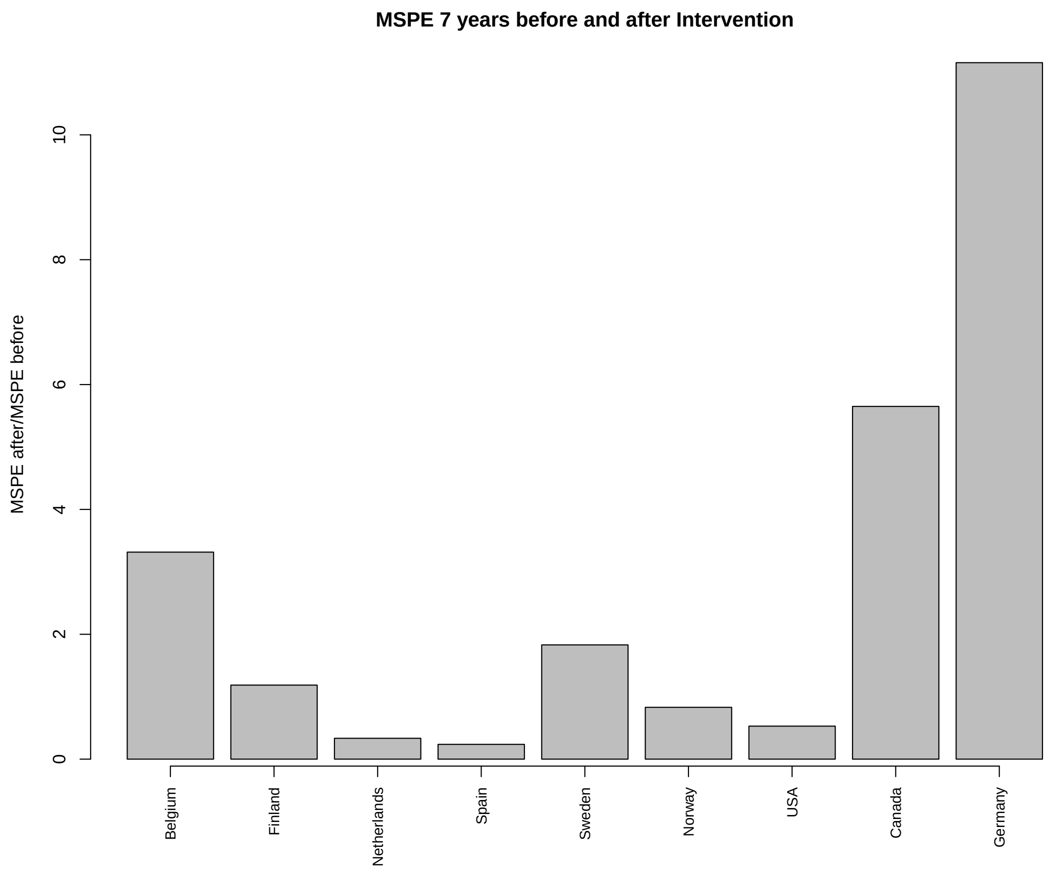

Figure 9: MSPE Relation

6.3 Robustness Checks

The synthetic Germany is a combination of only three countries (The Netherlands, the USA and Belgium). A possible robustness check for the synthetic control method is the leave-one-out analysis. It tests how sensitive the estimates are towards changes in the donor pool. The question to be answered is: how would the estimated effect change if the possible control countries were different? Hereby, we change the donor pool several times so that every country with a positive weight is excluded once from the possible control countries. We can then observe how the estimated effect reacts to this change. In our analysis the contributors to the synthetic Germany receive rather high weights, and only few control countries are available. Therefore, the leave-one-out analysis is to be interpreted with caution, because by excluding an additional country the number of possible donor countries becomes even smaller, and the effect of excluding a country with a higher weight can be expected to be large.

For every country with a positive weight, I first present the results of the leave-one-out analysis. Then, in order to support the robustness check, an overview of the most important policy changes in the country of interest is given. By this, one can control whether the estimated effect is driven by a change in the control country, instead of a change in the treated country.

6.3.1 The Netherlands

By excluding The Netherlands one excludes the country with the highest weight. That means, excluding the country that has been found to explain the German trajectory best. So it is not very surprising that the fit decreases dramatically. The MSPE of the pre-treatment period increases from 0.726 to 3.864. One reason why the fit reacts strongly is that many control countries that one typically would expect to explain Germany quite well, as Austria or France, are already excluded prior to the analysis. Thus, without The Netherlands it is hard to find a good predictor for Germany. Interestingly, the new synthetic Germany consists now of two countries, Canada and Belgium, and the USA is not part of the synthetic Germany any more. Now Canada contributes most with 54.5 %, Belgium receives a weight of 45.5%. The loss in the goodness of fit can also be observed graphically. Figure 10 shows the household saving rate of new synthetic Germany and the true Germany. The artificial Germany now cannot mimic the German trajectory prior to the treatment very well. The gaps between Germany and its synthetic counter-factual are larger during the pre-treatment period than the observed gap at the treatment year 1997. Therefore, the estimated effect vanishes. This shows that it is not possible to estimate the effect of abolishing the net wealth tax in Germany 1997 without including The Netherlands as a control country.

