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# War and Progressive Income Taxation in the 20th Century

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# War and Progressive Income Taxation in the 20th Century*

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I argue that progressive income taxation in the twentieth century is a product of the exigency of war and not of democracy. I obtain long-run series of the top marginal personal income tax rate for a large sample of OECD countries, and use data on wars of mass mobilization and democracy from the Correlates of War data set and Scheve & Stasavage (2012) to test this hypothesis. My results suggest that wars of mass mobilization (i.e. wars in which more than 2% of the population served in the military) cause substantial increases in tax progressivity. These effects are persistent and do not vanish upon the conclusion of war.

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# 1 Introduction

The most important innovation regarding tax matters in the twentieth century was the creation and development of the progressive income tax. Progressive taxation played an essential role in the development of the social state and in the transformation of the structure of inequalities in this period (Piketty, 2014). I show that the emergence of progressive income taxation in the twentieth century is a product of a conscious policy change, influenced by the exigency of war, and not of democratic responses to shifts in inequality levels. Using historical series of the top marginal personal income tax rate for a large sample of OECD countries and Scheve & Stasavage (2012)'s data on wars of mass mobilization and democracy, I argue that almost no country had high taxes on the rich before the advent of war, and that it was the Wars that caused substantial income tax progressivity in these countries.

Historically, two features of wartime politics have prompted tax reform. The first is sheer fiscal need. No government activity requires as much revenue as fighting a war. Success on the battlefield requires economic resources, and taxation is the best means of marshalling those resources (Bank *et al.* , 2008). The second is political opportunity, that is, the fact that wars – particularly inter-state wars – often create a new political atmosphere characterized by feelings of solidarity and shared sacrifice. Simply put, taxes are never popular, but they are never more popular than during wars (Bank *et al.* , 2008). Moreover, fighting a war in which a large segment of the population is mobilized requires societal consensus in favor of the war effort. This consensus will be easier to maintain if it is perceived that the burden of the war effort is shared fairly among different social groups. If the rich are less likely to be in the battlefield (either because they do not enlist or because they avoid conscription through a deferment, an exemption, or due to age), then those who do fight might demand they bear a disproportionate share of the financial burden for a war to promote equality of sacrifice. Indeed, the wartime context provides a way of supplementing standard "ability to pay" arguments to progressivity with an appeal to fairness (Scheve & Stasavage, 2010, 2012). This implies that wars of mass mobilization will be associated with political pressures to raise taxes for the rich. Furthermore, to the extent that a war is financed by debt that is repaid with taxes levied after the war's end, then said political pressures for high taxation of top fortunes will continue for some time.

The relationship between wars and progressive taxation has been the subject of extensive debate by both historians, political scientists, and economists in the past. In *Capital in the 21st Century*, Thomas Piketty (2014) described how progressive income, inheritance, and wealth taxes were created in the midst of the chaos and improvisation of World War I and II. Political scientists Kenneth Scheve and David Stasavage (2012) tested this theory that wars of mass mobilization caused increases in progressive inheritance taxation, against the alternative attributing this causality to the advent of democracy. In particular, the authors gathered series for the evolution in top inheritance tax rates for two centuries, and validated the former theory over the latter.[1] Similarly, Scheve & Stasavage (2010) analyzed the effect that the Great War had on income tax progressivity in eight OECD countries.[2] Notwithstanding these developments, a lack of data on top income tax rates from a long-run perspective has prevented researchers from extending this analysis to a large sample of countries. This paper intends to bridge this gap in the literature by gathering data for one hundred years and for almost twenty OECD countries.

The case of income taxation is interesting and worth studying on several grounds. First, income taxation has the potential of being the most redistributive tax. Unlike inheritance taxation, the income tax applies every year and has cumulative effects. Second, it is a highly visible tax, subject to great public debate. The evolution of the tax schedule in general, and the top income tax rate in particular, thus sheds lights on the social norms regarding perceptions of fairness and distributive justice. Finally, over time, the income tax has become much more important than other direct taxes as an aggregate revenue source. These facts motivate me to study the effect of war on income taxation, while focusing on a key feature of the income tax that captures the burden of the tax on a country's richest citizens – the top marginal personal income tax rate.

I obtain long-run series of the top marginal personal income tax rate for a large sample of OECD countries, and use data on wars of mass mobilization and democracy from the Correlates of War data set and Scheve & Stasavage (2012) to test this hypothesis. My results suggest that wars of mass mobilization (i.e. wars in which more than 2% of the population served in the military) cause substantial increases in tax progressivity. The coefficient estimates for countries that mobilized for war for an entire 5-year period range between 13.9 and 17.1. The magnitude of these coefficients is similar to that found by Scheve & Stasavage (2012) for inheritance taxation, and is roughly similar than that found for income taxation for the eight countries in Scheve & Stasavage (2010)'s sample. My findings thus offer supportive empirical evidence to "ratchet effect" theories of long-run government growth à la Peacock & Wiseman (1961), wherein large-scale social disturbances such as major wars shrink the gap between ideas about desirable public spending and the limits of taxation. Wars therefore have a 'displacement effect', shifting public revenues and expenditures to new, and usually higher, levels; formerly unacceptable revenue-raising methods are tolerated in wartime and, upon the conclusion of war, this higher tax tolerance persists. My results are also in line with Besley & Persson (2009, 2010)'s theory of how governments invest in fiscal capacity (e.g., tax withholding) over time in response to wars.

The rest of this paper is organized as follows. Section 1.1 analyzes the rhetoric of progressive taxation in policy debates, taking the cases of the United States and France as illustrative

[1] Scheve & Stasavage (2012) argue that the fact that inheritance taxes can be administered without substantial expansion of bureaucratic capacity reduces the likelihood of their estimates being biased by a failure to control for levels of administrative capacity.

[2] The eight countries in Scheve & Stasavage (2010) 's sample are Canada, France, Germany, Japan, Netherlands, Sweden, United Kingdom, and United States. However, given the effect of war is not always immediate, their estimates based on annual frequencies fail to adequately capture the persistent effect of war on progressive taxation (see Section 4.2).

examples of what occurred more broadly in most OECD countries. Section 2 describes the data. Section 3 describes the econometric models for evaluating the effect of war on income taxation. Section 4 presents the main results of this exercise. Section 6 offers some concluding remarks.

## 1.1 The Rhetoric of Progressive Taxation in Policy Debates: The Cases of the United States and France

The mechanism through which mass warfare bred increases in top tax rates can be expected to operate via a shift in the messages sent by parties and an alteration in the opinion of the electorate (Scheve & Stasavage, 2010, 2012). I argue that contemporaries saw wartime imperatives as creating the case for an increase in progressive taxation to restore equality of sacrifice, and present the cases of the United States and France as illustrative examples of what occurred more broadly in most OECD countries.

### 1.1.1 The United States

It has been said that the history of America's tax system can be written largely as a history of America's wars. The first federal income tax was proposed during the War of 1812; however, it was never imposed because the treaty of Ghent was signed three years later, ending hostilities and the need for additional revenue. Later, the Civil War increased income tax rates in several states (e.g. Virginia, North Carolina, South Carolina, Alabama) and led to the creation of partial income taxes in others (e.g. Georgia, Missouri, Texas, Louisiana, West Virginia, Kentucky). Notwithstanding, in only a handful of cases was a general income tax established and, after the first ardor of war enthusiasm had subsided, it often worked exceedingly poorly. A last effort to establish federal income taxation was made in 1861, but it was quickly repealed and replaced by another tax due to defective provisions, exaggerated exemptions, and inefficient administration (Seligman, 1914).[3] After this last abandonment of the income tax, the subject of income taxation would disappear from the public mind for nearly two decades.

It was in the Gilded Age that elite views on inequality and taxation rapidly began evolving. An income tax adopted in 1894 amid fierce opposition was attacked as unconstitutional shortly after, and later invalidated by the Supreme Court.[4] The moral tone heard in par-

[3] Wisconsin was the exception to this norm. Reforming its fiscal administration, it adopted an income tax on July 15, 1911. It must be noted, however, that this was in no case a general income tax (Seligman, 1914).

[4] Illustratively, Mr. Adams of Pennsylvania vehemently opposed income taxation by declaring "An income tax! A tax so odious that no administration ever dared to impose it except in time of war; and you will find that the people will not tolerate it in times of peace. It is utterly distasteful both in its moral and material aspects. It does not belong to a free country. It is class legislation. Do you wish to put a tax upon thrift and impose a penalty upon success? Do you desire to offer a reward to dishonesty and to encourage perjury? The imposition of the tax will corrupt the people. It will bring in its train the spy and the informer... It is a direct step towards centralization, of which our Democratic friends profess such horror. It is expensive in its collection and cannot be fairly gathered; and finally, it is contrary to the traditions and principles of the republican government" (cited in Seligman (1914)).

liamentary debates regarding earned and unearned income reflected conflicted feelings about wealth (Kornhauser, 1994).[5] In parallel to the heated debate in parliament, many academics were equally concerned that the country was leaving behind the ideal of its pioneer origins. In 1915, Willford King expressed his concern with the possibility that the United States was becoming more and more similar to "hyper-inegalitarian" Europe. In 1919, Irving Fisher devoted his Presidential address to the American Economic Association to discussing America's "undemocratic distribution of wealth" that threatened its very foundations, arguing in favor of heavier taxation. In sum, modern capitalism was believed to have resulted in enormous economic wealth and inequalities and, given this reality, taxes could be levied according to the taxpayer's ability to pay (Steinmo, 2003).

The enactment of the income tax law of October 3, 1913 marked a new stage in the history of American finance. As the threat of war loomed, the first federal income tax was adopted with the Sixteenth Amendment to the Constitution under the chief argument that wealth was escaping its due share of taxation.[6] At the heart of this seismic shift was the idea that citizens owed a debt to society in relation to their "ability to pay"; that is, that individuals who had greater economic power also had a greater social obligation to contribute to the public good (Mehrotra, 2013). Yet in spite of antebellum United States being intellectually and politically prepared to establish progressive taxation, it was surprisingly not until the Great War broke out that this 'ability-to-pay' principle was implemented, and in fact taken to some remarkable extremes.

As Treasury confronted escalating war costs and American armed forces began sailing overseas, the social demands for higher taxes on income, as well as on profits and wealth transfers, became more vociferous. Calls for the "conscription of wealth" to match the conscription of men filled the editorial pages of America's leading publications. For instance, the *Los Angeles Times* rhetorically queried whether the relatively minor financial sacrifices made by the Rockefellers and the Fords could compare "with that of the man who bares his breast to the bullets of the bayonets of the foe and risks his life for his country" ("Conscripting Capital", *Los Angeles Times*, June 4, 1917, cited in Mehrotra, 2013, p. 304). Some economists, like O.M.W. Sprague of Harvard, also argued that the conscription of men "should logically and equitably be accompanied by something in the nature of of conscription of current income above which that is absolutely necessary" (Sprague, 1917, pp. 5–6). That same year, the War Revenue Act of 1917 dramatically raised the stakes for the rich, increasing the top marginal income tax rate from 15% to 67%, and 77% shortly thereafter.

