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Tracking and Taxing the Super-Rich: Insights from Swiss Rich Lists*

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Abstract

We collect, digitize, and supplement the Swiss rich list for the years 1989–2020 published in the "BILANZ" business magazine to gain new insights on the structure and dynamics of top wealth in Switzerland. Using this data allows us study the the super-rich in Switzerland in ways that were not possible in previous research based largely on tax data. In addition to making this valuable data source accessible for future research, and also discussing its limitations, we make three distinctive contributions to the literature. First, we present a number of new facts on the wealth elite in Switzerland. We show that about 60% of the super-rich are heirs—a much larger fraction than in the United States where many of the super-rich are self-made—and that five in ten super-rich residing in Switzerland are foreign-born. Second, we estimate the sensitivity of the location-decision of super-rich foreigners to a preferential tax scheme that offers wealthy foreigners to be taxed on their expenses rather than on their true income and wealth. We are the first to evaluate this policy—similar to "non-dom" taxation that exists in other countries like the UK or Italy—and show that when some of the Swiss cantons abolished this practice, they lost about 30% of their stock of super-rich taxpayers. Third, we use the wealth series compiled in our BILANZ dataset to estimate the wealth shares of the top 0.01% in Switzerland and show how they compare to earlier estimates by Föllmi and Martínez (2017) based on wealth tax data. We find that top wealth concentration is higher than previously assumed, an conclude that top wealth shares based on tax data constitute a lower bound, while the estimates based on our BILANZ data are upper bounds.

JEL-Classification: D31, H24, C81
Keywords: super-rich; wealth inequality; wealth distribution; wealth mobility; top wealth shares

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1 Introduction

It is well-known that Switzerland has not only served as a hiding place for large fortunes of the world (Zucman, 2013, Alstadsæter et al., 2019, Alstadsæter et al., 2022), but is also home to a considerable fraction of the global wealth elite. According to Forbes magazine, in March 2021 the number of billionaires per million inhabitants was 4—more than twice that of the United States. In Switzerland, the rich enjoy the discretion that comes with the tradition of (in the meantime abolished) banking secrecy and a mild tax climate. The tax privileges Switzerland grants in particular to rich foreigners have become under fire both internationally as well as within the country itself. Yet despite the strong interest of policymakers and voters, little is known about the super-rich in Switzerland, who they are, where their wealth comes from, and how their location decisions depend on the ingenious tax privileges Switzerland offers to wealthy foreigners.

In this paper, we fill this gap in the literature by examining the 300 richest individuals and families in Switzerland listed each year in the "BILANZ" magazine. We refer to this tiny wealth elite, which constitutes the top 0.01% wealth holders in Switzerland, as the super-rich. Together, they held an estimated amount of 680.675 billion in net wealth in 2019—17.4% of total private net wealth. Due to their large wealth holdings, this group is of utmost importance to understand the anatomy and dynamics of wealth inequality. They are also much sought-after taxpayers, even in a country that offers generally low tax rates by international comparison. Many countries try to attract rich taxpayers with tailored tax privileges. For more than a century, Swiss cantons have offered wealthy foreigners to be taxed according to their expenses, rather than their actual income and wealth. The only restriction is that they must not earn any labor income within Switzerland. The scheme is therefore comparable to "non-dom" taxation schemes that exist in other countries like the United Kingdom or Italy. However, to our knowledge no empirical evidence exists about how responsive the super-rich are to such tax privileges, and we are the first ones to address this question exploiting the Swiss case. Due to Switzerland's pioneering position in the competition for super-rich taxpayers from around the globe, the Swiss context provides a particularly fruitful context to study this question.

We make four distinctive contributions. First, we build a new and unique panel dataset that allows us to investigate the super-rich in Switzerland in detail. We have gathered and digitized data from the Swiss rich list published by the BILANZ magazine for all years from 1989 to 2020, and have supplemented this data with manually collected information on individuals and families. We are therefore the first to make this valuable data source available for systematic, quantitative research on the wealth elites residing in Switzerland over the past 30 years. In this paper, we present the dataset[1], and explain its advantages and potential downsides when it comes to the analysis of the super-rich and top wealth concentration.

Our second contribution is a detailed picture of the super-rich in Switzerland. Our newly

[1] We plan on making the dataset publicly available soon, such that it can be used for further research.

compiled dataset allows us to study the structure and dynamics of wealth at the very top of the distribution in Switzerland, including the influence of inheritances, the industry composition of the wealthy elites, the geographic distribution, the role of wealthy foreigners, and intra-generational wealth mobility. Our descriptive results can be summarized as follows. The wealthy are predominantly male or entire (extended) families. The share of women is below 10% and there are no signs of an increasing number of women among the super-rich. Average age is beyond 60 and has been increasing since 1989. The number of top managers has increased, but at 8% they still constitute a fairly small group at the absolute top.

Inheritances are still the main factor for making it to the very top of the wealth distribution in Switzerland: in 2020, 60% of those in the BILANZ rich list were heirs or had married into a wealthy family. Inherited wealth is much more widespread at the top of the wealth distribution in Switzerland than in the United States, particularly today. As the share of heirs in the Forbes 400 list has dropped significantly, from 56% in 1982 to 31% in 2018 (Scheuer and Slemrod, 2020), Kaplan and Rauh (2013a) conclude that access to education at a young age and applying one's skills in the most salable industries has become much more decisive than an extensive wealth background in making it to the top of the wealth distribution. In Switzerland, in contrast, the share of top wealth owned by heirs fluctuates between 60-80% over the entire period from 1989 to 2020, with no clear trend, and thus, we find no support for an increasing importance of meritocratic principles in accessing the top of the wealth distribution in Switzerland. The importance of inheritance is also reflected in the high persistence of the same individuals and dynasties over time in the BILANZ data. Moreover, wealth mobility within the tiny group of the super-rich has declined over the past two decades: 71% of those listed in 2000 were still present five years later in 2005. Fifteen years later, the persistence was even higher: 83% of those who were on the list in 2015 are still listed five years later.

Our data also shows the importance of super-rich foreigners in Switzerland. Since the turn of the century, about 50% of the individuals in the data are foreign-born (compared to 30% in the total resident population), and these super-rich foreigners are, on average, somewhat richer than their Swiss-born peers.

Wealthy foreigners enjoy tax privileges in Switzerland, as they can opt for expenditure-based taxation (often referred to as lump-sum taxation or "tax deals"). This scheme is only available to foreign nationals with no labor income earned in Switzerland. Rather than their actual income and wealth, a mix of living expenses reported by the taxpayer and expenses assumed by the tax law serve as the tax base, to which then the regular income and wealth tax rates are applied. Especially for the super-rich foreign-borns in our data, it is very likely that they do not earn any labor income in Switzerland and hence qualify for this long-standing tax scheme. It is certainly no coincidence that so many Formula 1 drivers like Sebastian Vettel (GER), Fernando Alonso (ESP), or Kimi Räikkönen (FIN) live in Switzerland, where, very conveniently, motor races are forbidden

by law since 1955, such that these motor sport stars will never end up working in Switzerland. In the 2014 Davis-Cup final, all five French players (Jo-Wilfried Tsonga, 2014 world rank 12; Gilles Simon, 18; Gaël Monfils, 20; Richard Gasquet, 22; and Julien Benneteau, 26) lived in Switzerland, but none of them played at the Swiss Indoors on the ATP Tour. If they did, they would have had to forego the prize money because they had opted for expenditure-based taxation. But also successful businessmen, like late IKEA founder Ingvar Kamprad, benefit from this scheme.[2]

The third contribution we make is to show how sensitive the location choices of these super-rich foreign-born taxpayers are to the availability of this preferential tax treatment. Our paper is thereby the first to provide empirical evidence on the effect of this highly controversial policy to attract wealthy foreigners to Switzerland.[3] Research on location choices of the super-rich is still very limited and often focused on particular groups, such as football players (Kleven et al., 2013) or star scientists (Akcigit et al., 2016). A recent exception (and the most similar paper to ours) are Moretti and Wilson (2022), who study how responsive the super-rich in the United States are to local differences in bequest taxation using Forbes data.

We exploit that between 2010 and 2014, some cantons abolished expenditure-based taxation by popular vote, and estimate the relative change in the stock of super-rich in a canton. To quantify the causal effect of the removal of expenditure-based taxation on the location choices of the super-rich, we employ two alternative identification strategies. We first estimate difference-in-differences models along with the corresponding event studies. In a second, alternative approach, we follow the empirical estimation strategy presented in Agrawal and Foremny (2019) that results from spatial equilibrium in a location decision model. Both empirical approaches show that removing this preferential tax treatment reduces the stock of super-rich foreigners by approximately 30%. As one would expect, the policy had no effect on the location choice of Swiss-born taxpayers, as they are not eligible for the preferential tax scheme.

A limitation of the Swiss setting is that we cannot relate the percentage change in super-rich foreigners in a canton to the percentage change in the effective tax rate. Note that the stipulated tax rates themselves did not change. What differs between regular taxation and expenditure-based taxation is the definition of the tax base. The issue is that we do not know the difference between the synthetic expenditure tax base and the true income and wealth tax base of the eligible taxpayers. We can therefore not compute wealth tax elasticities implied by our estimates, which would make it possible to compare our results directly to those in Moretti and Wilson (2022).

We make a fourth and final contribution to the literature on top wealth shares (Kopczuk and Saez, 2004; Roine and Waldenström, 2009; Alvaredo and Saez, 2009; Saez and Zucman, 2016; Föllmi and Martínez, 2017; Alvaredo et al., 2018; Artola Blanco et al., 2020). We use our new

[2] According to official cantonal statistics, in 2018, 4,557 taxpayers were taxed according to their expenditures. On average, they paid CHF 180,162 (approx. 195,000 US Dollars) in taxes, with they highest tax bill amounting to CHF 11,967,953 (approx. 12,960,000 US Dollars). Source: FDK (Konferenz der kantonalen Finanzdirektorinnen und Finanzdirektoren) https://www.fdk-cdf.ch/themen/steuerpolitik/aufwandbesteuerung.

[3] Blankart and Margraf (2011) study voting behavior in the proposed abolition of preferential tax treatment of wealthy foreigners in Switzerland.

dataset to construct the wealth share of the top 0.01% and benchmark it against previous estimates by Föllmi and Martínez (2017), that are based on wealth tax statistics. This exercise also allows us to asses the quality of the wealth estimates in our BILANZ dataset. Our results suggest that Switzerland's super-rich concentrate a higher share of total net wealth among them than previously assumed. We find a top 0.01% wealth share of approximately 16% in recent years, which is about one-third larger than the estimates based on wealth tax data by Föllmi and Martínez (2017). Both underlying data sources, wealth tax statistics and wealth data on the super-rich compiled by a journalistic outlet, have their deficiencies, which we discuss in detail. Top wealth shares based on tax statistics are likely downward biased due to i) measurement error in wealth of super-rich foreigners who are taxed according to expenditure, which leads to a systematic underestimation of their wealth, and ii) double counting within Switzerland, which dilutes top wealth. Both effects bias top wealth shares downward. In contrast, top wealth shares based on the BILANZ rich list represent an upper bound. Given that the super-rich in Switzerland are a truly global elite, the location of their legal residence is often unclear. The BILANZ rich list may therefore include some super-rich individuals or families who do not form part of the permanent resident population and tax base in Switzerland.

The remainder of this article is organized as follows. In Section 2, we relate this work to the existing literature on wealthy elites. Section 3 describes the data and methodology, followed by descriptive analysis of the super-rich and the origins of their wealth in Section 4. We present estimates of the top 0.01% wealth share in Section 5. Section 6 analyzes the role of preferential tax treatment for location choices of the wealthy. We provide some concluding remarks in Section 7.

2 Related Literature on Wealth Elites

Over the past two decades, scholars have relied in particular on tax data to study distributional issues, most notably in constructing long-run series of top incomes and wealth shares (see Roine and Waldenström, 2015, for a survey). Given the much higher concentration of wealth relative to income, and particularly because of limited data availability, early studies of wealth inequality focused on the calculation of top wealth shares over the long-run (see, e.g., Dell et al., 2007; and Föllmi and Martínez, 2017, for Switzerland; Kopczuk and Saez, 2004, for the United States; Piketty et al., 2006, for France; and Roine and Waldenström, 2009, for Sweden). Wealth tax returns are the best available source of data to examine the top end of the wealth distribution because, unlike surveys, they do not suffer from sampling errors (see Vermeulen, 2016). It is fair to say, however, that the study of wealth and its distribution, even when wealth tax data is available, is fraught with greater difficulties than the study of income. We discuss some shortcomings of the Swiss wealth tax statistics in Section 5.2.

The publication of Piketty's book, *Capital in the Twenty-First Century*, has triggered a veritable explosion in research on wealth inequality in recent years. Subsequent research has made

significant methodological advances in the measurement and analysis of wealth inequality (see Zucman, 2019 for a recent survey) as well as stimulated renewed interest in theories of wealth distribution (see Benhabib and Bisin, 2018 for a review).

In the absence of administrative tax data for many countries, another strand of the literature has started to estimate the distribution of wealth using survey and rich list data. As surveys typically do not capture the upper part of the (wealth) distribution well, various authors have supplemented surveys by including individuals from rich lists (e.g., Vermeulen, 2018, for the United States, the U.K., Germany, France, Italy, Spain, the Netherlands, Belgium, Austria, Finland, and Portugal, and Bach et al., 2019, for France, Germany, and Spain). Our study relates to this literature as it estimates the share of wealth going to the very top based on rich list data and compares it to estimates based on wealth tax statistics.

Although the empirical research on wealth inequality has made considerable progress over the past two decades, we still know relatively little about who the people at the absolute top of the wealth distribution are, how they got there, and how long they stay at the top. A minor strand of the literature has examined a variety of factors, particularly how important inheritances are in making it to the absolute top of the wealth distribution. Kaplan and Rauh (2013a) show that Americans in the Forbes 400 are less likely to have inherited their wealth today than they did back in the 1980s. They conclude that this decline in the importance of family wealth is largely due to the major improvements in information technology that allows skilled individuals—superstars—to apply their talents to much larger amounts of capital (see also Kaplan and Rauh, 2013b, and Scheuer and Slemrod, 2020). This finding is generally supported by Korom et al. (2017), who note, however, that family wealth still matters in the sense that it reduces the likelihood of falling off the Forbes 400 list. We add to this literature in Section 4 by analyzing Switzerland in similar fashion.

Recent studies have further started using rich list data to study other phenomena such as tax avoidance (Moretti and Wilson, 2022) and political influence (Salach and Brzezinski, 2020).

3 The BILANZ Rich List Dataset, 1989–2020

The BILANZ is a Swiss business magazine that publishes an annual rich list in Switzerland since 1989—similar to the Forbes 400 in the United States. We have collected the data from the BILANZ rich list for all years from 1989 to 2020 from hard copies. Since its first edition in 1989, two major factors have influenced the composition of the BILANZ rich list. First, the number of ranking entries fluctuated significantly in the first ten years, from 100 in 1989 to 300 in 1999, remaining stable thereafter. Second, until 1993 only Swiss citizens were included in the rankings.[4]

We have collected the following yearly information from the BILANZ magazine: individual

[4]Besides Swiss residents, the BILANZ magazine covers a small number of Swiss citizens living abroad, as well as a few entries from the Principality of Liechtenstein. We exclude those observations from our panel dataset as we are interested in the top wealth dynamics of Swiss residents.

respectively family name, net wealth (in intervals), industry information, the canton of residence (the subnational Swiss states are called cantons), and a series of dummy variables indicating whether the entry refers to a family (vs. an individual), whether the individual is a CEO or has a similar top managerial role, and whether the individual is female. We supplement this data with the following manually collected information: dates on birth and death, a foreign-born dummy variable, a variable that categorizes the origin of wealth (inherited, through marriage, self-made), and a dummy variable indicating whether wealth foundation occurred prior to or after WW2. In addition, we capture the reason why someone has entered or exited the sample. The manually collected data are taken from the prologues and short profiles in the BILANZ magazine as well as from various online sources (e.g., newspapers, Wikipedia, and other websites). The panel dataset is described in detail in Appendix A. Table C1 reports yearly number of observations and a set of summary statistics of our dataset.

Data Limitations.

The limitations of using rich lists for economic research have been discussed extensively in the literature (see, e.g., Davies and Shorrocks, 2000; Atkinson, 2008; Piketty and Zucman, 2015; Bach et al., 2019; and Handreke, 2020). As we provide our panel dataset for future research, we want to transparently discuss several crucial limitations which may be particular of the Swiss rich list data that must be considered in any empirical analysis and interpretation of this data.[5]

First, the methods used by the BILANZ are mostly unknown and of journalistic nature. Some super-rich individuals may be more news-worthy than others, and this may influence who enters or exits the panel at some point. The assumptions underlying the decision to add new entries or remove existing entries, as well as the criteria for assigning an entry to a specific industry, are not fully disclosed by the BILANZ magazine, and thus we often cannot conclusively track changes. Similarly, the method of wealth estimation is by and large unknown and may potentially differ between entries, as comparable information is not available for all individuals, ultimately leading to inaccuracies or differences in wealth estimates.

Second, the net wealth estimates in the Swiss rich list are considerably less granular than those in the Forbes 400 rich list. BILANZ reports net wealth in intervals that span a range of 50 million for the "poorest" entries, and a range of up to one billion Swiss Francs for the richest entries. This results in two drawbacks. First, multiple individuals or families are assigned to the same wealth interval, which does not allow us to provide a unique ranking within each interval. Second, "smaller" changes in net wealth—up to 50 million for the poorest and up to a billion Swiss Francs for the richest—are not captured, limiting wealth mobility analyses. Note that throughout all analyses, we use the average of the lower and upper bounds of the reported wealth intervals.

Third, and perhaps most concerning, the Swiss rich list does not use a uniform unit of ob-

[5]We thank Simon Handreke (2020), an undergraduate student to whom we provided our data for his bachelor thesis, for carefully documenting various weaknesses in the BILANZ data.

servation. The ranking entries may be individuals or families.[6] Moreover, the observation unit sometimes does not remain constant over time either: individuals become families and later in some cases appear again as individuals. This is not only a drawback of the Swiss rich list, but is also inherent for Germany (Bach et al., 2019) and Austria (Eckerstorfer et al., 2016), for instance. For the United States, on the other hand, this problem is far less prevalent, as the Forbes 400 list includes far fewer family entries. The Swiss rich list contains a relatively large number of families in the ranking, and their number has increased significantly in recent years (see Table C1). As expected, family observations are significantly richer than individuals, by an average of approximately 50% over the 2013-2020 period. We take this into account when calculating top wealth shares (see Section 5.1).

Despite these data limitations, the BILANZ rich list is a valuable complementary data source to survey and administrative data to study the super-rich and top wealth dynamics. The key advantage of our unique panel data is that we can use market value estimates of net wealth along with socioeconomic characteristics and ancillary information, providing valuable additional insights into the evolution of the enormous fortunes at the top end of the wealth distribution over the past 30 years. Unlike more populous countries as the United States, where the Forbes 400 list only covers the top 0.00025% of the population (see Kopczuk and Saez, 2004; Saez and Zucman, 2016), the Swiss rich list captures a relatively large fraction of the wealth distribution at the top end—roughly the top 0.01%.

Summary Statistics.

Appendix Table C1 gives an overview of the observations and amounts reported in our BILANZ panel dataset. The unbalanced panel includes 8,057 ranking-year observations covering a total of 898 individuals (or families) which belong to a total of 711 different families. Real average wealth increases over time. After 1999, when the number of individuals is stable and foreigners are included, average real wealth was 1.71 billion (in 2020 Swiss Francs).[7] Median real wealth was significantly lower at 0.64 billion, reflecting the highly right-skewed wealth distribution among BILANZ's richest. The 300 richest in Switzerland are therefore relatively poor compared to the Forbes 400. In the Forbes 400 sample of Moretti and Wilson (2022), covering the period 1982-2017, mean real wealth was 3.02 billion (in 2017 dollars) and median real wealth was 1.6 billion. As expected, family observations, which have increased over time, tend to be richer on average than individuals, although there is some variation over time.[8]

[6] In a few rare cases, individuals who are not related are grouped as collectives, e.g. because they are joint owners of a venture and their assets cannot be distinctly associated with a single individual.

[7] 1 CHF is roughly equivalent to 1 US Dollar. Absolute values of net wealth are at constant prices of 2020. To deflate the different nominal wealth series we use the Swiss consumer price index (CPI), available for download from the FSO: https://www.bfs.admin.ch/bfs/en/home/statistics/prices/consumer-price-index.html

[8] Table C2 in the Appendix further displays selected percentiles of the BILANZ wealth distribution.

4 The Super-rich in Switzerland

4.1 Who are the Super-rich?

From previous research, we know relatively little about who the super-rich in Switzerland are. In this section, we provide descriptive statistics from our newly compiled BILANZ dataset.

Families and Individuals

Between 30 and 50 percent of all observations are recorded as families, and this percentage has steadily increased in recent years (Figure 1). Among individuals, we observe that the Swiss wealth elite is predominantly male. The share of women among the super-rich individuals fluctuates around 10% over the period from 1989 to 2020. There is no indication that the share of women has risen in recent years, if anything we observe the opposite.