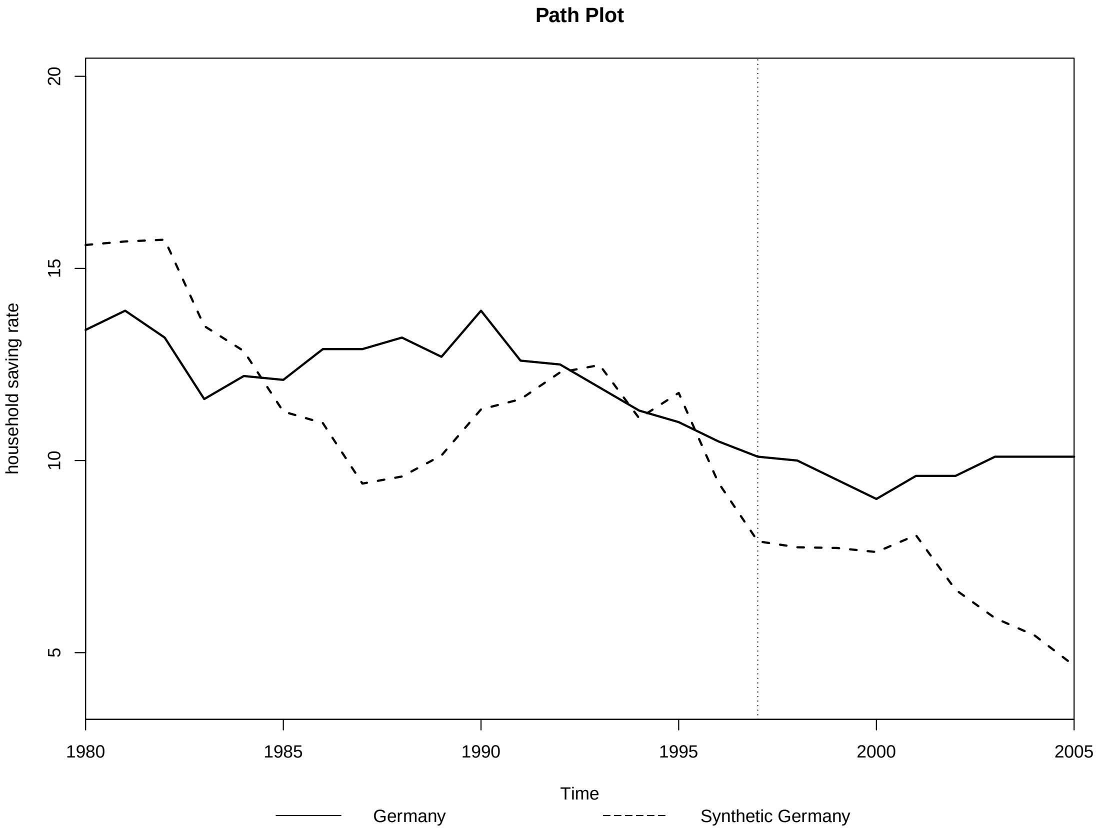

Figure 10: Leave-one-out analysis: excluding The Netherlands

Because the leave-one-out analysis of The Netherlands shows a huge effect it is particularly important to check for any reforms that took place in The Netherlands. This helps to clarify whether the estimated effect may stem from a policy change in The Netherlands instead of the abolition of the German net Wealth tax. In the years around 1997 The Netherlands had two important policy goals. Firstly, it focused on meeting the Maastricht criteria, in particular on reducing the debt to GDP ratio. Secondly, the government concentrated on promoting employment, especially for low-income workers. Hereby, the most relevant reform measures were the reduction of the non-wage labour costs, and tax credits for low-wage workers (i.e. workers earning a wage in a range up to 115 percent of the minimum wage). Furthermore, an "opening clause" was introduced that allows companies to hire workers of a certain target group (e.g. long term unemployed) below the legal minimum wage. Additionally, the possibility of a temporary tax cut for hiring long-term unemployed was introduced. Moreover some social security reforms took place, as e.g. privatising sick-leave insurance. Lastly, at the beginning of 1998 the new Competition Act was introduced which defines the control of mergers and acquisitions. (oecd 98)

6.3.2 The USA

When excluding the USA from the possible control countries, two new countries, Finland and Canada, are included instead. In addition, the weights are shifted. The weight for The Netherlands decreases to only 53.5%, but it is still the country with the largest impact. Belgium receives 20.6%, Canada 19.8% and Finland 6.2%.

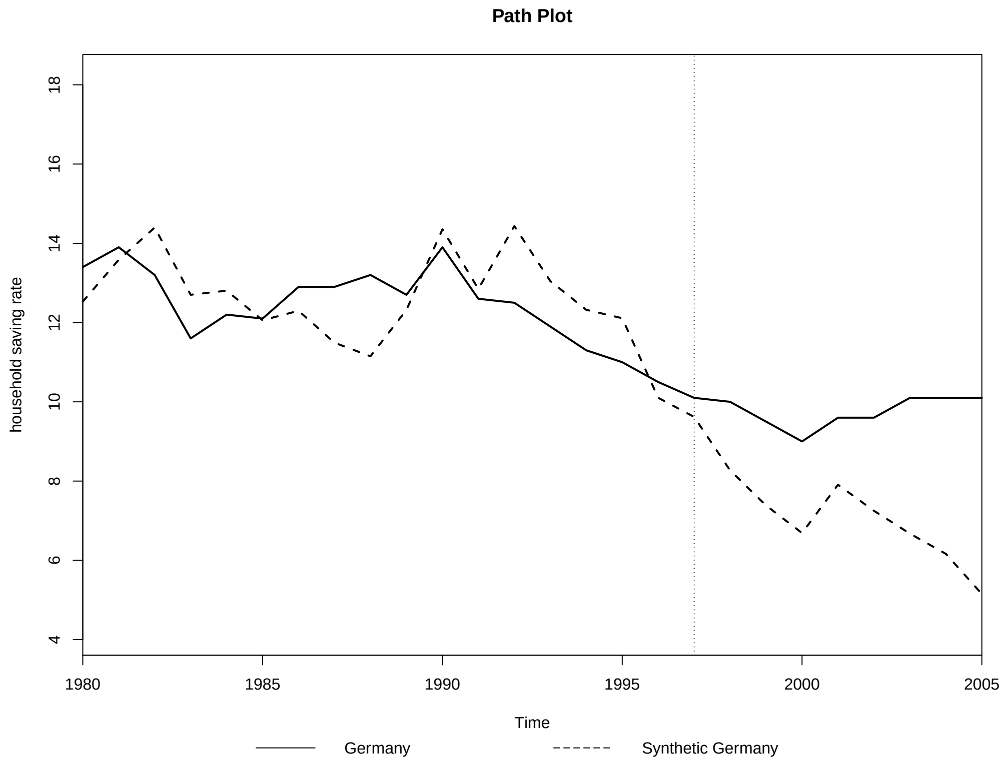

Figure 11: Leave-one-out analysis: excluding the USA

Although the included countries as well as the distribution of the weights are very different now, the new synthetic Germany can still mimic the trajectory of Germany quite well. Figure 11 shows that in 1997 the two household saving rates start to diverge, similarly to the original estimation. Again, one can see the peak in 2001, marking the point in time when The Netherlands also abolished the wealth tax. The MSPE of the pre-treatment time period again increases, but this time only from 0.726 to 1.031. The fit is of course worse, but as one excludes a country with a relative high weight, this is intuitively clear.

