Did capital go away? Capital flight as an explanation for declining reported wealth inequality during and after World War I

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Abstract

Wealth inequality reportedly dropped sharply during and/or after World War I for France, Germany, and some other European countries (Piketty 2014). This paper explores what part of this drop was likely due to capital flight rather than solely physical destruction or solely loss in asset values. Piketty and Zucman (2014, Data Appendix) acknowledge that capital flight was one causal factor, at least flight of foreign assets from Germany in 1918-19 or so. For capital flight to Switzerland from France from 1912 to 1929, it is estimated, based on plausible assumptions, that the top 1 percent of wealth-holders transferred as much as 8 percent of their wealth to Switzerland, up to three-fourths of it as securities and one-fourth as financial deposits. This was over 5 percent of all private wealth in France. It was also over one-fifth of the financial deposits owned by the 1 percent, and it was the large majority of their foreign securities (apart from worthless Russian bonds, which the Soviets repudiated in 1918). Such capital flight alone would account for about one-fifth of the 11.3 percentage point decline in the top 1%'s share of wealth in France from 1912 to 1929. But if the wealthy borrowed back their own flight capital in the guise of arm's-length loans, the total could account for two-fifths of the decline in the 1%'s share of wealth by both removing the assets from reported wealth and transforming them into liabilities. Losses on Russian bonds evidently accounted for up to one-fifth of the decline. This establishes the plausibility of the hypothesis that by 1929, true wealth inequality in France and Germany, at least, had declined much less than reported inequality.

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A central claim in Piketty's work is that increasing inequality over more than a century was powerfully, but temporarily, interrupted by the events of 1910-1950, and that now "capital is back" (Piketty and Zucman 2014). The evidence is a dip between 1910 and 1950, the period of the two world wars, in the share of the top 1 percent of wealth-holders in total wealth in large European countries such as France and Germany. This paper asks how much of the dip in wealth inequality is due not to a decline in the value of capital or to destruction of physical capital, but rather to capital flight during and after World War I, and hence represents a smaller decline in true inequality than in reported inequality of wealth.

[Figure 1 about here]

I. Decline in the top 1 percent's share of wealth during and after World War I

The share of the top 1 percent of wealth holders in reported wealth fell during and after World War I in France and other countries, three of which are shown in Figure 1. Notice that the share of the top 10 percent in wealth (the curves above the 80% level) fell much less than did the share of the top 1 percent (the curves in the 45%-70% range) or the share of the top 0.1 percent. Figure 2 reveals this feature much more starkly for France in this period, by showing separately the wealth shares of the top 0.1 percent of wealth holders and the next 0.9 percent—both of which fell appreciably over the period. The share of the top 0.1% fell from 29.0% in 1910-1913 to 23.1% in 1920-29, while the share of the next 0.9% fell from 31.5% to 26.1%. In contrast, the next 9%'s share actually *rose* from 28.0% to 32.4%.

It is important to clarify that the data are not actually for the years shown. In the Piketty (2014) tables and figures, the data point for 1920 is a "decennial" average for 1920-1929 and the data point for 1930 is an average for 1930-39. However, in part because data are lacking during World War I, and in part because a data point was desired that included only pre-war years, the year 1910 refers to an average for 1910-1913 (Piketty 2010: 2, FN5). This paper considers the period 1912-1929, and so the 1920 data point actually reflects the decline this paper seeks to explain; in any case, for France only a small additional decline in wealth inequality was recorded during the 1930s. In view of the Great Depression and its presumed effect on asset values, this is rather remarkable. The share of the top 1 percent of

wealth holders in total wealth in France was reported to have declined from 60.5 percent in 1912 to 49.2 percent in 1920-29 (Piketty 2014, Chapter10TablesFigures, Table TS10.4).

[Figure 2 about here]

Why would the reported wealth of the top 1 percent decline, while the reported wealth of the next 9 percent rose? There are several possible explanations. Part of the hypothesis of this paper, and one that is capable of partly explaining the 1912-1929 period, is that the top 1 percent of households, and only the top 1 percent, were able to engage in capital flight to tax havens with banking secrecy, so that they could cease reporting a portion of their wealth to the French tax authorities. Why just the top 1 percent? Perhaps because capital flight entailed large but fairly fixed transaction costs, implying significant scale economies so that only the wealthiest would reap a positive net benefit from paying the costs of capital flight. Figure 2 is the basis for the assumption in this paper that it was the top 1 percent of wealth holders who engaged in capital flight, an assumption that will facilitate estimating the size of flight capital.

Another possible factor might have been changes in the tax rate structure: if much higher marginal tax rates were imposed on only the top 1 percent of wealth holders or so, and the dramatic increases in those tax rates at certain points during the post-World-War-I period fell mainly on this same group, then only they would be highly motivated to engage in capital flight. We will look at evidence for this shortly. A third possible factor was exchange rate risk and overall uncertainty, particularly in 1924-25 when France faced a financial crisis due to its heavy debt and inadequate tax collection (Peel 1926).

A further contributing factor to the sharp decline in the share of the top 1 percent in all wealth was also certainly the repudiation of Russian government bonds by the Soviet government in 1918. French investors had bought up a considerable value of Russian bonds in the pre-war years (Kindleberger 1993, 222-3), and after the Russian bonds were repudiated they became worthless (though in 1996 the Russian government finally offered to redeem them for a small sum). In 1912, the top 1 percent held 60.5 percent of the total wealth held in France, according to Piketty (2014, Chapter10TablesFigures.xls, Table 10.1). Total wealth was estimated by Lévy-Leboyer (1977) at 297 billion francs, with 41 billion francs of this estimated to be foreign assets (Kindleberger 1984, 227-8). Of these, Kindleberger (1993, 223) cites data from other sources supporting the estimate that 18.5

billion francs of Russian bonds were held in France before the war. Some were paid off prior to the Russian Revolution, and "French loss on the remaining bonds plus those sold by southeast Europe and defaulted is estimated at 15 billion or 16 billion gold francs" (quote from Kindleberger 1993, 223, citing Lévy-Leboyer 1977, 139). Since another category of bonds is included in the estimate, this only gives the upper bound that the losses on Russian and southeastern Europe bonds were no more than 63.4 percent of the value of all government bonds: (16/297)/(5.8% + 2.2% + 0.4%) = 63.4%, with the denominator values from Table 1.

[Table 1 about here]

Table 1 shows, for 1912, the share of foreign assets, and individually of the three subcategories of foreign assets (private equity, private foreign securities, and foreign government bonds), in the wealth of the top 1 percent of wealth holders, the next 9%, and the next 40%. It also calculates what share each of these subcategories constituted of the total wealth of France. Finally, it shows what share each wealth quantile held of each subcategory of foreign assets. The top 1 percent held about three-fourths of the value of all foreign assets, and close to that share of each subcategory, they held only 69 percent of all foreign government bonds held in France.

The amount of the decline in wealth inequality explained by the loss of Russian bonds depends on what share of the bonds was held by the top 1 percent. If they held all the Russian bonds, then these must have constituted much of their holdings of foreign government bonds (Russian bonds would be 8.9% of their wealth, while foreign government bonds were 9.6%.) In that case the collapse in Russian bonds would have nearly wiped out their holdings of foreign government bonds. This would also mean that the next 49% of wealth holders would not have faced any such losses, and this in turn would have reduced the top 1 percent's wealth share from 60.5 percent to 58.3 percent, a decline of 2.2 percentage points:

$$\frac{60.5\% - 8.9\%(60.5\%)}{100\% - 8.9\%(60.5\%)} = 58.3\%$$

Such an event would explain almost one-fifth of the 11.3 percent decline in the top 1 percent's share of wealth from before the war to the 1920-1929 period.

However, this author has encountered no evidence that the 1 percent were the only ones who suffered losses on Russian bonds. Just 69 percent of foreign government bonds were owned by the top 1 percent, while 27 percent were held by the next 9 percent of wealth holders, and the remaining 5 percent by the next 40 percent of wealth holders (see Table 1; shares total more than 100 percent due to rounding). Thus if for all wealth quantiles their holdings of Russian bonds were the same percent of all their holdings of foreign government bonds, then in the collapse of Russian bonds each wealth quantile would have lost 63.4 percent of the value of its foreign government bonds. The effect of this loss on the top 1 percent's wealth share would have been to reduce it to:

$$\frac{60.5\% - 3.4\%}{100\% - 5.4\%} = 60.1\%$$

and this is a reduction of only 0.4 percentage points, less than one-twentieth of the whole reported decline in the top 1 percent's share of wealth.

It is worth noting that to produce the observed decline in the top 1 percent's share of total wealth from 60.5 percent to 49.2 percent, while the wealth of the rest of the population was unchanged, would require a *37 percent* decline in the top 1 percent's wealth.[1] It will be shown that even in the event that the losses from Russian bonds fell entirely on the top 1 percent, adding them to the 1 percent's apparent maximum possible recorded decline in wealth from capital flight (about 16 percent) yields at most a 25 percent decline in this group's wealth. It could therefore account at most for only about two-thirds (25/37) of the decline in the top 1 percent's wealth share. That is, losses on Russian bonds can at most account for about one-fifth of the whole decline, and it will be shown that capital flight could account for something over two-fifths of it (totaling about two-thirds). The remainder may flow from a variety of causes, possibly including recording asset values at their historical cost rather than "marking to market", reflecting growing price inflation during and after World War I. A later section also discusses the rather lax tax administration system, whose lack of rigorous enforcement procedures evidently encouraged understating the value of assets.

[1] That is, solving this equation for x: $(60.5\% - 60.5\%x)/(100\% - 60.5\%x) = 49.2\%$, we get $x = (1 - 49.2\%/60.5\%)/(1 - 49.2\%) = 36.8\%$.

Other hypotheses might be thought to contribute something further to explaining the decline in reported wealth inequality. It might be hypothesized, for example, that the top 1 percent suffered larger losses in wealth than the next 9% because the top 1 percent held a larger percent of their wealth in the form of government bonds, which we know lost value during World War I because of substantial inflation. While plausible on its face, this hypothesis is not supported by Piketty's data on wealth composition for Parisians for 1912, which show that in that year the top 1 percent held public bonds making up 14 percent of their wealth—almost identical to the 15 percent share of public bonds in the next 9 percent's wealth (Piketty 2014, Chapter10TablesFigures.xls, Table 10.1). Thus inflation that eroded the value of public bonds should have affected the two groups equally, so that the wealth share of both groups should have declined (Piketty 2014, Table 10.1, 371). It does not, then, contribute to explaining the combination that actually occurred: a large loss in the top 1 percent's share combined with an noticeable increase in the next 9 percent's share. Of course it is possible that changes after 1912 created a differential between the two wealth groups; perhaps during the war the top 1% were disproportionately greater buyers of public bonds, and so suffered losses much greater than those of the next 9 percent; however, to date this author has been unable to find evidence on the two groups' purchase of public bonds. Likewise, it is possible that the composition of the top 1 percent's wealth in all of France was different enough from the composition of Parisians' wealth to support this sort of claim; but it appears unlikely.