Figure 2 displays the average age of all individual observations in our panel dataset. With an average age of more than 60 years, the wealth elite in Switzerland is relatively old, and has been growing older over the past two decades. The observed rise in mean age of the super-rich in Switzerland contrasts with the United States, where the Forbes 400 have become younger on average in recent years (Scheuer, 2020). The temporary decline in the average age in the second half of the 1990s can be explained in part by the entry of several new economy entrepreneurs into the ranking.

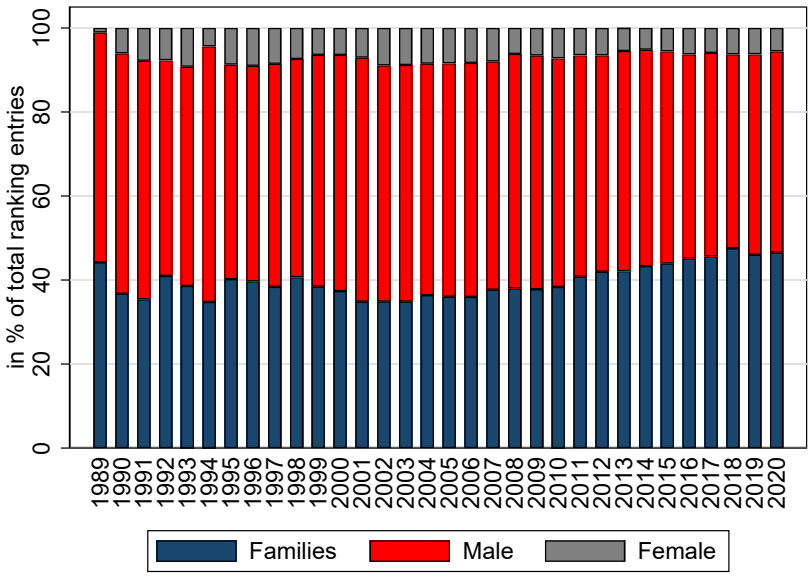


Figure 1: The Super-rich by Family Structure and Gender, 1989–2020

Note: This figure illustrates the rich list ranking entries by family structure and gender per year. The blue part of the bars shows the number of family observations as a share of all ranking entries. The gray and red parts of the bars show the percentage of female and male observations, respectively.

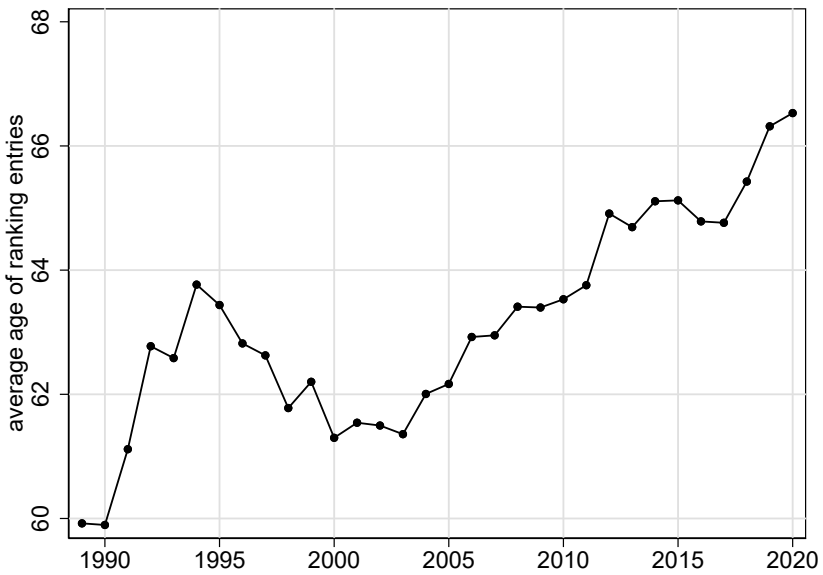


Figure 2: Age Structure of BILANZ Ranking Entries, 1989–2020

Note: This figure shows the average age per BILANZ ranking entry from 1989 to 2020. The average age is computed based on individual observations only. The temporary decline in the average age in the second half of the 1990s can be explained in part by the entry of several new economy entrepreneurs into the ranking. The number of observations in the BILANZ rich list remained stable since 1999.

Foreigners

The super-rich living in Switzerland belong to an international elite. Figure 3 shows the share of non-Swiss-born super-rich as well as their share in BILANZ total top wealth. Since the first inclusion of foreigners in 1993, we observe a steady increase of foreign-born residents among the super-rich to over 50% by 2010. Since then, the share of foreign-born super-rich has declined to about 47%, but is still well above the overall foreign-born share of the resident population of 30%.

The share of top wealth held by foreign-born super-rich fluctuates around 60%. Hence, the foreign-born super-rich are on average wealthier than those born in Switzerland. This comparison reveals that wealthy foreigners living in Switzerland are heavily over-represented at the top of the wealth distribution. Consequently, foreigners residing in Switzerland, and in particular those subject to expenditure-based taxation, need special consideration in the analysis of top wealth dynamics and concentration. We come back to the role of expenditure-based taxation for top wealth shares (Section 5) and for location decisions of the super-rich (Section 6).

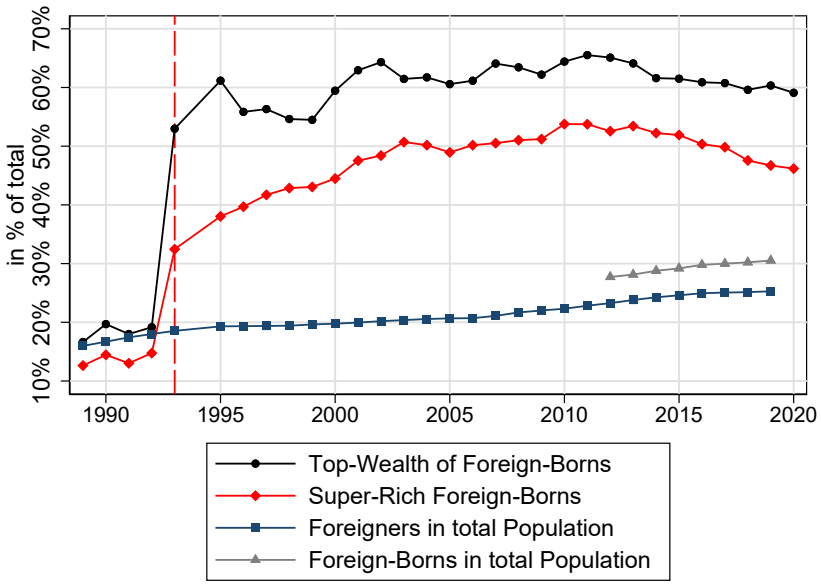


Figure 3: Share of Top Wealth held by Foreign-born Residents, 1989–2020

Note: This figure shows the share of foreign-born residents in relation to the overall number of observations in the Swiss rich list (red line), as well as their share in total BILANZ wealth (black line), from 1989 to 2020. The jump in 1993 is due to the first-time inclusion of foreigners in the Swiss rich list. The blue line depicts the percentage of foreigners in the total population. The gray line shows the share of first-generation immigrants in total population, for all people aged 15 and older. The population data are available for download from the FSO: https://www.bfs.admin.ch/bfs/en/home/statistics/population.html

Top Managers: The Rise of a New Elite?

The top of the wealth distribution has historically been made up of individuals and families who live off the income from their property rather than their labor income (see Piketty, 2014). Since the mid-1990s, however, it has been observed that the salaries of the top 0.01% of income earners in Switzerland have risen significantly faster than average incomes (Föllmi and Martínez, 2017). This has eventually led to the emergence of a new class of super-rich, the top managers. Figure 4 shows the entry and rise of the top managers in the list of the 300 richest in Switzerland. Their share was on the rise, especially between 2003 and 2013, to reach 8% of all observations. Since then, their number among the 300 richest is slightly declining. Notwithstanding the rapid rise in the first decade of the 20th century, the overall importance of managers in the Swiss wealth elite remains modest.

Another sign that old fortunes are still significantly more pertinent at the absolute top of the distirubiton is reflected by the fact that the share of top wealth held by managers (red line) is significantly lower than their frequency in the ranking. Thus, while some managers have made it to the top of the wealth distribution, they are still relatively poor compared to the traditional super-rich.

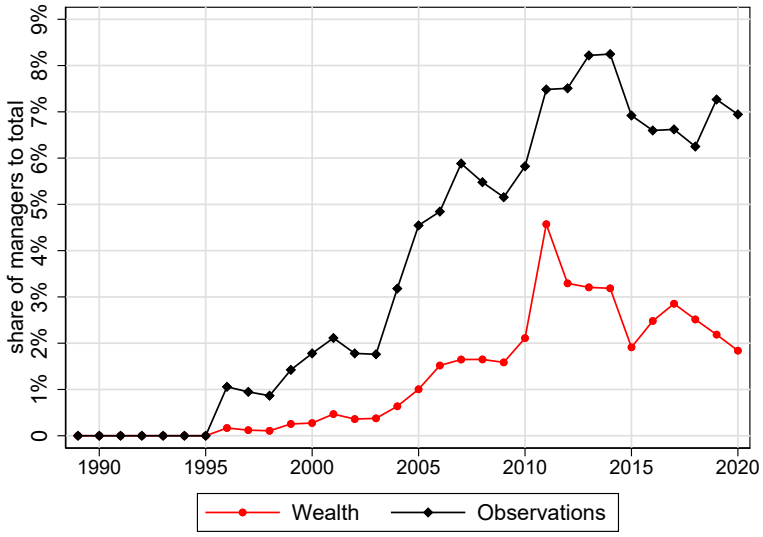


Figure 4: The Rise of Top Managers, 1995–2020

Note: This figure shows the managers' share in the overall panel data set for the years 1995 to 2020. The upper black line indicates the relative frequency of managers in total observations. The lower red line represents the share of total BILANZ wealth held by managers. The sharp increase in managers' share of wealth in 2011 is the result of Glencore's IPO, which turned the four Swiss-resident Glencore managers Ivan Glasenberg, Daniel Mate, Aristotelis Mistakidis, and Tor Peterson into billionaires over night.

Industry Composition

Figure 5 offers insights into which industries the fortunes of the super-rich are invested in. In the 1990s, four industries in particular stood out, accounting for the following share of total top wealth in 1990: (i) trade, retail 21.4%; (ii) banking, insurance, finance industry 12.7%; (iii) pharmaceuticals, chemistry, biotechnology 12.6%; and (iv) industry, manufacturing 11.0%. Over time, the importance of these industries in regard to their share of total top wealth has declined. Their combined share in top wealth fell from 57.6% in 1990 to 43.7% in 2020. Top wealth in Switzerland has become more diverse. This is also reflected in the category "shareholdings, investments (including real estate)",[9] which has increased from 10.1% in 1990 to 16.7% in 2020. Note however that since many individuals and families are increasingly invested in a range of companies across multiple industries, a distinct assignment to a particular industry can be difficult.

Perhaps surprisingly, the fashion and textile industry (+5.7pp.) and the food, drink and tobacco industry (+5.3pp.) are the industries that have seen the largest growth in their share of top wealth over the past three decades (apart from shareholdings). This substantial increase is due in particular to the rapid growth in net assets of six individuals or families, two of which moved to Switzerland after 2010. The joint net worth of Jorge P. Lemann (Anheuser-Busch InBev), Charlene de Carvalho-Heineken (Heineken), the heirs of Klaus J. Jacobs (various businesses), Gerard Wertheimer (Chanel), the Perfetti family (Perfetti Van Melle; moved to Switzerland in 2011) and Alexandre Van Damme (Anheuser-Busch InBev; moved to Switzerland in 2016) increased from

[9]The increase is only to a small extent due to the rise in real estate investments. The top wealth share of real estate increased from 1.0% in 2000 to 2.0% in 2019.

about 18.9 real billion in 2009 to 79.0 billion in 2020.

While in the United States six of the top 10 ranks of the Forbs 400 list are occupied by self-made billionaires from the new economy—Bill Gates (Microsoft), Mark Zuckerberg (Facebook), Larry Ellison (Oracle), Steve Ballmer (Microsoft), Larry Page (Google), and Sergey Brin (Google)—such individuals are nowhere to be found in Switzerland.[10] Although the top wealth share of the new economy in Switzerland has risen sharply from 0.5% in 2000 to 2.3% in 2020, it still remains unimportant in the overall context.[11] While superstars from the world of sports and entertainment may be very visible, they really only play a marginal role among the super-rich living in Switzerland. In general, the industry composition of top wealth in Switzerland is markedly different to that of the United States (see Korom et al., 2017; we report their results in Appendix Table C10).

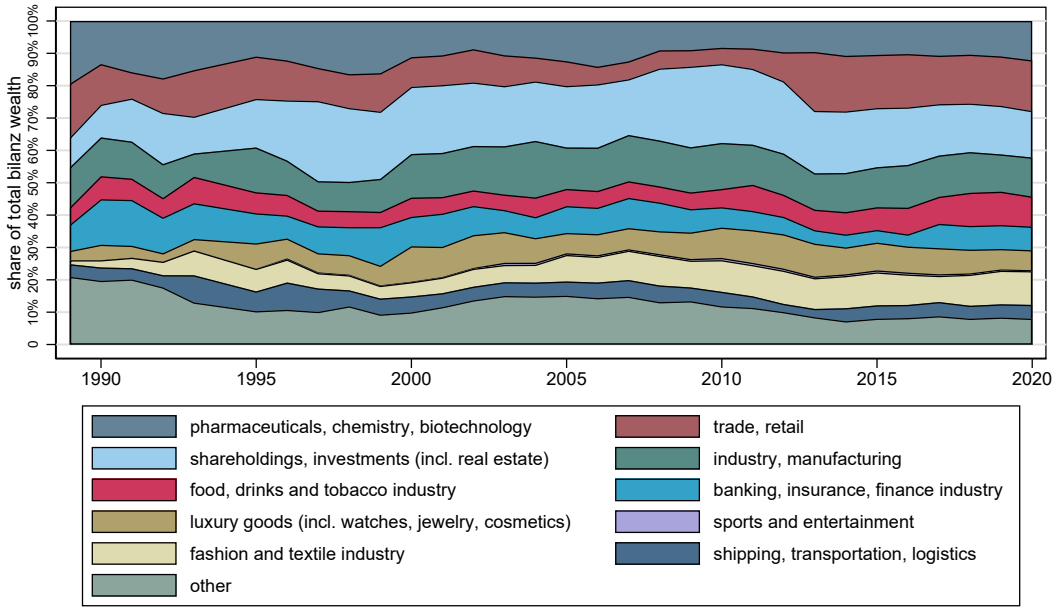


Figure 5: Share of Top Wealth by Industry, 1989–2020

Note: This figure shows the share of total BILANZ wealth by industry between 1989–2020. For a more concise visualization, various industries have been grouped together. For more information on the industries, see the corresponding section in Appendix A and Table A2.

4.2 Wealth Mobility

There are essentially three ways to become rich: (i) either through one's own work and savings, (ii) through inheritance, or (iii) by marrying into a large family fortune (Piketty, 2011). These paths to prosperity are guided by fundamentally different economic forces and are arguably critical to society's acceptance of the prevailing level of inequality. When people believe that there is a legitimate, albeit small, chance of becoming (super-)rich through one's own efforts and work, they

[10] See: https://www.forbes.com/forbes-400/; accessed February 4, 2021.
[11] The new economy (industry 17; see Table A2) is included in the industry "other" in Figure 5.

are more willing to accept higher levels of inequality (Alesina et al., 2018).

In this section, we shed light on intra- and intergenerational top wealth mobility in Switzerland. Two questions are thereby of main interest. First, how important are inheritances and what is the share of self-made super-rich? Second, how likely are the super-rich to remain at the top of the wealth distribution and how large is wealth mobility within the top?

Inherited or Self-made Wealth

A key difference in the process of wealth accumulation is whether wealth is self-made or whether most of it is obtained through inheritance or marriage. We categorize the origin of wealth in our data as follows: (i) self-made, (ii) inherited, (iii) acquired through marriage. Figure 6 illustrates the importance of these different origins for the observations in our BILANZ data. Throughout the entire period, only approximately 30-40% of all super-rich can be categorized as self-made. Thus, the vast majority of the super-rich are still heirs today, while marriage plays only a very minor role to enter the club of the super-rich in Switzerland.

Figure 7 shows the share of non-self-made wealth (i.e., the sum of ii) and iii)) in the BILANZ dataset's total top wealth.[12] The overall share of inherited wealth in total top wealth has fluctuated between 60% and 80% in the period from 1989 to 2020. These fluctuations are due in particular to the wealth dynamics of the non-Swiss-born super-rich (blue line).[13] For the Swiss-born, whose presence in the sample is likely more stable, we see a high share of inherited wealth of about 80% throughout the past 30 years. Moreover, a comparison of Figures 6 and 7 reveals that, on average, heirs are significantly richer than self-made super-rich.

Even though the shares and especially the fluctuations in Figure 7 should be interpreted with care, the overall pattern contrasts sharply with the experience in the United States: the share of heirs was and is much more prevalent at the top of the wealth distribution in Switzerland than in the United States, particularly today. Specifically, the share of heirs in the Forbes 400 has dropped significantly, from 56% in 1982 to 31% in 2018 (Scheuer and Slemrod, 2020), whereas it declined only modestly in Switzerland. From this, we conclude that changes in top wealth are much less dynamic in Switzerland than in the United States. Particularly, as a native Swiss, an inheritance seems to be the primary prerequisite for making it to the top of the wealth distribution, and this prerequisite has become noticeably more important again in recent years.

[12] To be precise, we define the share of inherited wealth shown in Figure 7 as: 1 minus the wealth share of first generation founders. This definition has been used elsewhere in the literature (see e.g., Kaplan and Rauh, 2013a and Scheuer and Slemrod, 2020).

[13] The sharp surge of close to 10 percentage points in 2013, for instance, is essentially due to the death of IKEA founder Ingvar Kamprad—Switzerland's richest self-made man at the time—who passed his fortune on to his sons.

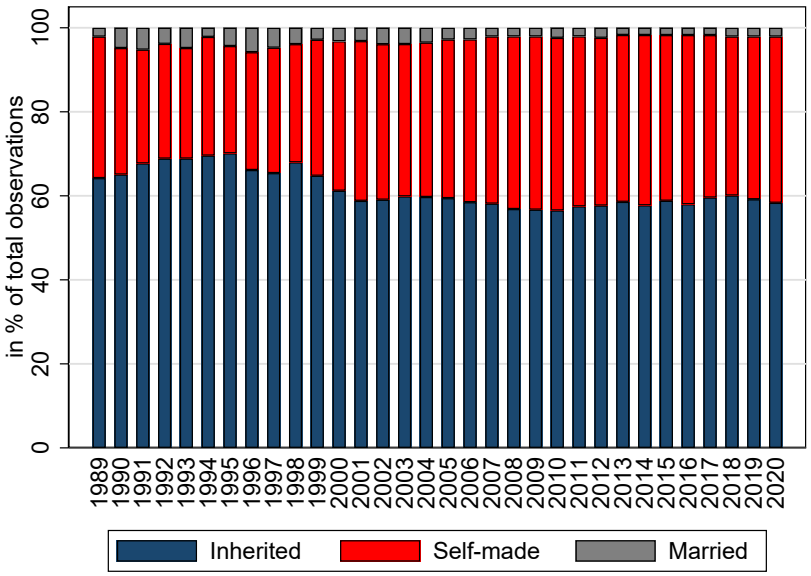


Figure 6: Share of Super-Rich by Category of Wealth Origin, 1989–2020

Note: This figure categorizes the observations of our BILANZ data set by origin of wealth into three categories: wealth acquired through marriage (gray), wealth inherited (blue) or self-made wealth (red).

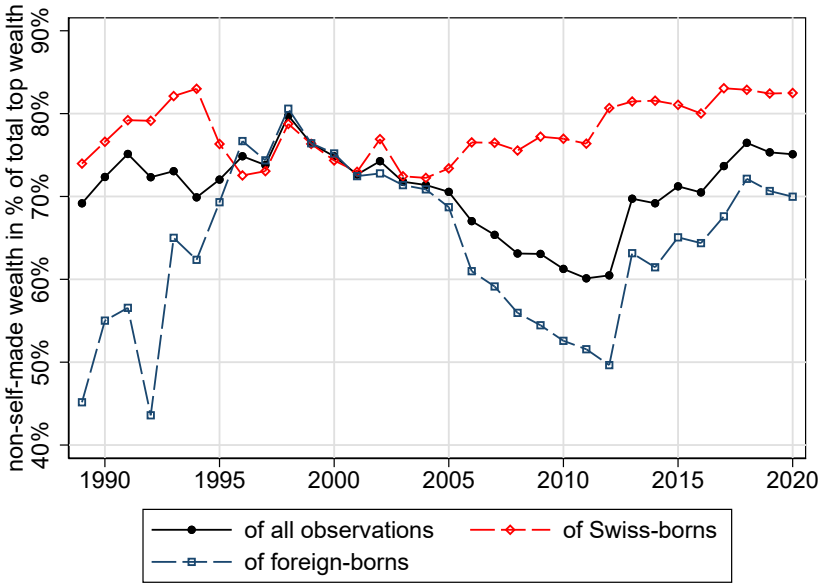


Figure 7: The Inheritance Share in Top Wealth, 1989–2019

Note: This figure displays the share of inherited wealth respectively non-self-made wealth in total BILANZ wealth. The origin of wealth is categorized in our data as: (i) self-made, (ii) inherited, or (iii) acquired through marriage. The share of inherited wealth is defined as non-self-generated wealth: category (ii) + category (iii) as a fraction of total BILANZ wealth. The black line shows the share of inherited wealth for all observations. The red and blue dashed lines respectively show the same share according to whether the observations were born in Switzerland or abroad.