[5] Democratic Senator of Tennessee Benton McMillin's speech in favor of an income tax largely embodies this evolving perception of distributive justice: "I ask of any reasonable person whether it is unjust to expect that a small per cent of this enormous revenue shall be placed upon the accumulated wealth of the country instead of placing all upon the consumption of the people... [The new income tax bill] is not a proposition to put an undue embargo upon wealth, but it is to make the wealth that is accumulated in this country pay some share of the expenses of government" (quoted in Seligman, 1914).

[6] As Democrat Congressman Cordell Hull of Tennessee, one of the chief architects of the 1913 income tax, explained: "I have no disposition to tax wealth unnecessarily or unjustly, but I do believe that the wealth of the country should bear its just share of the burden on taxation and that it should not be permitted to shirk that duty" (Congressional Record, 1909).

Discussions in Congress regarding the War Revenue Act of 1917 illustrate the extent to which the rhetoric of equal sacrifice and fiscal citizenship shaped the debate about progressive taxation in wartime.[7] Progressive Senator Robert M. La Follette appealed to his colleagues to make the income tax "a tax that shall be accepted by millions of the people who have to bear the great burdens which this war imposes them, [lifting] the load from those who furnish the great body of the soldiery that will be sent to slaughter and [placing] it upon those who are able to bear it, the owners of surplus incomes and those making profits from war" (Congressional Record, 1917, pp. 6279). Progressive Senator William Borah's speech in Congress further embodies the rhetoric of equalizing sacrifice through progressive taxation:

> *It is one of the remorseless axioms of war that, do the best we may, it is impossible to distribute its burdens, its sufferings, and sacrifices equally among the people. The poor will grow poorer and often the rich are made richer even under the most equitable and just laws which can be passed. The most of the fighting is done by humbler or less well-to-do people – if for no other reason because there are more of them and they make up the fighting forces. They make the supreme sacrifice... If in addition to all this we lay on even a slight additional tax, while it may seem slight to us, it falls with a heavy and crushing effect upon them... We must bare in mind that this is our war; that the citizen must meet the situation according to his ability.* (Congressional Record, 1917, pp. 6281-6283)

The institutionalization of progressive income taxation had enormous implications for subsequent developments in tax policy and the modern welfare state as a whole. Not only were these taxes producing enormous revenues, but the basic assumption about how taxes could legitimately be raised had now shifted. Taxes, it was now clear, "*could and should* be used as an instrument of economic redistributive policy" (Steinmo, 2003, p. 210). In addition, the majority of economists and tax professionals favored progressive taxes generally, with two-thirds of them agreeing that there should be higher income tax rates for unearned (i.e. capital) income in 1934 (Slemrod, 1995). Polls from 1938-1939 reveal an absence of public support for reductions in taxes "on people with high incomes", and a plurality of support for publicity of the income tax returns "of rich men" (Jones, 1989). Indeed, progressive taxes had become an integral part of the system, and to repeal them would have violated the commonly held values about social equity.

Granted, there were other factors affecting income tax progressivity in the United States. The violence of the Great Depression, and the blame placed on the economic and financial elites of the time, pushed President Roosevelt into raising the top income tax rate from 25% (a rate set by President Hoover in the late 1920s) to 63% in 1933, and then 79% in 1937, while leaving

[7] Wartime Treasury lawyers believed that fiscal citizenship meant that "the state had a reciprocal social obligation and democratic responsibility to its citizens, a duty not only to protect them during war, but to ensure that the responsibilities of wartime fiscal sacrifice were equitably distributed among all community members" (Mehrotra, 2013, p. 324)

the number of income taxpayers unchanged.[8] However, this most stratospheric of tax brackets applied to only a handful of individuals, most notably John D. Rockefeller; the income tax thus remained a class tax, with only 10% of Americans being covered by taxable returns between 1933 and 1939. Indeed, before the late 1930s, the popular perception was that the income tax was reserved for the fortunate few in the elite ranks of the income distribution.

The Second World War radically transformed this limited conception of the income tax and dramatically changed the tax policy climate in the United States. Though originally intended as a tax on the rich, Treasury officials discovered its enormous revenue potential. In parallel with developments in other countries (including France), revenue officials realized that income could be withheld by employers and paid directly to the government even before the worker collected it in his or her weekly paycheck. This gave rise of the Pay as You Earn (PAYE) system, established in 1943. As the new system eliminated delays in payments, the income tax was made more responsive to revenue expansion in wartime.

Furthermore, massive increases in government revenues could be justified politically and morally – it was 'fair' to tax income, as long as everyone paid. Given the now common egalitarian values among elites, it was even more 'fair' if the rich paid a higher share of their income than the poor. Indeed, progressivity remained a central concern of President Roosevelt: the Victory Tax Act set the top rate to 88%, and then to an extraordinary 94% in 1944. With Treasury Secretary Henry Morgenthau, Jr. declaring it would be "just and feasible to increase taxes on middle and lower income groups", the legal filing thresholds were lowered substantially in 1942, so that even modest income earners would contribute to the war effort directly with each paycheck. As the number of taxable returns skyrocketed, the income tax expanded from a class tax to a "people's tax", with more than 80% of Americans filing income tax returns by 1944. Shortly thereafter, the Individual Income Tax Act of 1944 simplified the income tax for those in the lower brackets, unifying exemptions and regularizing rate schedules to make the income tax more palatable to the new and average taxpayer. Together, these crucial reforms signaled a fundamental transformation of the income tax from an elite tax to a mass tax that soon became a feature of everyday life for most Americans.

In addition, the Roosevelt administration seemed to believe that both compliance and political acceptability were dependent upon a changed conception of the income tax in the minds of the American public. Indeed, a number of public relations or propaganda techniques were used by the Treasury department, its Bureau of Internal Revenue, and the newly-created Office of War Information (OWI) in convincing the new American taxpayers of the legitimacy

[8] Indeed, in his acceptance speech at the Democratic convention in Philadelphia, Roosevelt claimed to have enlisted in a war against the "economic royalists" who had crowded out "many thousands of small business men and merchants who sought to make a worthy use of the American system of initiative and profit" (Roosevelt, 1938).

of their burden (Jones, 1989).[9] Interestingly, while other calls for sacrifice explicitly tied to the war effort by propaganda diminished or virtually disappeared when victory came, the income tax, in contrast, never returned to its "class tax" character (Jones, 1989).

### 1.1.2 France

The creation of the income tax in France preceded World War I, and marked the culmination of a long legislative process.[10][11] An income-tax bill of the first kind was unsuccessfully introduced in 1894 by the Minister of Finance, Mr. Burdeau, in a lengthy parliamentary debate between right- and left-wing political parties. It resurfaced in parliamentary debates in 1907-1908, after Mr. Joseph Caillaux and other left-wing politicians used evidence gathered from inheritance tax data to argue that wealth was highly unequally distributed in the France of the *Belle Époque*, and advocated for the income tax as an indispensable instrument for redistribution and social justice.[12] Notwithstanding, it was only until the financial exigencies of the Great War became unsustainable that the bill was revived and a law was passed in July 15, 1914 creating the *impôt general sur le revenu* (Piketty, 2001). Albeit these efforts, the capacity of the income tax to reduce income disparities at the top and collect revenues was limited; the top marginal tax rate was only 2% and only a small minority of individuals were subject to the tax.

[9] Government tax propaganda included asking American taxpayers to contemplate "what it must be like for the citizens of occupied countries to pay taxes for the benefit of the invader!". Another product, administered by OWI, was the Victory Speakers program: "The new income taxes will call for many sacrifices, especially by people of low income who have never paid income tax before. But these sacrifices, difficult though they may be, are small compared with the sacrifices of those whose breadwinners have been drafted or who are serving in the armed forces". A more positive and powerful message was the purchase of victory with dollars, that is, the transformation of money into weapons; it was the average person's means of participation in the war (Jones, 1989, p. 722). A strong visual expression of this idea is depicted the Treasury commissioned Donald Duck film, *The New Spirit*. After the somewhat humorous scene in which Donald fills out his tax declaration, animated stacks of gold coins (presumably tax receipts) resolve into smokestacks for factories turning out guns, ships, and planes, as the narrator exclaims, "Taxes to Beat the Axis!" The result was, as expressed by Mr. Alex F. Osborne of the advertising firm of Batten, Barton, Durstine & Osborne, a change in the "minds of the audience about paying taxes. Within a few minutes, people who had long since made up their minds that they were being mistreated in being made to pay income taxes, were made to feel that it is a pleasure and a privilege to pay the Government every penny they could make or borrow" (Congressional Record, 1942, p. 1095). Reportedly, the Treasury Department also produced songs about the income tax and distributed them around the country. Finally, another example is Eddie Cantor's monologue in his radio program: "We want all you Axis countries to know that we in America are busy right now making out our income taxes. We know this must frighten you, because it's these taxes that paid for the ships that brought our men to your shores this year and we'll continue to pay our taxes so that we can beat you, Mr. Hitler and so that we can beat you, Mr. Tojo, and you, Mr. Mussolini" (Jones, 1989, p. 723).

[10] The intensity of the "tax battle" was such that over 200 tax bills were abandoned or rejected between 1880 and 1907 (Delalande, 2011).

[11] The progressivity of the income tax in France in the twentieth century depends on three main factors: the *quotient familial*, the non-deduction of the previous year's income tax, and the general structure of tax brackets. My main focus here is on this last factor, and I refer the interested reader to Piketty (2001).

[12] In his *Exposé des Motifs*, Caillaux said "Taking account of the distribution of wealth in France, of the existing state of affairs, and of the customs and traditions of the French taxpayers, the Chamber and the Government have succeeded in avoiding everything that might compromise the success of the work that has been undertaken. We have, however, not been willing to content ourselves with a mere semblance of reform; and inasmuch as the predominance of indirect taxes in our actual system involves a decided disadvantage to the small taxpayer, and an upside-down progression of individual payments, we have endeavored to reestablish, as far as possible, the principle of proportioning every one's sacrifices to his income, and thus to restore an equilibrium that has for a long time been disturbed." (cited in Seligman (1914)).

A law voted in June 25, 1920 marked the second birth of the income tax in France and rose the top marginal income tax rate steeply from 2% to 50%. Interestingly, the law was adopted by the *Chambre bleu horizon*, one of the most right-wing *chambres* in the history of the French Republic, constituted by mostly right-wing *Bloc National* coalition members. In antebellum France, this coalition had vehemently opposed income taxation above 2%, shouting "*l'Allemagne paiera!*" ("Germany shall pay!") in its campaign slogan during the 1919 legislative elections (Piketty, 2001, 2014). However, the financial disaster created by World War I forced politicians to reconsider. Indeed, France had accumulated tremendously high levels of debt and faced the fiscal challenge of financing its reconstruction. This, coupled with skyrocketing inflation rates and a plummeting purchasing power – which triggered massive strikes that threatened to paralyze the country in May-June 1919 and again in the Spring of 1920 – led most to acknowledge the need for new tax sources, regardless of their political color. Thus, it was in this chaotic and explosive political context, equally influenced by the Bolshevik revolution, that the modern progressive income tax was born (Piketty, 2014).