Again, it is important to check for policy changes in the USA. The most relevant policy change in the context of this study is the Taxpayer Relief Act (TPRA) of 1997 signed by former US president Bill Clinton. It focused mainly on the education of children from poor and middle-class families, but also aimed to encourage savings. The TPRA contained a child tax credit of 500 $ per child, various tax credits for higher education, and the reintroduction of the tax deductibility of student loans. Each of these policies was phased out for high-income households. The most relevant tax reform was the decrease of the capital gains tax from 28 to 20 percent for assets held more than eighteen months. (OECD 97) Obviously, this reform could clearly affect the results. However, by the leave-one-out-analysis one can see that the estimated effect remains very similar, even if the USA is excluded from the donor pool. Therefore, one can still rely on the original effect.

6.3.3 Belgium

The exclusion of Belgium leads, not very surprisingly, to a very similar result compared to the original one. The synthetic Germany without Belgium consists of 64.8% of The Netherlands and 35.2% of the USA. The new synthetic Germany still mimics the German household saving rate fairly well. Because Belgium originally contributed only little to the synthetic control country, the MSPE of the pre-treatment period remains, as expected, very close at a value of 0.804.

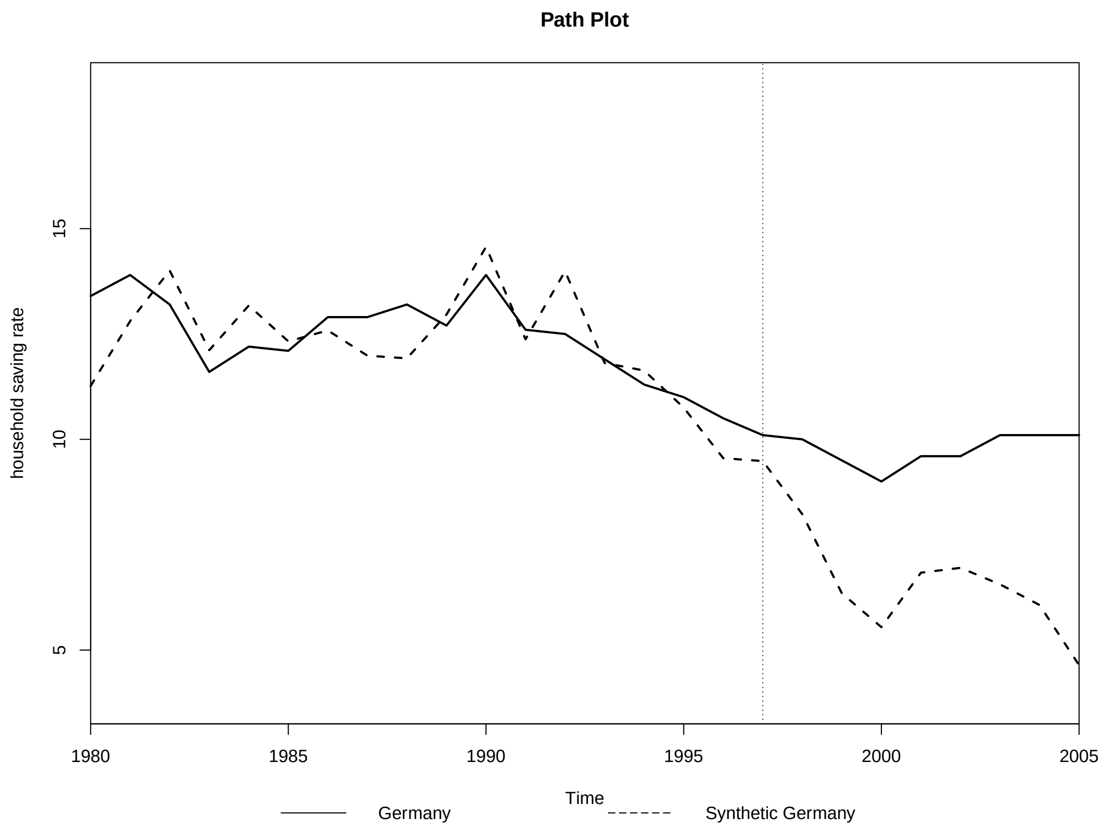

Figure 12: Leave-one-out analysis: excluding Belgium

Nevertheless, it is interesting to check briefly whether Belgium adopted tax changes that may affect the estimations. Belgium, like The Netherlands, closely linked the exchange rate of its currency (the Belgian Franc) to the German Deutschemark. As Belgium adopted the Euro in 2001, it is not surprising that around 1997 the Belgium administration focused on meeting the Maastricht criteria and therefore concentrated on reducing the debt to GDP ratio (OECD 99). In October 1995 the Belgium government declared to follow a multi-annual employment plan. Among other policies, the plan aimed to reduce non-wage labour costs, thus encouraging part-time work and support unemployed workers to find a job (OECD 97). Belgium did not pass any major reforms in the years between 1996 and 1998. In general, it concentrated on the labour market and its flexibility.

To conclude, this analysis shows that The Netherlands is the country with the most explanatory power and cannot be substituted by another control country. This is most likely due to the very limited number of countries available in the donor pool. Because of this unique characteristic of the Netherlands, it is important to check for large reforms between the years 1996 to 1999. The idea is that if The Netherlands changed for example capital taxes during this period, this could have driven the estimated effect. But as there were no major reforms in capital taxes, it seems as if Germany started to behave differently from The Netherlands and not the other way around. The same analysis has been conducted for the USA and Belgium. For both of these countries the estimated effect has remained similar after their exclusion from the donor pool. Therefore, policy changes during this time period are not as relevant as in the case of The Netherlands.

7 Discussion

The analysis has shown that the abolition of the net wealth tax in Germany in 1997 had a clear and positive effect on the household saving rate. This implies that empirically the substitution effect dominated. Given that only 3.1% of all German households were subjected to the net wealth tax in 1995 (Bach and Beznoska, 2012a), the magnitude of the estimated effect is surprisingly high.