Furthermore, many of the super-rich residing in Switzerland have been wealthy for several generations. Appendix Figure C2 shows the share of today's top wealth founded before World

War II. This share will inevitably decline over time, as new industries emerge replacing old ones—and as long as there is a certain degree of social mobility into the top. It is all more striking that this fraction has remained stable since 2010. We take this as tentative evidence that social mobility at the top of the wealth distribution has slowed down in recent years.

Persistence in the BILANZ rich list

The static view on the share of inheritances in total top wealth does not provide a comprehensive understanding of how dynamic the evolution of wealth is at the top. Therefore, we turn to the persistence of the super-rich at the top of the wealth distribution.

Figure 8 shows that of the top 300 in 2010 (blue line), 95% were still listed among the BILANZ richest in 2011, and ten years later, in 2020, that figure was still 68%. The super-rich may drop out of the top 300 for several reasons: (i) they are no longer wealthy enough, (ii) they left Switzerland, or (iii) their wealth has been dispersed, for instance, because they are deceased.[14]

With the data available, we cannot precisely quantify which reasons are responsible for which proportion of drop-out observations. Figure C4 shows, however, that of the 92 observations dropping out between 2010 and 2020, only 20 (22%) had assets of less than 200 million real Swiss Francs in 2010, suggesting that too little wealth is not the primary reason for leaving the BILANZ rich list.

Three key insights can be derived from Figure 8. First, persistence of top wealth is in general very high, and moderately higher in Switzerland than in the United States (see Scheuer, 2020 for a comparison). Second, the probability of dropping out of the top wealth group decreases over time in all periods between 2000 and 2020, as can be inferred from the flattening of the curves. Third, and most importantly, wealth persistence of the super-rich increased gradually and significantly between 2000 and 2020, most notably from 2000 to 2005.

[14]Note that the survival rates in Figure 8 are based on family observations rather than individual observations (for details on the two panel identifiers, see Appendix A). This implies, for instance, that if a super-rich individual dies and their heir is newly listed the next year, this observation does not drop out (i.e., the dynasty survives). The persistence is lower when the same analysis is performed on for individuals instead (see Appendix Figure C3). However, the structural pattern hardly changes.

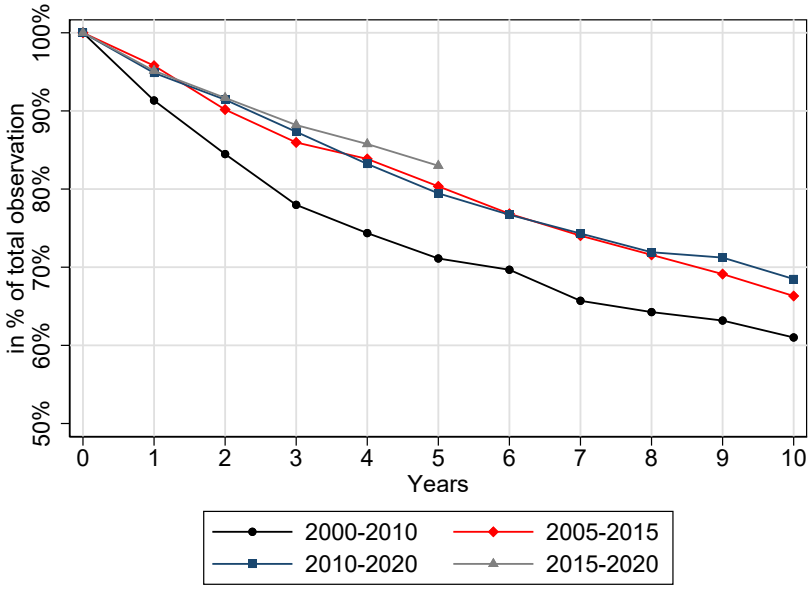


Figure 8: One- to Ten-year Survival Rates at the Top of the Wealth Distribution

Note: This figure shows, for the four different periods indicated, the persistence rates of those included in the Swiss rich list. Looking at the black line, for example, shows that 91% of the observations listed in 2000 were still reported in 2001. After 5 years, in 2005, 71% and after 10 years, in 2010, 61% are still listed. Survival rates are based on a panel of family dynasties, rather than individuals (see Appendix A for details). For the one- to 10-year survival rates based on individual observations, see Figure C3.

Mobility among the Super-rich

So far, we have seen that many super-rich remain relatively tenaciously at the top of the wealth distribution. But how do the super-rich move within the top end of the wealth distribution? Unfortunately, because the wealth brackets are of the BILANZ rich list are rather large and very unequal in size, we are not able to rank the rich with enough precision to compute mobility matrices or run rank-rank regressions, as is done, for example, in the literature on intra- and intergenerational income mobility (e.g., Auten and Gee, 2009; Chetty et al., 2014).

To shed light on wealth mobility within the 300 richest in Switzerland, we estimate the intragenerational wealth elasticity β for those observations who are present in our dataset over a 10-year period using the following regression specification:

$$\ln(wealth_{i,t+10}) = \alpha + \beta \ln(weath_{i,t}) + \varepsilon_i \tag{1}$$

where $\ln(wealth_i)$ is real log wealth at time t and $t + 10$, respectively. Figure 9 illustrates the results for the periods 2000–2010 and 2010–2020, respectively. The red dots show real log wealth of an individual or family in 2010, relative to their wealth in 2000. Similarly, the blue diamonds indicate the change in real log wealth from 2010 to 2020.

We find some mobility in the individual observations for both ten-year periods, with a larger dispersion in the first decade. Overall, however, the intra-generational wealth elasticity is high, indicating low mobility at the very top of the wealth distribution—also in comparison with overall

wealth mobility in Switzerland (see Moser, 2019, and Martínez, 2020). This elasticity has further increased over time, from 0.79 in the first decade of the new millennium to 1 in the 2010–2020 period. Essentially, this suggests that the low positive wealth mobility at the top has, on average, decelerated to zero mobility. This is further supported by the increase in the R^2 from 0.67 to 0.80, confirming that initial wealth has become a very strong predictor of future wealth. While this is certainly a simple exercise to estimate wealth mobility, the results suggest that wealth mobility at the top of the wealth distribution declined markedly and statistically significantly from the first to the second decade of the 2000s.

Figure 9: Top Wealth Mobility, 2000–2020

Note: This figure shows a scatter plot for real log net wealth for the period 2000 to 2010 (red dots) and for 2010 to 2020 (blue diamonds), respectively. We report slope estimates β and the R^2 from OLS regressions in the corresponding color. Both regression coefficients are statistically significant at the 1% level. The gray shading surrounding the gradients represent the 95% confidence intervals. The analysis here is based on family observations rather than individual observations (for details on the two panel identifiers see Appendix A). This means that if, for instance, a super-rich individual dies within the observation period, but his heir is listed in the last year of the analysis, then this observation does not drop out. We only use observations in the mobility analysis that are present in both the first and last year of the analysis. The small written text under the figure displays the dropout rate. Figure C4 in the Appendix provides the same analysis for sub-periods.

4.3 How Rich are the Super-rich?

In 1989, the Hoffmann–Oeri–Sacher family, led by Paul Sacher, ranked first on the BILANZ rich list with a fortune of 10.3 billion (in real terms as of 2020). Some thirty years later, in 2020, the rich list in Switzerland is led by the three sons of late IKEA founder Ingvar Kamprad, with a total estimated net worth of 55.5 billion Swiss Francs. However, not only the richest in Switzerland, but also the broader Swiss wealth elite has become significantly richer over the past three decades. The number of billionaires (in real terms of 2020) residing in Switzerland has risen from 45 in 1993 to 128 in 2020 (see Appendix Figure C1).

Figure 10 shows the evolution of top wealth and aggregate wealth over time. Both top wealth and total private wealth have grown at roughly the same rate since the turn of the 21st century. Since 2012, however, we observe a significantly steeper increase in net wealth of the first 10

entries in the rich list, indicating a marked concentration of wealth at the absolute top of the wealth distribution (see also Table C2). Compared to aggregate private net wealth, growth in top wealth is more volatile over the business cycle, growing faster in boom periods but, conversely, declining more sharply in downturns.

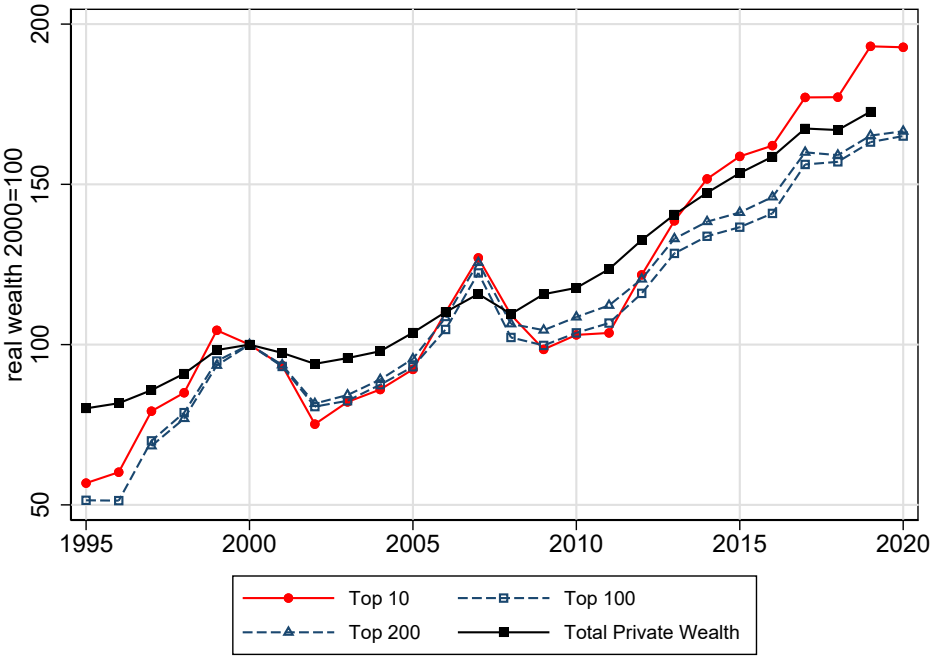


Figure 10: Evolution of Top Wealth and Total Private Wealth, 1995–2019

Note: This figure shows the development of BILANZ wealth clustered by different ranking entries compared to the total private net wealth of the Swiss economy. The Top 10, Top 100, Top 200 represent respectively the first 10, 100 and 200 entries in the BILANZ rich list. For 1995 and 1996, our panel does not include enough observations to show the evolution of the Top 200 (see Table C1). For details on the total net private wealth series, see Baselgia and Martínez (2021).

5 Top 0.01% Wealth Shares

Top wealth shares have become a popular inequality measure, indicating how wealthy the super-rich are relative to the rest of the population. Föllmi and Martínez (2017) present estimates of top wealth shares in Switzerland based on aggregate wealth tax statistics. How does the top 0.01% wealth share (the largest fractile we can cover with the rich list data) based on our BILANZ data compare to these existing series? In this section we describe the methods to estimate the top wealth share and compare our results to those in Föllmi and Martínez (2017).

5.1 Methodology

To estimate top wealth shares based on our BILANZ data that are comparable to estimates in Föllmi and Martínez (2017) based on tax data, we define the unit of observation, the reference population, and the total wealth denominator as follows.

Total Wealth Denominator. To calculate the top 0.01% wealth share, we set net BILANZ wealth in relation to total aggregate private wealth at market values.[15]

Tax Units. From our BILANZ dataset, we do not have any information on whether entries listed as individuals are married or not. If BILANZ observations are married, the estimated net assets are indeed more akin to the net assets of a joint household and, more importantly, of only one tax unit—as in Switzerland, married couples have to file taxes jointly. Thus, when calculating the wealth share of the top 0.01% wealth group, our unit of analysis are tax units rather than adults in Switzerland. We do this mainly to increase comparability with the top wealth shares previously estimated based on wealth tax statistics (Dell et al., 2007; Föllmi and Martínez, 2017). In addition, this makes our estimates rather more conservative, as we do not treat every observation as if they referred to a single adult individual. If we used the adults as unit of observation, we would have to include a larger number of entries from the BILANZ rich list to calculate the share of the riches 0.01% of the total adult population (which is larger than the total of tax units in the country). This could lead to an important overestimation of wealth concentration.

We calculate the total number of tax units in the country as the adult population minus half of the married adults, using official population statistics.[16]

Accounting for families. As family entries represent multiple tax units, we cannot use the raw BILANZ observations to calculate top wealth shares, as we would overestimate top wealth concentration. To address this issue, we divide all family observations and their corresponding wealth by 5. The overall result is robust to the choice of this divisor (Appendix Figure C5 shows wealth shares for divisor values of 3, 5, and 7). This approach significantly increases the number of person-year observations in our data.

Estimation of Top 0.01%. After splitting all family observations, we re-rank the entries of the rich list according to their wealth. To calculate the wealth share of the top 0.01%, we then use the rich list entries per year that equal to the number of tax units representing the top 0.01%, and divide their summed wealth by total private net wealth of the economy.

5.2 Top Wealth Shares in Comparison with Prior Estimates

Figure 11 shows our estimates of the top 0.01% wealth share in comparison to the estimates by Föllmi and Martínez (2017). According to our preferred specification (where we split all family

[15] For the period 2000–2019, the Swiss National Bank (SNB) provides reliable estimates on aggregate private net wealth at market values as part of the Swiss financial accounts: https://data.snb.ch/en. For years prior to 2000, we use the net private wealth estimates provided in Baselgia and Martínez (2021), see Appendix A in Baselgia and Martínez (2021) for a detailed description.

[16] The data is available for download from the Federal Statistics Office (FSO): https://www.bfs.admin.ch/bfs/en/home/statistics/population.html

observations and their net wealth by 5), the top 0.01% owned close to 17% of the economy's total private wealth in 2019. This share has turned out to be remarkably stable, ranging between 16 and 17% over the past decades—except for the strong business cycle effects around the Great Recession. These new estimates are about one-third larger than estimates based on wealth tax statistics. Moreover, while our new estimates show a relatively stable pattern over time, estimates based on tax data show an increase in the wealth share in the hands of the top 0.01% of approximately 50% between 1997 and 2016. Also in international comparison, these new top share estimates appear to be very high (see Saez and Zucman, 2016 for the United States; Alvaredo et al., 2018 for the U.K.; Garbinti et al., 2020 for France; Albers et al., 2020 for Germany).

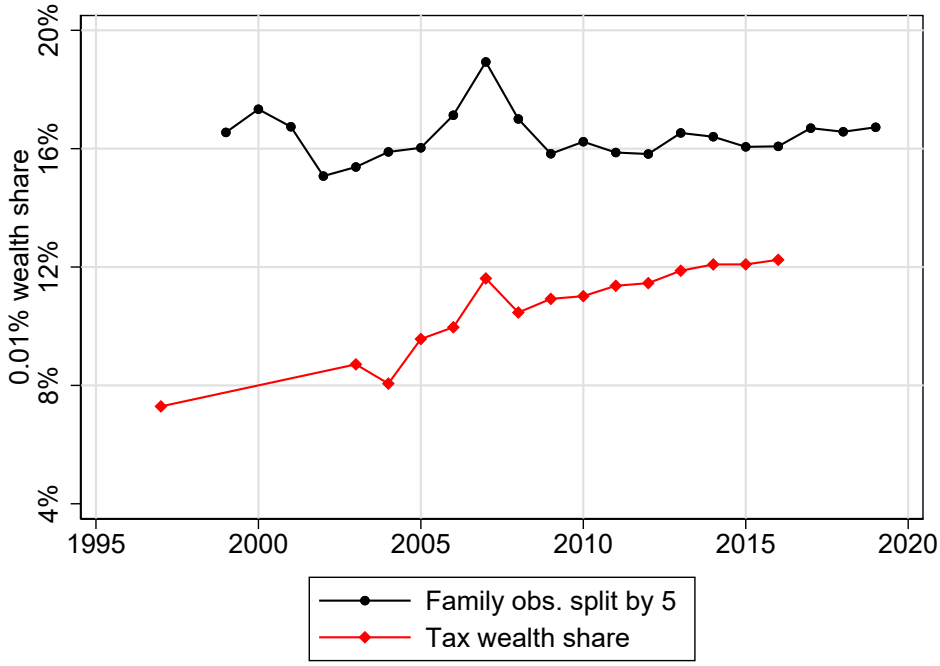


Figure 11: Top 0.01% Wealth Share in Switzerland in Comparison, 1997–2019

Note: This figure compares the top 0.01% wealth share based on the BILANZ data with previous estimates using the wealth tax statistics (FTA). The approach and data used to compute the top 0.01% wealth share based on the BILANZ data are described in Section 5.1. The wealth share of the top 0.01% based on wealth tax statistics is taken from Föllmi and Martínez (2017) and updated here accordingly. For details on the method and data, we refer to the original paper.

To put the two different top 0.01% wealth shares into perspective, it is important to note the differences in the underlying data sources. On the one hand, expenditure-based taxpayers and double counting lead to a downward bias in top shares based on Swiss wealth tax statistics. On the other, measurement error in the BILANZ rich list is likely to bias the estimates upwards. We discuss these sources of potential bias in turn.

Measurement errors in rich list data When it comes to the BILANZ data, two sources of measurement error may lead to an inflation of top wealth. First, certain assets, such as art and other collectibles, are included in the BILANZ' wealth estimates but not in total private wealth,

our denominator to compute top shares based on BILANZ wealth data.

Second, although the BILANZ cites some evidence that a fairly large number of foreign super-rich on their list have settled in Switzerland for tax reasons, not all of the wealth reported in the BILANZ may be part of total Swiss net wealth. BILANZ magazine seeks to capture the global wealth of the super-rich residing in Switzerland and, in part, their families—but not all family members necessarily also reside in Switzerland. Such a domestic approach is particularly problematic for the super-rich as they are members of a truly global elite. More generally, various super-rich in the BILANZ list own multiple properties and residences across the globe. Hence, the determination of primary residence and tax domicile may be ambiguous for at least some of the listed super-rich. Due to the large fortunes of the super-rich, a handful of observations wrongfully attributed to the Swiss tax base may considerably affect the results.

Undervaluation in tax data I: double-counting of tax units As a result of the federal tax system in Switzerland where wealth is only taxed at the cantonal but not at the federal level, double or multiple counting arises in the wealth tax statistics. This typically occurs when a taxpayer owns real estate in a canton other than their primary residence. The same taxpayer enters the statistic twice: (i) in the canton of primary residence, where all assets are subject to taxation except the out-of canton real estate. (ii) in the canton they own real estate, where only that real estate is subject to taxation.[17] As a result, the statistic dilutes wealth. Since such scenarios are more likely to be the case for taxpayers at the upper end of the wealth distribution, double counting will lead to an underestimation of wealth concentration measured with tax statistics.

Undervaluation in tax data II: expenditure-based taxation Wealthy foreigners without Swiss citizenship who reside in Switzerland but do not earn any labor income in Switzerland can benefit from a special tax treatment, known as expenditure-based taxation (sometimes mistakenly referred to as "tax deals"). The tax base for these individuals is not their actual income and wealth, but their total annual cost of living they incur for themselves and their dependents in Switzerland and abroad. The cost of living, i.e., the tax base, for these taxpayers is subject to some minimum thresholds stipulated in the tax laws. Note that only the tax base is different, taxation then follows the standard tax rates as laid out by the cantonal and federal tax laws.[18] By definition, these taxpayers belong to the top of the income and wealth distribution. In 2018, 4,557 persons—slightly less than 0.1% of all taxpayers—were subject to expenditure-based taxation in Switzerland. Föllmi and Martínez (2017) further show that their share has been stable over time, and amounts to less than 5% of taxpayers within the top 0.1% top income earners in federal income tax statistics.

[17] For details, see the explanations in the wealth tax statistics: https://www.estv.admin.ch/estv/de/home/allgemein/steuerstatistiken/fachinformationen/steuerstatistiken/gesamtschweizerische-vermoegensstatistik-der-natuerlichen-person.html

[18] For additional explanations see: https://www.efd.admin.ch/efd/en/home/steuern/steuern-national/lump-sum-taxation.html. The federal law on taxation regarding expenditure-based taxation can be found here: https://www.admin.ch/opc/de/official-compilation/2013/779.pdf

The regulations and minimum requirements of expenditure-based taxation are primarily designed to mimic income of wealthy foreigners. Yet, the wealth tax base is typically derived from the income tax base by applying a multiplication factor. Taxable wealth of expenditure-based taxpayers is likely to be significantly lower than their actual net wealth, although the specific arrangements of wealth taxation for expenditure-based taxpayers vary somewhat by canton (Appendix Table C3 shows the cantonal definitions and minima for the income and wealth tax base, respectively, of expenditure-based taxpayers).