Let us turn now to the main question: How much of the decline in wealth inequality from before World War I to 1929 can be attributed to destruction of the 1 percent's capital, either physically or in value, and how much to capital flight to tax havens like Switzerland? In other words, this paper asks: Did capital "go away" in the sense that its physical existence or value was destroyed by war, inflation, rent control, repudiation of debt, or other causes? Or did capital "go away" in the sense that it fled to tax havens, mainly Switzerland, and (with its income, presumably) ceased to be reported in the data – so that true wealth inequality declined less than reported wealth inequality?

Section II reviews reasons to believe that capital flight occurred, including contemporary and retrospective accounts, as well as evidence of motives, means, and opportunity. Section III constructs a plausible estimate for capital flight to Switzerland

during 1910-1929 based on available data. Section IV examines the consistency of the estimate for France with various fragments of data that are available and discusses whether the estimate violates any constraints imposed by the data. Section V concludes.

II. Reasons to think that capital flight occurred

There are two strong reasons to think capital flight to Switzerland took place from various European countries in the 1920s and to some extent before. One is commentary by contemporary observers, along with later authoritative accounts. Indeed, while the published work of Piketty and various co-authors makes no mention of capital flight in the World War I era, Piketty and Zucman (2014) do acknowledge in their online data appendix that during and after World War I capital flight affected the value of reported wealth. In discussing the β (ratio of private wealth to national income) series they constructed for Germany, they write:

> One caveat is that estimates of foreign assets [as part of estimating total wealth - ML] for the inter-war are probably on the low-end for the same reasons as they are today: they miss the foreign securities held offshore by individuals (Zucman, 2013). It was already well acknowledged by contemporaries that a sizable amount of foreign securities in private hands had left Germany since the end of World War I (see, e.g., Keynes, 1920, chapter 5, III:1). Available Swiss data show a large increase in foreign fortunes managed by Swiss banks in the 1920s, and in all likelihood a sizable fraction of those belonged to German households. (Piketty and Zucman 2014, Data Appendix, 92)

Piketty (2014, 467) further acknowledges that capital hidden in tax havens is substantial today, and should be added to total reported wealth for each country, though his graphs of wealth inequality evidently do not include it.

As Piketty notes above, Keynes, in *The Economic Consequences of the Peace* (1920, Chapter V, section III.1.iv), explicitly describes capital flight from Germany, explaining that wealthy Germans urgently sought to place their assets out of reach because the Allies intended to confiscate their wealth for war reparations:

> It is certain that since the Armistice there has been a great flight abroad of the foreign securities still remaining in private hands. This is exceedingly difficult to prevent. German foreign investments are as a rule in the form of bearer securities and are not registered. They are easily smuggled abroad across Germany's extensive land frontiers, and for some months before the conclusion of peace it was certain that their owners would not be allowed to retain them if the Allied Governments

> could discover any method of getting hold of them. These factors combined to stimulate human ingenuity, and the efforts both of the Allied and of the German Governments to interfere effectively with the outflow are believed to have been largely futile.

Since various German states such as Prussia had already had wealth taxes since the 1890s, there is reason to think that German wealth holders were already somewhat more experienced than those of other countries in concealing or transferring their wealth to reduce taxation. Piketty and Zucman (2014, Data Appendix) remark on the apparent degree of tax evasion in the wealth data for Germany in 1913, when a new "defense tax" (*Wehrbeitrag*) was imposed; they note, too, that German wealth-holders reported a surprisingly high level of liabilities compared to wealth holders in other countries with no wealth tax, and seem to imply that the liabilities were likely associated with tax evasion. A possible source of liabilities could be the use of loan-back schemes with the help of tax havens. The wealth holder in, say, Prussia puts wealth in, say, Switzerland, concealing its identity in a numbered bank account, or by creating an apparently independent entity, and then borrows back his own money. The funds placed abroad are presumably no longer reported as assets of the wealth holder, and in addition they are transformed into liabilities, which perhaps are deductible from taxable assets (or perhaps the interest payments are deducted from income), reducing the tax bite even further. Thus the presence of a surprisingly high level of liabilities could be evidence that loan-back schemes were being used.

A detailed 2007 history of the Swiss National Bank confirms the growing tax haven characteristics of Switzerland, and mentions loan-back schemes as one use of tax haven holdings:

> During the First World War, Switzerland had developed rapidly as a neutral intermediary, and then in the 1920 [sic] appeared as an island of stability in a wild sea of currency inflation and depreciation. In addition, a lack of transparency in corporate ownership and control meant that Swiss financial institutions offered attractions as part of a chain of holdings. In consequence, German and other central European corporations and individuals saw Swiss banks and their affiliates as ways of lending money back to themselves, with some tax advantages. Switzerland thus had a role as a secure tax haven. (Abegg et al. 2007, 71)

The second kind of reason is indirect, based on evidence of motive, means, and opportunity. Motives for the rich to move their funds to safe havens included new and increased taxation, both income taxes and inheritance taxes, that fell heavily on the rich,

particularly during and shortly after World War I, in order to pay for the war. They also included changes such as rising inflation, currency depreciation, and political uncertainty introduced in part by the Russian revolution and related revolutionary movements in Europe.

As for means, the wealthy living in countries sharing a border with Switzerland, including Germany, France, and Italy, could travel across the border or have assets smuggled across the border, perhaps paying for insurance or physical security to protect funds and financial assets in transit. We reasonably assume that the top 1 percent had the means to afford safe transport, since above some wealth level the return from doing so was presumably sufficient to cover the cost.

Finally, the opportunity was available in Switzerland as it rapidly became a tax haven in the 1920s, and to some extent even earlier: a country with a stable currency, stable prices, and lower effective taxation than elsewhere. Other countries also had some of the characteristics of tax havens, but Switzerland was a recognized leader in this area.

Motives for capital flight

As noted above, for Germans a prime motive for capital flight at war's end was the near-certainty that much wealth in Germany would be taken to pay war reparations. Piketty and Zucman (2014, data appendix) note that considerable wealth "left Germany"; Keynes suggests something slightly different: that in Germany foreign securities, which were largely bearer securities whose ownership was unregistered, were relatively easy to smuggle out of Germany – but an unknown amount of wealth was also effectively hidden inside Germany.

Germany also experienced a rapid and growing rate of inflation during and after World War I, reaching hyperinflation, rapid currency depreciation, and then complete currency collapse by 1923, after which the mark was replaced by a new currency (Eichengreen 1992; Farquet 2012). Other European countries also faced considerable depreciation of their currencies. Figure 3 shows the fluctuation of several currencies against the Swiss franc, including the dramatic depreciation of the German mark up through 1923. A similar plot of depreciation of the German mark against the dollar can be generated from League of Nations (1931) data.

[Figure 3 about here]

Wealthy households in Germany and France also had other reasons to engage in capital flight. The Russian Revolution had surely contributed to frightening the wealthy into moving their wealth to the safest possible place; although we now know that revolution did not spread throughout Europe, it was not then clear to them that this would be the outcome. In addition, especially in France, new income and inheritance taxes fell quite heavily on high incomes, at least in principle. Since the much of the population was in danger of sacrificing their lives or at least their health in the war, measures were implemented to relieve them of financial burdens which in any case they were likely in most cases unable to pay. Farmers and urban tenants received exemptions from rent payments if they had been mobilized to fight in the war. In part because of exemptions, but perhaps also due to tax avoidance or deficiencies in tax collection, tax payments in France fell to three-fifths of their previous normal level by the end of 1914 (Eichengreen 1992). Though statutory taxes were increased in France during the war, collection was spotty: tax collectors in France were told that households in which at least one member was in the military should not be prosecuted for failure to pay taxes (Eichengreen 1992, 75-76). Figure 4 shows the rise in statutory tax rates on top incomes in France, Germany, and the UK, and Figure 5 shows the rise in statutory tax rates on top inheritances in France and Germany, with data from Piketty (2014).

[Figure 4 about here]

[Figure 5 about here]

In addition, enforcement procedures were lax. Tax collectors did not have a way to ascertain the incomes of potential taxpayers; taxpayers were expected to state their incomes, but could not be legally made to show financial documentation even if tax collectors disputed their statements (Morgan and Prasad 2009). The levy of a new war profits tax and the increases in the income tax resulted in much less revenue than was hoped or expected, and statements were made in the Parliament on various occasions during the 1920s that indicated that evasion of taxes on securities was often at least half of expected revenue, and in some years more (Hautcoeur and Sicsic 1999).

Means for capital flight

Not all wealth-holders had the means to move their capital abroad or effectively hide it, but it is assumed that the top 1 percent of wealth-holders did. This assumption is consistent with Figure 2, and is based on the transaction costs involved – presumably payment for financial advice and services, the time and effort required to learn about the costs and comparative risks involved, and the cost of traveling to Switzerland to carry out the transactions, as well as the cost, in security and/or perhaps insurance, for moving financial assets to Switzerland. Another factor that made the 1 percent more likely to engage in capital flight was that a somewhat larger share of their fortunes in France were moveable financial assets, although in 1912 the difference was not large: 65 percent compared to 58 percent or less for those with less wealth (Piketty 2014, Table 10.1).

Opportunity for capital flight

Switzerland was viewed as an excellent safe haven for capital by the 1920s, and even to some extent before. An ideal tax haven needs a stable currency, bank secrecy, low taxes, and political institutions and governance that create confidence that these will remain in place. Switzerland had all of these by the early 1920s, after it brought moderate wartime inflation under control and stabilized the Swiss franc, backed by gold.

With regard to bank secrecy, Palan, Murphy, and Chavagneux (2010, 108) cite Fehrenbach (1966) as asserting that bank secrecy was standard in Switzerland by 1912, even though violation of bank secrecy was not criminalized by legislation there until 1934. Palan et al. also note, without citation, that there is "talk of the emergence of offshore trusts in Switzerland in the 1920s, used primarily by wealthy Italians to protect their assets" (115).[2]

The Swiss National Bank history quoted earlier establishes beyond doubt that Switzerland was a destination for flight capital in this period. Abegg et al. (2007) also remark on the size of flows; they discuss capital movements in and out of Switzerland over the 1920s, and then note:

In 1930, a private Swiss banker told a representative of the Bank of England that he

[2] In the present paper Italy is barely discussed because the author has not found data for this period.