However, the estimates should be interpreted with caution, as the analysis is limited by the available data. To my knowledge, there exists no micro-data for Germany exploring the saving decisions of households subjected to the net wealth tax, prior to and after the abolition of the net wealth tax. Because of the small number of observations, panel data methods cannot be applied here. Furthermore, a difference- in-difference approach is disputable for aggregate data. Especially the common-trend assumption is often not credible. This assumption, though, assures the unbiasedness of the estimation. According to the common-trend assumption the outcome for the treated and the non-treated group would have followed parallel paths in absence of the treatment (O'Neill et al., 2016; Kreif et al., 2016). We compare aggregate data of the household saving rate of various countries. In our setting, the common-trend assumption does not seem to be fulfilled. Furthermore, the treated group consists of only one country, additionally leading to a problem of too few observations. The synthetic control method relaxes the common trend assumption and is designed for cases where only one country is treated. Therefore, it is the preferred method to use. However, the major drawback of the synthetic control method is that it strongly depends on the possible control countries. Excluding several countries that received the treatment themselves, as for example France or Austria, decreases the already small number of countries in the donor pool even further. As the countries excluded are in many ways very similar to Germany they probably would have been very useful donors to form an artificial Germany. Thus the exclusion weakens the analysis, as fewer countries are left to choose from.

Eventually, the synthetic control country is formed by three countries only, so that the result heavily depends on these countries. A leave-one-out analysis shows that especially the exclusion of The Netherlands changes the results substantially. Hence, the estimated effect might come from a change in the saving behaviour of The Netherlands instead of a change in Germany. Yet, no tax reform that would change the households saving rate of The Netherlands (and thus weaken the estimated effect) has been introduced.

For Sweden, Seim (2012) finds that an increase in the net wealth tax rate induced an increase in tax evasion rather than a change in the saving behaviour. Due to the lack of microdata available, I cannot disentangle whether the estimated effect for Germany is due to an increase in household savings or a decrease in tax evasion, which might be an alternative explanation for the large magnitude of the discovered effect.

Altogether, the estimated results show a large positive effect of the abolition of the German net wealth tax on the household saving rate. The in-time placebo test shows that this result was not found by chance. Moreover, the robustness checks reveal that the result is robust against the exclusion of the USA and Belgium. Both test results therefore support our findings.

8 Conclusion

During the last three decades, many European countries abolished their net wealth tax. Yet, very few papers have studied the consequences of such an abolition. In recent years the political discussion of a reintroduction of the net wealth tax intensified, thus its abolition is an interesting historic event to study empirically. This thesis estimates the effect of the abolition of the net wealth tax in Germany in 1997 on the households saving rate.

I used a dataset of 13 OECD countries, their household saving rates as well as other economic variables, e.g. GDP, unemployment rate and inflation. Within this sample, countries that levied a net wealth tax between 1980 and 1994 had on average a lower households saving rate than countries that did not. The household saving rate was on average 1.97 percentage points higher in countries that did not have a net wealth tax.

I used the synthetic control method which forms an artificial Germany by a convex combination of control countries. Control countries are countries that have not abolished the net wealth tax during in the pre-treatment period, where the parameters are determined. The synthetic Germany consists of The Netherlands, the USA and Belgium. The estimations show that Germany should have had a much lower household saving rate in 1997 if it had not abolished the net wealth tax. After 3 years, the household saving rate of Germany was found to be 3 percentage points higher than it would have been without the abolition. Therefore, the abolition induced a remarkable positive effect on the household saving rate.

However, the results should be interpreted with caution. Due to data limitations, the analysis has some shortcomings. The number of possible control countries is limited because the household saving rate between 1980 and 1997 is not available for all OECD countries. Additionally, one cannot include countries that received the treatment themselves, which further limits the donor pool. This leads to an artificial Germany that consists of only three countries, and therefore depends strongly on their household saving rates.

This thesis is a first attempt to estimate the effect of the abolition of the net wealth tax on the saving decisions of households, which has not been done so far. I studied the case of Germany, as more countries would have been beyond the scope of this thesis. Nevertheless, for future work it would be interesting to perform a similar analysis for other countries. If indeed, the estimated effect is mainly due to the abolition of the net wealth tax, a similar effect should be observable for other countries that have as well abolished the wealth tax. Moreover, it would be interesting to extend the analysis by using microdata, if available, to disentangle the direct effect on the saving decisions from possible tax avoidance effects. Further, one could perform a similar analysis in order to study the effect of the implementation of a net wealth tax.

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10 Appendix

10.1 Optimization until 95

	Treated	Synthetic	Sample Mean
CPI	3.10	3.51	5.48
GDP	16929.04	17841.51	16464.66
Workingage	68.89	67.42	66.34
Investments	1.95	2.59	2.09
National_Saving_Rate	7.84	8.21	7.14
Unemployment_rate	43.90	37.18	29.83
InterestRate	7.61	8.54	10.37
National_Income	14381.81	15070.87	13694.71
Housing_Price_Index	117.77	52.25	51.78
Stock_Market	1280.15	933.13	853.26

Table 4: Comparison Mean of Germany and Synthetic Germany over the pre-treatment periods of all possible predictors

	v.weights
CPI	0.11
GDP	0.00
Workingage	0.12
Investments	0.00
National_Saving_Rate	0.01
Unemployment_rate	0.27
InterestRate	0.26
National_Income	0.00
Housing_Price_Index	0.07
Stock_Market	0.16

Table 5: Weights for predictors

w.weights	unit.names
0.06	Belgium
0.00	Finland
0.62	Netherlands
0.00	Spain
0.00	Sweden
0.00	Norway
0.32	USA
0.00	CAN