In the Canton of Berne, for instance, for expenditure-based taxpayers only real estate owned in the Canton of Berne is subject to wealth taxation and hence recorded in the wealth tax statistics.[19] Expenditure-based taxation therefore likely leads to a significant downward biased measurement of a taxpayer's market wealth. Alas, it is not feasible to accurately quantify the undervaluation of expenditure-based taxpayers in wealth tax statistics—anecdotal evidence suggests that such undervaluation might be sizable in certain cases.[20] We analyze the role of this preferential tax treatment for location decisions of the super-rich in Switzerland in Section 6.

Given these considerations and the limitations of the BILANZ data discussed in Section 3, we believe that the wealth tax statistics remains the most reliable source for measuring wealth concentration at the top end for Switzerland. Furthermore, only wealth tax statistics allow for a long-run analysis of top wealth shares. However, what our estimates from BILANZ rich list data indicate is that top shares from tax data may rather under- than overstate wealth concentration at the very top.

6 Preferential Taxation and the Location Choice of Super-rich Foreigners

In this section, we analyze the effect of the expenditure-based taxation available to super-rich foreigners described above on their location choices within Switzerland, exploiting the fact that between 2010 and 2014 several cantons have abolished this practice. Several studies have shown that taxpayers, especially the rich, tend to sort into low-tax cantons and municipalities within Switzerland (e.g., Schmidheiny, 2006; Brülhart et al., 2022; Martinez, 2021). Schmidheiny and Slotwinski (2018) show that foreigners respond to tax incentives in their location decision when they are taxed at the regular local rate after being in Switzerland for a few years. However, we are the first to study the effect of the abolition of expenditure-based taxation in Swiss cantons on the location choices of the super-rich. Detailed tax data to study this question is unfortunately not accessible, and tax administrations have not released statistics on the number of former expenditure-based taxpayers who remained in the respective cantons or moved away after the

[19] See: http://www.taxinfo.sv.fin.be.ch/taxinfo/display/taxinfo/Besteuerung+nach+dem+Aufwand

[20] With the departure of the richest Swiss-based billionaire Ingvar Kamprad in 2013, it became public that he was not even among the top 15 taxpayers due to the expenditure-based taxation in his longtime tax domicile of Epalinges, a village of less than 10,000 inhabitants. See: https://www.nzz.ch/schweiz/minus-ein-pauschalbesteuerter-1.18106985

abolition of the special tax treatment. To shed light on this crucial policy question, we therefore exploit our newly compiled BILANZ dataset to estimate the impact of eliminating expenditure-based taxation on the location decision of the super-rich.

6.1 Abolition of Expenditure-Based Taxation Across Cantons

As described in the previous section, wealthy foreigners can benefit from expenditure-based taxation, a preferential tax treatment that uses expenditures instead of actual income and wealth as tax base. Appendix Table C3 gives an overview of how the income and wealth tax bases are defined in each canton.

This preferential tax scheme is explicitly aimed at attracting wealthy foreigners to Switzerland. While they do not need to be rentiers but can have businesses and work abroad, they cannot earn any type of labor income *within* Switzerland.[21] Swiss citizens are not eligible. The scheme has been in place in different cantons since the late 19th century and was introduced at the federal level in 1934. Similar tax regimes exist in the United Kingdom (known as the "Non-Dom" System, dating back to 1799), Belgium, Austria, and Italy. In 1948, expenditure-based taxation was harmonized across cantons and the federal state, but differences in tax base definitions remain to this day.

Although less than 0.1% of all taxpayers in Switzerland benefit from such preferential tax treatments, expenditure-based taxation has become the subject of heavy criticism over the past decade, both from outside and within the country. In light of these discussions, several cantons proposed to abolish this practice, usually taking the question to the ballots. The cantons of Zürich (2010), Schaffhausen (2012), Appenzell A.Rh (2012), Basel Stadt (2014), and Basel-Landschaft (2014) adopted corresponding proposals and removed the option of expenditure-based taxation from their tax laws. Seven cantons held a popular vote between 2011 and 2014 that did not find a majority.[22]

Because personal taxes in Switzerland are residence-based, and due to strong cantonal tax autonomy, expenditure-based taxation for the federal income tax is only available if residing in one of the cantons that still offers this practice. A popular vote to abolish expenditure-based taxation at the national level was rejected by 59.2% in 2014.

6.2 Trends in Location Choice

According to our BILANZ dataset, in 2019, 53.6% of the 289 richest individuals or families in Switzerland were concentrated in five out of 26 cantons (Zurich: 51; Geneva: 33; Vaud: 24; Bern: 24; Schwyz: 23). To take into account the different size of the cantons, Panel a) of Figure 12 shows the cantonal share of super-rich per 100,000 inhabitants in 2009.[23] Clearly, the super-rich are clustered in the low-tax cantons of central Switzerland. Panel b) of Figure 12 presents the

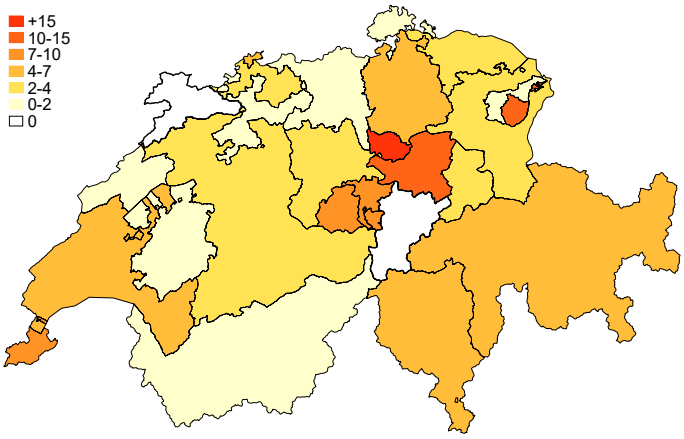
[21] A tennis player, for example, could not play the Basel ATP without losing his or her preferential tax treatment, as this would be considered work.

[22] Table C4 in the Appendix lists dates and further details on all the popular votes held and the corresponding results.

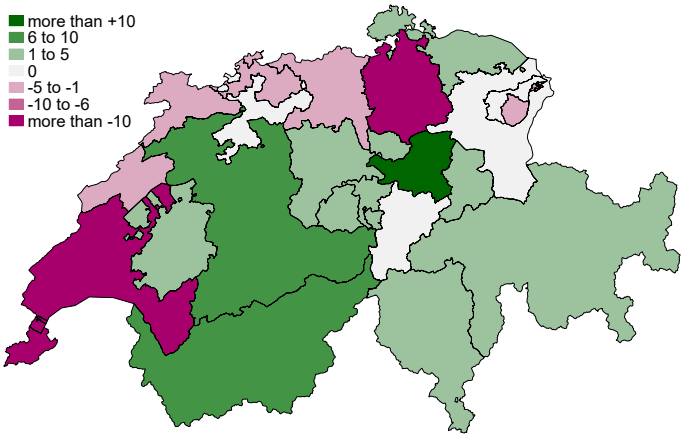
[23] We choose this year because it predates the reforms we analyze.

net changes of the super-rich between 1999 and 2019. Over this period, the number of super-rich living in German-speaking Switzerland has increased at the expense of French-speaking areas. In addition, rural and alpine cantons in particular appear to have gained in attractiveness for the super-rich. This is in line with findings on the importance of nature and local amenities (e.g., the availability of land, proximity to lakes, mountain views) for the location choice of rich households (Young et al., 2016).

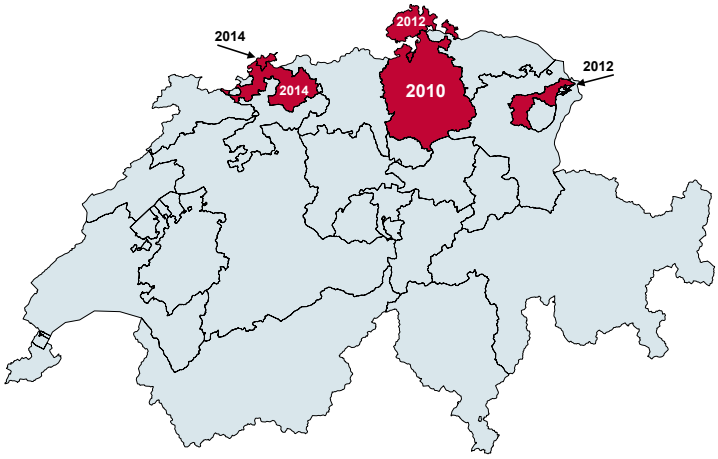
The major losers in the intercantonal competition for super-rich households (and potential taxpayers) are the cantons of Zurich, Geneva, and Vaud. In contrast, the largest increase occurred in the low-tax canton of Schwyz, where the number of super-rich grew from 8 in 1999 to 23 in 2019. Panel c) indicates the cantons that have abolished expenditure-based taxation.



(a) Stock 2009 (per 100,000 inhabitants)



(b) Net absolute changes in the super-rich, 1999-2019



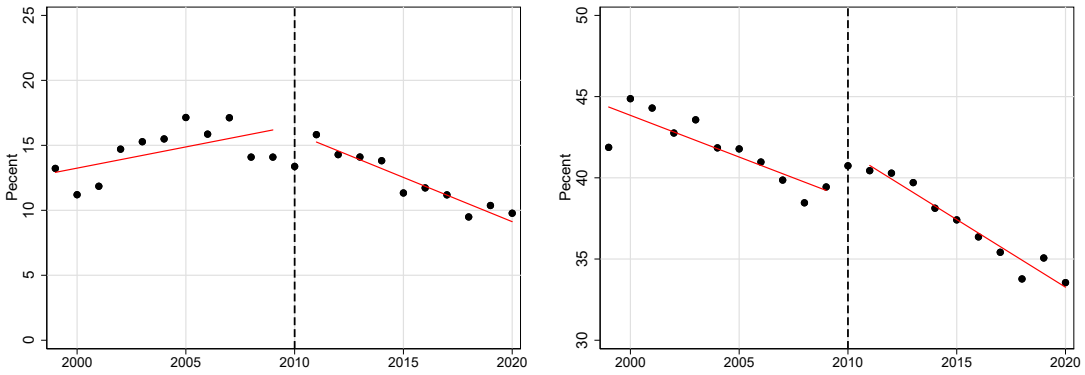
(c) Abolition Cantons

Figure 12: Regional Distribution and Net Changes of the Super-rich, 1999–2019

Note: Panel a) of this figure shows the number of BILANZ ranking entries by canton of residence (per 100,000 inhabitants) in 2009. Panel b) shows the net changes in the number of super-rich between 1999 and 2019. Panel c) indicates cantons that abolished expenditure-based taxation all between 2010 and 2014 (for details on the cantonal reforms and their timing, see Table C4).

The abolition of expenditure-based taxation may not have been exogenous to the evolution of super-rich living in the canton. Panel a) of Figure 13 shows the share of foreign-born super-rich,

i.e., those presumably affected by the policy changes, living in cantons that eventually abolished expenditure-based taxation. Panel b) shows the share of Swiss-born super-rich living in the abolishing cantons.[24] Already prior to the reform, foreign-born super-rich were less likely to live in reform cantons: in 1999, less than 15 percent of all foreign-born super-rich were living in a canton that would eventually abolish expenditure-based taxation. Yet in the abolishing cantons the share of super-rich foreigners had been *increasing* before 2010, a trend that reversed after the reforms. While abolishing cantons had apparently never been among the favorite for wealthy foreigners, they were home to almost 45 percent of all Swiss-born super-rich in 1999 (Panel b). But for the Swiss-born super-rich, we see a clearly declining trend over the entire time span. Their trend seems to be unaffected by the tax policy that targets super-rich foreigners—just as one would expect.



(a) Foreign-born (b) Swiss-born

Figure 13: Share of Super-rich living in an "Abolition" Canton

Note: Panel (a) shows the share of the foreign-born super-rich living in cantons that have abolished expenditure-based taxation. Likewise, Panel (b) shows the share of Swiss-born super-rich. The dashed vertical line in 2010 indicates the year in which the first canton abolished expenditure-based taxation, further abolitions took place in 2012 and 2014. The solid red lines are best linear fits before and after 2010.

6.3 Estimating Location Choice of Super-rich in Response to Tax Privileges for Wealthy Foreigners: Difference-in-Differences Setting

To quantify the causal impact of the elimination of expenditure-based taxation on the location choices of the super-rich, we conduct two different empirical analyses. In this section, we turn to a Difference-in-Differences (DD) setting and estimate cumulative event studies, showing how the effect of abolishing the policy played out over time. The second, alternative approach that arises from a spatial equilibrium model is described in Section 6.4.

Difference-in-Differences Specification

To examine how the removal of expenditure-based taxation affects the location decisions of the super-rich, we first estimate various specifications of a two-way fixed effects DD model of the type

[24] As our BILANZ dataset does not contain information on the nationality of individuals, we proxy nationality by country of birth.

$$\ln N_{c,t} = \beta^{DD}\tau_{c,t} + \theta_c + \theta_t + \Theta_c \cdot t + \Psi X_{c,t} + \epsilon_{c,t}, \tag{2}$$

where $\ln N_{c,t}$ is the log number of super-rich living in canton c at time t. $\tau_{c,t}$ is a treatment dummy that equals 1 if canton c abolishes expenditure-based taxation in year t. In all specifications, the treatment is defined in the year of the statutory removal (e.g., $\tau_{ZH,2010} = 1$ for the canton of Zurich). θ_c and θ_t capture canton and year fixed effects, respectively, and $\Theta_c \cdot t$ denotes a canton-specific linear trend. Thus, the model specified in Equation (2) absorbs (i) all unobservable time-invariant canton-specific characteristics by θ_c, (ii) all unobservable canton-invariant time-specific effects by θ_t, and (iii) stable canton-specific differences in growth of the number of super-rich by $\Theta_c \cdot t$. The vector $X_{c,t}$ adds the following time-varying canton controls in logarithms: (i) top average net-of-tax rate on wealth, $(1 - \tau^w)$, (ii) top average net-of-tax rate on income, $(1 - \tau^y)$, (iii) top average net-of-tax rate on bequests, $(1 - \tau^b)$, (iv) total population (a proxy for urbanization), and (v) the share of foreigners in total population (a proxy for internationalization).[25]

β^{DD} is our parameter of interest. It captures the effect of the abolition of expenditure-based taxation on the number of super-rich in the treatment cantons compared to the non-treatment cantons that did not abolish the preferential tax scheme. Since one can presumably preserve more of one's income and wealth when being taxed under expenditure-based taxation (i.e., if $\tau_{c,t} = 0$), we expect a negative sign for β^{DD}.

We are aware that our analysis has two limitations. From a theoretical perspective, we would ideally want to relate the percentage change in the number of super-rich to the percentage change in the effective net-of-tax rate. Specifically, dividing β^{DD} by the percentage change in the effective net-of-tax rate would lead to the implied mobility elasticity with respect to taxation. However, due to the nature of the preferential tax treatment, what changes prima facie is not the legal tax rate, but the tax *base*. Given the lack of any official information on the true income and wealth tax bases under expenditure-based taxation, we cannot calculate the change in the effective net-of-tax rate—and thus the implicit tax elasticity. We are therefore limited to estimating the percentage change in the number of super-rich with respect to the removal of the preferential tax treatment.

In addition, our estimates are affected by measurement error. Because we do not observe actual expenditure-based super-rich taxpayers, but rather infer from the place of birth an individual's non-Swiss citizenship, we measure our outcome of interest with error. This will render the estimates less precise and hence increase standard errors (but the OLS estimator is still unbiased).

Event Study Specification

The key identifying assumption of the DD identification strategy is that the log number of super-rich foreigners would have evolved the same in cantons that did abolish expenditure-based taxation

[25] We greatly thank Raphaël Parchet (2019) for providing us with wealth and income tax rate data; we collected bequest tax rates published annually by the federal tax administration in: *Steuern in der Schweiz - Charge fiscale en Suisse*. The data used as controls and its sources are described in detail in Appendix B.

and those that did not. Panel a) of Figure 13 indicates that this is may not be the case, and that we need to correct for canton-specific time trends.

To assess the validity of the parallel trends assumption in our main specification, we turn to event studies. The event study design further allow us to study the dynamics driven by the policy changes. In particular, we estimate the following distributed-lag model in logs using OLS:

$$\ln N_{c,t} = \sum_{j=-3}^{5} \gamma_j \tau_{c,t-j} + \theta_c + \theta_t + \Psi X_{c,t} + \epsilon_{c,t}. \tag{3}$$

As before, $\ln N_{c,t}$ is the log number of super-rich living in canton c at time t and $\tau_{c,t}$ is a treatment indicator for the removal of expenditure-based taxation. θ_c and θ_t again refer to canton and year fixed effects, respectively, and the vector $X_{c,t}$ adds the same time-varying canton controls as in the DD analysis. As shown by Schmidheiny and Siegloch (2020), the model in Equation (3) is identical to a specification of an event study with binned endpoints 4 years before and 5 years after the event.

The *cumulative* effect j years after the reform can be obtained from the distributed-lag coefficients γ as

$$\beta_j^{DD} = \begin{cases} -\sum_{k=j+1}^{-1} \gamma_k & \text{if } -4 \leq j \leq -3 \\ 0 & \text{if } j = -1 \\ \sum_{k=0}^{j} \gamma_k & \text{if } 0 \leq j \leq 5 \end{cases} \tag{4}$$

Normalizing to the pre-reform year, i.e., $\beta_{-1}^{DD} = 0$, we show the dynamic reform effect β_j^{DD} relative to the year prior to the abolition of expenditure-based taxation between abolisher and non-abolisher cantons.

DD Results

Table 1 shows the two-way fixed effects DD estimates using standard OLS. The abolition should only affect location choices of foreign super-rich, hence we estimate Equation (2) for foreign-born super-rich in the BILANZ dataset over the period 1999 to 2020 (Panel A). In the sample of Swiss-born super-rich (Panel B), in contrast, we would not expect to see any effects. Given that foreign-born make up almost half of all super-rich (see Figure 3), we also run the estimation on the full sample of the super-rich in the BILANZ rich list to see whether responses by foreign-born super-rich are large enough to be reflected in the full sample (Panel C). In Panel D, finally, we estimate Equation 2 for the period 2003-2017 using an even broader population: all taxpayers with net wealth exceeding 10 million Swiss francs as reported in official wealth tax statistics.[26]

Column 1) reports the estimates with only time- and canton-fixed effects. Estimates from this specification suggest that eliminating expenditure-based taxation reduces the number of super-rich

[26]This data, available since 2003, reports the number of taxpayers by canton and for different wealth brackets. The top bracket contains the number of taxpayers with net wealth greater than 10 million Swiss francs. The data can be downloaded here: https://www.estv.admin.ch/estv/de/home/die-estv/steuerstatistiken-estv/allgemeine-steuerstatistiken/gesamtschweizerische-vermoegensstatistik-der-natuerlichen-person.html

by 26-31 percent across all sub-samples. This result, however, seems to be driven by canton-specific time trends. Once we control for these trends (Column 2), the effect vanishes. For the foreign-born (Panel A), the coefficient remains large and negative, but is not statistically significant anymore. In the other samples, the coefficient changes sign and / or is close to zero with large confidence intervals.

Sequentially adding controls in Columns 3) through 7) does not significantly change the size of the estimate of interest. In the sample of foreign-born super-rich, however, the coefficient becomes significant again, once we control for the general tax environment in the canton, the share of foreigners, and population growth. With the full set of controls, the coefficient of -0.28 is significant at the 90 percent level. Note, however, that because our outcome variable is measured with error, OLS estimates are less precise by definition. In all the other samples that include the non-treated population, canton-specific time trends absorb most of the variation across cantons and the coefficients remain insignificant, even after the inclusion of further controls.

Robustness

Our dataset on the super-rich contains true zeros, i.e., there are a few cantons where no super-rich resides. Apparently, these cantons cannot compete in tax competition for the super-rich. Therefore, when estimating Equation (2) with the log number of super-rich as outcome in a standard OLS model, these observations (cantons) with zeros are dropped from the model, since the logarithm of zero is undefined. As a robustness check, we therefore employ the Poisson pseudo-maximum likelihood (PPML) estimator which can incorporate observations with zeros into the estimation (for a detailed discussion of PPML estimation, see the seminal contribution by Silva and Tenreyro, 2006).