> would be afraid if he knew how much foreign money (presumably French and German) was flowing into Switzerland. (72, citing an archived Bank of England memorandum)

Naylor (1987, 33) cites evidence from an internal Chase Manhattan Bank memo that by the mid-1960s Switzerland was already by far the leading tax haven in the world. He notes, too, that at least as early as 1932, American criminals were depositing funds in banks in Switzerland and using loan-back schemes to reduce tax liability (21-22).

Another of Switzerland's advantages as a tax haven was lower tax collection in practice than other countries. Figure 6 shows that tax revenues collected as a share of GDP in Switzerland were lower than those in France, Germany, and the UK in this period. As Farquet (2012) explains in detail, Switzerland's fairly progressive official tax structure was not a good guide to the actual tax burden on foreign assets held in Switzerland. This was in part because taxes were collected by cantons, which not only were in tax competition with one another, but typically relied on self-reporting of income, wealth, and inheritance, and often exempted or partially exempted from taxation those who proved that they were domiciled outside Switzerland. The increase from 1920 to 1922 shown in the graph probably represents an increase in Swiss holdings of flight capital rather than a change in the tax rate. With respect to Germany, for example, hyperinflation probably explains the sharp decline of deposits in German commercial banks, reported in League of Nations (1931, 138-139), and it is likely that much of these deposits fled to safety in Switzerland.

[Figure 6 about here]

Another Swiss advantage was the stability of its currency relative to other currencies, already illustrated in Figure 3. That is, in the diagram the Swiss franc is the reference horizontal line, and fluctuations in the value of other currencies measured against the Swiss franc are shown. In fact, the value of the Swiss franc did vary a bit during World War I, appreciating against the US dollar about 6 percent from 1913 to 1918; yet variation of other currencies against the dollar was typically greater. After the war, in 1919 and 1920, the Swiss franc depreciated from $0.2043 in 1918 to $0.1540 in 1920, but by 1921 it had returned to $0.1953, close to its 1913 level of $0.1930. After a brief 5% depreciation over the next two years, it returned to its 1921 (and 1913) level and remained there for the rest of the 1920s, backed by an ample supply of gold (League of Nations 1931).

In addition, a conservative government and weak federalism helped preserve the status quo. In terms of secrecy, low taxation, price stability, and a stable currency, then, by the early 1920s Switzerland offered a golden opportunity as a safe haven for capital.

III. Estimating capital flight

We begin by estimating what share of on-balance-sheet financial deposits held in Swiss banks, credit unions, and other financial institutions in 1929 was flight capital, using League of Nations (1931) data on bank balance sheets, by country, for that year. Combining this with Piketty's wealth distribution and wealth composition data for France, and with a few plausible assumptions, allows estimating the implied share of their wealth that the top 1 percent moved to Switzerland. Using other information, an estimate can also be made for flight capital in the form of securities held off-balance-sheet in Swiss banks, usually as the holdings of trust companies controlled by the banks.

Estimating flight capital to Switzerland in the form of on-balance-sheet financial deposits

How much flight capital was there in Switzerland in the form of on-balance-sheet financial deposits in 1929? Table 2 shows, by country, aggregate financial deposits in commercial banks, credit unions, and other financial institutions divided by population, from a League of Nations report (1931, Table 1). The fourteen European and Scandinavian countries with the highest per capita aggregate deposits, including the UK and Ireland, are shown; the US is also shown for comparison.

France, Germany, and Italy are three major countries that border Switzerland (along with Liechtenstein and Austria); and Switzerland has French-speaking, German-speaking, and Italian-speaking cantons. For these reasons, but also because we have already noted specific accounts of capital flight from each of these three countries to Switzerland, let us assume that all the flight capital estimated in the first step came from these three countries alone. Using 1929 population data (Maddison 2010) and 1929 per capita domestic deposits in France ($90), Germany ($122), and Italy ($76) we estimate the value of their flight capital

in the form of deposits in Swiss financial institutions, as a share of the aggregate domestic deposits of these three countries.[3] Details are explained below and in Table 3.

[Table 2 about here]

[Table 3 about here]

It is assumed that the excess of Switzerland's per capita financial deposits over the $178 average per capita deposit ($714 – $178 = $536) represents flight capital, and this is about three-fourths of the total. That is, the ratio of the value of all flight capital in Switzerland in the form of financial deposits D_{FGIS} (presumed to be from only France, Germany, and Italy) to the value of all deposits in domestic financial institutions in these three countries in 1929 D_{FGI} was calculated as

$$\frac{D_{FGIS}}{D_{FGI}} = \frac{d_S - \frac{\vec{d}\vec{N}}{\vec{1}\vec{N}} N_S}{\vec{d}_{FGI}\vec{N}_{FGI}} = 14.68\% \qquad (1)$$

Here, d_S = Switzerland's financial deposits per capita in 1929 ($714)

N_S = Switzerland's population in 1929

$\vec{d}$ is a 1x14 row vector of the per capita financial deposits, by country, for the fourteen European countries shown in Table 2 and Figure 7 (including Switzerland, the UK, and Ireland, but not the US)

$\vec{N}$ is a 1x14 row vector of the populations in 1929 of the same thirteen countries

$\vec{1}$ is a 1x14 row vector of 1's, so that $\vec{1}\vec{N}$ is just the sum of the populations of all 14 countries

$\vec{d}_{FGI}$ is a 1x3 row vector of the per capita financial deposits in 1929, by country, for just France, Germany, and Italy (data from Table 2)

[3] League of Nations (1931, 9) explains some of the difference in per capita aggregate deposits among countries by the different degree to which financial intermediation was used to mobilize savings for investment; in some countries households were more likely to invest directly into firms, while in others they were more likely to deposit funds in banks, which lent funds to firms for investment.

$\vec{N}_{FGI}$ is a 1x3 row vector of the 1929 population by country, of just France, Germany, and Italy; data in Table 2 from Maddison (2010)

Multiplying by the Swiss population of 4.022 million (Maddison 2010), total flight capital in deposits in Swiss banks in 1929 is estimated at $2.26 billion in current dollars ($31 billion in 2014 dollars). This is not a large share of total wealth in the three countries, but it is a substantial share of the deposits owned by the top 1 percent. Figure 7 shows just the per capita aggregate deposits for the fourteen countries, excluding the US, but also including he per capita aggregate deposit amount of $178 for all 13 countries together.

[Figure 7 about here]

It would help to know what share of all flight deposits in Swiss financial institutions in 1929 came from each of the three countries France, Germany, and Italy. Lacking such information, however, the rest of this paper focuses mainly on France and assumes as a working hypothesis that France alone had the same ratio as the three countries combined:

$$\frac{D_{FS}}{D_F} = 14.68\% \qquad (2)$$

where D_{FS} is deposits in Switzerland held by French residents, and D_F is all deposits in France.

The total wealth held in France by French residents, denoted W_{FF}, is the sum of the wealth of three wealth quantiles: the top 1%, the next 9%, and the next 40%. The bottom 50% is omitted on the assumption that it had zero net wealth and zero deposits.[4] From Piketty (2014, Chapter10TablesFigures.xls, Table S10.1) on France we have each quantile's share of W_{FF} in 1912. This is $W_j/\mathrm{W_{FF}}$ with $W_j = W_{1\%}$, $W_{9\%}$, and $W_{40\%}$. From the same source on France (but Table S10.4) we have, for each quantile, the share of "Other financial deposits (cash, deposits,…)" in all its wealth, D_j/W_j. We assume for the moment, because of the way the data will be used, that this category consists entirely of deposits, an assumption whose possible inaccuracy it will be shown is of little consequence to the final estimates of flight capital. We then obtain D_j/W_{FF} for each j by:

[4] This is probably a slight overestimate, since the zero *wealth* of the bottom 50 percent is after debts have been netted out, but nothing is netted out of deposits, so they are probably not zero for this group; but we assume the error is small; in addition, it is of little consequence in the overall estimate of capital flight.

$$\frac{D_j}{W_j}\frac{W_j}{W_{FF}} = \frac{D_j}{W_{FF}} \quad (3)$$

which is each quantile *j*'s deposits in France in 1929 as a share of all wealth held in France. We use this as the estimate of each quantile's share before capital flight began in earnest, which is to say before substantial postwar taxes were imposed; so in effect we assume that (3) for each quantile (column [C] in Table 4) was about the same in 1917 as in 1912 or so.

Table 4 shows data that allow us to calculate what share of the deposits held by the top 1% in France had been moved to Switzerland by 1929. We have data on the composition of each quantile's wealth: Table 4, column 2 shows the share of "other financial assets" ("cash, deposits, etc.") in their wealth holdings (Piketty 2014, Table 10.1). It is assumed, in effect, that this category entirely consists of deposits. For each group we multiply these two quantities together to find each group's deposits in France as a share of all wealth in France (column 3). Finally, summing these three categories to find that deposits were 9.44% of total wealth, we divide each wealth group's deposits as a share of total wealth by total deposits as a share of total wealth (4.98%/9.44%, and so forth) to get each wealth group's share of total deposits held in France, shown in the right-hand column of Table 4.

[Table 4 about here]

Each wealth quantile's financial deposits in France as a share of all deposits in France in 1929 is calculated in column [D] of Table 4 from the shares that appear in column [C]. For example, in 1912 the top 1 percent owned 4.98%/9.44% = 52.72 percent of all domestic financial deposits. Since this group owned 60.5 percent of all wealth, and its financial deposits were a smaller share of its wealth than for the less wealthy, this seems plausible. However, this may be a slight overestimate, as explained in footnote 4. Perhaps a larger source of error is the assumption that the whole "Other…" category in Table 4 is deposits. Nevertheless, neither of these affects the overall estimate of capital flight, since any overestimate in the share of deposits in the 1 percent's wealth can be offset by assuming they moved a higher fraction of their deposits to Switzerland, so that the share of flight-capital-as-deposits in total wealth of the 1 percent remains the same. Neither creates the likelihood of overstepping any known constraints; for example, the implied flight-capital-as-deposits share of all deposits held by the 1 percent is only 22 percent, and so is in no danger of exceeding 100 percent, as is shown next.

The right hand column in Table 4 finds that the top 1 percent held 51.76 percent of total deposits in France (in 1912). We already estimated that 14.7 percent of total deposits became flight capital; hence the top 1 percent in France had a value of deposits in Swiss banks that was 14.68%/52.72% = 27.84% of the deposits they held in France in 1929. This also implies that $D_{FS}/(D_F + D_{FS})$ (the 1%'s flight capital as deposits in Swiss banks, divided by all deposits held by the 1% in both France and Switzerland together) was 27.84%/127.84% = 21.78 percent.[5] In other words, it is estimated that in 1929 the top 1% of wealth holders in France held in Swiss banks a little more than one-fifth of the total financial deposits they held in the two countries combined.