Table 6: Country specific Weights

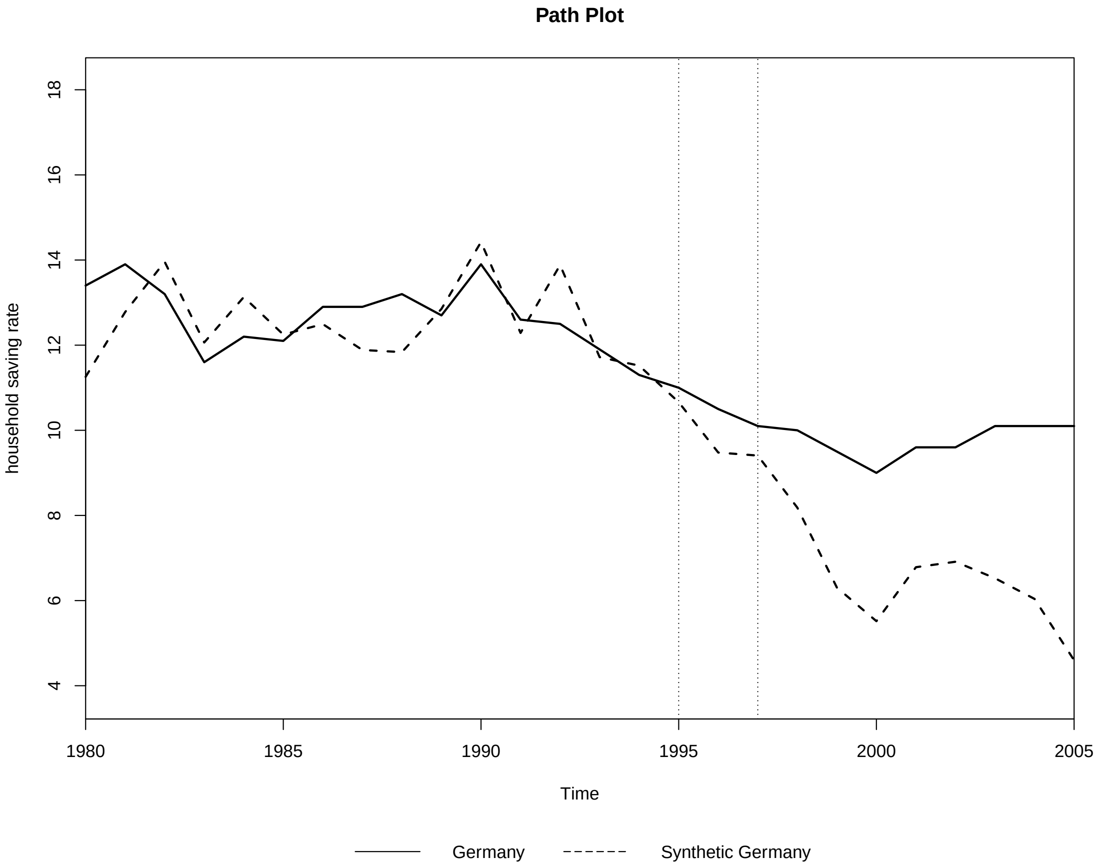

Figure 13: Time-Plot Saving Rate of Germany and Synthetic Germany - Treatment was defined to occur in 1995. First vertical dotted line indicates the year 1995, second vertical line indicates the year 1997.

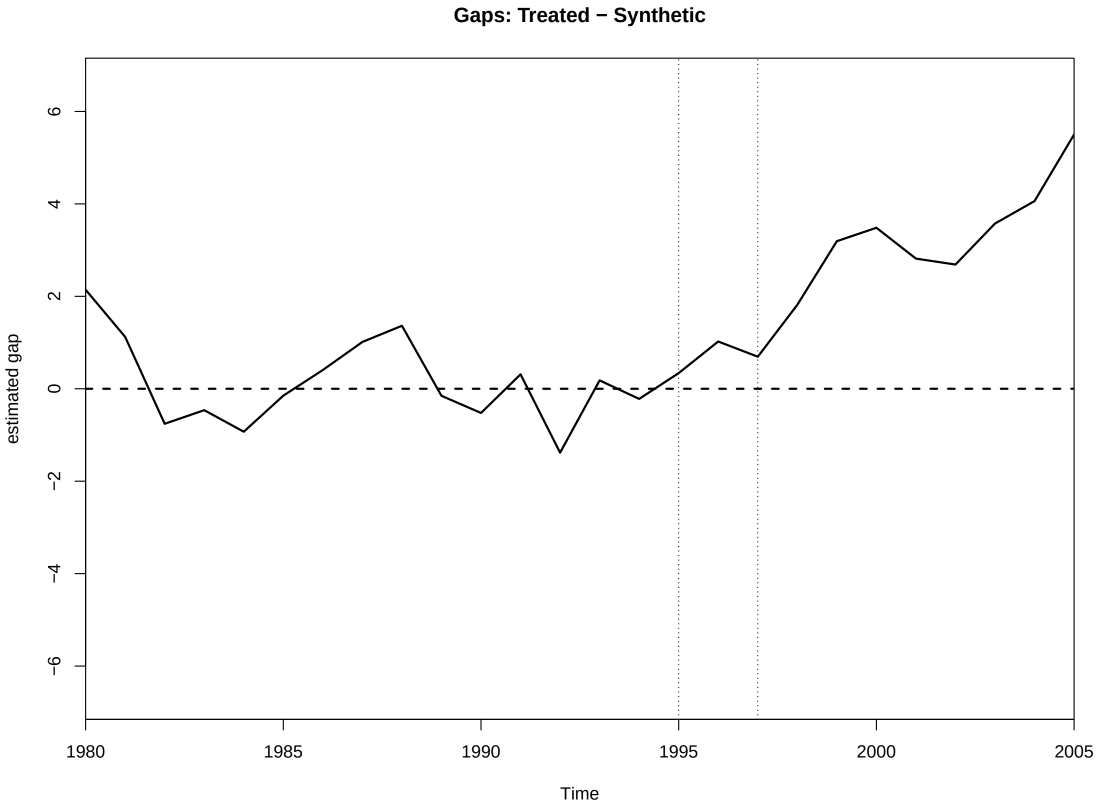

Figure 14: Gap Plot: Difference in Saving Rate between Germany and Synthetic Germany - Treatment was defined to occur in 1995. First vertical dotted line indicates the year 1995, second vertical line indicates the year 1997.