The period between 1920 and 1926 was marked by significant variation in top marginal rates.[13] While acting within the general structure established by the 1920 Law regarding tax brackets and rates, each administration exploited the leeway left by this common framework following the chaotic evolution of public finances.[14] In 1923, the top rate was raised to 60%, and then 72% the following year by a majority center-right Senate. In 1926, Prime Minister Raymond Poincaré reduced the top rate to 30%, that is, the most significant reduction of tax rates in the history of income taxation in France.[15] The income tax was again reformed in December 1936 by the *Front Populaire*, an alliance of left-wing movements that re-established a system of average tax rates to better target income groups and reinforce the progressivity of the income tax. Notwithstanding these efforts, the income tax remained an elite tax in the social consciousness prior to World War II; it was built to affect only the richest "200 families" and it virtually exonerated the middle class from this tax. Indeed, the middle class paid a maximum of 1% of their income to income taxation, while said "200 families" paid almost one-third.[16] Furthermore, this limited conception of the income tax was left unquestioned by any government prior to the Second World War.

After the explosion of the Second World War, the Vichy regime reformed the income tax in 1942, reinforcing its progressivity by raising the top rate to 70% and drastically lowering

[13] Note, however, that the difference between *marginal* versus *average* income tax rates plays an important role in the history of income taxation in twentieth-century France. Marginal taxes were levied in 1919-1935 and without interruption after 1942, while average taxes were levied in 1917-1918 and 1936-1941. The switch from one system to another will play an important role in the political economy of income taxation in France (see Piketty, 2001, Chapters 4 and 5).

[14] A system of "unconventional" marginal tax rates characterized this period, in which 0/25ths of income below 6000 francs, 1/25ths of the share of income between 6000 and 20,000 francs, etc., and 25/25ths of the share of income above 550,000 francs, was taxed at a single rate (initially set to 50%). From a political standpoint, this drastically reduced governments' freedom of maneuver: taxation was progressive, but there was only one rate to be determined and it would affect all income groups in the same proportions. This did not dissuade governments from modifying the tax rate.

[15] However, the loss in revenues would be more than compensated by a large expansion of indirect taxes.

[16] For a discussion, see Piketty (2001), pp. 348-352.

the threshold for the top bracket from 1.33 million francs to 400,000 francs. However, the War's massive capital destruction had shrunk the incomes of the richest individuals in the income hierarchy. In response to this fractured importance of high incomes, the income tax was reformed to levy no longer exclusively the elite, but also the middle and upper middle classes.[17] Parallel to the seismic transformation occuring in other countries, including the United States, the income tax was thus progressively "democratized" and the top tax bracket "popularized". Indeed, the minimum income required to belong to the top bracket shrunk by 6 since 1919 and by 9 since 1936. While the top income tax rate affected incomes that were more than 200 times the average income (the top 0.01%) in the inter-war years; the top rate was applied to incomes only 6 times the size of the average income (respectively, the top 0.7%) by the end of the century (Piketty, 2001).

The share of individuals subject to the income tax grew significantly in the decades following the Second World War. While the tax schedule remained almost the same, the threshold after which tax was levied was left unchanged by authorities. This, coupled with nominal income growth, led to a sustained increased in the share of households contributing to the income tax: from 15-20% in the early 1950s, to 65% in 1970 (see Figure 3). This reinforced what had already begun since the end of World War II, that is, the deconcentration and massification of the income tax. Indeed, by the end of the twentieth century, the income tax in France largely affected the middle and upper middle classes, and no longer exclusively the ultra rich.[18]

## 2 Data

The main dependent variable is the top marginal personal income tax rate. The motivation for using the top rate is threefold: the need to make data collection feasible, the fact that it often provides a useful measure of progressivity, and the fact that it provides an inherently interesting picture of the societal consensus concerning the rate at which the richest citizens should be taxed.[19] Nevertheless, the use of top marginal rates for this sample of OECD countries raises several questions for the analysis. First, the possibility that tax avoidance and tax evasion render top statutory rates of income taxation meaningless. This is an important limitation of my study. A second question regards how many people pay and whether these taxes are really progressive. To answer this, I contrast the evolution of *top* and *bottom* marginal tax rates for countries where data is available, as well as the share of the population subject to the income tax. Finally, there is a risk of sample bias given the countries and time period chosen. Indeed, while my results may be relevant for a large sample of developed countries in the twentieth

[17] A reform in 1945 reinstated marginal tax rates.

[18] Notwithstanding, the income tax in France remained highly concentrated until the end of the twentieth century: the top 10% of households contributes 65-70% of total income tax revenue, whereas the bottom 90% represent only 3% (Piketty, 2001).

[19] The top marginal income tax rate generally applies to a small fraction of the population, i.e. the top 1% but sometimes fewer than the top 0.1%.

century, they may not apply for other regions in different periods. I leave this last question open for future research.

Table 1 presents summary statistics for data on income taxation, war mobilization, and universal suffrage for the countries included in this study. I compile series of top marginal rates for selected OECD countries from various sources. Most of them are related to recent literature that constructs top income shares time series over the long run using tax records.[20] When such data were not readily available, I constructed the historical series exploring national tax legislation and other government sources.[21]

Table 1: Summary Statistics

| Country | Income Tax Data Begins | War Mobilization | Universal Suffrage |
|---|---|---|---|
| Australia | 1909 | 1915–18, 1941–45 | 1901 |
| Austria | 1920 | 1915–18, 1939–45 | 1897 |
| Canada | 1920 | 1915–18, 1941–45 | 1921 |
| Denmark | 1903 | | 1918 |
| France | 1914 | 1914–20, 1940–41 | 1848 |
| Germany | 1900 | 1915–18, 1939–45 | 1871 |
| Ireland | 1923 | | 1922 |
| Italy | 1925 | 1915–18, 1935, 1940–43 | 1913 |
| Japan | 1886 | 1941–45 | 1925 |
| Korea | 1933 | 1953, 1965, 1967–68, 1970 | 1948 |
| Netherlands | 1940 | | 1918 |
| New Zealand | 1911 | 1915–18, 1941–45 | 1879 |
| Sweden | 1886 | | 1911 |
| Switzerland | 1917 | | 1848 |
| United Kingdom | 1909 | 1915–18, 1940–45 | 1918 |
| United States | 1913 | 1918, 1942–45, 1951–53 | 1965 |

To indicate whether a country engaged in mass warfare between 1900 and 2000, I use Scheve & Stasavage (2012)'s measure of *War Mobilization*. This is a dummy that is equal to 1 if in a particular year the country was engaged in an interstate war and a prespecified percentage (the main specification uses 2%) of the population was serving in the military. Defining this variable in this way captures the key characteristics necessary for conflict to have its hypothesized effect on top income taxation. As the authors argue, there must be a war fought in which the citizens who fight in the conflict sacrifice not only their time and livelihood but also risk their lives. It must also be a conflict that involves a significant proportion of the population. This procedure captures high-mobilization years during World War I and II, and the Korean War (but excludes the Vietnam War).[22] Finally, I take several measures of democracy from Scheve & Stasavage (2012), in particular, the existence of universal male suffrage and competitive elections.

Figure 1 presents the series of top marginal income tax rates in the twentieth century for selected OECD countries. The graphs reveal several striking patterns. First, with the income

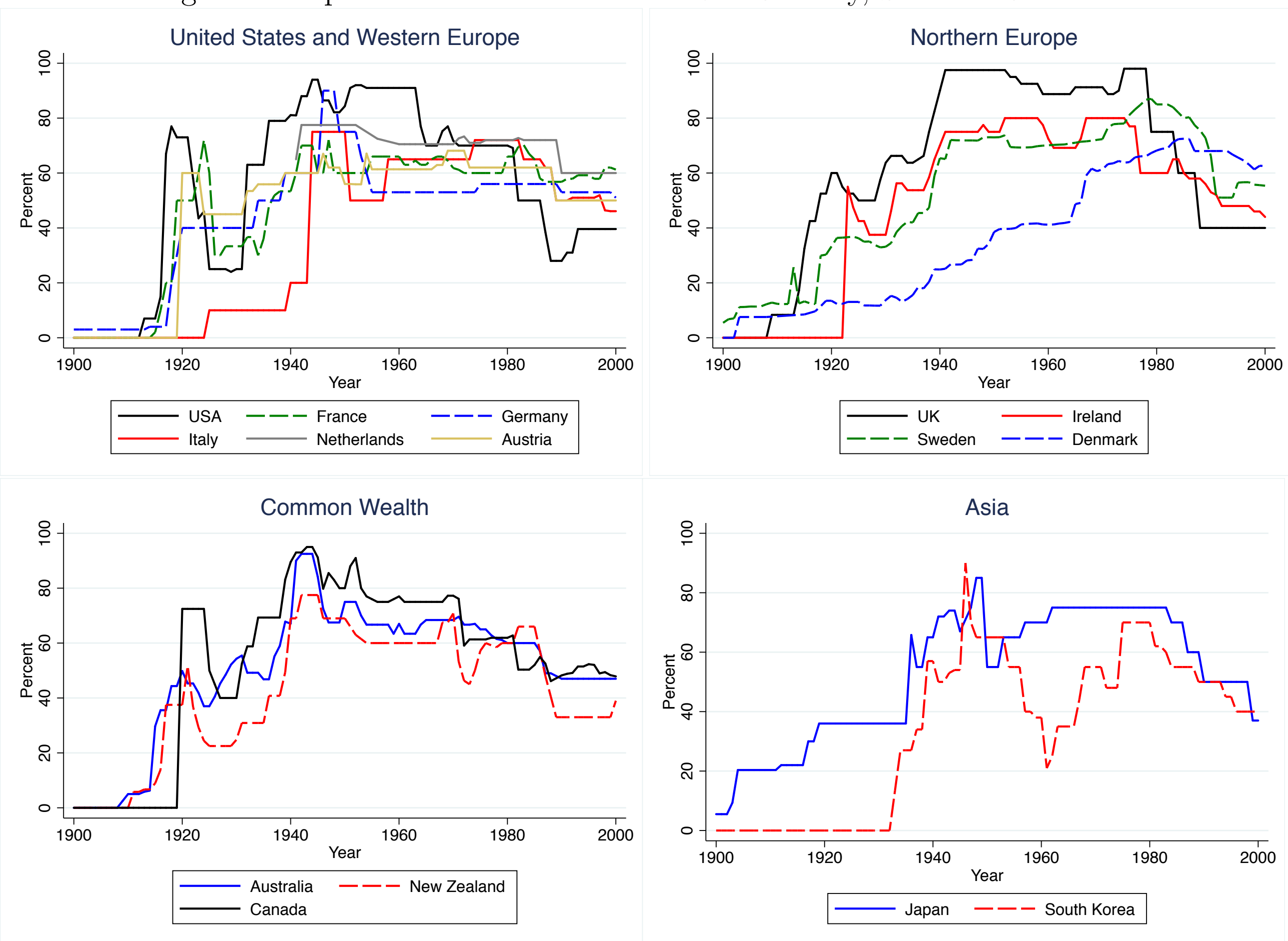
[20] See The World Top Income Database by Facundo Alvaredo, Tony Atkinson, Thomas Piketty, and Emmanuel Saez. The complete database is available online at http://topincomes.g-mond.parisschoolofeconomics.eu.