The results of estimating Equation (2) with PPML are shown in Appendix Table C7. They generally confirm the findings of the analysis above. Again, controlling for canton-specific time trends crucially affects and reverses the sign of the coefficients the Swiss-born super-rich (Panel B), for the full sample (Panel C), and the rich taxpayers (Panel D), but not for the foreign-born super-rich (Panel A), where the coefficients remain virtually unchanged across all specifications. However, in the PPML estimation, the coefficients on the foreign-born super-rich are somewhat smaller and not statistically significant at any conventional level.[27]

Overall, the DD specifications suggest that super-rich foreigners have been responsive to the abolition of expenditure-based taxation. The removal of expenditure-based taxation in a canton reduces the number of foreign-born super-rich by approximately 30 percent, while it had no effect on the location choices of Swiss-born super-rich—just like one would expect, given the nature of the tax policy. The response of rich, foreign-born taxpayers, however, seems to be too small to

[27] Comparing the standard OLS with the PPML estimation results based on Panel D—which includes only observations with positive values and thus identical observations—suggests that PPML leads to somewhat less negative coefficients in this setting. Given this and the fact that OLS excludes cantons that cannot compete in tax competition for the super-rich, it is hardly surprising that the observed effect is smaller.

be detected in larger samples that include all super-rich.

Table 1: The Abolition of Expenditure-Based Taxation – DD-Estimation

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Foreign-born Super-rich, 1999-2020						
β^{DD}	−0.31***	−0.30	−0.32	−0.33**	−0.31	−0.29*	−0.28*
	(0.09)	(0.18)	(0.30)	(0.15)	(0.34)	(0.15)	(0.15)
No. of obs.	411	411	375	375	375	375	375
adj. R^2	0.922	0.952	0.952	0.952	0.952	0.953	0.953
	Panel B: Swiss-born Super-rich, 1999-2020						
β^{DD}	−0.27***	0.11	0.10	0.11	0.07	0.08	0.07
	(0.09)	(0.08)	(0.10)	(0.08)	(0.10)	(0.09)	(0.10)
No. of obs.	466	466	421	421	421	421	421
adj. R^2	0.925	0.952	0.954	0.954	0.954	0.954	0.954
	Panel C: All Super-rich, 1999-2020						
β^{DD}	−0.26***	0.04	0.04***	0.04	0.02	0.04	0.02
	(0.09)	(0.13)	(0.00)	(0.07)	(0.07)	(0.05)	(0.06)
No. of obs.	506	506	460	460	460	460	460
adj. R^2	0.955	0.970	0.969	0.969	0.969	0.970	0.970
	Panel D: Rich Taxpayers, 2003-2017						
β^{DD}	−0.27***	0.00	−0.01	0.00	0.00	0.00	−0.03
	(0.08)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)
No. of obs.	390	390	390	390	390	390	390
adj. R^2	0.984	0.995	0.995	0.995	0.995	0.995	0.996
Controls	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Canton Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canton-specific linear trend	No	Yes	Yes	Yes	Yes	Yes	Yes
Top average wealth-tax rates	No	No	Yes	Yes	Yes	Yes	Yes
Top average income-tax rates	No	No	No	Yes	Yes	Yes	Yes
Bequest-tax rates	No	No	No	No	Yes	Yes	Yes
Share of foreigners	No	No	No	No	No	Yes	Yes
Total population	No	No	No	No	No	No	Yes

Note: This table shows the estimation results of the model presented in Equation (2) using OLS. Panel A uses the number of foreign-born super-rich in our BILANZ dataset as the dependent variable. More detailed results for this sub-sample, including estimation coefficients on the control variables, are presented in Table C5 in the appendix. Analogously, Panel B employs the number of Swiss-born super-rich. Again, for more detailed results, see the Table C6 in the appendix. Panel C utilizes the full sample of super-rich and Panel D the number of rich taxpayers (i.e., taxpayers with net wealth greater than CHF 10 million), respectively. See Table C7 for the estimation results using PPML. Two-way clustered standard errors by canton and year are shown in parentheses, below the coefficients. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

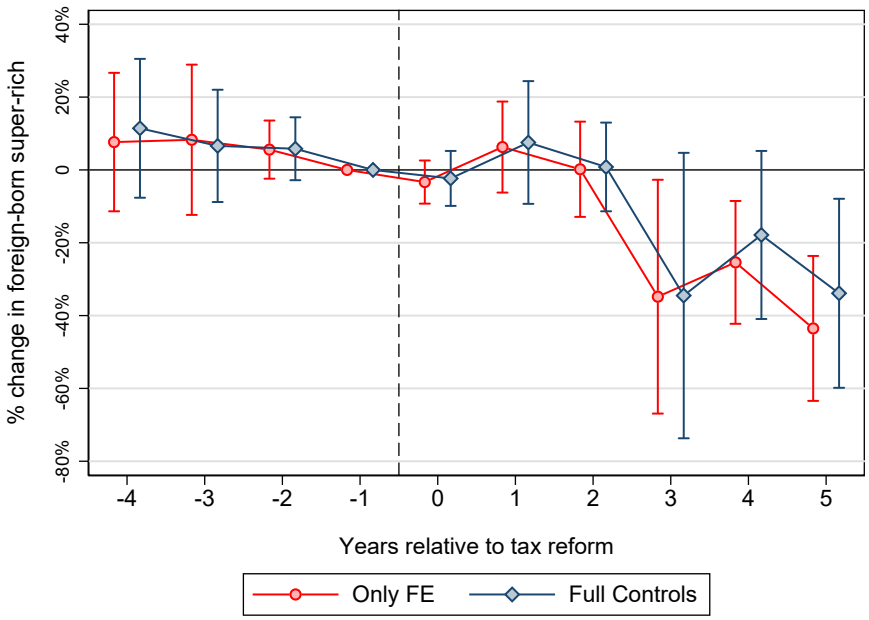
Event Study Results

Figure 14 presents the event study estimates for the foreign-born super-rich. In Figure 14(a), we show the dynamic effects when the treatment indicator $\tau_{c,t}$ is defined as in the DD-analysis (i.e., $\tau_{c,t} = 1$ in the year of the statutory removal in the respective canton). The pre-treatment estimates are slightly positive but stable and statistically not significant, even without controlling for potential confounders. Hence, the identifying parallel trends assumption holds in our DD setting. This finding stands somewhat in contrast to the other samples (see Figure C6 in the Appendix), where evidence points towards negative pre-trends. Abolishing cantons had a declining share of wealthy taxpayers, but, interestingly, not a declining share of super-rich foreigners prior to their reforms (in line with the evidence presented in Figure 13). In fact, we find a common, similar negative time pattern in all other samples that seems to be largely independent of the policy reforms. This explains why controlling for canton-specific time trends in the DD analysis profoundly changes the estimates for these other groups of super-rich and wealthy taxpayers, while having no effect on the foreign-born super-rich.

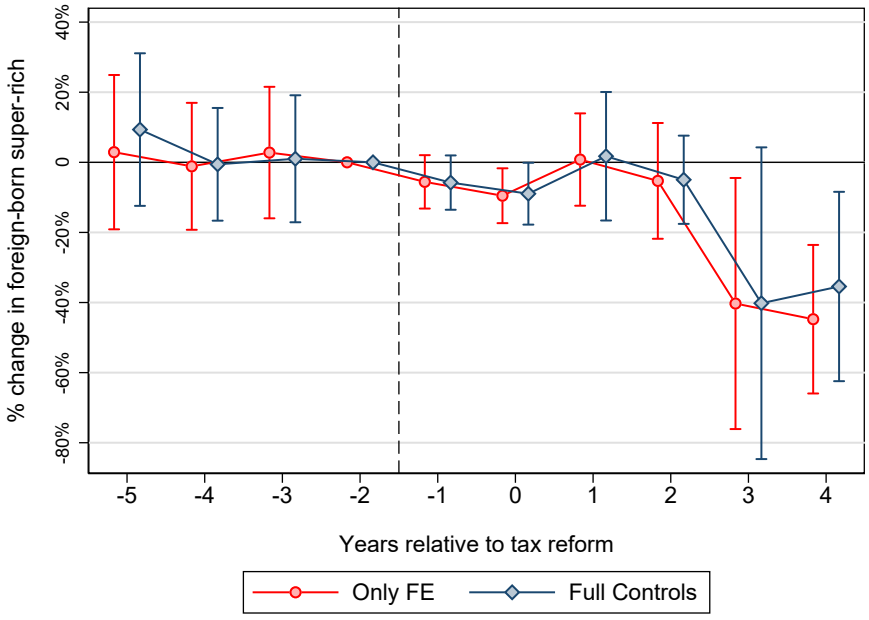
The statutory removals of expenditure-based taxation were typically preceded by public discussions, the political decision-making process, and the popular votes held in the respective cantons. Some affected taxpayers may have anticipated the results and made location choices accordingly, e.g., by not moving to one of the cantons that was considering abolishing expenditure-based taxation. To account for such potential anticipatory effects, we additionally perform the analysis normalizing the coefficients to the year $t - 2$, i.e., the second year prior to the removal of the preferential tax treatment, in Figure 14(b).[28] However, the results hardly change at all.

The negative location effect of the foreign-born super-rich with respect to the elimination of expenditure-based taxation does not materialize immediately after the reform. The observed effects are likely the combined result of higher out-migration and lower in-migration into reform cantons (although we do not observe actual flows). Overall, the event-study analysis affirms the above findings and suggests that the location decision of the foreign-born super-rich is sensitive to the abolition of expenditure-based taxation, at least in the medium run.

[28] We shift the time axis in Figure 14(b) to still have four pre- and six post-treatment periods.



(a) No anticipation effect



(b) One year anticipation effect

Figure 14: Cumulative Event Study – Foreign-born Super-rich

Note: This figure shows the cumulative effects given by Equation (4) for the foreign-born super-rich. Panel a) presents the estimation results when the treatment indicator $\tau_{c,t}$ is defined as in the DD-analysis (i.e., for instance $\tau_{ZH,2010} = 1$ for the canton of Zurich). Panel b) reports the analogous estimation results when the treatment indicator $\tau_{c,t}$ is introduced with a one-year lead (i.e., for instance $\tau_{ZH,2009} = 1$ for the canton of Zurich). In both panels, the red line with circles corresponds to a specification of Equation 3, which contains only year and canton fixed effects. The blue line with diamonds corresponds to a specification that additionally contains the full vector of time-varying cantonal controls $X_{c,t}$. Point estimates are reported with their corresponding 90% confidence intervals based on two-way clustered standard errors by canton and year. Figure C6 displays the analogous results for all super-rich, Swiss-born super-rich, and rich taxpayers.

6.4 Estimating Location Choice of Super-rich in Response to Tax Privileges for Wealthy Foreigners: A Spatial Equilibrium Approach

In this section, we turn to a second, alternative estimation approach, arising from spatial equilibrium in a location decision model, as described in Agrawal and Foremny (2019).[29]

Stock Ratio Estimation of Super-rich across Canton-Pairs.

Following the approach presented in Agrawal and Foremny (2019), we compare the number of super-rich across all canton pairs, and estimate how these relationships have been affected by the unilateral abolishment of expenditure-based taxation by some cantons. We first describe the formal empirical model, followed by a discussion of the identifying assumptions. The pivotal idea is to compute for each year the log ratio of the stock of the super-rich for each canton-pair—which then serves as the dependent variable—using our BILANZ dataset. To compute such canton-pair ratios, we restrict our sample to cantons that consistently host at least one super-rich person per year. The six smaller cantons (UR, SH, AR, AI, NE, and JU) that cannot successfully compete for super-rich foreigners are therefore not considered in this analysis. This leaves a total of 20 cantons and thus $20 \times 19/2 = 190$ unique canton-pair combinations. With this much larger number of observations relative to the DD analysis in Section 6.3, we can include a larger set of fixed effects and linear time trends, obtain more statistical power, and apply three-way clustered standard errors.

We estimate the following pairwise model

$$\ln\left(\frac{N_{d,t}}{N_{o,t}}\right) = \beta^{SR}\tau_{do,t} + \theta_d + \theta_o + \theta_t + \Theta_{do} \cdot t + \Psi X_{do,t} + \epsilon_{do,t} \tag{5}$$

where $\ln\left(N_{d,t}/N_{o,t}\right)$ is the log ratio of the super-rich across canton-pairs, where d denotes destination and o the origin canton.[30] This notation uniquely captures all canton-pair combinations. Because of how we define the right-hand side variables, it does not matter whether a canton enters the model in the numerator as a destination, or in the denominator as origin canton. As such, $\tau_{do,t} \equiv \tau_{d,t} - \tau_{o,t}$ is an indicator variable that equals 1 if destination canton d abolishes expenditure-based taxation in year t, but canton o does not.[31] Conversely, $\tau_{do,t}$ equals -1 if the destination canton d does not remove expenditure-based taxation in year t, but canton o does. And third, $\tau_{do,t}$ equals 0 if either both cantons d and o abolish expenditure-based taxation in year t or neither of them does, which is the empirically more pertinent case. θ_d, θ_o, θ_t capture destination, origin, and year fixed effects, respectively. Thus, θ_d and θ_o capture amenities and all time-invariant policies in the destination and origin cantons. The term $\Theta_{do} \cdot t$ denotes a linear time trend for each *canton-pair* combination. The vector $X_{do,t}$ adds the same control variables as

[29] For the theoretical model, the interested reader is referred to Agrawal and Foremny (2019). We confine here to our modified empirical model.

[30] Note that we do not actually have aggregate data on flows, but only on stocks, so there is effectively no origin or destination. However, we stick to the notation of Agrawal and Foremny (2019). This phrasing is helpful for discussing the empirical set-up, as we do not have to refer to some arbitrary reference canton.

[31] For instance, if canton d abolishes expenditure-based taxation in year t, but canton o does not, $\tau_{do,t} = 1 - 0 = 1$. Or vice versa $\tau_{do,t} = 0 - 1 = -1$.

employed in the DD analysis. Here, however, the controls are included in the vector $X_{do,t}$ as log ratios (i.e., log differentials) for each of the canton pairs. For example, in the case of top average wealth-tax rates as $[(\ln(1-\tau_{d,t}^{w}) - \ln(1-\tau_{o,t}^{w})]$, which is the log net-of-wealth-tax rate differential between each canton-pair.

β^{SR} is our parameter of interest. The interpretation of β^{SR} is as follows: removing expenditure-based taxation in canton d while holding the policy fixed in canton o, makes people more likely to move away from canton d, or more likely to stay in canton o, respectively, as one can preserve more of its income and net wealth from being taxed. This leads to a decrease in the stock of super-rich in canton d relative to canton o. If canton of origin o abolishes expenditure-based taxation but canton d does not, the interpretation is vice versa. If either both cantons, d and o, or neither of them abolish expenditure-based taxation, there is no policy change to differentially affect the stock of super-rich—and by construction we define $\tau_{do,t} = 0$ in this case. Importantly, the estimation of β^{SR} in ratios with Equation (5) affects its interpretation. Following the discussion in Agrawal and Foremny (2019), it can be shown that the tax reform in a given canton can influence the number of super-rich in other cantons. By differentiating Equation (5) with respect to the policy reform in canton d, one obtains

$$\beta^{SR} = \frac{\partial \ln N_{d,t}}{\partial \tau_{d,t}} - \frac{\partial \ln N_{o,t}}{\partial \tau_{d,t}} \equiv \eta - \mu \tag{6}$$

where η is the stock elasticity of the super-rich in canton d with respect to its own policy reform $\tau_{d,t}$. μ is the cross-elasticity of canton o's super-rich with respect to canton d's policy reform $\tau_{d,t}$. Agrawal and Foremny (2019) argue that since $\eta > 0$ and $\mu < 0$ have opposite signs, the estimate of β^{SR} overestimates the elasticity of the stock in a given canton and should therefore be considered an upper bound. However, as the number of cantons increases, μ converges to zero. In our empirical analysis with 20 cantons, μ is not expected to be zero, but quite close to zero, therefore β^{SR} is a fair approximation of the true stock elasticity.[32]

Correct identification based on the model presented in Equation (5) relies on the condition that, in the absence of policy reforms (i.e., no changes in $\tau_{do,t}$) and given the set of fixed effects, linear time trends, and control variables, the canton-pair stocks of the super-rich remain constant over time. Any canton-pair-specific unobservable factor correlated with both the elimination of expenditure-based taxation and the migration behavior of the super-rich between a canton-pair may jeopardize our identification strategy. Introducing linear time trends for each canton-pair combination separately is a conservative estimation procedure that likely captures much of the variation across canton-pairs. Moreover, the event study analysis above provided evidence that the location decisions of the foreign-born super-rich do not precede but follow the policy reforms.

[32] Agrawal and Foremny (2019) conclude that in their setting with fifteen regions μ to be relatively close to zero.

Stock Ratio Results

Table 2 presents the estimation results of Equation (5) for the years 1999 to 2020. As before, the results are presented separately for foreign-born super-rich (Panel A) and other samples (Panels B to D). Column 1) shows the estimates with only destination, origin, and year fixed effects. Again, we find a negative response of approximately 35% across all sub-samples.

The results on the foreign-born super-rich in Panel A are very robust to the inclusion of canton-pair specific trends, $\Theta_{do} \cdot t$ (Columns 2 ff.), and the addition of further controls in Columns 3) to 7). The removal of expenditure-based tax privileges led to a 32-37% decline in the stock of super-rich compared to non-reform cantons. We use three-way clustered standard errors and our results are staistically significant at the 1% level. This negative location choice effect is slightly larger than the one identified in the DD analysis, which is consistent with the discussion of Equation (6) and the conclusion that β^{SR} is an upper bound estimate.

For the Swiss-born super-rich (Panel B), all super-rich (Panel C), or the merely wealthy taxpayers (Panel D), we again find that the coefficient of interest flips sign once that we include canton-pair specific linear trends. Considering the Swiss-born super-rich in Panel B, we find a small but positive and significant effect in some specifications. A speculative explanation for this positive coefficient is that with the exodus of some foreign-born super-rich from cantons that have abolished expenditure-based taxation, the supply of high-end housing increased in these cantons, which may have led to these positive migration responses of some Swiss-born super-rich. However, these estimates are very sensitive to the inclusion of additional covariates.

Summing up, our results show that the abolition of expenditure-based taxation resulted in a medium to long-run decline of about 30% in the stock of foreign-born super-rich in reform cantons, while the number of Swiss-born super-rich and wealthy taxpayers in abolishing cantons remained unaffected.

Table 2: Stock Ratio Estimation across Canton-Pairs

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Foreign-born Super-rich, 1999-2020						
β^{SR}	−0.33***	−0.36***	−0.37***	−0.37***	−0.34***	−0.33***	−0.32***
	(0.09)	(0.11)	(0.10)	(0.10)	(0.10)	(0.09)	(0.09)
No. of obs.	3'198	3'198	2'926	2'926	2'926	2'926	2'926
No. of canton-pairs	171	171	171	171	171	171	171
adj. R^2	0.920	0.952	0.953	0.953	0.954	0.954	0.954
	Panel B: Swiss-born Super-rich, 1999-2020						
β^{SR}	−0.38***	0.13*	0.13**	0.13**	0.07	0.07	0.04
	(0.06)	(0.07)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
No. of obs.	3'659	3'659	3'279	3'279	3'279	3'279	3'279
No. of canton-pairs	190	190	190	190	190	190	190
adj. R^2	0.919	0.947	0.950	0.950	0.952	0.952	0.952
	Panel C: All Super-rich, 1999-2020						
β^{SR}	−0.36***	0.03	0.02	0.02	0.01	0.01	0.01
	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
No. of obs.	4'180	4'180	3'800	3'800	3'800	3'800	3'800
No. of canton-pairs	190	190	190	190	190	190	190
adj. R^2	0.946	0.967	0.967	0.967	0.967	0.968	0.968
	Panel D: Rich Taxpayers, 2003-2017						
β^{SR}	−0.35***	0.02	0.02	0.02	0.02	0.01	−0.02
	(0.04)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)
No. of obs.	2'850	2'850	2'850	2'850	2'850	2'850	2'850
No. of canton-pairs	190	190	190	190	190	190	190
adj. R^2	0.980	0.993	0.993	0.993	0.993	0.994	0.994
Controls	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Destination Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Origin Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canton-pair-specific linear trend	No	Yes	Yes	Yes	Yes	Yes	Yes
Top average wealth-tax rates	No	No	Yes	Yes	Yes	Yes	Yes
Top average income-tax rates	No	No	No	Yes	Yes	Yes	Yes
Bequest-tax rates	No	No	No	No	Yes	Yes	Yes
Share of foreigners	No	No	No	No	No	Yes	Yes
Population density	No	No	No	No	No	No	Yes

Note: This Table shows the estimation result of the model presented in Equation (5). Panel A uses the number of foreign-born super-rich in our BILANZ dataset as the dependent variable. More detailed results for this sub-sample, including estimation coefficients on the control variables, are presented in Table C8 in the appendix. Analogously, Panel B employs the number of Swiss-born super-rich. Again, for more detailed results, see the Table C9 in the appendix. Panel C utilizes the full sample of super-rich and Panel D the number of rich taxpayers (i.e., taxpayers with net wealth greater than CHF 10 million), respectively. Following the recommendations in Agrawal and Foremny (2019) standard errors allow for three-way clustering (canton-pair, origin-year, destination-year) and are shown in parentheses beneath the estimates. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Robustness

While unlikely, the negative estimate found in the stock-ratio analysis could be endogenous or driven by some form of spurious correlation, rather than by the policy reforms we analyzed. To address this potential threat, we conduct a placebo test (similar as in Agrawal and Foremny,

2019), where we shift the treatment indicator, $\tau_{do,t}$, by five years into the pre-treatment period, and re-estimate Equation (5). If our identifying assumption holds and the effects we find in our main analysis are indeed driven by the actual policy change, a placebo policy change that did not happen should in turn not be correlated with the number of super-rich foreigners in a canton. Table 3 confirms this. We find no significant correlation between the stock ratio of the foreign-born super-rich pre-treatment and the post-treatment policy changes across all specifications.