10.2 MSPE Relation

4 years before and after the Intervention

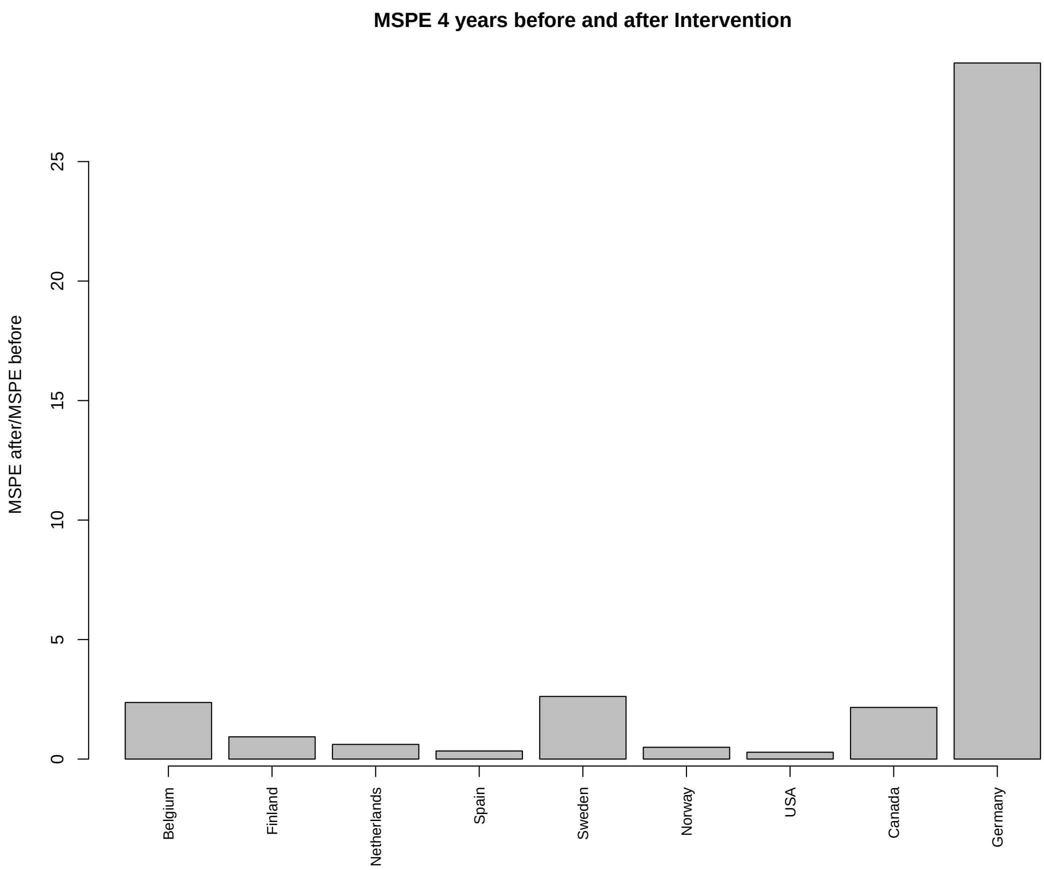

Figure 15: MSPE Relation 4 years beofre and after the Intervention occurred

3 years before and after the Intervention

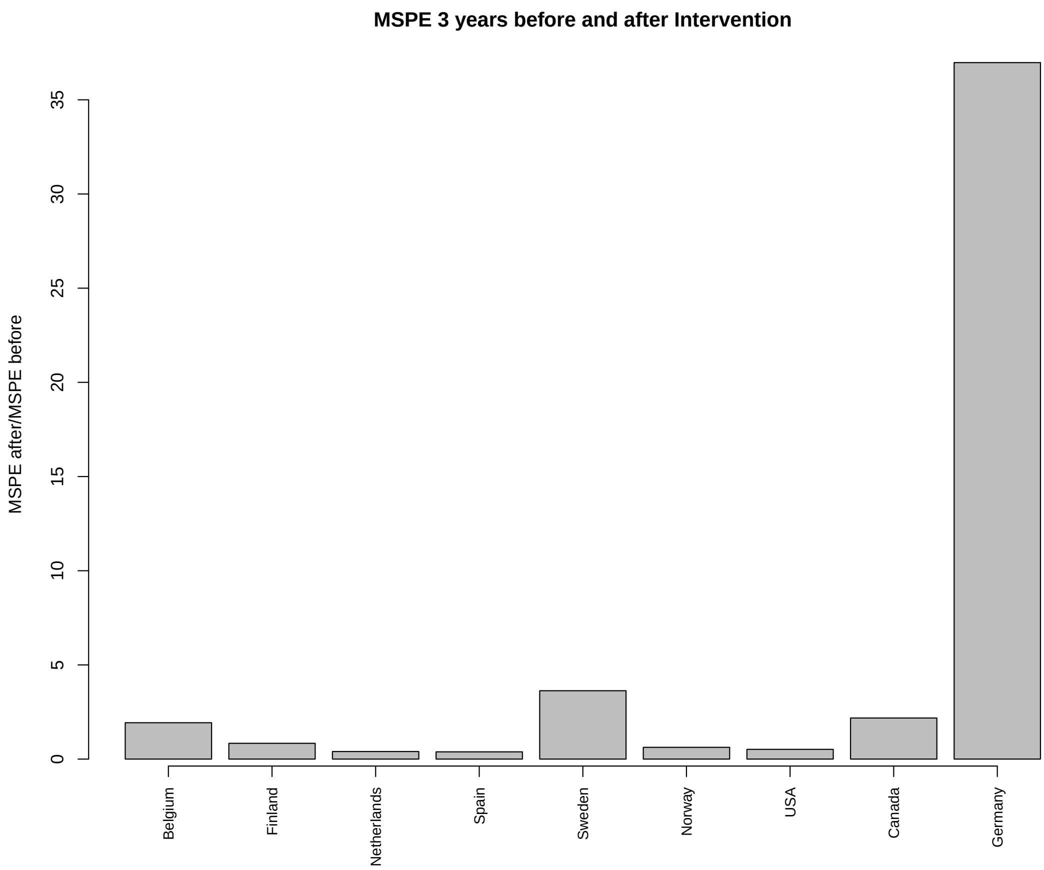

Figure 16: MSPE Relation 3 years beofre and after the Intervention occurred

Relation of all pre and all post periods

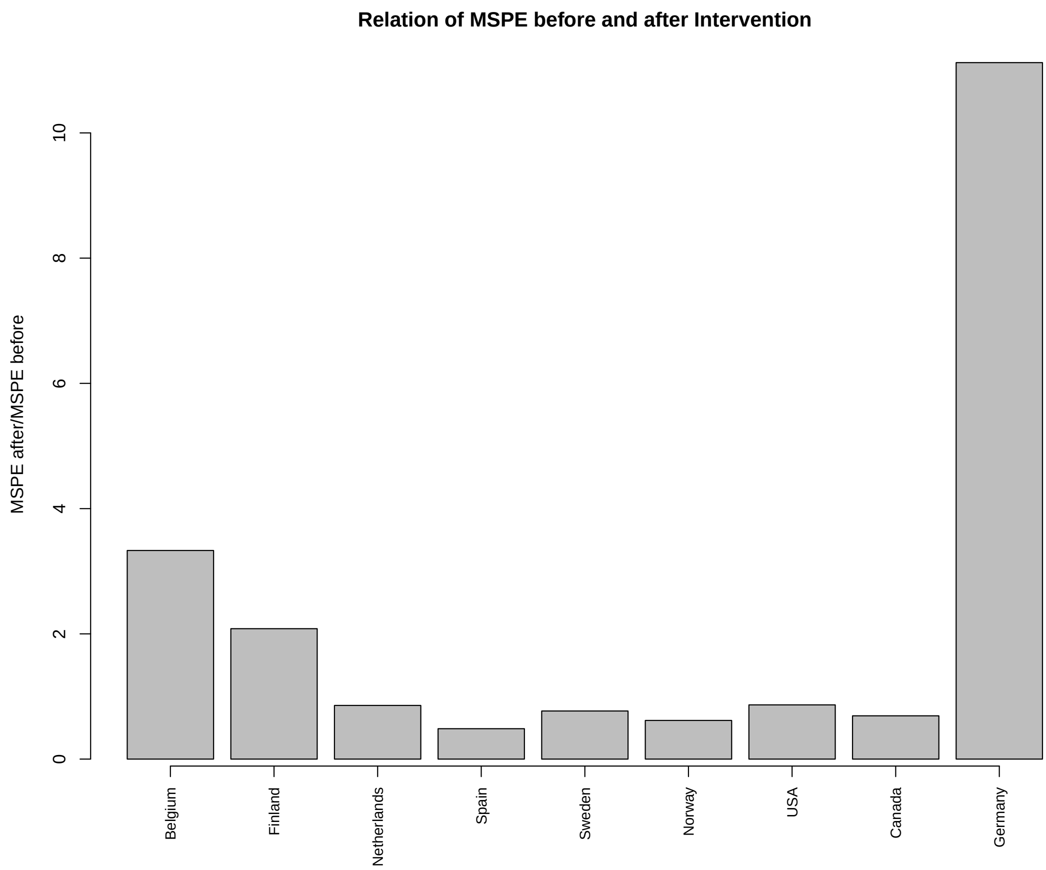

Figure 17: Pre periods MSPE Relation to post periods MSPE

10.3 Data

Households Saving Rate

Definition according to OECD: "Net household saving is defined as the subtraction of household consumption expenditure from household disposable income, plus the change in net equity of households in pension funds." [2]

Belgium
Time range: 1980-2015
Source: OECD

Canada
Time range: 1981-2015
Source: OECD

Finland
Time range: 1980-2015
Source: European Commission

Germany
Time range: 1980-2015; before 1991 Saving Rate of Germany
Source: European Commission

The Netherlands
Time range: 1980-2015
Source: European Commission

Norway
Time range: 1980-2015
Source: OECD

Spain
Time range: 1980-2015
Source: OECD

[2] https://data.oecd.org/hha/household-savings.htm

Sweden
Time range: 1980-2015
Source: European Commission

The USA
Time range: 1980-2015
Source: OECD

Consumer Price Index
OECD Variable Name: Inflation (CPI) – Annual growth rate (%), yearly
Definition according to OECD: "Inflation measured by consumer price index (CPI) is defined as the change in the prices of a basket of goods and services that are typically purchased by specific groups of households. Inflation is measured in terms of the annual growth rate and in index, 2010 base year..."[3]