However, this only accounts for a small part of capital flight, since wealth in the form of deposits constituted less than 10 percent of the 1 percent's total wealth (Piketty 2014, Table 10.1). We need to estimate flight to Switzerland of the other main moveable form of wealth, namely foreign securities, as well. The reason why only foreign, not domestic, securities are considered is that the French authorities taxed securities at the source, and it is assumed that putting them physically in Switzerland would not have shielded them from being known to tax officials. In contrast, foreign securities were often bearer bonds and could be stowed abroad in a location with bank secrecy, and thus hidden from tax authorities.

Recall that it is assumed that all the capital flight was carried out by the top 1% of wealth-holders, for three reasons. First, there were presumably economies of scale in transactions costs such as hiring financial advisors, traveling to Switzerland, and paying any fees required. Second, the data also show that the top 1 percent held a somewhat larger share of their wealth in moveable forms such as financial assets than did other wealth quantiles in 1912 (Piketty 2014, Table 10.1, p. 371); Piketty's data also show that this share had been growing, as securities markets had grown. Third, it was only the reported wealth share of the top 1 percent that dropped sharply. For France, assuming that only the top 1 percent engaged in capital flight allows us to derive the share of all domestic deposits that were held by the top 1%, and then to calculate the share of those deposits in the total wealth held in France. There is reason to think, however, that a much larger value of securities was also moved to Switzerland, so we also estimate the size of that form of flight capital.

[5] This is true because $[D_{FS}/D_F]/[\,1 + D_{FS}/D_F] = D_{FS}/(D_F + D_{FS})$.

[Table 5 about here]

Estimating flight capital to Switzerland in the form of securities

Keynes (1920) strongly asserts in the passage quoted above that there was likely considerable flight of securities from Germany, at least, to Switzerland just after World War I. Securities in Germany were often bearer bonds, and therefore easier to transfer to Swiss banks than other securities. They apparently were typically held off-balance-sheet in trusts controlled primarily by large banks. Fortunately, we have some fragmentary information about the size of such off-balance-sheet holdings. Farquet (2012, 4), relying on research by others, writes:

> A committee of experts working on Swiss history during World War II who, exceptionally, had access to the in-house archives of the banks, showed that holdings of securities, generally in off-balance-sheet bank custody accounts, represented, in the two biggest Swiss banks in 1931, more than three times their balance-sheet. Hence, the figure of 1,359.6M Swiss francs (CHF) for 1937 that was given during the first survey undertaken by the Swiss National Bank (SNB) on the assets of foreign clients was amply underestimated.

It was earlier estimated that three-quarters of all 1929 on-balance-sheet Swiss financial deposits were flight capital. So if off-balance-sheet securities were worth more than three times the balance sheet amount, the amount of flight capital off-balance-sheet as securities could have been more than $3/(3/4) = 4$ times the value on balance sheet, at least for the two largest Swiss banks to which Farquet refers, presumably Credit Suisse and Union Bank of Switzerland (UBS). However, this refers to 1931, a year when there was a banking crisis in Germany (Kenwood and Lougheed 1999, Chs. 12-13), when one would expect an upsurge in flight capital to Switzerland, at least from Germany. In fact, an increase, both in deposits and in the holdings by trust companies controlled by the big banks, began around 1926 and was in full swing by 1929 (League of Nations 1931, 258-278, esp. 266). If the banking crisis increased flight of securities more rapidly than flight of deposits (and we do not know this was the case), perhaps a conservative figure of 3 times the value of deposits is more realistic for 1929.

Assume further (similar to what was assumed for financial deposits) that all the

foreign-owned securities in Switzerland came from the top 1 percent of wealth-holders. For the top 1% in France in 1929, the estimates above imply that capital flight as deposits made up 2.29% of the 1 percent's total domestic wealth (see Table 5). If the value of securities they moved to Switzerland was three times this value, then both types of assets together totaled four times this amount. So for the top 1%, that means they moved to Switzerland a value equal to 9.16% of their wealth held in France, implying that 9.16%/109.16% = 8.39% of their total wealth (in France and Switzerland combined) was held in Switzerland. (And this was 5.54% of all private wealth held in France; see Table 4.) This might seem low, but of course not all wealth was easily moved, unless perhaps it was sold and the proceeds of the sale deposited in Swiss banks.

Tax evasion in France

If a central purpose of capital flight was tax avoidance or tax evasion, then we would expect to find evidence that taxes were indeed evaded, especially taxes on foreign securities. And we do find such evidence. Hautcoeur and Sicsic (1999, FNs 12 and 13) note several independent sources of estimates of tax evasion on foreign securities in various years, including a statement in the *Chambre des députés* in 1922 that implied that tax evasion was about two-thirds of tax liability, and possibly a bit more. An estimate for 1930 found that about half of these taxes were evaded. The most widely held type of securities in France was bearer securities, and a tax was imposed on the issuer of bearer securities, but in addition *rentiers* (those who lived on the proceeds) were required to report the income and pay an additional tax on it (Hautcoeur and Sicsic 1999, 38). However, these authors write, "these rates were probably never paid since it was very easy to avoid paying IGR [*impót general sur le revenu*] on bearer securities, because coupons were paid to the bearer without any requirements enabling his future IGR declaration to be checked" (40).

The flight of foreign securities is also consistent with the reported decline in net foreign assets from 123% of French national income in about 1913 to 6% of national income in 1925, although the repudiation of Russian bonds and the collapse in value, at least temporarily, of some other coutries' government bonds, explains a substantial portion of it (Piketty 2014, Chapter3TablesFigures.xls, TS3.2; Keynes 1920); see section IV.

Losses on Russian and southeast European bonds

As described at the beginning of this paper, losses on Russian bonds due to repudiation by the revolutionary government in 1918, and on some other lesser amounts of southeast European assets, were estimated by Lévy-Leboyer (1977, cited in Kindleberger 1993, 223) at up to 16 billion gold francs, which was 5.4 percent of the estimated total wealth in France of 297 billion francs, and it was a value equal to 5.4%/60.5% = 8.9 percent of the 1 percent's total wealth. We consider the impact of this loss on wealth inequality, both for comparison purposes and because the value of foreign securities that the 1 percent could have used as flight capital depends on what value of foreign securities they still owned after their Russian bonds became worthless. However, the top 1 percent were not the only owners of foreign securities, nor the only owners of foreign government bonds. They did own 69% of foreign government bonds (see Table 1), but the next 9 percent wealth quantile owned 27% of them, and the next 40 percent owned the remaining 5%. Hence the impact of the repudiation of Russian bonds on wealth inequality depends on the extent to which the losses were distributed proportionately among these three wealth quantiles, or suffered solely by the 1 percent. In this discussion, because we rely on Lévy-Leboyer's estimate of the loss, when we refer to "Russian" bonds we are including the southeast European bonds whose value collapsed or was repudiated, and that were included in Lévy-Leboyer's estimate of losses.

We consider three possible cases: (a) that the 1 percent owned all the "Russian" bonds and suffered all the losses; (b) that the 1 percent owned most (89%) of the "Russian" bonds and suffered most of the losses; and (c) that each wealth quantile owned the same proportions of Russian to other foreign government bonds, so that the losses were distributed over the quantiles in proportion to their holdings of such bonds. If case (a) is the true one, then it would be necessary to slightly reduce the estimate of flight capital as securities, since it would imply, given the other assumptions and consequent estimates above, that the 1 percent moved a greater value of foreign securities to Switzerland than they actually owned. The discrepancy is small, however, and the 89% figure in case (b) is chosen to just barely eliminate it. In all three cases, the 1 percent, who own 69% of all the Russian bonds, bear the brunt of the losses. Even in [c], where all wealth quantiles lose the same share of their foreign government bond holdings, the holdings of the less wealthy are so much smaller that wealth inequality still declines, although not much.

This discussion is continued in the following section, in the context of analyzing what share of the decline in reported wealth inequality various factors, and combinations of factors, can account for.

What share of the fall in reported wealth inequality do these factors explain?

The top 1 percent's share of wealth in France before World War I (in 1912) was 60.5 percent, and for 1920-29 was 49.2 percent, a fall of 11.3 percentage points (Piketty 2014, Chapter10TablesFigures, Table S10.1). We have considered three main causes of this sharp decline in reported wealth inequality. One cause is capital flight to Switzerland in the form of both deposits and foreign securities. The second is the use of that flight capital in loan-back schemes, explained in further detail below. The third is losses on Russian bonds, together with southeast European securities that also collapsed in value. How much of the reported 11.3 percentage point decline does each of these explain, and how much do all of them together explain? It turns out that capital flight alone is able to explain about one-fifth of this fall, and when combined with the full use of that flight capital in loan-back schemes it accounts for more than two-fifths of the decline. Adding the effect of losses on Russian bonds accounts for at least three-fifths of the observed fall in the 1 percent's wealth share, and this is true whether we assume that these losses fell entirely on the top 1 percent or were to some degree shared by the less wealthy, mostly based on the size of capital flight estimates in Table 5.

[Table 6 about here]

Table 6 summarizes these effects. For each change listed in column [A], column [F] shows what percent of the decline in the 1 percent's wealth share it can account for. Column [D] calculates the 1 percent's new wealth share as a result of the change, by:

$$\frac{60.5\% - [B](60.5\%)}{100\% - [C]} = [D]$$

For example, in row 1, when the top 1 percent of wealth holders put 21.78% of the deposits they own in Switzerland, this amounts to 2.29% of their wealth (see Table 5), and their share of reported total wealth falls to 59.9%; note that in this case, because only the reported

wealth of the top 1 percent changes, the amounts subtracted from the numerator and denominator are equal, that is, 2.29%(60.5%) = 1.39%.

$$\frac{60.5\% - 2.29\%(60.5\%)}{100\% - 1.39\%} = 59.9\%$$

Then, as column [E] shows, 0.6 percentage points (60.5% - 59.9%) out of the 11.3 point decline are accounted for by flight of deposits alone. Finally, this constitutes (column [F]) 0.6/11.3 = 5% of the whole 11.3 percentage point decline.