Table 3: Placebo Test – Foreign-born Super-rich, 1999-2015

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
β^{PBO}	−0.05	−0.05	−0.04	−0.04	0.00	−0.01	−0.01
	(0.08)	(0.11)	(0.10)	(0.10)	(0.10)	(0.11)	(0.10)
No. of obs.	2'518	2'518	2'518	2'518	2'518	2'518	2'518
No. of canton-pairs	171	171	171	171	171	171	171
adj. R^2	0.942	0.958	0.958	0.958	0.958	0.958	0.959
Controls	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Destination Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Origin Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canton-pair-specific linear trend	No	Yes	Yes	Yes	Yes	Yes	Yes
Top average wealth-tax rates	No	No	Yes	Yes	Yes	Yes	Yes
Top average income-tax rates	No	No	No	Yes	Yes	Yes	Yes
Bequest-tax rates	No	No	No	No	Yes	Yes	Yes
Share of foreigners	No	No	No	No	No	Yes	Yes
Population density	No	No	No	No	No	No	Yes

Note: This table shows the result of estimating a simple placebo test of the model shown in Equation (5) for the foreign-born super-rich. Instead of the true treatment indicator, we use a placebo treatment indicator lagged by 5 years. The effective treatment effects are shown in Panel A of Table 2. Following the recommendations in Agrawal and Foremny (2019) standard errors allow for three-way clustering (canton-pair, origin-year, destination-year) and are shown in parentheses beneath the estimates. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

7 Conclusion

We have compiled a new dataset on the super-rich residing in Switzerland based on the BILANZ magazine rich list covering the years 1989–2020, and enhanced with further biographical information on these individuals. This dataset allows us i) to describe the the super-rich in Switzerland over the past three decades, which coincide with an increase in income and wealth inequality in the country, ii) to estimate the location choices of super-rich foreigners in Switzerland with respect to a preferential tax treatment the country has been offering to the global wealth elite for more than a century, and iii) to put some earlier estimates on the top 0.01% wealth share into perspective.

Our descriptive results reveal two distinctive features of the wealthy elite in Switzerland. First,

we have shown the importance of inheritances at the top and how sluggish the wealth dynamics of the super-rich are in Switzerland, particularly when compared to the United States. We estimate that only some 40% of the super-rich in Switzerland are self-made, compared to roughly 70% in the United States. While managers are on the rise among the super-rich, they still only make up about 7–8% and own about 2% of the wealth belonging to the 300 richest individuals and families in Switzerland. Once individuals make it to the very top, they are likely to stay at the top, and intra-generational mobility has even *decreased* over the first two decades of the 21st century.

Second, we have captured the importance of foreigners at the very top of the wealth distribution. We find that foreign-born individuals make up approximately 50% of the super-rich, and they own 60% of top wealth. Hence, they are on average even wealthier than their Swiss-born peers.

This high share of foreigners can likely be explained by the preferential tax treatment Switzerland offers to super-rich foreigners, who are eligible for expenditure-based taxation. While we cannot quantify the pull effect of this policy at the international level, we provide first-time evidence of how sensitive super-rich foreigners are to this policy when it comes to their choice where in Switzerland they decide to reside. More specifically, we exploit the abolition of expenditure-based taxation in some cantons, using two alternative identification strategies. Both approaches suggest that location-choices of the super-rich are sensitive to taxation: the abolition of these preferential tax treatments reduces the stock of super-rich in a canton by about estimated 30%.

Finally, we show that wealth concentration in Switzerland is likely somewhat higher than previously assumed. According to our estimates based on the Swiss rich list, the wealth share of the top 0.01% has been roughly 16% in recent years, which is about one-third larger than prior estimates based on tax data have suggested. We explain why existing estimates based on tax statistics tend to underestimate wealth concentration. At the same time, we have reason to believe that the top 0.01% wealth share estimate based on the BILANZ rich list constitutes an upper bound, as the BILANZ data has its own inaccuracies.

We believe that the BILANZ dataset we have compiled can be a valuable source to studying the super-rich in Switzerland. We have documented the data and described its limitations, and plan to make the data available for future research.

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A Data Appendix I

In this section, we provide a comprehensive description of all variables and definitions included in our panel dataset.

id_pers. This variable is an individual observation identifier. An *id_pers* can represent a single individual or a family (or, in exceptional cases, some other kind of collective).

id_fam. This variable is a family identifier that links different individual observations (*id_pers*) that belong to the same family (collective). This allows family wealth to be tracked in the panel dataset over a longer period of time, since in some cases individuals die and their heirs are subsequently listed by the BILANZ magazine. In some cases, the BILANZ has split or aggregated a family's assets among different members without any change in the family structure being apparent.

name. This variable contains first and last name of individuals or the (family-) name in case of a collective including the description of the type of collective. For example: Stephan Schmidheiny (*id_pers*=3); Familie Ringier (*id_pers*=12); Erben Oscar Weber (*id_pers*=30).

year. This variable indicates the corresponding year.

n_magazine. This variable gives the number of ranking entries as shown on the magazine cover of the corresponding annual edition. The number of ranking entries recorded by the BILANZ magazine has varied considerably from 100 to 250 in the first 10 years (see Table C1). Since 1999, the BILANZ ranking includes 300 entries each year. In the early years, the number of ranking entries in the BILANZ magazine does not necessarily correspond exactly to the number given on the cover. Moreover, since our panel dataset only covers Swiss residents, the number of observations per year in our panel is always slightly below the number on the cover (see *n_panel*).

n_panel. This variable indicates the number of ranking entries covered in our panel dataset per year.

wealth_low & wealth_high. The BILANZ magazine estimates net wealth per ranking entry in intervals. The two variables *wealth_low* and *wealth_high* capture the interval limits. The two variables thus indicate the lower and upper bounds, respectively, of the net wealth estimate per ranking entry in nominal millions of Swiss Francs.

wealth_mean. This variable is simply the arithmetic mean of the variables *wealth_low* and *wealth_high*. *wealth_mean* is our main variable of interest and shows net wealth per observation (in nominal millions of Swiss Francs). We frequently represent *wealth_mean* as a real variable by deflating it by the Swiss CPI.

ranking. This variable indicates the rank of each observation within the rich list per year. Note that since BILANZ magazine estimates net worth in intervals, multiple ranking entries have the same net worth estimate and consequently the same position in the ranking.

family. This dummy variable indicates whether the observation represents a single individual (*family*=0) or whether it is a family or some other collective (*family*=1).

female. This dummy variable indicates whether an individual observation (*family*=0) is male (*female*=0) or female (*female*=1).

manager. This dummy variable indicates whether an observation is a manager (*manager*=1) or not.

swiss. This dummy variable indicates if the observations (including family observations) are Swiss citizens (*swiss*=1) or not. This information was collected from the texts in the BILANZ magazine and supplemented by manual Internet search. The quality of this variable is limited, as it was difficult in many cases to assign a nationality. The variable indicating whether someone was born outside Switzerland (*foreignborn*) is certainly more reliable and should preferably be used.

foreignborn. This dummy variable indicates whether the observations (including family observations) were born outside (*foreignborn*=1) or inside (*foreignborn*=0) Switzerland. This information was collected mostly by manual Internet search.

foreigners_in_ranking. This dummy variable indicates whether foreigners (non-Swiss citizens) are also included in the ranking (*foreigners_in_ranking*=1) or not. Before 1993, only Swiss citizens were covered by the BILANZ magazine. Therefore, this variable is equal to 1 in 1993 and thereafter.

old_wealth_WW2. This dummy variable indicates whether the foundation for wealth was laid before 1945 (*old_wealth_WW2*=1) or not. This information was recorded by the BILANZ magazine in the 1993 issue. For observations from other years, we have added this information by manual Internet search.

canton. This variable indicates the canton of residence per observation and year. See Table A1 for the canton codes.

industry_1; industry_2; industry_3. For each ranking entry, the BILANZ magazine records information one or more industries in which the observation is active. We recorded this information in the 3 variables *industry_1*, *industry_2* and *industry_3*. We have assigned the information from the BILANZ magazine to one of 26 different industries. See Table A2 for details on the various industries and codes).

industry_main. For many ranking entries, the the BILANZ magazine assigns multiple industries. With the information from the magazine, it is impossible to disaggregate net wealth per ranking entry to the different industries in which the observation is operating. In order to investigate how aggregate BILANZ net wealth has evolved by different industries over time, we have assigned a characteristic industry to each observation per year in the variable *industry_main*. The classification and coding again follows Table A2.

wealth_origin. The variable *wealth_origin* is a categorical variable that indicates the origin of wealth. Where *wealth_origin*=1 stands for wealth acquired through marriage, *wealth_origin*=2 stands for inherited wealth and *wealth_origin*=3 for self-made wealth. We follow a definition in the literature (see Kaplan and Rauh, 2013a and Scheuer and Slemrod, 2020) and define self-made wealth as wealth of first-generation founders. This information was collected from the texts in the BILANZ magazine and supplemented by manual Internet search.

birth_date. This variable indicates the date of birth if the observation is an individual (*family*=0). For some observations, we were unable to determine the exact date of birth and recorded only the year of birth. This information was collected from the texts in the BILANZ magazine and supplemented by manual Internet search.

death_date. This variable indicates the date of death if the observation is a deceased individual. For some observations, we were unable to determine the exact date of death and recorded only the year of death. Individuals that are still living are coded as *alive*. This information was collected from the texts in the BILANZ magazine and supplemented by manual Internet search.

entryreason & exitreason. The variables *entryreason* and *exitreason* specify the reason for ranking entry respectively exit as categorical string. The quality of this variable is limited as it was challenging to identify a reason for entering or leaving the rankings for many observations. Accordingly, this variables contain many unexplained values and should be used with caution. See Table A3 for details on the definitions of *entryreason* and Table A4 for *exitreason*, respectively.

id_link. This variables provides information about which different individual observations belong systematically together by referring to the old *id_pers*. In some cases, individuals are grouped into collectives in certain years and then listed individually again later. We have created this variable to track such incidents. In this way, it is possible to quickly find out which observations have been grouped differently over time.

Table A1: Swiss Cantons

Canton Number	Canton Name
1	Zürich
2	Bern
3	Luzern
4	Uri
5	Schwyz
6	Obwalden
7	Nidwalden
8	Glarus
9	Zug
10	Fribourg
11	Solothurn
12	Basel-Stadt
13	Basel-Landschaft
14	Schaffhausen
15	Appenzell Ausserrhoden
16	Appenzell Innerrhoden
17	St. Gallen
18	Graubünden
19	Aargau
20	Thurgau
21	Ticino
22	Vaud
23	Valais
24	Neuchâtel
25	Genève
26	Jura

Note: The coding of the cantons follows the standard numbering of the Swiss cantons.

Table A2: Industry Coding and Labeling

Industry Code	Industry Name
1	pharmaceuticals; chemistry; biotechnology; synthetics; fertilizers
2	trade; retail
3	commodities; commodity trading
4	shareholdings; investments
5	art; various collections (incl. car collections); horse breeding
6	industry; manufacturing
7	food, drinks and tobacco industry
8	banking; insurance; finance industry
9	services
10	construction (incl. construction materials)
11	machinery
12	media (incl. publishing)
13	real estate
14	watches; jewelry; luxury goods
15	athletes
16	musicians; writers
17	ICT; telecommunications; internet
18	sports industry
19	high-tech industry; electronics
20	restaurants; hospitality; hotels
21	perfumes; cosmetics; beauty care products
22	fashion and textile industry
23	other consumer goods
24	shipping; transportation; distribution; logistics
25	energy and oil industry
26	other

Note: The table shows the name and coding of the industry variables *industry_1*, *industry_2*, *industry_3* and *industry_main* as specified in our panel dataset.

Table A3: Description of Entry Reasons

entryreason	description
Unexplained	The ranking entry of an individual or a family in the specific year cannot be explained.
Entered	The ranking entry of an individual or a family can be explained by an increase in estimated wealth over the threshold triggered by a specific incident within the last year.
Re-entered	The ranking entry of an individual or a family can be explained by an increase in estimated wealth over the threshold triggered by a specific incident within the last year and the individual or family had previously dropped out because of lacking wealth.
Migration	The ranking entry of an individual or a family can be explained by migration into Switzerland within the last year.
Control transfer	The ranking entry of an individual or a family can be explained by a transfer of operative control over wealth which was accounted for in the prior year.
Inheritance	The ranking entry of an individual or a family can be explained by a transfer of ownership of wealth which was accounted for in the prior year.
Family aggregation	The ranking entry of a family can be explained by the aggregation of wealth which was accounted for in the prior year, attributed to multiple individuals or families.
Collective aggregation	The ranking entry of a collective can be explained by the aggregation of wealth which was accounted for in the prior year, attributed to multiple individuals or collectives.
Family aggregation with members previously not in the ranking	The ranking entry of a family can be explained by the aggregation of wealth which was only partly accounted for in the prior year, attributed to one individual or family or multiple individuals or families, and of wealth which was partly not accounted for in the prior year.
Collective aggregation with members previously not in the ranking	The ranking entry of a collective can be explained by the aggregation of wealth which was only partly accounted for in the prior year, attributed to one individual or family or multiple individuals or families, and of wealth which was partly not accounted for in the prior year.
Family split	The ranking entry of an individual or a family can be explained by the splitting of wealth which was attributed to a family in the prior year.
Collective split	The ranking entry of an individual or a family can be explained by the splitting of wealth which was attributed to a collective in the prior year.
Start foreigners	The ranking entry of an individual or a family in 1993 can be explained by the fact that it was the first year including non-Swiss in the data.
Start ranking	An individual or a family entered the ranking in 1989.

Note: The table displays and describes the various categorical strings of the variable *entryreason*.

Table A4: Description of Exit Reasons

exitreason	description
Unexplained	The ranking exit of an individual or a family in the specific year cannot be explained.
Not enough wealth	The ranking exit of an individual or a family can be explained by a decrease in estimated wealth under the threshold triggered by a specific incident within the last year.
Emigration	The ranking exit of an individual or a family can be explained by emigration out of Switzerland within the last year.
Control trasfer before death	The ranking exit of an individual can be explained by a transfer of operative control over wealth which is accounted for in the coming year.
Inheritance before death	The ranking exit of an individual can be explained by a transfer of ownership over wealth which is accounted for in the coming year.
death	The ranking exit of an individual can be explained by its death within the last year.
Family aggregation	The ranking exit of an individual or family can be explained by the aggregation of wealth which is attributed to a family in the coming year.
Collective aggregation	The ranking exit of an individual or collective can be explained by the aggregation of wealth which is attributed to a collective in the coming year
Family split	The ranking exit of a family can be explained by the splitting of wealth which is attributed to another individual or family or multiple individuals or families in the coming year.
Collective split	The ranking exit of a collective can be explained by the splitting of wealth which is attributed to another individual or family or multiple individuals or families in the coming year.
End ranking	An individual or a family included in the 2019 ranking.

Note: The table displays and describes the various categorical strings of the variable *exitreason*.

B Data Appendix II

The regression results presented in Table 1 include in their full specification the five time-varying canton controls below. Thereby, all control variables (i) to (v) are introduced in logarithmic form. In the empirical specification presented in Table 2 the five time-varying canton-pair controls are included in the vector $X_{do,t}$ as log ratios or log differentials for each of the canton pairs. For example in the case of (i) as $[(\ln(1-\tau^{w}_{d,t}) - \ln(1-\tau^{w}_{o,t})]$, which is the log net-of-wealth-tax rate differential between each canton-pair.

(i) Top average wealth-tax rates. This variable contains the average personal wealth tax rate (i.e., including cantonal, municipality and parish taxes) by canton for an unmarried taxpayer without children with gross wealth of 10 million Swiss Francs.[33] Cantonal average wealth tax rates are aggregated from all Swiss municipalities for the period 1998-2018. For the years 2009-2019 these data are available directly from the FTA.[34] Parchet (2019) has computed consolidated tax rates at municipal level for all municipalities in Switzerland between 1983 and 2012.[35] We are very grateful to Raphaël Parchet (2019) for providing us with his data (for the period 1998-2014). This enables us to construct top average wealth tax rates for all Swiss municipalities for the entire period from 1999-2018. The top average wealth tax rates at the cantonal level are constructed by weighting the tax rates by the number of taxpayers in each municipality.[36]

(ii) Top average income-tax rates. This variable contains the average personal income tax rate (i.e., including cantonal, municipality and parish taxes) by canton for an unmarried taxpayer without children with annual gross income of 1 million Swiss Francs. This variable is constructed analogously to the one above and also builds on the data compiled by Parchet (2019).

(iii) Bequest-tax rates. To control for cantonal differences in bequest taxes, column (4) includes two different tax rates for the entire 1999-2018 period. The first tax rate reflects the percentage of tax due on an inheritance of 500,000 Swiss Francs bequeathed to direct descendants. The second tax rate analogously includes the percentage in the case of an inheritance of 500,000 Swiss Francs to an unrelated person. Both tax rates refer to the tax burden at the cantonal capital. We have gathered these data from the annual publication "Steuerbelastung in den Kantonshauptorten".[37]

Proxies for (iv) urbanization and (v) internationalization. We approximate ur-

[33] For the canton of Basel-Stadt, we had to rely on the wealth tax rate on gross wealth of 5 million Swiss francs due to data limitations. However, since we exploit variation over time, this should not be an issue.

[34] See: https://www.estv.admin.ch/estv/de/home/allgemein/steuerstatistiken/fachinformationen/steuerbelastungen/steuerbelastung.html

[35] Details on the construction of these tax rates can be found in the online appendix of his paper.

[36] The data of the taxpayers can be obtained from the FTA: https://www.estv.admin.ch/estv/de/home/allgemein/steuerstatistiken/fachinformationen/steuerstatistiken/direkte-bundessteuer.html

[37] See: https://www.estv.admin.ch/estv/de/home/allgemein/steuerstatistiken/fachinformationen/steuerbelastungen/steuerbelastung.html

banization by total cantonal population. Similarly, we use the share of foreigners in the total population as a proxy for internationalization.[38]

[38]The data are taken from the FSO: https://www.bfs.admin.ch/bfs/de/home/statistiken/bevoelkerung.html

C Additional Tables and Figures

C.1 Additional Tables

Table C1: Summary Statistics of the BILANZ Panel Dataset, 1989–2020

	Sample size					BILANZ real net wealth (in billions of 2020 Swiss Francs)				
	n (magazine)	n (panel dataset)				all obs.			family obs.	individuals obs.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Year	all obs.	all obs.	family obs.	male obs.	female obs.	mean	median	std. dev.	mean	mean
1989	100	95	42	52	1	0.94	0.48	1.42	1.01	0.89
1990	175	166	61	95	10	0.66	0.33	0.82	0.66	0.66
1991	200	192	68	109	15	0.61	0.31	0.78	0.56	0.64
1992	200	183	75	94	14	0.59	0.30	0.81	0.50	0.65
1993	250	228	88	119	21	0.85	0.29	1.31	0.68	0.96
1994	50	46	16	28	2	2.53	2.84	1.48	2.03	2.80
1995	200	184	74	94	16	1.08	0.39	1.69	0.97	1.16
1996	200	189	75	97	17	1.05	0.39	1.76	1.18	0.97
1997	250	211	81	112	18	1.29	0.39	2.40	1.49	1.17
1998	250	231	94	120	17	1.34	0.39	2.60	1.48	1.24
1999	300	281	108	155	18	1.38	0.38	2.88	1.56	1.26
2000	300	281	105	158	18	1.47	0.48	2.42	1.65	1.36
2001	300	284	99	165	20	1.36	0.48	2.25	1.67	1.20
2002	300	281	98	158	25	1.20	0.37	1.93	1.56	1.02
2003	300	284	99	160	25	1.23	0.47	2.01	1.57	1.06
2004	300	283	103	156	24	1.31	0.47	2.12	1.61	1.13
2005	300	286	103	159	24	1.38	0.57	2.27	1.71	1.20
2006	300	289	104	161	24	1.55	0.56	2.69	1.75	1.43
2007	300	289	109	157	23	1.79	0.66	3.22	1.90	1.72
2008	300	292	111	163	18	1.51	0.64	2.84	1.66	1.42
2009	300	291	110	162	19	1.49	0.55	2.71	1.64	1.39
2010	300	292	112	159	21	1.54	0.64	2.86	1.64	1.47
2011	300	294	120	155	19	1.58	0.64	2.75	1.59	1.57
2012	300	293	123	151	19	1.69	0.65	3.15	1.72	1.67
2013	300	292	123	153	16	1.87	0.75	3.55	2.31	1.55
2014	300	291	126	150	15	1.95	0.75	3.84	2.36	1.64
2015	300	289	127	146	16	2.00	0.75	4.03	2.46	1.65
2016	300	288	130	140	18	2.08	0.76	4.08	2.50	1.73
2017	300	287	131	139	17	2.28	0.75	4.45	2.72	1.92
2018	300	288	137	133	18	2.26	0.75	4.48	2.82	1.75
2019	300	289	133	138	18	2.34	0.74	4.81	2.86	1.89
2020	300	288	134	138	16	2.36	0.75	4.91	2.93	1.88

Note: This tables provides some summary statistics of our BILANZ panel dataset. Column (1) indicates the number of ranking entries as shown on the magazine cover of the corresponding annual edition. Columns (2)-(5) show the total, family, male, and female number of ranking entries per year recorded in our panel dataset. Columns (6)-(8) display the mean, median and standard deviation of real net wealth (in billions of 2020 Swiss Francs) per year. While columns (9) and (10) present the mean net wealth of the family and single individual observations separately. Columns (6)-(10) were deflated using the Swiss CPI.