Belgium
Time range: 1980-2015
Source: OECD

Canada
Time range: 1980-2015
Source: OECD

Finland
Time range: 1980-2015
Source: OECD

Germany
Time range: 1980-2015
Source: OECD

[3] https://data.oecd.org/price/inflation-cpi.htm

The Netherlands
Time range: 1980-2015
Source: OECD

Norway
Time range: 1980-2015
Source: OECD

Spain
Time range: 1980-2015
Source: OECD

Sweden
Time range: 1980-2015
Source: OECD

The USA
Time range: 1980-2015
Source: OECD

Gross Domestic Product
OECD Variable Name: Gross domestic product (GDP) - yearly
Definition according to OECD: "Gross domestic product (GDP) at market prices is the expenditure on final goods and services minus imports: final consumption expenditures, gross capital formation, and exports less imports. "Gross" signifies that no deduction has been made for the depreciation of machinery, buildings and other capital products used in production. "Domestic" means that it is production by the resident institutional units of the country. "[4]

Belgium
Time range: 1980-2015
Source: OECD

[4] https://data.oecd.org/gdp/gross-domestic-product-gdp.htm

Canada
Time range: 1980-2015
Source: OECD

Finland
Time range: 1980-2015
Source: OECD

Germany
Time range: 1980-2015
Source: OECD

The Netherlands
Time range: 1980-2015
Source: OECD

Norway
Time range: 1980-2015
Source: OECD

Spain
Time range: 1980-2015
Source: OECD

Sweden
Time range: 1980-2015
Source: OECD

The USA
Time range: 1980-2015
Source: OECD

Interest Rate

OECD Variable Name: long-term interest rate – in %, yearly

Definition according to OECD: "Long-term interest rates refer to government bonds maturing in ten years. "[5]