[21] Detailed information regarding the sources of data for each country is available in the Appendix.

[22] It should be noted that, like Scheve & Stasavage (2012), the focus of my work is on wars of mass mobilization – not wars in general. Indeed, the question of fairness would enter into the equation in the former, but not in the latter. Also, only interstate wars are considered, that is, civil wars are excluded from the analysis.

tax first appearing in some countries in the late-nineteenth and early-twentieth centuries, by 1910 most countries had adopted a system of income taxation. That is, the creation of the income tax –albeit its very low rates– often preceded World War I. Second, the twentieth century was marked by tremendous variation over time and across countries in the top marginal income tax rate. For instance, the United Kingdom raised its top rate from 8% in 1909, to suddenly 40% in the aftermath of the Great War. It then reached an unprecedented, record-high top rate of 98% in the 1940s and 1970s. Similarly, the United States raised its top rate from 15% to 67% 1917, and then 77% in 1918. Later, the Great Depression pushed President Roosevelt to raise the top income tax rate from 25% to 63% in 1933, and up to 79% in 1937. In 1942, the Victory Tax Act set the rate to 88%, and then 94% in 1944. The top rate stabilized around 90% until the 1960s, and then around 70% until the beginning of the 1980s. Albeit less extreme, Germany and Japan also had high postbellum top marginal tax rates, generally of around 50-70%. The only exception was after World War II, where the top income tax rate was raised to 85-90%, but this was period in which tax rates were determined by allied occupation authorities – in practice, American authorities (Piketty, 2014). Indeed, as soon as the countries regained their fiscal sovereignty, the top rates were lowered (see Figure A.1 in the Appendix).

Figure 1: Top Income Taxation in the 20th Century, Selected Countries




*Sources:* See Appendix B.

# 3 Methodology

This section describes the econometric models used to evaluate the effects of war mobilization on income taxation. Following Scheve & Stasavage (2012), I model the top marginal rate of the personal income tax as a function of a measure of war mobilization, a measure of democracy, country fixed effects that control for time-constant unobserved country-level heterogeneity, time-period effects that control for common shocks, and time-varying control variables.[23]

The first estimation strategy uses the following the fixed-effects model:[24]

$$T_{i,t} = \alpha + \beta_1 W_{i,t-1} + \beta_2 D_{i,t-1} + \gamma \mathbf{X_{i,t-1}} + \eta_i + \theta_t + \epsilon_{i,t} \tag{3.1}$$

where $i$ indexes each country and $t$ indexes the time period; $T_{i,t}$ is the top income tax rate; $W_{i,t}$ is a measure of participation in mass warfare; $D_{i,t}$ is a measure of democracy; $X_{i,t}$ is a vector of control variables (e.g. partisan control of the government and real GDP per capita);[25] $\eta_i$ are country fixed effects; $\theta_t$ are period fixed effects; and $\epsilon_{i,t}$ is the error term.[26] I present ordinary least squares (OLS) estimates of this model and report country-clustered standard errors to account for within-country correlations including serial autocorrelation in the data. The primary hypothesis is that mass mobilization for warfare causes the adoption of higher top marginal income tax rates ($\beta_1 > 0$). A secondary hypothesis is that increases in democracy (measured in different ways) raise income taxation ($\beta_2 > 0$), à la Meltzer & Richard (1981).

There are a number of endogeneity concerns in using this specification. First, it is possible that countries select into war participation partly following their beliefs about their ability to finance the war by taxing the rich. This would bias the estimates upwards and lead to an overestimation of the effect of war on income taxation. As argued in Scheve & Stasavage (2012), however, this potential selection issue is likely not to be present. First, many of the decisions countries make that lead them to be differentially exposed to mass warfare are long-term choices that remain fixed during the period of study. In particular, it is implausible that the timing of war exposure for the key conflicts in the data, such as World War I and II, was determined by expectations about the ease of taxing income. Skepticism about the importance of this potential source of bias is further bolstered by the fact that in critical cases,

[23] Unlike Scheve & Stasavage (2012), who the top marginal tax rate of the *first* year in the 5-year and 10-year specifications (e.g. 1940 tax rate in 1940-1945 and 1940-1950 periods), I use the *average* rate in the period. This reduces the sensitivity of my results to the year composition in the period groups.

[24] Note that the key to this fixed-effects estimation is the assumption that the unobserved country-level heterogeneity, $\eta_i$ appears without a time subscript in a linear model for $T_{i,t}$. Indeed, fixed-effects estimators are based on the presumption of time-invariant (or group-invariant) omitted variables. The model also assumes that the causal effect of war mobilization is additive and constant.

[25] I control for partisan control of the government and GDP per capita. I include lagged values of the variable *Left Executive* equal to 1 if the head of government is from a socialist or social democratic party and 0 otherwise in some specifications. The main source for the partisanship variable is Flora (1987). The inclusion of the variable real GDP per capita controls for the possibility that countries at different levels of development choose different levels of income taxation. The source for the real GDP per capita measure is Angus Maddison, *Historical Statistics of the World Economy*, http://www.ggdc.net/maddison/ (accessed March 20, 2014).

[26] One year and one country are omitted due to the constant.

such as World War I, none of the initial participants correctly anticipated the length of the conflict or the extent of mobilization necessary to fight the war. The second concern regards the plausibility of unobservables that would lead a country to both raise income tax rates and mobilize for war (adopt democratic institutions). Again, this would overestimate the effect of war (democracy) on income taxation. Finally, there exists the possibility of reverse causality, especially if non-democratic countries raise taxes to avoid having to democratize. This would lead to an underestimation of the effect of democracy on income taxation.

In addition, it may be that the assumption that the most important omitted variables are time-invariant will not seem plausible. That is, that past top marginal tax rate is a time-varying confounder that cannot be subsumed in a time-invariant variable like $\eta_i$. This motivates a second estimation strategy that controls for past top marginal income tax rate directly and dispenses with the country fixed effects:

$$T_{i,t} = \alpha + \rho T_{i,t-1} + \beta_1 W_{i,t-1} + \beta_2 D_{i,t-1} + \gamma \mathbf{X_{i,t-1}} + \theta_t + \epsilon_{i,t} \tag{3.2}$$

Unlike specification 3.1, this model adds the lagged dependent variable and deletes the country fixed effects.[27] I present the OLS estimates and report panel-corrected standard errors to account for country heterogeneity and cross-country correlations in the data.

Finally, it seems likely that the effect of mass war mobilization on the top marginal income tax rate is not immediate, rendering analyses based on annual frequencies problematic. I follow Scheve & Stasavage (2012) and I focus my analysis on specifications with observations spaced at 1, 5, and 10-year intervals, with particular focus on the results over 5-year intervals.

# 4 Results

## 4.1 The Emergence of Progressive Taxation is a Product of War

Figure 2 presents the evolution of the top marginal income tax rates of income for a selected sample of countries, and includes Scheve & Stasavage (2012)'s series for inheritance taxation for a comparison. Years that had a massive mobilization for war (in particular, where more than 2% of the population mobilized for war) are marked with grey vertical bars. Several patterns emerge from this figure. First, no country had high taxes on the rich before the advent of war, with top rate rarely exceeding 10%.[28] Second, the Wars created substantial income tax progressivity, with periods of mass war mobilization coinciding with significant rises in the top

[27] The country fixed effects are omitted because their inclusion in estimation 3.2 would render OLS estimates inconsistent, since $\Delta\epsilon_{i,t}$ is necessarily correlated with the lagged dependent variable, $\Delta T_{i,t-1}$.

[28] Exceptions include only Japan and Sweden, whose top income tax rates on the eve of the Great War were 22% and 12.3%, respectively. Note, however, that the changes in Japan's top rate coincide with the advent of other inter-state conflicts, namely the Russo-Japanese war in 1904, the First World War, and the Third Sino-Japanese War.

income tax rate.[29] Third, the effect is greater for income taxation than it is for inheritance taxation. As discussed before, this may be due to the fact that the income tax is a more visible tax, and it constitutes a potentially greater source of revenue for the state in wartime need.