Table C2: Distribution of BILANZ Net Wealth, 1999–2020

Year	10th	25th	50th	75th	90th	99th
1999	0.16	0.27	0.38	1.37	3.83	10.39
2000	0.16	0.27	0.48	1.35	3.77	12.38
2001	0.16	0.27	0.48	1.33	3.73	12.27
2002	0.16	0.26	0.37	1.32	3.71	10.06
2003	0.16	0.26	0.47	1.32	3.69	11.06
2004	0.16	0.26	0.47	1.31	3.65	13.05
2005	0.15	0.26	0.57	1.29	3.61	9.81
2006	0.15	0.26	0.56	1.79	3.57	14.81
2007	0.15	0.25	0.66	1.77	4.56	15.72
2008	0.15	0.25	0.64	1.73	3.47	12.38
2009	0.15	0.25	0.55	1.74	3.48	10.45
2010	0.15	0.25	0.64	1.73	3.46	12.35
2011	0.15	0.25	0.64	2.46	3.45	12.32
2012	0.15	0.25	0.65	2.48	3.47	16.38
2013	0.17	0.27	0.75	2.24	4.23	20.40
2014	0.17	0.27	0.75	2.24	3.73	25.37
2015	0.18	0.33	0.75	2.26	4.28	25.66
2016	0.18	0.33	0.76	2.27	4.30	23.75
2017	0.18	0.38	0.75	2.26	4.78	24.64
2018	0.17	0.32	0.75	2.24	5.48	21.42
2019	0.17	0.32	0.74	2.23	5.46	23.32
2020	0.18	0.33	0.75	2.25	5.50	25.50
Mean	**0.16**	**0.27**	**0.64**	**1.77**	**3.77**	**14.53**

Note: This Table shows selected percentiles of the wealth distribution in our BILANZ panel for the period 1999–2020. All net wealth figures are expressed in real terms (in billions of 2020 Swiss Francs). Net wealth was deflated using the Swiss CPI.

Table C3: Expenditure-based Taxation across Swiss Cantons

canton	exp.-based taxation	min. taxable income* (in 1'000 Swiss Francs)	wealth tax
Zürich	abolished (Jan. 2010)		
Bern	Yes	400	real estate within the canton (ord. tariff)
Luzern	Yes	600	min. 20 x taxable income (ord. tariff)
Uri	Yes	400	min. 20 x taxable income (ord. tariff)
Schwyz	Yes	600	min. 20 x taxable income (ord. tariff)
Obwalden	Yes	400	min. 10 x taxable income (ord. tariff)
Nidwalden	Yes	400	min. 20 x taxable income (ord. tariff)
Glarus	Yes	400	min. 20 x taxable income (ord. tariff)
Zug	Yes	500	min. 20 x taxable income (ord. tariff)
Fribourg	Yes	250	min. 4 x taxable income (ord. tariff)
Solothurn	Yes	400	min. 20 x taxable income (ord. tariff)
Basel-Stadt	abolished (Jan. 2014)		
Basel-Landschaft	abolished (Jan. 2014)		
Schaffhausen	abolished (Jan. 2012)		
Appenzell A.Rh.	abolished (Jan. 2012)		
Appenzell I.Rh.	Yes	400	min. 20 x taxable income (ord. tariff)
St. Gallen	Yes	600	min. 20 x taxable income (ord. tariff)
Graubünden	Yes	400	min. 20 x taxable income (ord. tariff)
Aargau	Yes	400	min. 20 x taxable income (ord. tariff)
Thurgau	Yes	*	*
Ticino	Yes	400	min. 5 x taxable income (ord. tariff)
Vaud	Yes	415	15% of income tax liability
Valais	Yes	250	min. 4 x taxable income (ord. tariff)
Neuchâtel	Yes	400	min. 5 x taxable income (ord. tariff)
Genève	Yes	400	10% of the income tax base
Jura	Yes	200	min. 8 x taxable income (ord. tariff)

Note: This table shows in which cantons expenditure-based taxation is applicable and which tax base is taxed at which rates. Five Swiss cantons abolished expenditure-based taxation in the post-2009 period. *In all cantons (except the canton of Thurgau), minimum taxable income is seven times the owner-occupied rental value (in the case of residential property) or seven times the rent (in the case of rental property). For persons without an own household (in case of hotel stays), three times the pension price for accommodation and meals is considered as the minimum taxable income. However, the minimum taxable income must be at least the amount shown in column 3. The higher of these two amounts of minimum taxable income is taxed at the statutory tax rate. In the canton of Thurgau, the following applies: 10 times the rental value or owner-occupied rental value or 4 times the pension price. The wealth tax base is, however, not statutorily specified, but the sum of the cantonal income and wealth taxes paid must be at least 150,000 Swiss francs per year. In most cantons, the wealth tax base is a simple multiple of the minimum taxable income and is taxed at the ordinary rate. The information shown in the table is taken from cantonal websites, cantonal tax laws or in some cases was provided to us via email by cantonal tax authorities.

Table C4: Cantonal Votes on Expenditure-Based Taxation

Canton	Vote	Date	Abolition	Percent in Favor	Statutory Removal	Remarks
Zürich	Yes	08.02.2009	Yes	52.9	01.01. 2010	
Schaffhausen	Yes	25.09.2011	Yes	55.1	01.01. 2012	
Apenzell A.Rh.	Yes	11.03.2012	Yes	61.1	01.01. 2012	
Basel-Stadt	Yes	19.09.2012	Yes	*	01.01. 2014	Abolished by cantonal parliament vote (56 Y / 16 N / 4 abstentions).
Basel-Landschaft	Yes	23.09.2012	Yes	61.5	01.01. 2014	
Glarus	Yes	01.05.2011	No	< 50		Actual percentage of yes-votes is unknown, as in Glarus voting is done by show of hands.
Thurgau	Yes	15.05.2011	No	47.0		A counter-proposal to tighten the conditions for expenditure-based taxation was accepted (61%).
St. Gallen	Yes	27.11.2011	No	51.9		In the run-off question, the counter-proposal won by 64,681 to 54,987 votes against the initiative.
Luzern	Yes	11.03.2012	No	48.0		A counter-proposal to tighten the conditions for expenditure-based taxation was accepted (52%).
Bern	Yes	23.09.2012	No	33.5		A counter-proposal to tighten the conditions for expenditure-based taxation was accepted (53%).
Nidwalden	Yes	03.03.2013	No	31.4		
Geneve	Yes	30.11.2014	No	31.6		
Uri	No					
Schwyz	No					
Obwalden	No					
Zug	No					
Fribourg	No					
Solothurn	No					
Apenzell I.Rh.	No					
Graubünden	No					
Aargau	No					
Ticino	No					
Vaud	No					
Valais	No					
Neuchatel	No					
Jura	No					
Federation	Yes	30.11.2014	No	40.8		Expenditure-based taxation would have been forbidden at once in the entire country by constitutional law. The overall participation rate in the federal vote was 49.2%.

Note: This table shows in which cantons a vote on the abolition of the expenditure-based taxation took place. Column 5 presents the percentage of votes in favor of abolishing expenditure-based taxation in the cantonal popular votes. Column 7 contains remarks. The information displayed in the table is taken from cantonal websites or in some cases was provided to us via email by cantonal authorities.

Table C5: The Abolition of Expenditure-Based Taxation – DD-Estimation

Panel A:	**Foreign-born Super-rich, 1999-2020**						
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
β^{DD}	−0.31***	−0.30	−0.32	−0.33**	−0.31	−0.29*	−0.28*
	(0.09)	(0.18)	(0.30)	(0.15)	(0.34)	(0.15)	(0.15)
ln top average net-of-wealth-tax rate			2.90	21.72	23.59	31.41	20.73
			(66.88)	(66.95)	(61.08)	(67.71)	(63.62)
ln top average net-of-income-tax rate				−1.79	−1.88	−1.61	−0.77
				(2.81)	(2.97)	(2.90)	(2.96)
ln net-of-bequest-tax rate (direct descendants)					1.62	1.84	1.72
					(3.70)	(2.62)	(2.65)
ln net-of-bequest-tax rate (unrelated individual)					0.27	0.07	−0.01
					(0.93)	(0.76)	(0.61)
ln share of foreigners						−2.26	−2.22
						(2.53)	(2.37)
ln total population							−4.55
							(4.29)
No. of obs.	411	411	375	375	375	375	375
adj. R^2	0.922	0.952	0.952	0.952	0.952	0.953	0.953
Controls	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Canton Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canton-specific linear trend	No	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table shows the detailed estimation results for the sample of foreign-born super-rich (Panel A) shown in condensed form in Table 1. Analogously, Table C6 presents the detailed estimation results for the Swiss-born super-rich (Panel B). Two-way clustered standard errors by canton and year are shown in parentheses, below the coefficients. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table C6: The Abolition of Expenditure-Based Taxation – DD-Estimation

Panel B:	**Swiss-born Super-rich, 1999-2020**						
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
β^{DD}	−0.27***	0.11	0.10	0.11	0.07	0.08	0.07
	(0.09)	(0.08)	(0.10)	(0.08)	(0.10)	(0.09)	(0.10)
ln top average net-of-wealth-tax rate			−4.09	−19.63	−2.94	−1.51	0.53
			(64.28)	(67.59)	(57.93)	(62.78)	(65.58)
ln top average net-of-income-tax rate				1.78	1.51	1.80	1.65
				(2.89)	(2.83)	(3.20)	(3.43)
ln net-of-bequest-tax rate (direct descendants)					−4.83	−4.72	−4.72
					(3.44)	(3.34)	(3.24)
ln net-of-bequest-tax rate (unrelated individual)					−0.16	−0.22	−0.18
					(0.42)	(0.29)	(0.30)
ln share of foreigners						−0.72	−0.74
						(1.17)	(1.21)
ln total population							1.30
							(4.40)
No. of obs.	466	466	421	421	421	421	421
adj. R^2	0.925	0.952	0.954	0.954	0.954	0.954	0.954
Controls	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Canton Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canton-specific linear trend	No	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table shows the detailed estimation results for the sample of Swiss-born super-rich (Panel B) shown in condensed form in Table 1. Analogously, Table C5 presents the detailed estimation results for the foreign-born super-rich (Panel A). Two-way clustered standard errors by canton and year are shown in parentheses, below the coefficients. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table C7: The Abolition of Expenditure-Based Taxation – DD-Estimation with PPML

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Foreign-born Super-rich, 1999-2020						
β^{DD}	−0.20*	−0.16	−0.18	−0.19	−0.19	−0.20	−0.20
	(0.12)	(0.14)	(0.14)	(0.14)	(0.16)	(0.17)	(0.15)
No. of obs.	484	484	438	438	438	438	438
pseudo R^2	0.679	0.700	0.702	0.702	0.702	0.703	0.703
	Panel B: Swiss-born Super-rich, 1999-2020						
β^{DD}	−0.17*	0.11	0.13	0.14	0.13	0.13	0.11
	(0.09)	(0.08)	(0.08)	(0.09)	(0.10)	(0.10)	(0.12)
No. of obs.	550	544	497	497	497	497	497
pseudo R^2	0.701	0.718	0.727	0.727	0.727	0.727	0.727
	Panel C: All Super-rich, 1999-2020						
β^{DD}	−0.18**	0.05	0.07	0.07	0.06	0.05	0.04
	(0.09)	(0.13)	(0.09)	(0.08)	(0.07)	(0.06)	(0.06)
No. of obs.	550	544	497	497	497	497	497
pseudo R^2	0.764	0.775	0.782	0.782	0.782	0.782	0.782
	Panel D: Rich Taxpayers, 2003-2017						
β^{DD}	−0.30***	0.02	0.03	0.04*	0.04	0.05	0.04
	(0.06)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)
No. of obs.	390	390	390	390	390	390	390
pseudo R^2	0.978	0.985	0.985	0.985	0.985	0.985	0.985
Controls	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Canton Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canton-specific linear trend	No	Yes	Yes	Yes	Yes	Yes	Yes
Top average wealth-tax rates	No	No	Yes	Yes	Yes	Yes	Yes
Top average income-tax rates	No	No	No	Yes	Yes	Yes	Yes
Bequest-tax rates	No	No	No	No	Yes	Yes	Yes
Share of foreigners	No	No	No	No	No	Yes	Yes
Population density	No	No	No	No	No	No	Yes

Note: This table shows the estimation results of the model presented in Equation (2) using PPML. Panel A uses the number of foreign-born super-rich in our BILANZ dataset as the dependent variable. Panel B employs the number of Swiss-born super-rich. Panel C utilizes the full sample of super-rich and Panel D the number of rich taxpayers (i.e., taxpayers with net wealth greater than CHF 10 million), respectively. See Table 1 for the estimation results using OLS. Two-way clustered standard errors by canton and year are shown in parentheses, below the coefficients. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table C8: Stock Ratio Estimation across Canton-Pairs

Panel A:	**Foreign-born Super-rich, 1999-2020**						
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
β^{SR}	−0.33***	−0.36***	−0.37***	−0.37***	−0.34***	−0.33***	−0.32***
	(0.09)	(0.11)	(0.10)	(0.10)	(0.10)	(0.09)	(0.09)
ln top average net-of-wealth-tax rate			−32.63	−4.55	−2.55	5.47	−4.50
			(33.24)	(33.22)	(32.59)	(32.96)	(32.67)
ln top average net-of-income-tax rate				−2.68	−2.90*	−2.69	−1.93
				(1.67)	(1.68)	(1.71)	(1.79)
ln net-of-bequest-tax rate (direct descendants)					3.02	2.93	2.85
					(2.01)	(2.00)	(1.96)
ln net-of-bequest-tax rate (unrelated individual)					0.47	0.34	0.23
					(0.38)	(0.38)	(0.38)
ln share of foreigners						−1.37	−1.40
						(1.01)	(0.98)
ln total population							−4.07*
							(2.07)
No. of obs.	3'198	3'198	2'926	2'926	2'926	2'926	2'926
No. of canton-pairs	171	171	171	171	171	171	171
adj. R^2	0.920	0.952	0.953	0.953	0.954	0.954	0.954
Controls	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Destination Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Origin Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canton-pair-specific linear trend	No	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table shows the detailed estimation results for the sample of foreign-born super-rich (Panel A) shown in condensed form in Table 2. Analogously, Table C9 presents the detailed estimation results for the Swiss-born super-rich (Panel B). Following the recommendations in Agrawal and Foremny (2019) standard errors allow for three-way clustering (canton-pair, origin-year, destination-year) and are shown in parentheses beneath the estimates. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table C9: Stock Ratio Estimation across Canton-Pairs

Panel B:	**Swiss-born Super-rich, 1999-2020**						
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
β^{SR}	−0.38***	0.13*	0.13**	0.13**	0.07	0.07	0.04
	(0.06)	(0.07)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
ln top average net-of-wealth-tax rate			−19.21	−34.78	−17.49	−16.21	−11.03
			(31.69)	(33.79)	(32.11)	(32.00)	(32.08)
ln top average net-of-income-tax rate				1.91	1.83	2.13	1.70
				(1.40)	(1.43)	(1.47)	(1.56)
ln net-of-bequest-tax rate (direct descendants)					−5.37***	−5.39***	−5.38***
					(1.89)	(1.87)	(1.82)
ln net-of-bequest-tax rate (unrelated individual)					−0.09	−0.14	−0.03
					(0.17)	(0.17)	(0.18)
ln share of foreigners						−0.76	−0.76
						(0.67)	(0.67)
ln total population							3.67
							(2.41)
No. of obs.	3'659	3'659	3'279	3'279	3'279	3'279	3'279
No. of canton-pairs	190	190	190	190	190	190	190
adj. R^2	0.919	0.947	0.950	0.950	0.952	0.952	0.952
Controls	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Destination Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Origin Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canton-pair-specific linear trend	No	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table shows the detailed estimation results for the sample of Swiss-born super-rich (Panel B) shown in condensed form in Table 2. Analogously, Table C8 presents the detailed estimation results for the foreign-born super-rich (Panel A). Following the recommendations in Agrawal and Foremny (2019) standard errors allow for three-way clustering (canton-pair, origin-year, destination-year) and are shown in parentheses beneath the estimates. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table C10: Industry Composition Forbes 400

	1982	1992	2002	2012	Δ 1982–2012
Industrial					
Retail and Restaurant	5.5	11.4	12.8	16.3	10.8
Technology - computer	3.0	5.1	10.2	12	9.0
Technology - medical	0.5	1.8	2.3	2.8	2.3
Consumer goods	13.5	18.4	13.8	11.3	-2.2
Media	14.2	13.9	16	8.8	-5.4
Diversified	19.8	18.7	15.3	11.3	-8.5
Energy	21.8	9.9	6.8	9.8	-12.0
Finance and Investments					
Hedge funds	0.5	1.0	2.5	8.3	7.8
Private equity and LBO	1.8	3.3	4.5	6.8	5.0
Money management	2.0	6.1	6	4.3	2.3
Venture capital	0.3	0.5	1	1.3	1.0
Real estate	17.2	10.1	8.8	7.3	-9.9

Note: This table shows the share of total wealth of the Forbes 400 by industry between 1982 and 2012. This table is taken from Korom et al. (2017).

C.2 Additional Figures

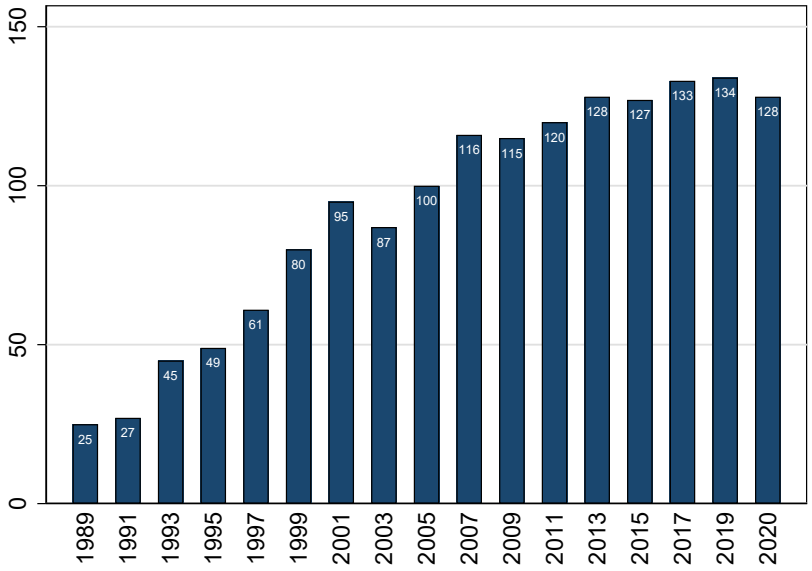


Figure C1: Real Wealth Billionaires in Switzerland, 1989–2020

Note: This figure shows the number of real wealth billionaires (measured in 2020 Swiss Francs) in Switzerland between 1989-2020. Nominal net wealth is deflated by the Swiss CPI. Note that the leap from 1991 to 1993 is due to the first-time inclusion of foreigners in the Swiss rich list.

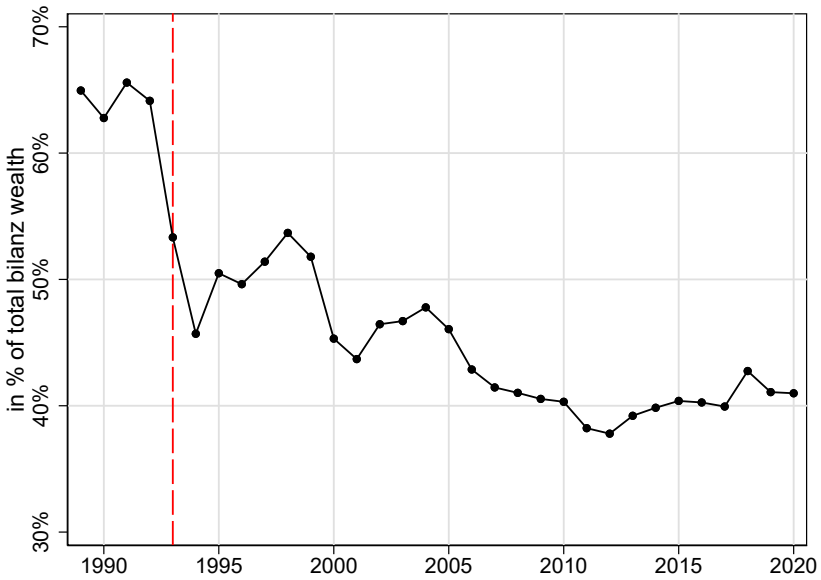


Figure C2: Share of Top Wealth originating before WW II, 1989–2020

Note: This figure shows the share of today's top wealth whose origins predate World War II. The vertical red line indicates the first-time inclusion of foreigners in the Swiss rich list. The first sharp drop in this share from 64% in 1992 to 53% in 1993 is attributable to the first-time inclusion of foreigners in the Swiss rich list. It seems that super-rich foreigners who entered the sample in 1993 were less likely than Swiss nationals to have laid the foundation for their fortunes before the mid-20th century. Since 1995, this share kept declining (with fluctuations over the business cycle) from 50% to some 40% in 2010. How large these fortunes were at that time cannot be concluded from the figure shown, nor do we have any information that would allow us to do so.