In two of the cases of losses on Russian bonds, namely [2b] and [2c], the amount subtracted from total wealth in the denominator is larger than the amount subtracted in the numerator from the 1 percent's wealth. This is because in these two cases other wealth quantiles suffer some of the losses on Russian bonds, so the deduction from total wealth in France exceeds the deduction from the 1 percent's wealth. Case [2c], in which it is assumed that for each wealth quantile Russian bonds were the same proportion of all foreign government bonds, explains the smallest fraction of the decline in wealth inequality, while case [2b] explains somewhat more, and case [2a] explains one-fifth of the decline.

As for capital flight alone as a cause, the estimated flight of both deposits and securities (row [4]) on the top 1 percent's share of all wealth held in France would only reduce its reported share from 60.5% to (60.5% - 5.54%)/(100% - 5.54%) = 58.2%, a reduction of 2.3 percentage points in its wealth share., or just over one-fifth of the 11.3 percentage point fall**.** However, there were other potential benefits to capital flight besides directly avoiding taxation on the capital moved abroad, or the income from that capital.

One such potential benefit was reducing tax liability by using loan-back schemes, as Abegg et al. (2007) mention in the passage quoted earlier. A French depositor's flight capital in Switzerland could be lent back to that person in the guise of an arm's-length loan, creating debt that could reduce the net worth and hence evidently the wealth tax liability of the French depositor, as well as interest payments that apparently could reduce the taxable income, and hence the income tax liability, of the French depositor (see Peel 1926, 91, 94). Piketty and Zucman (2014, Data appendix, 83-84) remark on the very high liabilities that appear in the German data, and note that, according to official wealth data gathered for the German "defense tax" (*Wehrbeitrag*) imposed in 1913 to help finance the anticipated war, reported liabilities constituted over 20 percent of the gross value of assets, and therefore

over 25 percent of reported net worth. This was so large that the researcher upon whose work Piketty and Zucman drew adjusted the value of assets upward, assuming that much or all of this was tax evasion. Indeed, loan-back schemes are mentioned frequently in the capital flight literature. And even allowing for some liabilities that were not part of loan-back schemes involving tax havens, it is striking that as much as 20 percent of the gross value assets was liabilities in a period before World War I, and before the main rise of tax havens. It suggests that loan-back schemes were a well-developed tax avoidance strategy by the beginning of the World War I era we consider here.

If all French flight capital were lent back to its owners and the loans thus generated were reported as liabilities and deducted from net worth held in France, then they evidently could approximately double the contribution of capital flight to the decline in the share of the top 1 percent in total wealth held in France. That is, the consequent top 1 percent's lower share of reported total wealth due to capital flight would be (60.5% – 2·5.54%)/(100% – 2·5.54%) = 55.6 percent, and capital flight to Switzerland would therefore account for 4.9 percentage points of the 11.3% decline, which is 43 percent, or well over two-fifths of it.

Finally, in rows [6] and [7], where we combine the [2a] and then the [2c] Russian bond scenario with capital flight and loan-backs, the package explains at least three-fifths of the decline in the 1 percent's share of all wealth in France, regardless of which Russian bond scenario we use.[6]

For simplicity several factors have been omitted from the analysis. One is that deposits in commercial banks in the Netherlands approximately quadrupled from 1913 to 1919, although they leveled off after that; and we know that the Netherlands also had some of the features of a tax haven, such as a quite stable currency and apparently a relatively low tax rate (Farquet 2012), and so suspect that at least some of this was capital flight. In fact, Farquet says, "Switzerland was positioned at the forefront of tax dumping in presenting, maybe with the Netherlands, the most favourable conditions for imported capital" (13). For these and other reasons, the estimate here should be regarded as a lower bound for the amount of capital that remained in possession of the top 1%, but shifted from being

[6] Note that nonlinearities mean that adding Russian bond losses on top of capital flight and loan-backs makes them appear to have a larger impact.

reported to being unreported either because it fled to tax havens or was hidden in some other way.[7]

IV. Consistency with available data

There is another useful fragment of information whose consistency with these results can be established. With regard to the rapid growth of assets held by Swiss banks during and after World War I, Farquet (2012) cites the finding of Guex (1993, 150) that holdings of Swiss banks were 2 billion Swiss francs (CHF) before World War I, according to contemporary accounts, but by 1920 had grown to 10-20 billion CHF.[8] Farquet (2012, 4) further notes that "Although…the cumulative balance sheets of the major Swiss banks represented only 26% of those of their French counterparts in 1913, they subsequently amounted to 73% in 1929."

[Figure 8 about here]

Figure 8, based on League of Nations (1931) data, shows the rising ratio of the total assets (or liabilities) of the six largest Swiss banks to the assets of the six biggest French banks. (Small discrepancies between the ratios in the graph and in the quote may be due to the exchange rates used; but the growth from 26 percent to 73 percent in the quote is much the same as the growth from 31 percent to 83 percent in the graph.) Such a change could result both from an increase in foreign-owned deposits in Swiss banks, and movement of French deposits out of French banks.[9] Since the sum of German and Italian bank assets was about four times French bank assets both in 1913 and in 1929, simple algebra shows that a transfer of 10% of domestic French, German, and Italian deposits to Swiss banks, with no

[7] Keynes (1920, Ch. 5, III.1.c.iv) estimates that at least $0.5 billion of securities in Germany either fled or were hidden within Germany by the time of his writing. If German and Italian capital flight were in the same proportion to domestic wealth as French capital flight, then the estimate here implies a much larger amount: $1.2 billion flight of financial deposits from Germany to Switzerland and $3.6 billion of securities.

[8] Indeed, judging by the fact that big banks did almost no mortgage lending (League of Nations 1931), it may be that the big banks' customers were almost exclusively foreign nationals, and that Swiss nationals typically used cantonal banks, local banks, credit unions, or the post office for banking services; this is, however, only a guess.

[9] However, it is only fair to acknowledge that they could also result from other behavioral changes, such as shifts within Switzerland in use of major banks vs. use of local or cantonal banks.

other change or growth (and since German and Italian domestic deposits totaled about three times French deposits in 1913 as they did in 1929), would bring about the result described by Farquet.[10] This differs from the 14.7% estimate, but is in the same plausible range; further analysis might be able to explain the difference.

V. Conclusion

This paper explores the possibility that wealth inequality did not, in fact, decline nearly as much during the World War I era as Piketty's data appear to show. Instead, a plausible case is made that capital flight and loan-back schemes account for at least two-fifths of the decline, and that therefore at least that part of the decline is spurious.

There is little doubt that both capital flight to Switzerland and repudiation of Russian debt after the 1917 Revolution played some role in the decline in wealth inequality in France, Germany, and some other European countries during and after World War I. Other factors almost certainly included a temporary or permanent collapse in values of other foreign assets, and a decline in reported value of assets due to a large rise in inflation and a lack of reasons to record rising values of assets by "marking to market". We know that tax evasion was rampant in France during the World War I era, especially the 1920s, from credible contemporary reports. Flight capital was evidently a particularly effective means of avoiding taxes when used in loan-back schemes, as mentioned in the Swiss National Bank history (Abegg et al. 2007). Such methods reduced tax liability by not only reducing reported wealth once by removing it and putting it into the guise of third-party ownership, but reducing reported net worth by up to an equal amount through lending the same funds back to themselves, at interest, and recording liabilities that reduced net worth further.

This paper arrives at a rough estimate for capital flight as a cause of declining reported wealth and income inequality, arguing that, in France at least, less than 6 percent of total French private wealth, but over 8 percent of the wealth of the top 1 percent, was in Swiss banks and trust companies by 1929. This could explain a little over 40 percent of the

[10] If F is initial French deposits, and K denotes French capital flight in deposits to Swiss banks, then $.26F + 4K = .73(F - K)$ or $K/F = .47/4.73 \sim 10$ percent. The "$4K$" is because total flight deposits from the three countries was assumed to be four times French flight deposits alone, in line with the ratios in 1913 and 1929.

decline in wealth inequality in France – the larger figure if all the flight capital were lent back to its owners and reported as liabilities. The estimate is consistent with the fact that it was the top 1% whose share of total wealth plunged from 1912 to the 1920s.

It has been shown for France that under reasonable assumptions, the implied share of their financial deposits that the top 1 percent of wealth holders held in Swiss banks was a plausible 22 percent. It has further been estimated that the flight capital held by French residents in Switzerland consisted of around three-fourths securities and one-fourth financial deposits. In addition, these estimates are probably somewhat low for all flight capital, in light of other locations that reportedly received flight capital, such as the Netherlands, and in light of other ways to hide wealth within one's country of residence. The analysis here has relied focused on France, where suitable data are more readily available due to Piketty's work.

The point is not that these are the exactly correct figures; there are far too many uncertainties to be very certain about the size of capital flight. The point, rather, is to establish the plausibility of capital flight as a significant partial explanation for the reported decline in wealth of the top 1 percent, that is, the reported decline in wealth inequality, in France during 1912-1929. This is done by showing the estimates are consistent with the available data on bank balance sheets, wealth composition, and other data. In other words, the set of parameters (the ratio of securities to financial deposits in flight capital; the ratio of flight capital to domestic holdings of the 1 percent; and so on) that fit all the known data about possible capital flight from these countries is shown to be non-empty. The obvious conclusion is that the wealthy probably held onto a sizeable fraction of the wealth that the data make it appear that they lost.

A number of these possibilities, and the overall story, could be further checked (among other methods) by extensive searching in contemporary periodicals, including financial journals, and by looking carefully at trends in reported liabilities during the period. Much remains to be done, and it is hoped that this exercise helps to point the way to further sources and methods that could lead to refining these estimates.

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Table 1. Wealth composition in France in 1912, overall and by form of wealth.

		Type of asset			
A. Share of category in quantile's wealth		Foreign equity	Foreign private bonds	Foreign government bonds	All foreign assets
1 percent		9.3%	5.2%	9.6%	24.1%
9 percent		2.5%	3.7%	8.0%	14.2%
40 percent		0.8%	2.0%	3.5%	6.2%
B. Quantile's wealth/all wealth in France (by category)					
	Share of all wealth				
1 percent	60.5%	5.7%	3.1%	5.8%	14.6%
9 percent	28.0%	0.7%	1.0%	2.2%	4.0%
40 percent	11.5%	0.1%	0.2%	0.4%	0.7%
C. Quantile's share of category					
1 percent		87.6%	71.3%	68.6%	75.6%
9 percent		11.0%	23.6%	26.6%	20.7%
40 percent		1.4%	5.1%	4.8%	3.7%

Source: Piketty (2014), Chapter10TablesFigures.xls, Tables TS10.1, TS10.4 and author's calculations.

Notes:

A and the first column of B: Data from Piketty (2014).

B. 5.7% = 60.5%(9.3%);

0.7% = 28.0%(2.5%); and so on.