Figure 2: War and Progressive Taxation in the 20th Century, Selected Countries

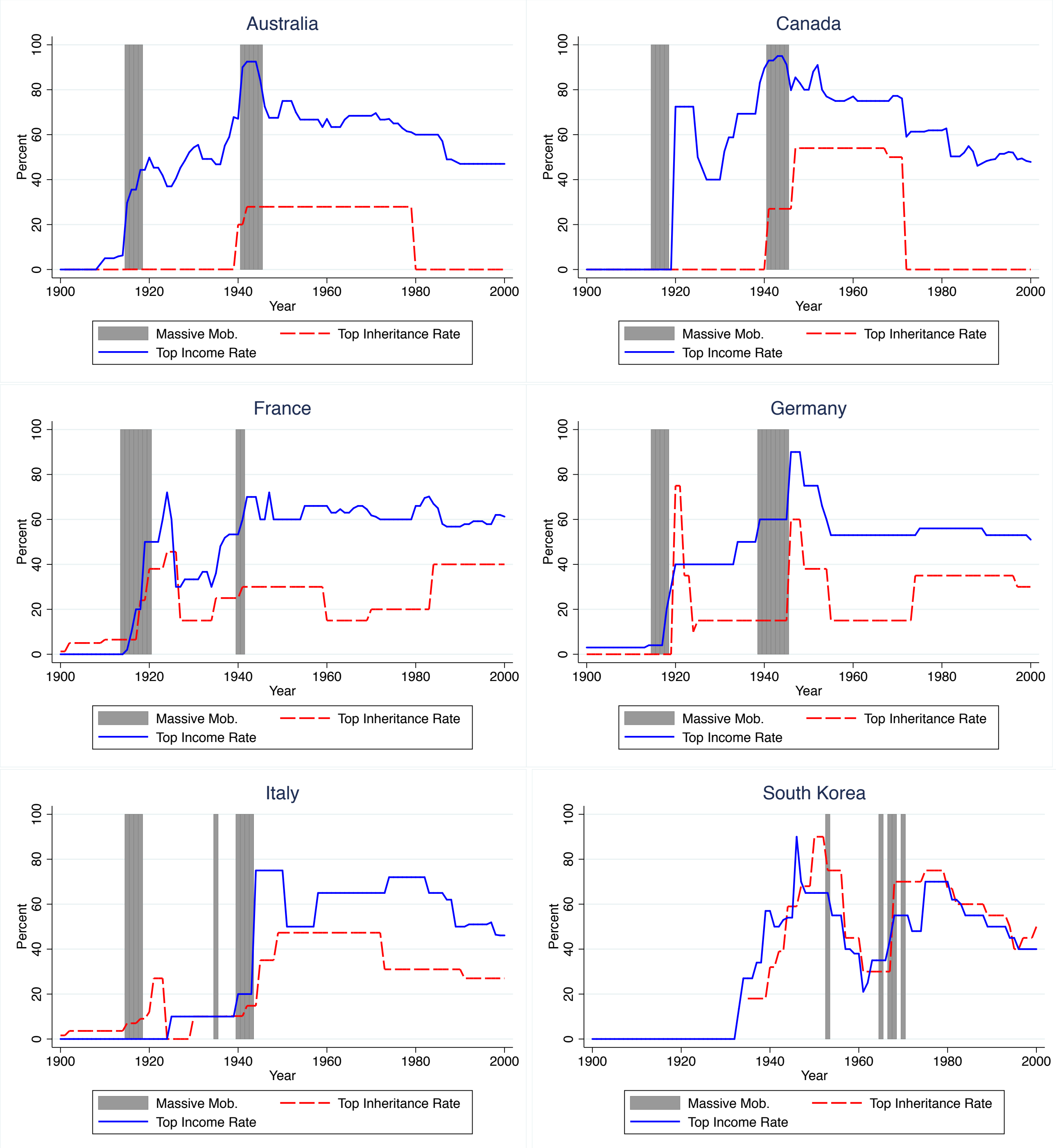
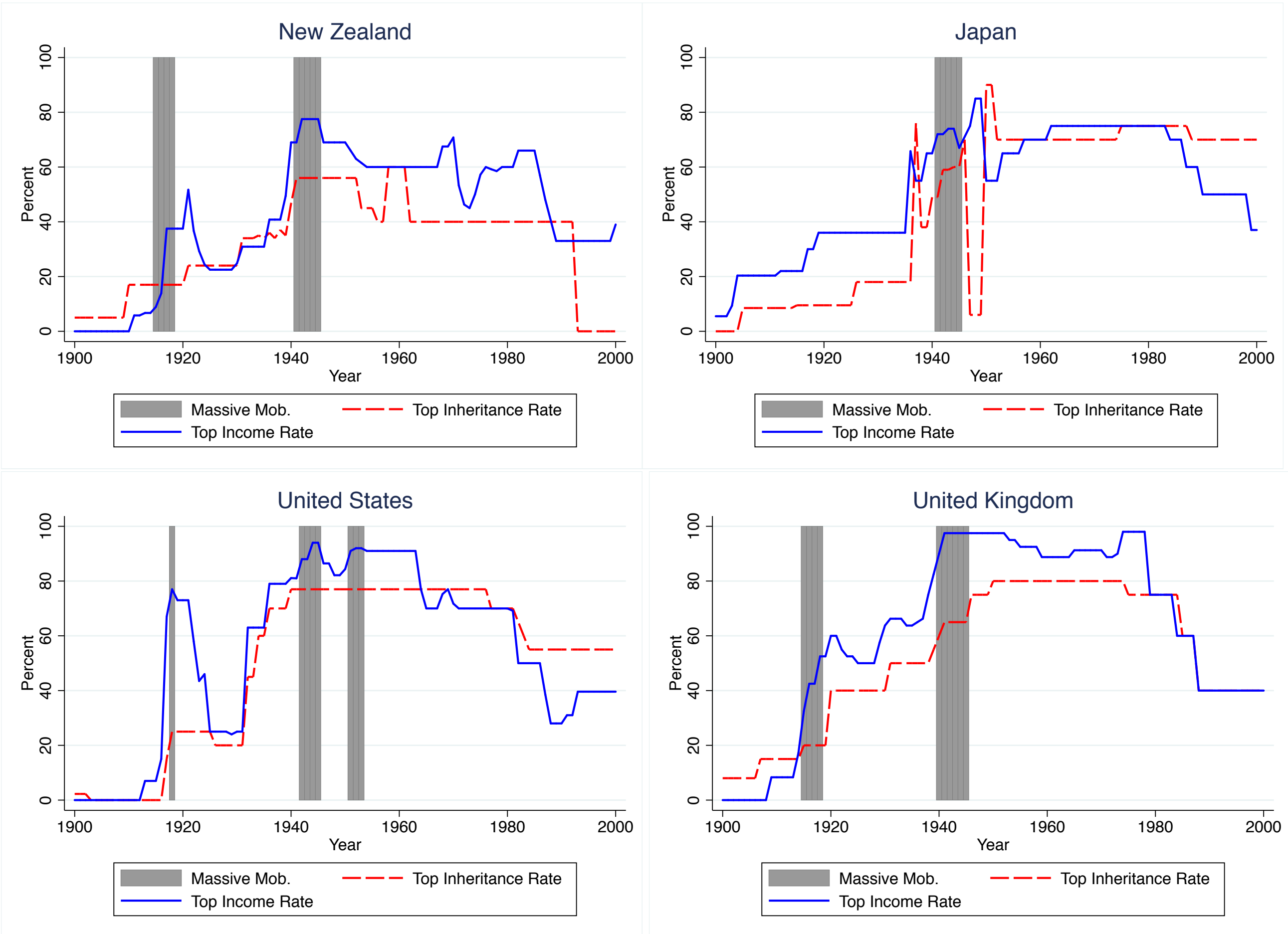



Table 2 presents the main results of my estimation strategy. The first three columns

[29] Note, however, that some Nordic countries like Denmark and Sweden are not included in Figure 2. Indeed, these countries did not experience wars of massive mobilization during the twentieth century. However, increases in their top marginal income and inheritance rates roughly coincide with World War II. Therefore, these countries' adoption of relatively high marginal income tax rates *circa* World War II and the late twentieth century suggests that war mobilization cannot have been the only path to progressive taxation for modern states. I devote the last part of this section to discuss these specific country cases.




*Sources:* See Appendix B.

report the results of the fixed-effects specifications, i.e. specification 3.1, for the 5-year panels. Column 1 excludes the time-varying control variables, while column 2 includes them. Column 3 includes country-specific time trends. Columns 4-6 report the results of the lagged dependent variable specifications, i.e. specification 3.2, for the 5-year panel. Column 4 excludes the time-varying control variables, while column 5 includes them. Column 6 includes country-specific time trends. Columns 7 and 8 report results for the 10-year interval panel for specifications 3.1 and 3.2, respectively. Columns 9 and 10 do the same for the annual panels.

The results from Table 2 suggest that democracy, measured as universal male suffrage, is not associated with increases in tax progressivity; the estimated coefficients are of the opposite sign and only significant in some specifications. Indeed, most countries in the sample had established universal male suffrage long before the turn of the twentieth century, without however establishing progressivity in the income tax schedule. In contrast, my estimates are consistent with a strong and statistically significant effect of mass mobilization for war on the top rate at the 1% level. The size and significance of the coefficients would suggest that a country that mobilized for mass war for an entire 5-year period increased its top income tax rate by 13.9 to 17.1 percentage points compared to a country that did not mobilize for war. The estimates for the 10-year and annual panels are quantitatively similar, and also significant. The coefficients using annual data are not as strongly significant, which suggests that the effect of war on tax progressivity is not necessarily immediate (a hypothesis that will be tested later in Table 3). Indeed, the political economy of tax reforms takes at least a year to fulfill, even in extraordinary situations such as mass war. Importantly, the fact that Table 2 finds broadly similar outcomes using the alternative identifying assumptions in the models discussed in Section 3 (i.e. specifications 3.1 and 3.2) serves to validate the robustness of my findings.[30] Governments at the left end of the political spectrum tend to raise progressivity in the tax schedule, but the coefficient is significant only in some cases. This finding is consistent with the notion of left governments being closer to equity and distributional concerns and implementing higher taxes on income. Finally, the level of real GDP per capita does not have an effect on tax progressivity; the coefficients are always zero and non-significant. In sum, the evidence presented in Table 2 suggests that war mobilization was a crucially important factor in the development of income tax progressivity in the twentieth century.

[30] Fixed effects and lagged dependent variable estimates have a useful bracketing property; the reader should thus interpret the fixed effects and lagged dependent variable results as bounding the causal effect of interest (see Angrist & Pischke (2009), pp. 182–184).

Table 2: War Mobilization, Universal Suffrage, and Income Taxation, 1900-2000

| | Dependent variable: $TopRate_t$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 5-year data | | | | | | 10-year data | | Annual data | |
| | Country FE | | | Lag DV | | | Country FE | Lag DV | Country FE | Lag DV |
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** | **(7)** | **(8)** | **(9)** | **(10)** |
| $TopRate_{t-1}$ | | | | 0.828 | 0.823 | 0.731 | | 0.812 | | 0.944 |
| | | | | (0.025)*** | (0.024)*** | (0.039)*** | | (0.047)*** | | (0.006)*** |
| $War_{t-1}$ | 17.042 | 17.052 | 16.316 | 13.922 | 14.391 | 15.485 | 15.366 | 11.963 | 0.864 | -1.059 |
| | (6.418)** | (6.325)** | (5.480)*** | (2.342)*** | (2.384)*** | (2.357)*** | (8.453)* | (7.173)* | (3.615) | (0.552)* |
| $UniSuff_{t-1}$ | -8.085 | -8.063 | -11.467 | -3.582 | -4.296 | -5.562 | -6.654 | -3.681 | -10.430 | -1.367 |
| | (6.438) | (6.251) | (9.902) | (1.502)** | (1.402)*** | (1.541)*** | (11.629) | (2.250) | (9.819) | (0.403)*** |
| $LeftExec_{t-1}$ | | 1.120 | -0.264 | | 2.713 | 1.049 | 0.805 | 4.701 | 0.183 | 0.587 |
| | | (3.508) | (4.045) | | (1.000)*** | (1.136) | (5.441) | (2.125)** | (2.344) | (0.214)*** |
| $GDPpc_{t-1}$ | | -0.000 | -0.001 | | -0.000 | 0.000 | -0.001 | -0.000 | -0.000 | -0.000 |
| | | (0.001) | (0.001) | | (0.000) | (0.000) | (0.001) | (0.000) | (0.001) | (0.000) |
| Period FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country time trends | No | No | Yes | No | No | Yes | Yes | No | Yes | No |
| Country FE | Yes | Yes | Yes | No | No | No | Yes | No | Yes | No |
| $R^2$ | 0.816 | 0.816 | 0.860 | 0.883 | 0.885 | 0.890 | 0.864 | 0.846 | 0.846 | 0.960 |
| $N$ | 296 | 296 | 296 | 292 | 292 | 292 | 151 | 149 | 1451 | 1442 |

*Notes:* The table reports the results of pooled cross sectional OLS regressions of the variable *Top Rate* on *War Mobilization* lagged one period and *Universal Suffrage* lagged one period. The specifications in columns 1-3, 7, and 9 include country fixed effects and report robust standard errors clustered by country in parentheses. The specifications in columns 4-6, 8, and 10 include a lagged dependent variable and report panel-corrected standard errors in parentheses. Specifications in columns 2, 3, and 5-10 include control variables for lagged partisan control of government and lagged real GDP per capita. All specifications include period fixed effects.
* denotes significant at the 10% level, ** denotes significant at the 5% level, and *** denotes significant at the 1% level.