Belgium

Time range: 1980-2015

Source: OECD

Canada

Time range: 1980-2015

Source: OECD

Finland

Time range: 1988-2015

Source: OECD

Germany

Time range: 1980-2015

Source: OECD

The Netherlands

Time range: 1980-2015

Source: OECD

Norway

Time range: 1985-2015

Source: OECD

Spain

Time range: 1980-2015

Source: OECD

[5] https://data.oecd.org/interest/long-term-interest-rates.htm

Sweden
Time range: 1987-2015
Source: OECD

The USA
Time range: 1980-2015
Source: OECD

Working Age
OECD Variable Name: Working Age Population – in %of population, yearly
Definition according to OECD: "The working age population is defined as those aged 15 to 64. "[6]

Belgium
Time range: 1980-2014
Source: OECD

Canada
Time range: 1980-2014
Source: OECD

Finland
Time range: 1980-2014
Source: OECD
Germany
Time range: 1980-2014
Source: OECD

The Netherlands
Time range: 1980-2013
Source: OECD

[6] https://data.oecd.org/pop/working-age-population.htm

Norway
Time range: 1980-2014
Source: OECD

Spain
Time range: 1980-2014
Source: OECD

Sweden
Time range: 1980-2013
Source: OECD

The USA
Time range: 1980-2014
Source: OECD

Investments
OECD Variable Name: Investment (GFCF)- Annual growth rate (%)
Definition according to OECD: "Gross fixed capital formation (GFCF) is defined as the acquisition (including purchases of new or second-hand assets) and creation of assets by producers for their own use, minus disposals of produced fixed assets."[7]

Belgium
Time range: 1980-2015
Source: OECD

Canada
Time range: 1980-2015
Source: OECD

Finland
Time range: 1980-2015
Source: OECD

[7] https://data.oecd.org/gdp/investment-gfcf.htm

Germany
Time range: 1980-2015
Source: OECD

The Netherlands
Time range: 1980-2015
Source: OECD

Norway
Time range: 1980-2015
Source: OECD

Spain
Time range: 1980-2015
Source: OECD

Sweden
Time range: 1980-2015
Source: OECD
The USA
Time range: 1980-2015
Source: OECD

National Saving Rate
OECD Variable Name: Saving rate - % of GDP, yearly
Definition according to OECD: "Saving is the difference between disposable income plus the change in net equity of households in pension funds and final consumption expenditure. Saving therefore reflects the residual income used to acquire financial and non-financial assets. It's important to note that disposable income does not include any capital gains or indeed losses, and so neither does saving."[8]

[8] https://data.oecd.org/natincome/saving-rate.htm

Belgium
Time range: 1981-2015
Source: OECD

Canada
Time range: 1981-2015
Source: OECD

Finland
Time range: 1981-2015
Source: OECD

Germany
Time range: 1981-2015
Source: OECD

The Netherlands
Time range: 1981-2015
Source: OECD

Norway
Time range: 1981-2015
Source: OECD

Spain
Time range: 1981-2015
Source: OECD

Sweden
Time range: 1981-2015
Source: OECD

The USA
Time range: 1981-2015
Source: OECD

Unemployment Rate
OECD Variable Name: Long-term unemployment rate - yearly
Definition according to OECD: "Long-term unemployment refers to people who have been unemployed for 12 months or more. The long-term unemployment rate shows the proportion of these long-term unemployed among all unemployed. "[9]

Belgium
Time range: 1983-2015
Source: OECD

Canada
Time range: 1980-2015
Source: OECD

Finland
Time range: 1980, 1982-1987, 1989,1990, 1991,1993, 1995-2015
Source: OECD

Germany
Time range: 1983-2015
Source: OECD

The Netherlands
Time range: 1983, 1985, 1987-1999, 2002-2015
Source: OECD

Norway
Time range: 1983-19985,1987-2014
Source: OECD

[9] https://data.oecd.org/unemp/long-term-unemployment-rate.htm

Spain
Time range: 1986-2015
Source: OECD

Sweden
Time range: 1980-2004, 2007-2015
Source: OECD

The USA
Time range: 1980-2015
Source: OECD

National Income
OECD Variable Name: Net national income - US dollars/capita, yearly
Definition according to OECD: "Net national income (NNI) is defined as gross domestic product plus net receipts of wages, salaries and property income from abroad, minus the depreciation of fixed capital assets... through wear and tear and obsolescence"[10]

Belgium
Time range: 1980-2015
Source: OECD

Canada
Time range: 1980-2015
Source: OECD

Finland
Time range: 1980-2015
Source: OECD

Germany
Time range: 1980-2015
Source: OECD

[10] `https://data.oecd.org/natincome/net-national-income.htm`

The Netherlands
Time range: 1980-2015
Source: OECD

Norway
Time range: 1980-2015
Source: OECD

Spain
Time range: 1980-2015
Source: OECD

Sweden
Time range: 1980-2015
Source: OECD

The USA
Time range: 1980-2015
Source: OECD

Housing Price

OECD Variable Name: Housing - 2010=100, yearly
Definition according to OECD: "The Housing indicator shows indices of residential property prices over time. Included are rent prices, real and nominal house prices, and ratios of price to rent and price to income..."[11]

Belgium
Time range: 1981-2015
Source: OECD

Canada
Time range: 1981-2015
Source: OECD

[11] https://data.oecd.org/hha/housing.htm

Finland
Time range: 1981-2015
Source: OECD

Germany
Time range: 1981-2015
Source: OECD

The Netherlands
Time range: 1981-2015
Source: OECD

Norway
Time range: 1981-2015
Source: OECD

Spain
Time range: 1981-2015
Source: OECD

Sweden
Time range: 1981-2015
Source: OECD

The USA
Time range: 1981-2015
Source: OECD

Stock Market

Belgium
Time range: 1986-2015
Stock: BEL20

Canada
Time range: 1983-2015
Stock: S&P /TSX

Finland
Time range: 1988-2015
Stock: OMXH25/ HEX25

Germany
Time range: 1980-2015
Stock: DAX

The Netherlands
Time range: 1981-2015
Stock: AEX

Norway
Time range: 1997-2015
Stock: OBX

Spain
Time range: 1988-2015
Stock: IBEX 35

Sweden
Time range: 1981-2015
Stock: OMXS30

The USA
Time range: 1980-2015
Stock: Dow Jones