C. 87.6% = 5.7%/(5.7% + 0.7% + 0.1%); and so on.

Table 2. Approximate amount in dollars per head of population of commercial banks' total assets and deposits, of deposits in other credit institutions, and of aggregate deposits in 1929.

	Commercial bank deposits	Other credit institutions deposits	Aggregate deposits
Switzerland	580	134	**714**
US	351	87	438
Denmark	152	161	313
Norway	101	212	313
Sweden	153	139	292
UK		53	292
Scotland	250		
England & Wales	238		
Ireland (Free State & N. Ireland)	205	7	212
Netherlands	114	61	175
Czechoslovakia	53	81	134
Belgium	102	30	132
Germany	62	60	**122**
Austria	57	38	95
Finland	56	38	94
France	60	30	**90**
Italy	41	35	**76**

Source: League of Nations (1931), p. 8, Table 1.

Notes:

Canada's commercial bank deposits and aggregate deposits exclude deposits in branches abroad.

Commercial bank figures for the UK include private banks, but exclude British overseas banks and English branches of foreign banks.

UK figures in the two right hand columns include discount houses, trustee, and P.O Savings Banks, including those in N. Ireland.

Australia commercial bank figures exclude offices abroad, and the two right-hand columns include deposits with the Commonwealth Bank.

New Zealand commercial bank figures exclude offices abroad.

The first two columns for the Netherlands are based on the assumption that the leading banks account for 60% of commercial banking.

In the first two columns for Germany the estimate for all commercial banks, including *Staats-* and *Landesbanken*, is based on the last official interim return for 1929.

The two left-hand columns for France are based on the assumption that the leading banks account for 75% of total commercial banking. The two right-hand columns for France are for savings banks only; *banques d'affaires* are included under the first two columns.

Table 3. If flight capital from Germany, France, and Italy to Switzerland were 14.7% of each country's domestic deposits, and there were no flight capital in Switzerland from any other country, then flight capital would be about 75% of Swiss deposits in banks and financial institutions, and the remaining 25% would amount to $178 per capita for Swiss resident owners of the deposits. All monetary data are in current US dollars of 1929.

	Per capita aggregate deposits	Country per capita possible flight K	$million at midyear **1929 Population**	Aggregate deposits (millions)	Flight capital portion of Swiss deposits (millions)	
Switzerland	714	536	4.022	2,871.708	2,155.685	**Flight capital**
All 13 countries	178					**(000s)**
Germany	122	18	64.739	7,898.158	**14.7%**	1,159,450
France	90	13	41.230	3,710.700	**14.7%**	544,731
Italy	76	11	40.469	3,075.644	**14.7%**	451,505
					Total	
				14,684.502	Ge, Fr, It deposits	2,155.685
						Ge, Fr, It flight capital

Source: Author's calculations from League of Nations (1931), Table 1, p. 8, and population data from Angus Maddison, Historical Statistics of the World Economy, AD1-2030, horizontal file_02-2010.xls

Table 4. Share of all deposits in Parisian portfolios, by wealth group, based on "1910" data on wealth distribution and wealth composition. Column [B] (financial assets as share of a group's wealth) is from Table 10.1 (Piketty 2014), data for 1912. Calculations assume deposits were the same share of "other financial assets" for each group of wealth-holders. The bottom 50% of wealth-holders are assumed to have zero net worth, on average, and no deposits. "Deposits" refer only to deposits held in France.

	Group's wealth / Total wealth (1910) [A] = W_j/W_{FF}	Group's deposits / Group's wealth (1912) [B] = D_j/W_j	Group's deposits / Total wealth [C] = D_j/W_{FF} = [A] x [B]	Group's deposits / Total deposits [C]/∑[C] = $D_j/\sum D_j$ [4.84%/9.61%,…]
Wealth-holders				
Top 1%	60.50%	8.25%	4.98%	**52.76%**
Next 9%	28.00%	8.73%	2.45%	**25.43%**
Next 40%	11.50%	17.54%	2.02%	**22.81%**
			All deposits / All wealth 9.44%	**100.00%**

Sources: Author's calculations from Piketty (2014, Table 10.1, 371) and online Chapter10TablesFigures.xls at piketty.pse.ens.fr

Table 5. Estimated capital flight of French residents in the form of deposits and securities in Swiss financial institutions. The column heading is the numerator and the row label is the denominator for each estimate.

Column category's share of row category	1%'s deposits in SWI	1%'s securities in SWI	1%'s deposits + securities in SWI
1%'s total deposits in France	27.84%		
1%'s total wealth in France	2.29%	6.87%	9.16%
All deposits in France	14.68%		
All wealth in France	1.39%	4.16%	5.54%
1%'s total deposits (in FRA+ SWI)	21.78%		
1%'s total wealth (in FRA+SWI)	2.10%	6.29%	8.39%
All wealth (in FRA+ SWI)	1.37%	3.99%	5.25%

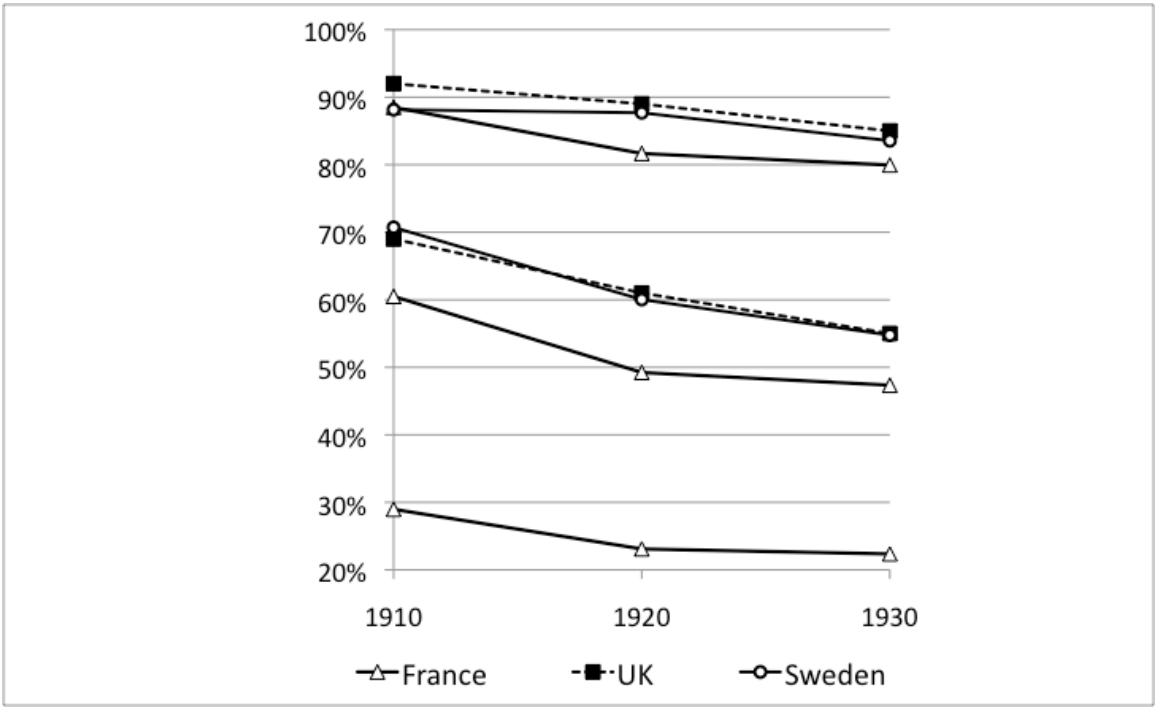
Source: Author's calculations; see Tables 2-3 and assumptions explained in the text.
SWI = Switzerland; FRA = France. The estimates are rough, and not to be viewed as valid to two decimal places; the decimal places are included to make it easier to check and grasp the relationships among variables. All securities figures in column 2 are three times the figure in the same row in column 1, by assumption.

Table 6. Share of the 11.3 percentage point observed decline in the 1 percent's wealth share from 1912 to 1920-29 accounted for by capital flight, loan-back schemes, and losses on Russian bonds.

	[A]	[B]	[C]	[D]	[E]	[F]
	Source of decline in actual or reported wealth	% fall in 1 percent's wealth	% fall in total wealth	New 1% wealth share	Pc point fall in 1% share	Share of 11.3%
[1]	Flight of deposits	2.29%	1.39%	59.9%	0.6%	5%
[2a]	Russian bonds, 1 percent suffers all losses	8.90%	5.39%	58.3%	2.2%	20%
[2b]	Russian bonds, 1 percent suffers 89% of losses	7.92%	5.39%	58.9%	1.6%	14%
[2c]	Russian bonds, each wealth quantile loses 69% of holdings	6.06%	5.39%	60.1%	0.4%	4%
[3]	Flight of securities	6.87%	4.16%	58.8%	1.7%	15%
[4]	Flight of deposits + securities ([1]+[3])	9.16%	5.54%	58.2%	2.3%	21%
[5]	Deposits + securities + loan-backs (2 x [4])	18.32%	11.08%	55.6%	4.9%	44%
[6]	Dep + secur + loan-backs + Russian bonds [a] ([5]+[2a])	27.23%	16.47%	52.7%	7.8%	69%
[7]	Dep + secur + loan-backs + Russian bonds [c] ([5]+[2c])	24.38%	14.75%	53.7%	6.8%	60%

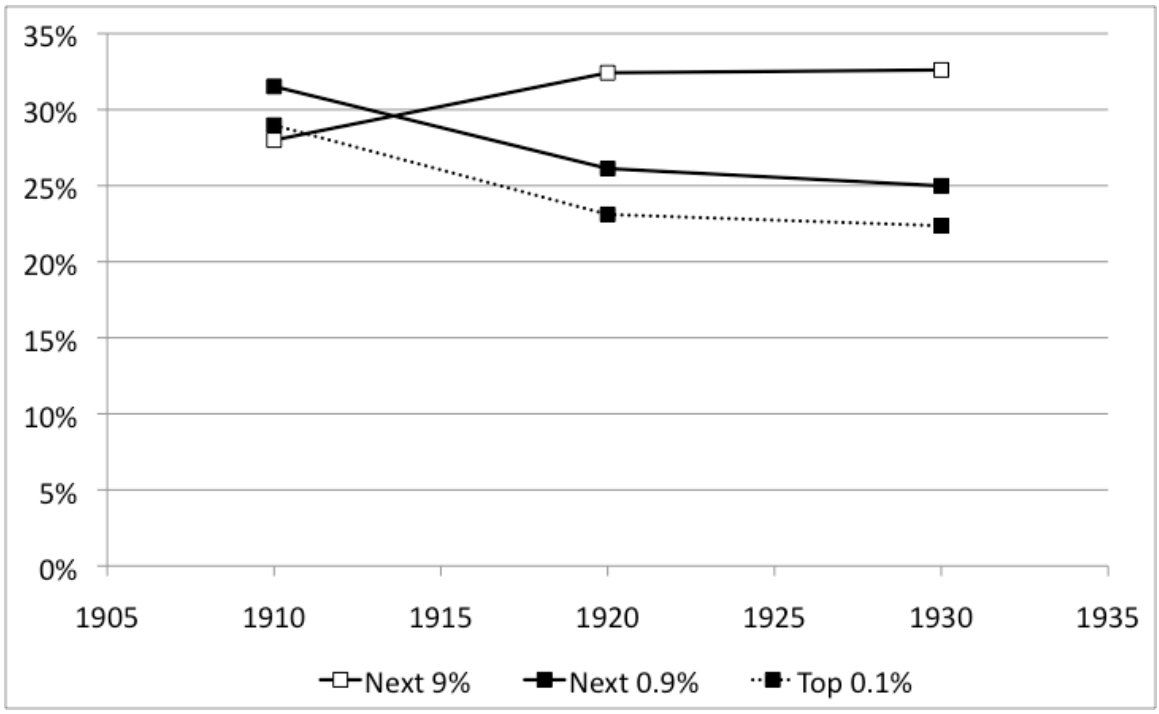
Source: Author's calculations.