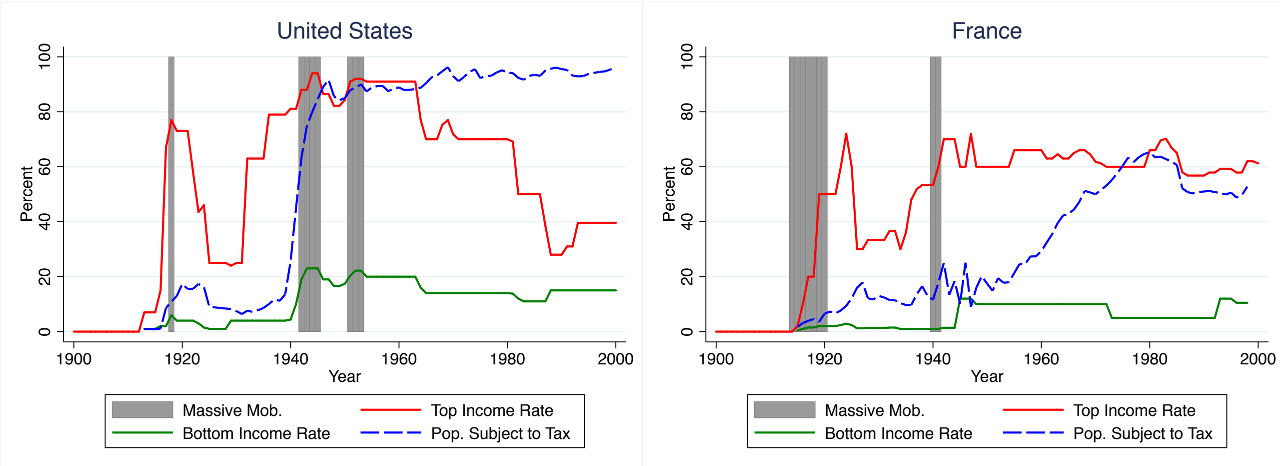
I have posited that support for tax reform is most likely to exist when there is a clear argument that it is fair to tax the rich more heavily than others, as this would correct for some preexisting unfairness involving the way that incomes have been earned or the way in which the non-rich have been obliged to contribute disproportionately to fighting in the battlefield. My results from Table 2 strongly suggest that top income taxation did rise during periods of war. However, it is important to address the following question: were the rich taxed disproportionately relative to others? In other words, are my results simply reflecting a general tax increase in war participants, rather than an increase in tax progressivity in these countries?

To explore this question, I use two alternative measures of income taxation among the non-rich. The first is the bottom marginal income tax rate, which applies to those closer to the left side of the distribution. This, of course, ignores the possibility that a large share of those at the left side of the distribution may be excluded from the income tax, either by being exempted from the tax or by being levied at a rate of zero. For this reason, the second measure is the share of the population subject to the income tax.[31] Figure 3 presents this comparison for the United States and France in 1900–2000. Figure 3 suggests that, while countries increased both the

[31] In the United States, this is proxied by the share of individuals filing income taxes. Admittedly, this is a very gross measure of the share of the population subject to the income tax. First, because filing a tax return does not systematically imply paying taxes. Indeed, while over 90% of Americans file income tax returns, roughly half of them do not pay income taxes. Second, because individuals that are not required to file income tax returns may still be levied via the withholding tax. In spite of this, the advantage of using this measure is that it is available for a number of countries and that it reveals the extent of the transformation that the income tax underwent in World War II.

top and bottom statutory income tax rates during the Wars, they generally increased rates on higher incomes by larger amounts – that is, an increase in progressivity. A second observation is that World War I raised the top marginal income tax rate substantially more than the bottom rate, while the share of individuals subject to the income tax was left unaffected. In contrast, the events of 1940–1945 triggered an explosion of the population subject to the tax. This phenomenon is not limited to the cases of the United States and France. Indeed, in most developed countries, while the income tax initially targeted the top 1–2% of the population, it was gradually extended to the entire population (or at least 50–60%). This massification of the income tax raised tax revenues and gave rise to the modern fiscal state.

Figure 3: Progressive Income Taxation in US and France, 1900-2000




*Sources:* See Appendix B.

For the sake of completeness, the rest of this section discusses the cases of the peaceful reformers, that is, the countries that developed progressive taxation in the absence of war.[32] In particular, the cases of Sweden and Denmark stand out as illustrative examples of such countries. Revealingly, however, the extent to which the top income tax rate was raised differs substantially between the two; while Sweden experienced a relatively sharp break, tax progressivity was established in a steady and moderate fashion in the case of Denmark (see Figure A.2 in the Appendix). I suggest that this difference illustrates the contrasting approaches with which the countries faced the threat of war. Indeed, even if Sweden never officially participated in the Wars, its anticipation of engaging in mass mobilization led it to raise tax progressivity in a similar fashion to its battling counterparts.

In Sweden, the trend of low marginal tax rates since the establishment of the new state income tax in 1903 was abruptly brought to a halt by the defense tax of 1914. This defense tax raised the top marginal income tax rate from 12.3% to 25.7% (it was paid in 1915, 1916, and 1917), and later to 29.9% in 1918. The supposedly temporary tax increase was rendered

[32] This is the case of Denmark, Ireland, Netherlands, Sweden, and Switzerland, which did not experience massive mobilization for war in the twentieth century.

permanent in the reform of 1928.[33] Further, on the eve of the Second World War, another supposedly temporary defense tax (*värnskatter*) was levied. This was a highly progressive income tax that was levied on most taxpayers between 1939 and 1947. Similar to the reasoning behind the defense tax of World War I, its revenue was purportedly earmarked to rearm the military and strengthen the Swedish defense capacity. Indeed, the rise of military expenditures during this period (see Figure A.2 in the Appendix) further supports the idea that incentives to levy progressive tax rates were considered in light of the likelihood of future conflict. Moreover, due to rising military tensions throughout the world at that time, little debate or criticism of the 1939 tax reform arose; in fact, it was almost a unanimous political decision (DuRietz *et al.* , 2014). Later, the rise in tax rates that had been a product of World War II was made permanent for many taxpayers by the tax reform of 1948.[34] Indeed, the acceptance of higher taxes on the rich stood strong upon the conclusion of war.

In contrast, Denmark implemented very moderate and steady increases in tax progressivity until the 1960s (see Figures 1 and A.2 in the Appendix). During the First World War, the Danish government largely expected that the war would be short and was slow to adopt measures such as permanent tax increases (Atkinson & Soogard, 2013). Later, during its occupation by Nazi Germany in the Second World War, the tax rate barely increased.[35] Thus, Denmark's adoption of relatively high marginal income tax rates well after the conclusion of World War II suggests that war mobilization was not the only path to progressive taxation for modern states in the twentieth century.

## 4.2 The Persistent Effect of War on Progressive Taxation

After a war's conclusion, there is no reason to expect that the debate over progressive taxation should immediately shift back to where it stood before the war's outbreak, as long as the issue of repaying war debt remains politically salient. First, since wars impose new and continuing obligations of governments (e.g., payments of war pensions, debt interest, reparation payments), the question of who should pay for a war often persists for some time as the debate shifts to collection of revenues for settling such war debts (Peacock & Wiseman, 1961). Second, those who return from fighting a war may feel a new sense of entitlement, and this may influence their political behavior whether in the form of voting or street protests (Scheve & Stasavage, 2012). Third, radical institutional and ideological shifts in the levels of the tax burden deemed tolerable may have taken place in wartime, and will only sluggishly return to their pre-war level (if at all). The last reason is simple status quo bias: once the immediate issue of war finance is settled, high tax rates on the rich become a new status quo and, in the absence of a very

[33] Notwithstanding, the conception of the income tax remained limited: until 1920, about 98% of all individuals with taxable income paid the lowest marginal state tax rate or were virtually exempted from it (DuRietz *et al.* , 2014, p. 173).

[34] In the following decades, high inflation and high wage increases resulted in a sharp rise in the marginal income tax rate for many taxpayers in Sweden.

[35] It should be noted that, during its occupation by Nazi Germany, Denmark was able to maintain its own government with a high level of autonomy over internal affairs until 1943 (Atkinson & Soogard, 2013).

penalizing reversion outcome associated with their maintenance, we can expect them to endure for some time (Scheve & Stasavage, 2012).

To understand the degree of persistence of war mobilization on progressive taxation, Table 3 re-estimates specification 3.2 using annual data while varying the lagged variable for war mobilization.[36] The results suggest that the effect of war on the top marginal income tax rate persists after five years: coefficients in columns 2–5 are positive and strongly significant. Moreover, including lagged values of war mobilization for years 1–5 and testing $H_0 : W_{t-1} = W_{t-2} = W_{t-3} = W_{t-4} = W_{t-5} = 0$ leads to a rejection of the null hypothesis for joint non-significance. Furthermore, testing $H_0 : W_{t-1} + W_{t-2} + W_{t-3} + W_{t-4} + W_{t-5} \leq 0$ against $H_A : W_{t-1} + W_{t-2} + W_{t-3} + W_{t-4} + W_{t-5} > 0$ leads to a rejection of the null hypothesis at the 1% level. That is, war has a persistent and positive effect on progressive income taxation.

Table 3: Testing the Persistence of War Mobilization on Progressive Income Taxation

| | *Dependent variable: $TopRate_t$* | | | | |
|---|---|---|---|---|---|
| | Annual data | | | | |
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
| $TopRate_{t-1}$ | 0.944<br>(0.006)*** | 0.949<br>(0.006)*** | 0.948<br>(0.006)*** | 0.948<br>(0.006)*** | 0.947<br>(0.006)*** |
| $War_{t-1}$ | -1.059<br>(0.552)* | | | | |
| $War_{t-2}$ | | 1.239<br>(0.546)** | | | |
| $War_{t-3}$ | | | 2.591<br>(0.538)*** | | |
| $War_{t-4}$ | | | | 1.942<br>(0.544)*** | |
| $War_{t-5}$ | | | | | 2.371<br>(0.543)*** |
| $UniSuffrage_{t-1}$ | -1.367<br>(0.403)*** | -1.130<br>(0.412)*** | -1.371<br>(0.422)*** | -1.379<br>(0.433)*** | -1.380<br>(0.442)*** |
| $LeftExec_{t-1}$ | 0.587<br>(0.214)*** | 0.669<br>(0.213)*** | 0.675<br>(0.213)*** | 0.656<br>(0.214)*** | 0.663<br>(0.214)*** |
| $GDPpc_{t-1}$ | -0.000<br>(0.000) | -0.000<br>(0.000) | -0.000<br>(0.000) | -0.000<br>(0.000) | -0.000<br>(0.000) |
| Period FE | Yes | Yes | Yes | Yes | Yes |
| Country time trends | No | No | No | No | No |
| Country FE | No | No | No | No | No |
| R2 | 0.960 | 0.963 | 0.963 | 0.961 | 0.960 |
| N | 1442 | 1428 | 1414 | 1400 | 1387 |

*Notes:* * denotes significant at the 10% level, ** denotes significant at the 5% level, and *** denotes significant at the 1% level.

[36] Specifically, Column 1 presents the same regression as Column 10 in Table 2, while columns 2–5 include different lagged values of war mobilization separately. Variables for war mobilization at $t-6, t-7, \ldots$ are non-significant, and therefore not reported here.