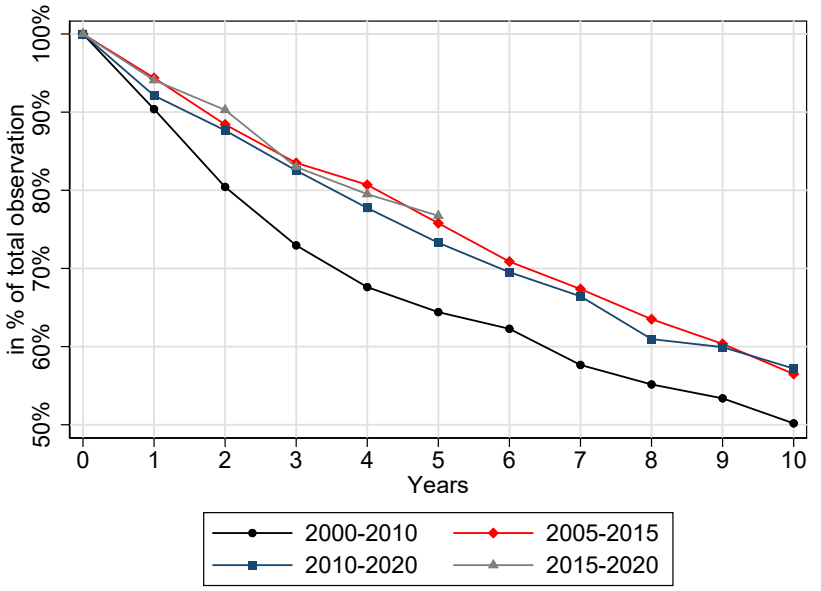
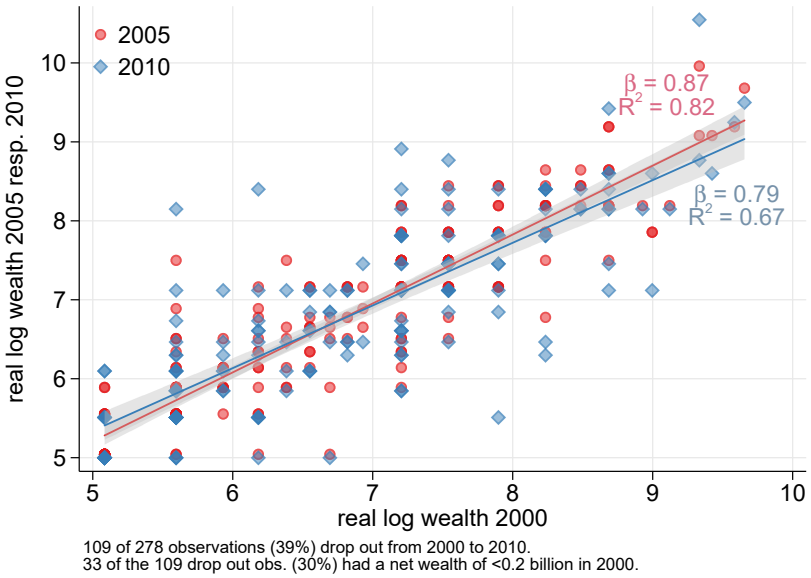
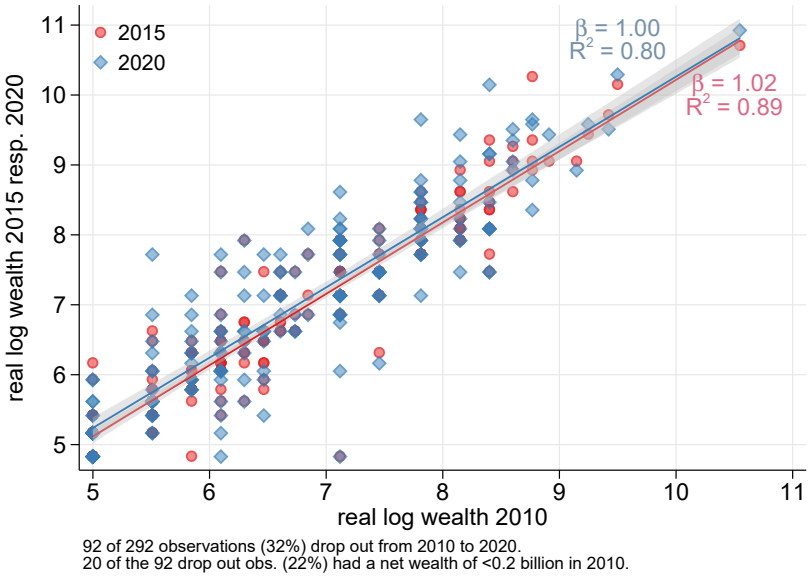


Figure C3: One- to Ten-year Survival Rates at the Top of the Wealth Distribution

Note: This figure shows, for the four different periods indicated, the persistence rates of those included in the Swiss rich list. Note that this survival rates are based on individual observations rather than family observations (for details on the two panel identifiers see Appendix A). For more detailed explanations see Figure 8.



(a) 2000–2005–2010



(b) 2010–2015–2020

Figure C4: Top Wealth Mobility, 2000–2020

Note: Panel a) shows a scatter plot for real log net wealth for the period 2000 to 2005 (red dots) and for 2000 to 2010 (blue diamonds). Analogously, Panel b) shows the scatter plot for real log net worth for the period 2010 to 2015 (red dots) and for 2010 to 2020 (blue diamonds), respectively. We report slope estimates β and the R^2 from OLS regressions in the corresponding color. All regression coefficients are statistically significant at the 1% level. The gray shading surrounding the gradients represent the 95% confidence intervals. The analysis here is based on family observations rather than individual observations (for details on the two panel identifiers see Appendix A). This means that if, for instance, a super-rich individual dies within the observation period, but his heir is listed in the last year of the analysis, then this observation does not drop out. We only use observations in the mobility analysis that are present in both the first and last year of the analysis. The small written text under the figures displays the dropout rate.

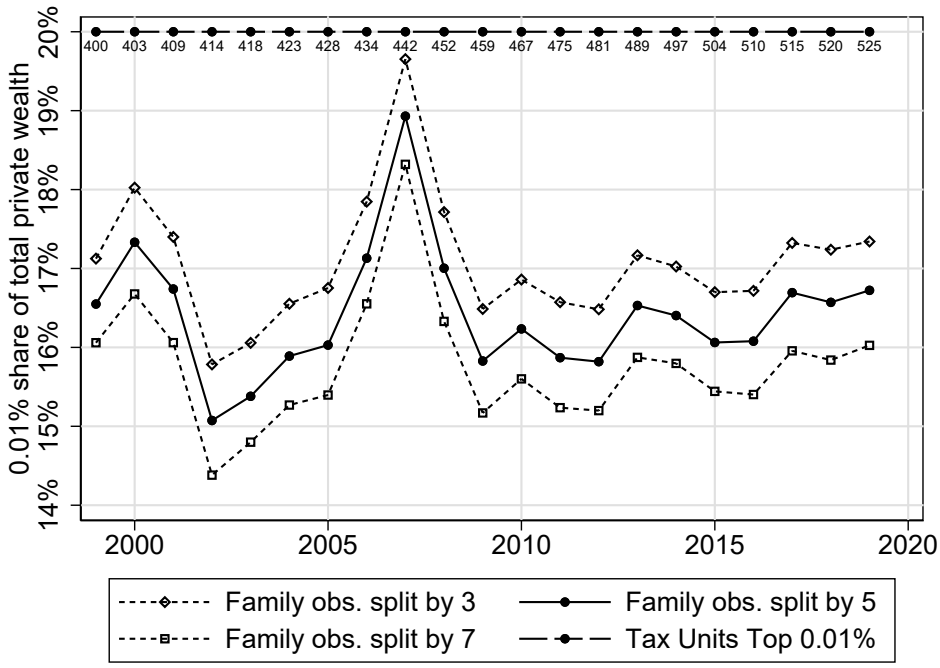
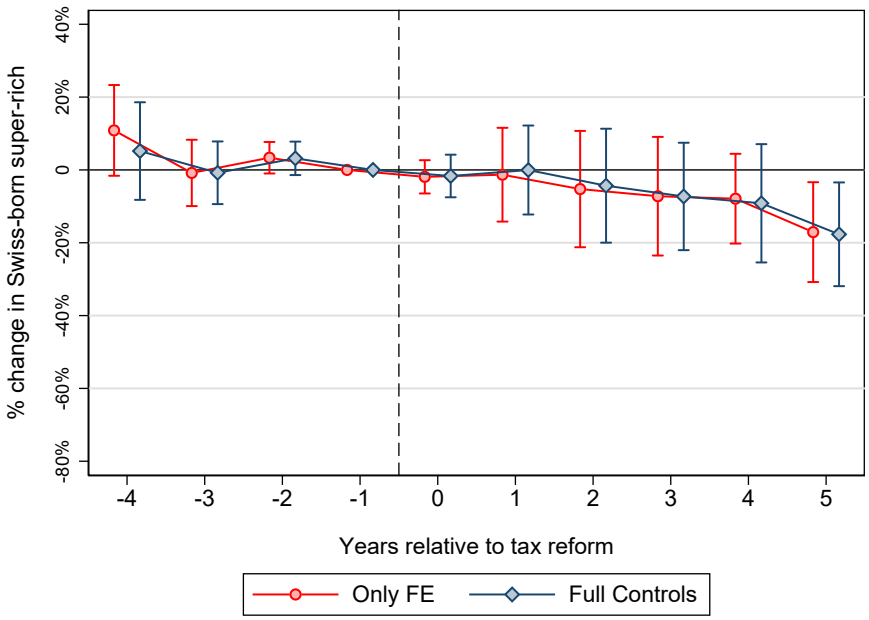
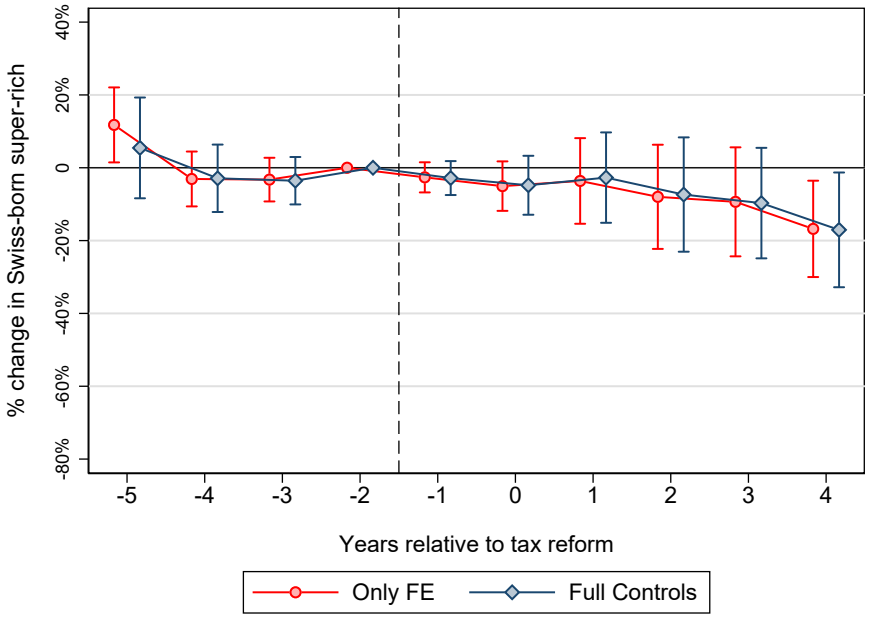


Figure C5: Top 0.01% Wealth Share in Switzerland, 1999–2019

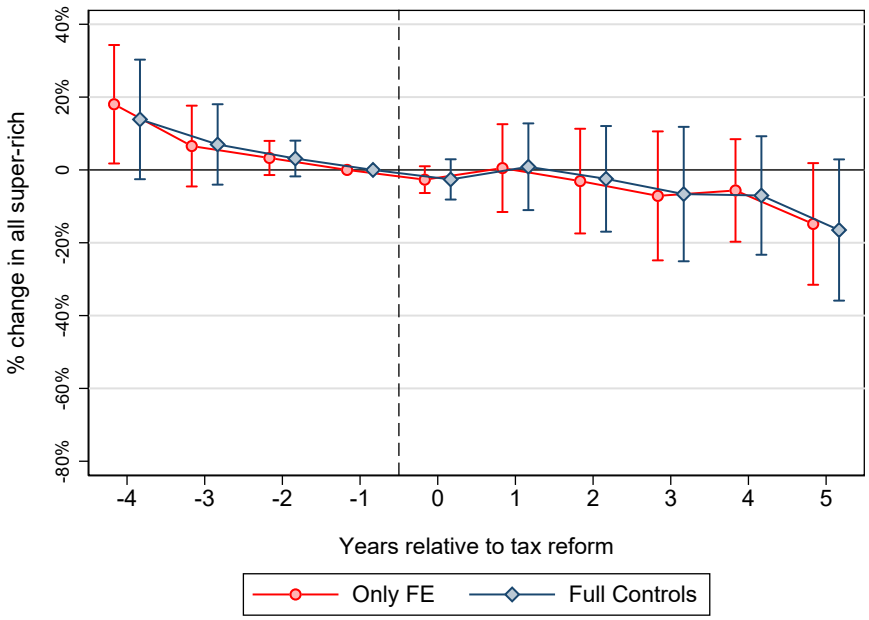
Note: This figure shows the evolution of the wealth share of the top 0.01% in Switzerland and is based on the BILANZ data. We restrict the analysis to the years after 1998, since the rich list consistently features 300 entries thereafter. The numbers in the top line show the number of tax units representing the top 0.01% in each year. The approach and data used to compute the top 0.01% wealth share are described in Section 5.1.



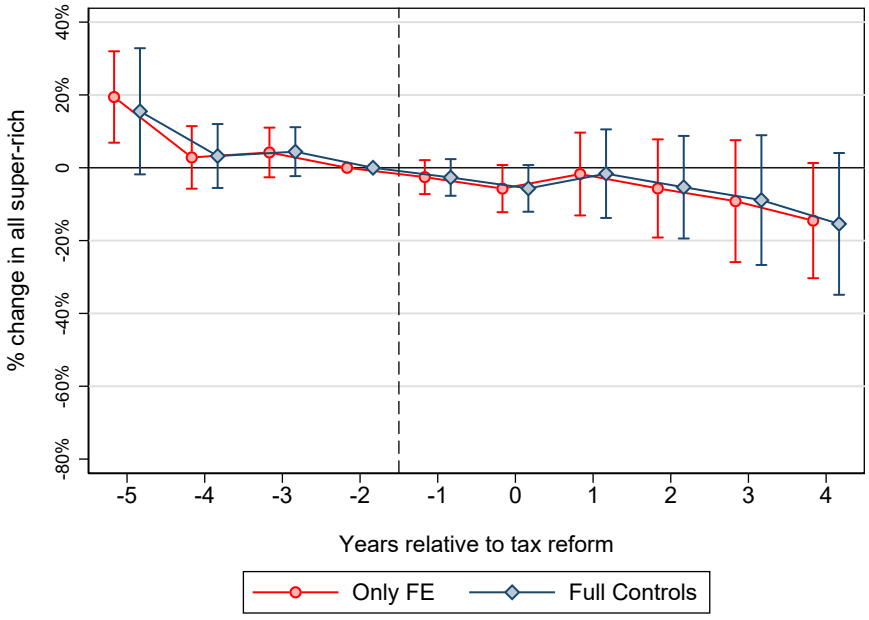
(a) Swiss-born Super-rich: No anticipation effect



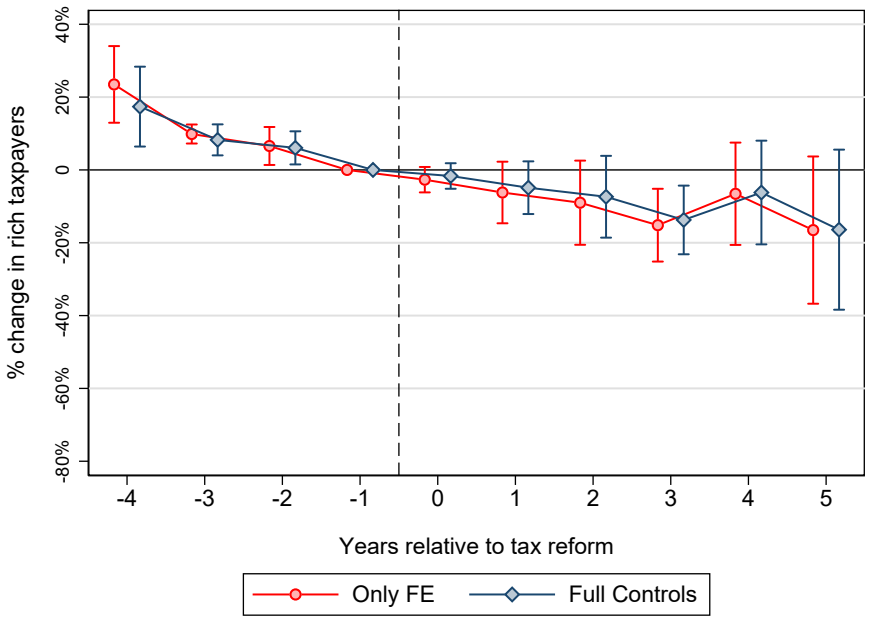
(b) Swiss-born Super-rich: One year anticipation effect



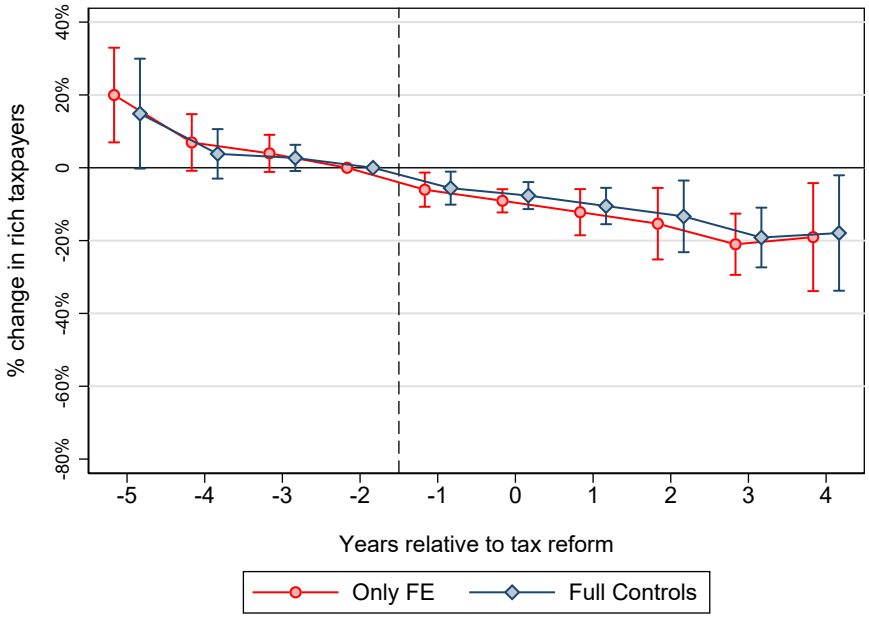
(c) All Super-rich: No anticipation effect



(d) All Super-rich: One year anticipation effect



(e) Rich Taxpayers: No anticipation effect



(f) Rich Taxpayers: One year anticipation effect

Figure C6: Cumulative Event Study

Note: This figure shows the cumulative effects given by Equation (4) for the Swiss-born super-rich (Panel a&b), all super-rich (Panel c&d), and rich taxpayers (Panel e&f).The left figures present the estimation results when the treatment indicator $\tau_{c,t}$ is defined as in the DD-analysis (i.e., for instance $\tau_{ZH,2010} = 1$ for the canton of Zurich). Whereas the right figures report the analogous estimation results when the treatment indicator $\tau_{c,t}$ is introduced with a one-year lead (i.e., for instance $\tau_{ZH,2009} = 1$ for the canton of Zurich). The red lines with circles always correspond to a specification of Equation 3, which contains only year and canton fixed effects. The blue lines with diamonds correspond to a specification that additionally contains the full vector of time-varying cantonal controls $X_{c,t}$. Point estimates are reported with their corresponding 90% confidence intervals based on two-way clustered standard errors by canton and year. Figure 14 displays the analogous results for the foreign-born super-rich.