Figure 1. The share of the top 1% and the top 10% in total wealth declined in France, Sweden, and the UK, 1910-1930. In all three countries, the top 10% (the top three lines) held 80% or more of all wealth, and the top 1% held 45% to 70% of all wealth (the three lines in that range). In France, the only country for which we have separate data for the top 0.1% (the lowest line), this group held between 20% and 30% of all wealth.



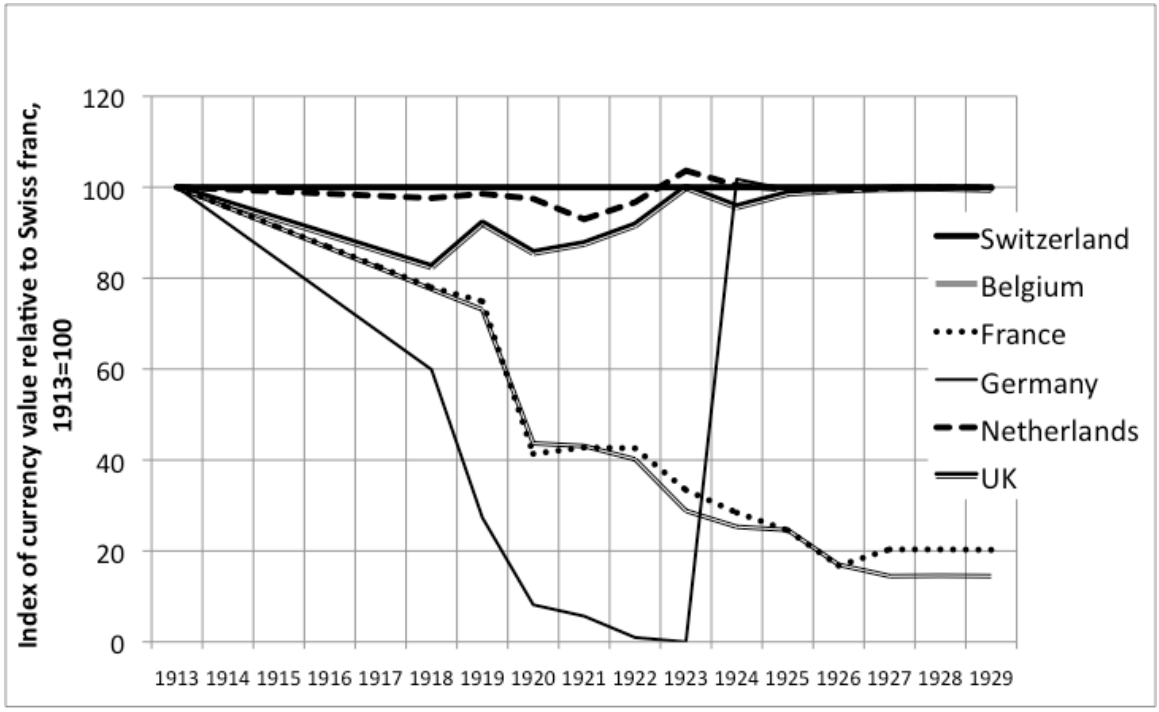
Source: piketty.pse.en.fr/Capital21c, Chapter10TablesFigures.xls, TS10.1

Figure 2. In France, as in some other countries, the top 1%'s share of total wealth declined from 1910 to 1939, but the share of the next 9% actually rose. Here the top 1% is divided into two groups: the top 0.1%, whose share fell from 29.0% in "1910" to 23.1% in 1920-29, and the next 0.9%, whose share fell from 31.5% to 26.1%. The next 9%'s share *rose* from 28.0% to 32.4%.



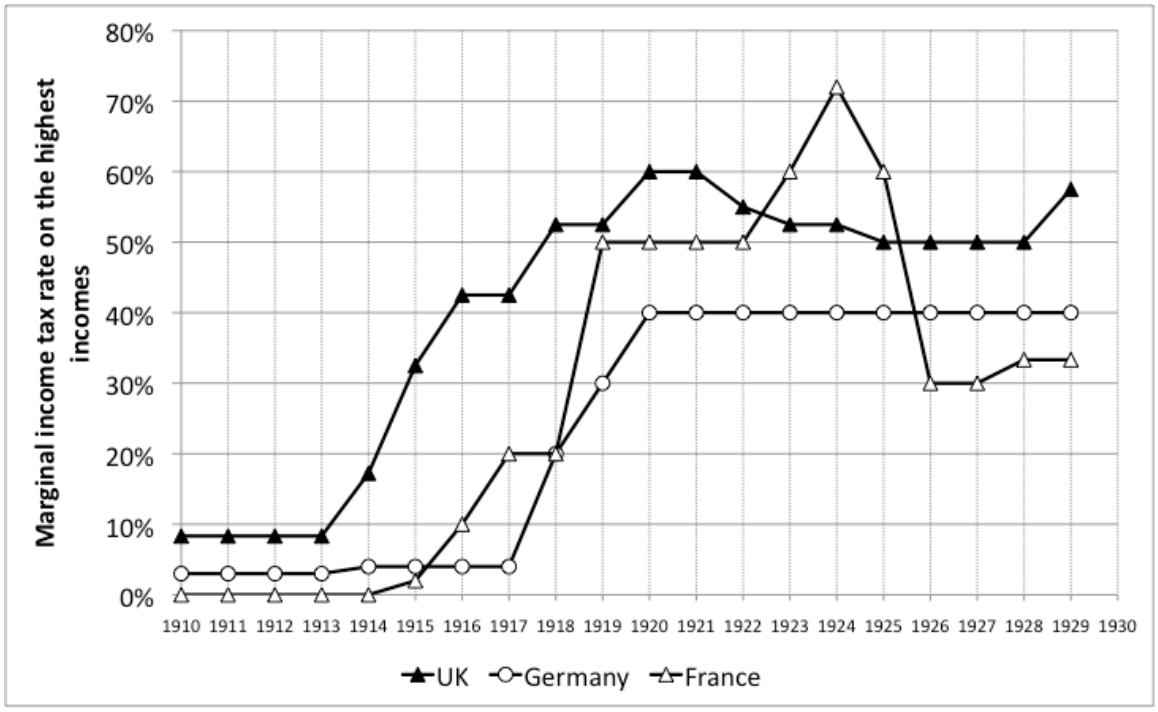
Source: Author's calculations from piketty.pse.en.fr/Capital21c, Chapter10TablesFigures.xls, TS10.1. Decennial data for 1920 and 1930 are means for the 10-year period beginning in the year shown ("1920" is for 1920-1929, and so on). However, "1910" is actually a mean of the years 1910-1913. No data were available for the World War I years.

Figure 3. Currency depreciation was a motive for capital flight to Switzerland; the graph shows currency values relative to the Swiss franc, 1913-1929. The currencies of Switzerland, the Netherlands, and the UK remained fairly stable, while the value of the German mark fell to zero by 1923 with Weimar Republic hyperinflation, and the currencies of Belgium and France also fell rapidly in value.



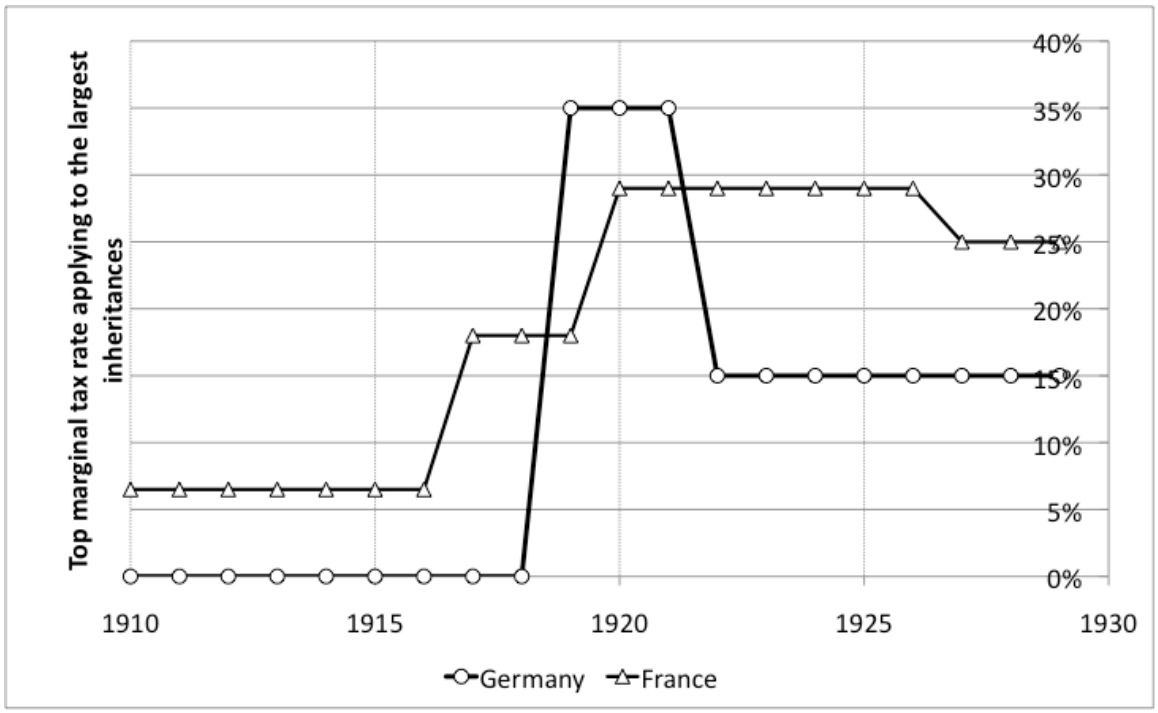
Source: Author's calculations from Farquet (2012), 35 (Appendix 2, CHF exchange rates). Data points for 1914 -1917 are missing for all countries; 1918 is also missing for Belgium.