It is difficult to say what would have happened to progressive income taxation without the brutal shocks of the First and Second World Wars. It is very likely the case that the establishment of progressive taxation would have taken a much slower course (if at all) in the absence of the imperatives of national defense (Piketty, 2014). Indeed, before the Great War, a top tax rate deemed "reasonable" by today's developed countries would rarely be above 10%, regardless of the level of income. In contrast, the Wars gave birth to the progressive income tax, with substantially higher top tax rates. Indeed, the unprecedented turn geared by the Great War toward a system of steeply graduated taxes fundamentally altered the distribution of economic obligations, the meaning of fiscal citizenship, and the burgeoning powers of the administrative state (Mehrotra, 2013). Later, World War II established mass taxation and further reinforced progressivity in the tax schedule, while structures and messages that made it seem routine and bearable were partly responsible for the permanence of the income tax as a mass and progressive tax. In France, the lowering of the income threshold for the top tax bracket after World War II had a striking symbolic meaning, giving new taxpayers social representativeness via a shift in the messages sent by parties and an alteration in opinion of the electorate. By ceasing to stigmatize the astronomical incomes of ultra-rich taxpayers and replacing them with high, "reasonable" incomes, the legislature did not simply record changes in the structure of real income; it also helped to express and sustain a new way of perceiving and representing inequality (Piketty, 2001).[37]

My results from Table 3 suggest that progressive income taxation was not immediately rolled back upon the conclusion of war. On the contrary, once these changes in the tax structure had been institutionalized (e.g., high rates on top incomes, withholding taxes, a large majority of residents subject to the tax), they became the foundation for new 'ideas' after the war. Indeed, by the late 1940s, there was a widespread consensus among policy elites and voters that the state now had a meaningful and appropriate role in managing the capitalist economy (Steinmo, 2003). As the income tax ratio (revenue as percentage of GDP) continued rising over the second half of the twentieth century, the income tax became an engine for a greatly expanded government in the developed world.[38]

This widespread expansion of government activity and taxation is one of the most impressive economic facts observed over the last century.[39] My findings in Table 3 offer supportive empirical evidence to "ratchet effect" theories of long-run government growth. Such theories argue that large-scale social disturbances, like major wars, reduce the gaps between ideas about desirable public spending and the limits of taxation. Wars thus create a 'displacement effect', shifting public revenues and expenditures to new, and usually higher, levels (Peacock & Wise-

[37] This symbolic dimension of tax rates has also played a large role in policy debates. In 1936, the exhibition of the richest "200 families" triggered a debate on inequality and redistributive policies, and it would be frequently used by politicians and political movements of the time to argue in favor of tax reforms. For instance, the communist party in France would use such tax statistics to calculate how much income could be collected by taxing the rich (Piketty, 2001).

[38] See Figure A.3 in the Appendix for an illustration of the rise of the income tax as a share of GDP in the twentieth century in selected OECD countries.

[39] A number of theories have been put forward to explain this long-run growth of government. See e.g. Kleven *et al.* (2009) for a brief review.

man, 1961). Formerly unacceptable revenue-raising methods are tolerated in wartime and, upon the conclusion of war, this higher tax tolerance persists. This enables the government to implement expenditure programs that it desired but was hitherto unable to finance, and a new, higher plateau of expenditure is reached. My findings are also in line with Besley & Persson (2010)'s theory of how governments invest in fiscal capacity (e.g., tax withholding) over time in response to wars.

Notwithstanding, the last decades of the past century and the first years of the new millennium experienced a stark change in progressive income taxation, with most developed countries markedly reducing their top income tax rates.[40] This has strongly coincided with a sustained increase in the share of total income share captured by the top 1%, especially in the United States and the United Kingdom (Atkinson *et al.* , 2011). In the absence of a radical shock, it seems likely that the actual equilibrium will continue long enough (Piketty, 2014). In this context of rising income inequality, the issue progressive income taxation represents an exciting subject of contemporary public and academic debate.

# 5 Robustness checks

It may be the case that my measure of democracy, universal male suffrage, is not adequately capturing the potential effect that democracy may have on progressive taxation. Following Scheve & Stasavage (2012), Table 4 re-estimates specifications 3.1 and 3.2 while employing an alternative measure of democracy, namely, the presence of a competitive election. The results suggest that, while the presence of a competitive election is positive for all specifications, it is not always significant – specifically, it is significant only for the lagged dependent variable model using 5- and 10-year data. In contrast, the size and significance of the war mobilization dummy remains the same as in Table 2. These results bolster support for the argument that it was war, not democracy, that triggered progressive income taxation.

[40] Many theories have been advanced to explain the fall in top income tax rates. In particular, Piketty *et al.* (2014) argue that CEO remuneration, both pecuniary (e.g. wages, bonuses) and in-kind (e.g. private jets, luxurious offices), has exploded during this period, and that the exceptionally large reduction in the top income tax rates in the United States and the United Kingdom have completely transformed CEO formation and remuneration negotiation. Indeed, the lower tax rates since the 1980s have increased the political power of the rich, with CEOs devoting considerable efforts into lobbying for higher remuneration and lower taxation, for instance, by financing political parties, advocacy groups, and think-tanks. The authors argue that the only way put an end to this soaring CEO remuneration and limit this "economically useless" behavior would be to impose "dissuasive" tax rates, as high as those applied during the 1970s.

Table 4: War Mobilization, Competitive Elections, and Income Taxation, 1900-2000

| | Dependent variable: $TopRate_t$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 5-year data | | | | | | 10-year data | | Annual data | |
| | Country FE | | | Lag DV | | | Country FE | Lag DV | Country FE | Lag DV |
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** | **(7)** | **(8)** | **(9)** | **(10)** |
| $TopRate_{t-1}$ | | | | 0.829 | 0.823 | 0.740 | | 0.807 | | 0.947 |
| | | | | (0.025)*** | (0.025)*** | (0.041)*** | | (0.049)*** | | (0.006)*** |
| $War_{t-1}$ | 20.150 | 20.550 | 19.440 | 15.215 | 15.894 | 17.035 | 19.134 | 13.399 | 2.074 | -1.033 |
| | (5.502)*** | (5.650)*** | (5.650)*** | (2.364)*** | (2.361)*** | (2.362)*** | (9.200)* | (7.475)* | (3.280) | (0.571)* |
| $CompElect_{t-1}$ | 9.584 | 9.592 | 7.887 | 2.970 | 3.807 | 4.169 | 9.034 | 4.118 | 5.008 | 0.340 |
| | (5.444)* | (5.407)* | (6.442) | (1.188)** | (1.241)*** | (1.281)*** | (6.222) | (2.092)** | (5.059) | (0.350) |
| $LeftExec_{t-1}$ | | 0.537 | -1.691 | | 1.806 | 0.603 | -0.676 | 3.660 | -0.447 | 0.436 |
| | | (3.677) | (4.723) | | (1.021)* | (1.158) | (6.727) | (2.168)* | (2.548) | (0.216)** |
| $GDPpc_{t-1}$ | | -0.000 | -0.001 | | -0.000 | 0.000 | -0.001 | -0.000 | -0.000 | -0.000 |
| | | (0.001) | (0.001) | | (0.000) | (0.000) | (0.001) | (0.000) | (0.001) | (0.000) |
| Period FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country time trends | No | No | Yes | No | No | Yes | Yes | No | Yes | No |
| Country FE | Yes | Yes | Yes | No | No | No | Yes | No | Yes | No |
| $R^2$ | 0.819 | 0.819 | 0.857 | 0.883 | 0.884 | 0.889 | 0.866 | 0.847 | 0.843 | 0.960 |
| $N$ | 296 | 296 | 296 | 292 | 292 | 292 | 151 | 149 | 1451 | 1442 |

*Notes:* The table reports the results of pooled cross sectional OLS regressions of the variable *Top Rate* on *War Mobilization* lagged one period and *Competitive elections* lagged one period. The specifications in columns 1-3, 7, and 9 include country fixed effects and report robust standard errors clustered by country in parentheses. The specifications in columns 4-6, 8, and 10 include a lagged dependent variable and report panel-corrected standard errors in parentheses. Specifications in columns 2, 3, and 5-10 include control variables for lagged partisan control of government and lagged real GDP per capita. All specifications include period fixed effects.
* denotes significant at the 10% level, ** denotes significant at the 5% level, and *** denotes significant at the 1% level.

An alternative interpretation of the effect of war on taxation is that wars are expensive affairs that must be financed, and that taxation is a way to do this. A way to test this alternative hypothesis is to augment my main model with a variable representing total military spending. Indeed, if the effect of war on taxation were primarily due to the need for revenue, then I would expect the coefficient for war to be substantially attenuated once I control for military spending. Table 5 presents the results of this specification, including military spending as a control variable. The coefficient for military expenditures is close to zero and non-significant across specifications (except under the lagged dependent variable model using competitive elections as a proxy for democracy, i.e. column 4, where it is significant at the 10% level), while the size and significance of the variable for war mobilization remains very similar to those presented in Tables 2 and 4. Together, these findings suggest that the effect of war on taxation was not driven by the need to collect additional revenue, but rather that wars of mass mobilization create political conditions conducive to progressive income taxation to restore equality of sacrifice.

Table 5: War Mobilization, Democracy, and Income Taxation, 1900-2000: Conditioning on Military Expenditures

| | Dependent variable: $TopRate_t$ | | | |
|---|---|---|---|---|
| | 5-year data | | | |
| | Country FE | | Lag DV | |
| | **(1)** | **(2)** | **(3)** | **(4)** |
| $TopRate_{t-1}$ | | | 0.857 | 0.848 |
| | | | (0.013)*** | (0.014)*** |
| $War_{t-1}$ | 14.206 | 16.452 | 10.434 | 11.557 |
| | (5.953)** | (6.111)** | (1.445)*** | (1.697)*** |
| $MilitaryExpenditures_{t-1}$ | 0.033 | 0.048 | -0.005 | 0.009 |
| | (0.032) | (0.031) | (0.008) | (0.005)* |
| $UniversalSuffrage_{t-1}$ | -15.484 | | -3.381 | |
| | (9.926) | | (1.044)*** | |
| $CompElections_{t-1}$ | | 11.236 | | 3.789 |
| | | (6.395)* | | (1.246)*** |
| $LeftExecutive_{t-1}$ | 0.896 | -0.967 | 1.630 | 1.329 |
| | (4.216) | (5.027) | (0.596)*** | (0.611)** |
| $GDPperCap_{t-1}$ | -0.001 | -0.001 | -0.000 | -0.000 |
| | (0.001) | (0.001) | (0.000) | (0.000)** |
| Period FE | Yes | Yes | Yes | Yes |
| Country time trends | Yes | Yes | No | No |
| Country FE | Yes | Yes | No | No |
| $R^2$ | 0.872 | 0.865 | 0.897 | 0.897 |
| $N$ | 269 | 269 | 265 | 265 |

*Notes:* The table reports the results of pooled cross sectional OLS regressions of the variable *Top Rate* on *War Mobilization* lagged one period and *Competitive elections* lagged one period. The specifications in columns 1 and 2 include country fixed effects and report robust standard errors clustered by country in parentheses. The specifications in columns 3 and 4 include a lagged dependent variable and report panel-corrected standard errors in parentheses. All specifications include control variables for lagged partisan control of government and lagged real GDP per capita, as well as period fixed effects.
* denotes significant at the 10% level, ** denotes significant at the 5% level, and *** denotes significant at the 1% level.