Figure 4. The marginal tax rate on the highest incomes was increased sharply in Germany, France, and the UK to help pay for the war. Germany's formal tax increased latest, but wealth taxes had existed since the late 18th century in Prussia and elsewhere. In addition, the German government requisitioned gold from households during the war to help finance war spending; many hid their wealth rather than turn it over to the government (Keynes 1920).



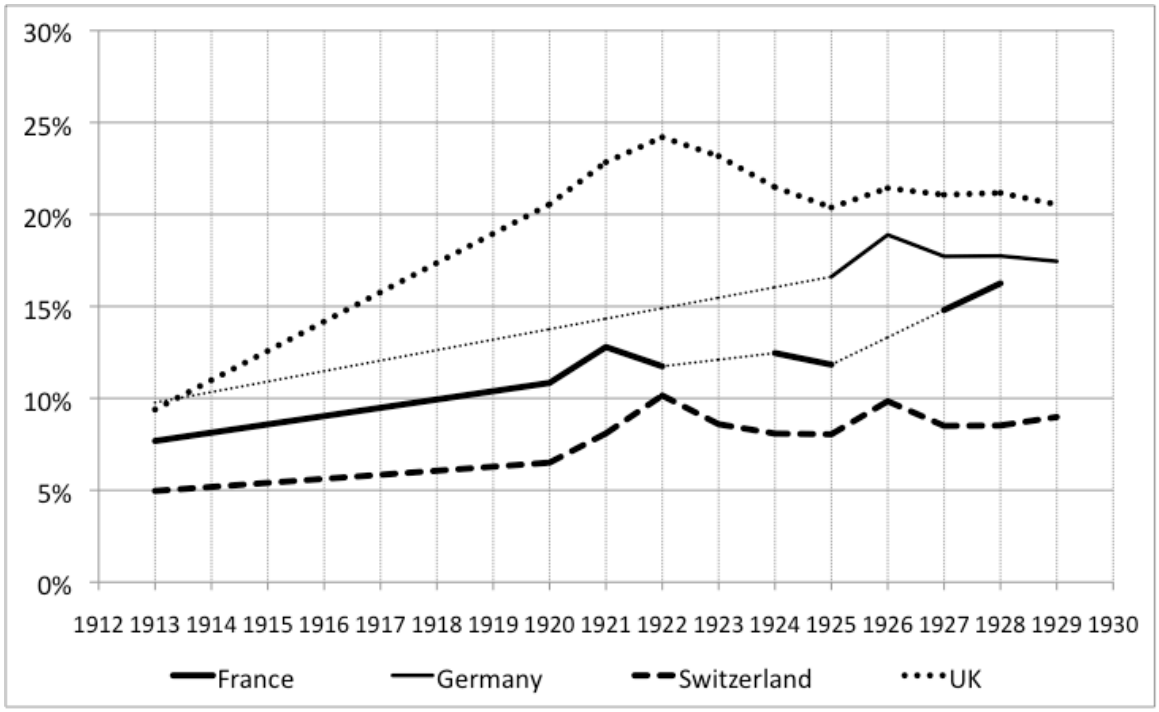
Source: Piketty (2014), piketty.pse.ens.fr/Capital21c, Chapter14TablesFigures.xls, TS14.1.

Figure 5. Top inheritance tax rates for Germany and France, 1910-1929.



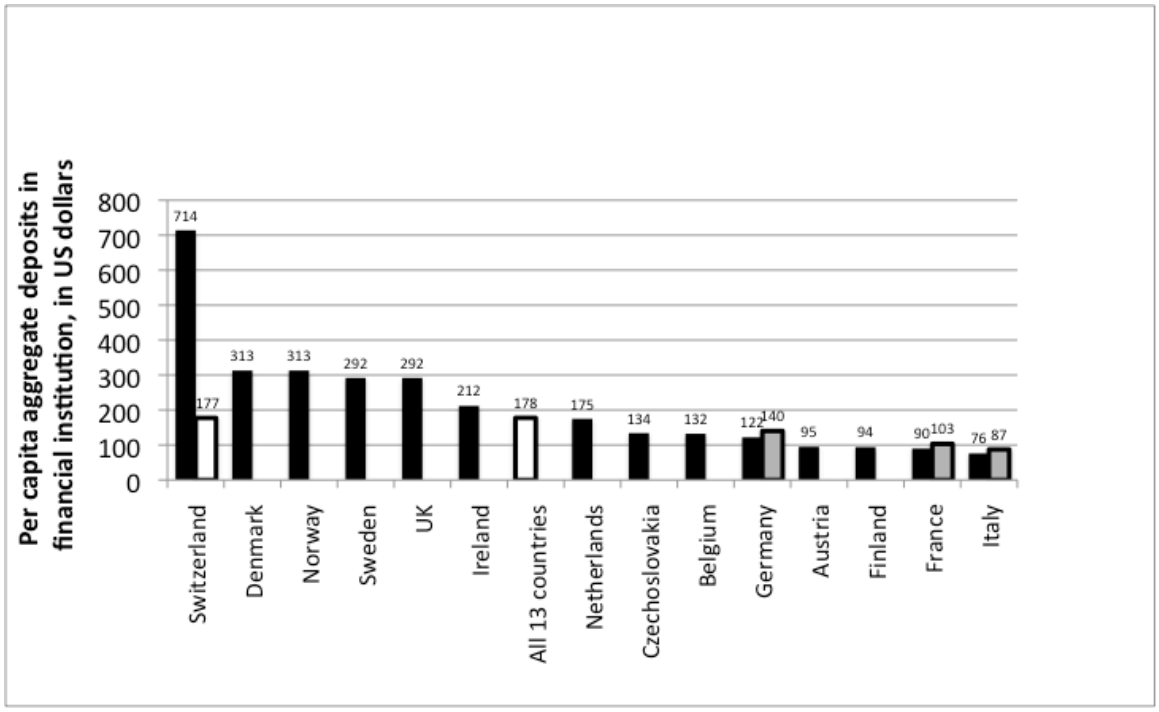
Source: Piketty (2014), piketty.pse.ens.fr/Capital21c, Chapter14TablesFigures.xls, TS14.2.

Figure 6. Switzerland's tax collection was below that of neighboring countries during the entire period 1913-1929. Its total tax revenues as a share of GDP, for the years reported in Farquet (2012), were lower than in France, Germany, or the UK, creating an incentive for capital flight to Switzerland.



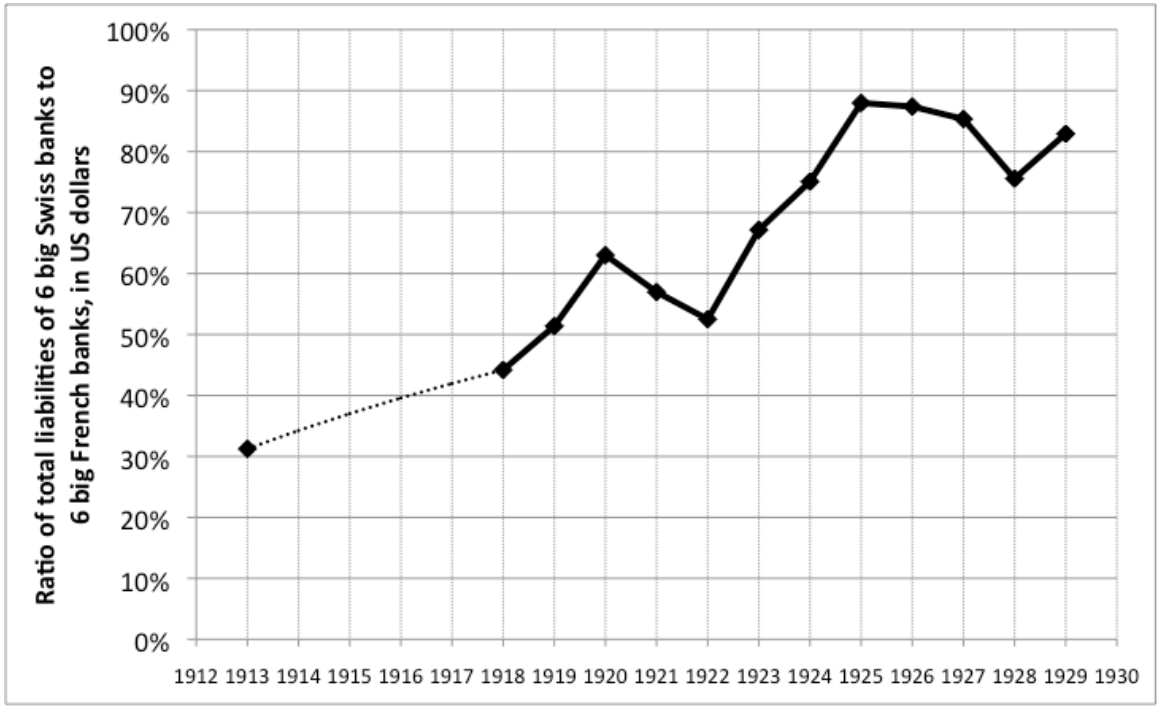
Source: Farquet (2012). Thin dotted lines connect years before and after missing data.

Figure 7. Per capita aggregate deposits in banks and other financial institutions such as credit unions, top 13 countries of Europe, the UK, and Scandinavia, 1929, in current US dollars. If only $178 of Swiss per capita deposits in 1929 (equal to the average of all 13 countries) was owned by Swiss residents, and the remaining three-fourths of Swiss deposits were flight capital exclusively from France, Germany, and Italy, then the flight capital from each of these countries would amount to about 15% of its domestic deposits. See Table 3.



Source: League of Nations (1931), Table 1, p. 8, and author's calculations. See also Tables 2 and 3.

Figure 8. The ratio of total liabilities of six big Swiss banks to those of six big French banks, 1913-1929, after conversion to current US dollars, rose substantially, a fact consistent with capital flight to Swiss banks, including from France. Data were not reported for 1914-1917.



Source: Author's calculations from League of Nations (1931, 112-113 and 271).