# 6 Conclusion

The emergence of progressive income taxation in the twentieth century is a product of the Wars and not of democracy. High taxes on the rich did not exist prior to the advent of war, with the Wars giving birth to progressive tax systems. Indeed, while universal male suffrage has no statistically significant effect on tax progressivity (and when significant, it is of the opposite sign), countries that mobilized for war raised their top marginal income tax rates substantially. My results extend Scheve & Stasavage (2012)'s findings on war and inheritance taxation for the case of the income tax, arguably a more visible and politically salient tax. In other words, changes in income tax rates over the last century across OECD countries were the product of war, and not of macroeconomic conditions nor democratic efforts to cap income inequality.

While the development of the modern state occurs gradually over time, war constitutes an impetus that serves to telescope that process. Wars were thus the pivot upon which the fiscal revolution of progressive taxation turned. It also gave new meaning to the idea of shared sacrifice while irreversibly expanding administrative capacities. Policy debates in the United States and France during the First and Second World Wars document the extent to which wartime conditions created political pressures for the adoption of high top rates of income taxation in an effort to restore equality of sacrifice. Importantly, the uniqueness of wartime increases in income tax rates in the twentieth century lies in its resonance with politicians across the political spectrum. This phenomenon was observed in most OECD countries that mobilized for war during this period. Importantly, progressive income taxes were not rolled back upon the conclusion of war. On the contrary, the income tax ratio continued rising in later half of the twentieth century, with income taxation playing an essential role in the development of the modern state.

Finally, it is difficult to say what would have happened to progressive taxation without the shocks of the First and Second World Wars. It is very likely the case that the emergence of progressive taxation would have taken a much slower course in the absence of the imperatives of national defense. However, my findings suggest that precisely because the rise of progressive income taxes was a product of war, it was not an inevitable development. Thus, my explanation for the causes that led to high taxation of the rich in the twentieth century is not meant to be exhaustive, nor does it pretend to be applicable across countries and time periods. Indeed, the existence of peaceful reformers like Sweden and Denmark suggests that war mobilization was not the only path to progressive taxation for modern states. It was, however, a crucially important one.

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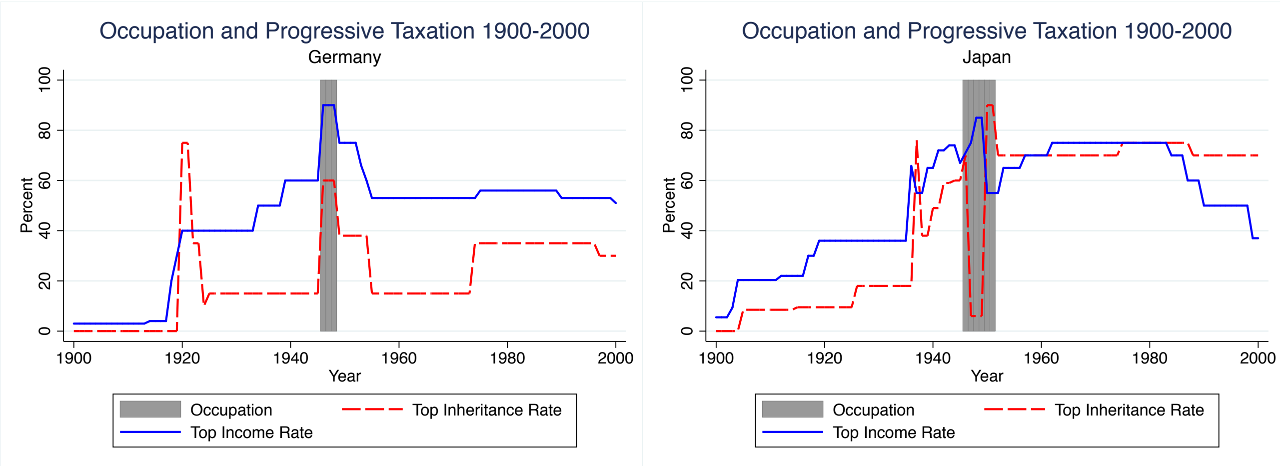
# Appendices

## A Additional Robustness Checks

### A.1 Progressive Income Taxation in Occupied Germany and Japan

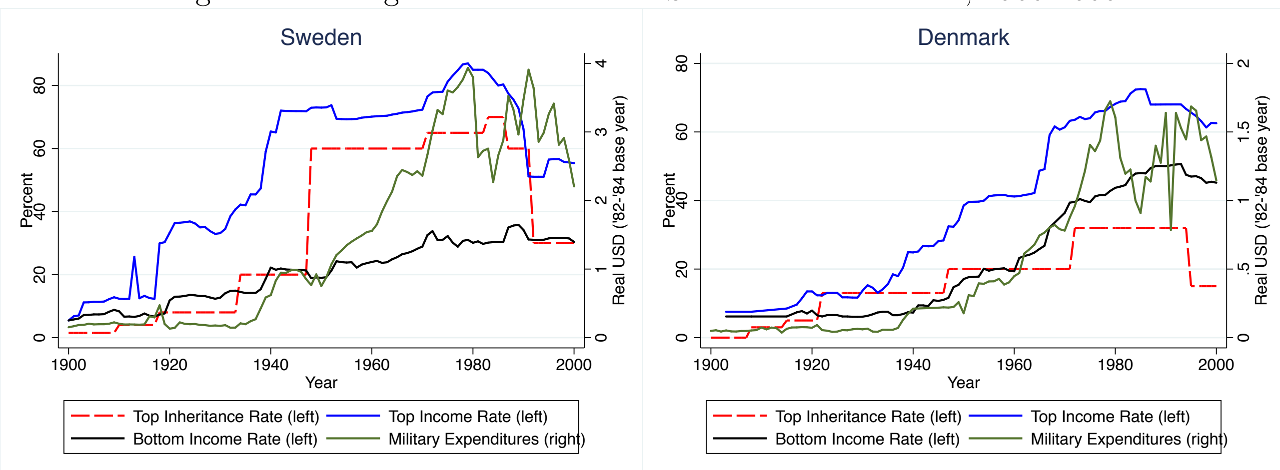
Figure A.1: Progressive Income Taxation in Occupied Germany and Japan




*Sources:* See Appendix B.

### A.2 Progressive Income Taxation in Sweden and Denmark

Figure A.2: Progressive Taxation in Sweden and Denmark, 1900-2000

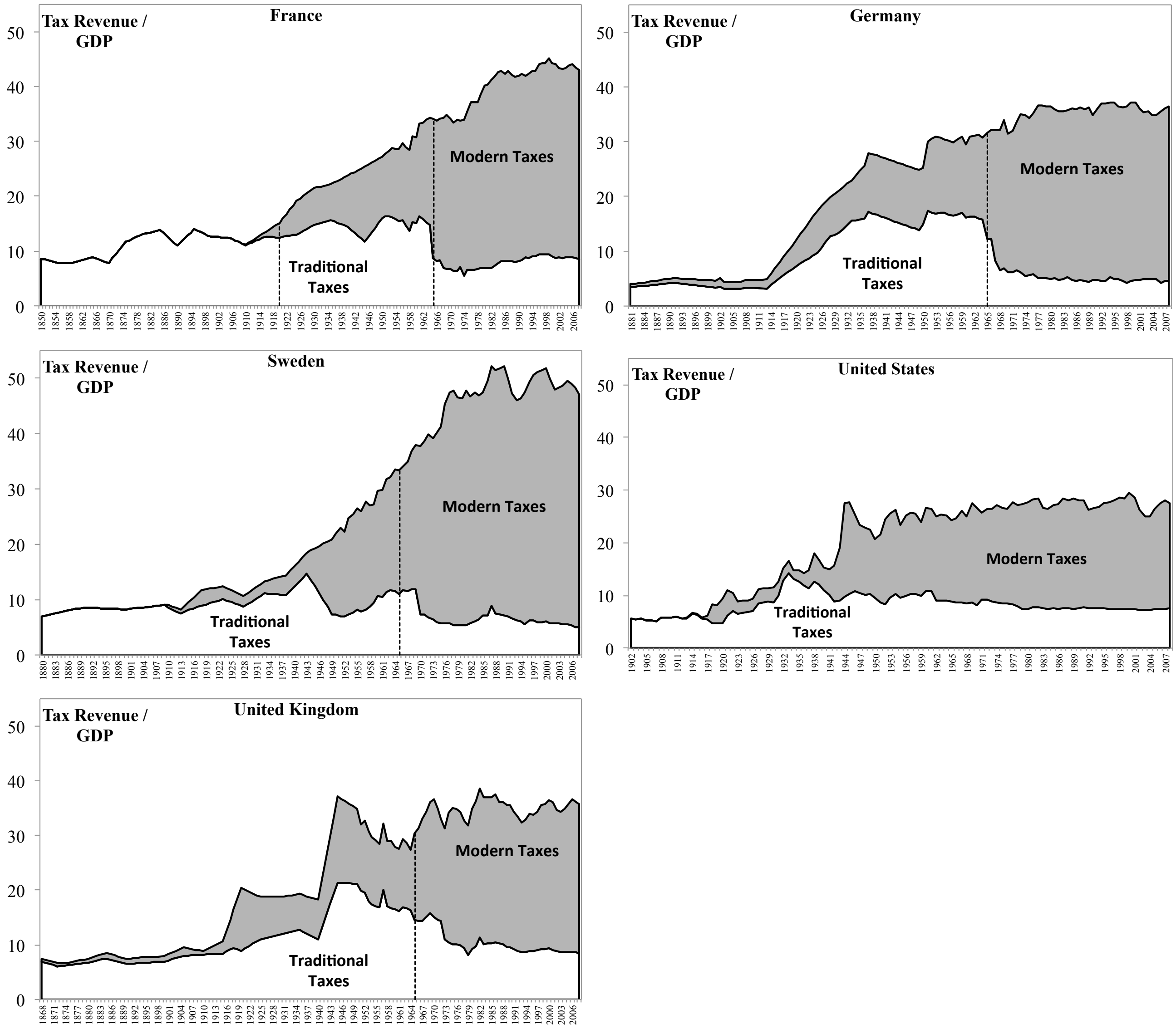



*Sources:* The source for the variable *Military expenditures* is the Correlates of War National Material Capabilities Data. The original measure is in current British pounds (billons) for 1900-1913 and current U.S. dollars (billions) for after 1914. I use Scheve & Stasavage (2012)'s version of this data, which converts all measures to U.S. dollars in real terms with 1982-84 as the base year. For taxation data, see Appendix B.

### A.3 Testing Different War Mobilization Measures

I employ alternative measures of war mobilization used by Scheve & Stasavage (2012). These include a dummy that is equal to 1 in a particular year if the country was engaged in an interstate war and

Figure A.3: The Evolution of the Income Tax as a Share of GDP, Selected Countries




*Notes: Modern taxes* refer to income taxes. They include corporate and personal income taxes at the federal and state levels, and all payroll taxes financing social insurance programs. *Other taxes* include all other taxes (e.g., property taxes, sales taxes, excise taxes, custom duties, estate and inheritance taxes).
*Sources:* Kleven *et al.* (2009).

at least 5% (not 2%) of the population was serving in the military, as well as a variable that is equal to the share of the population mobilized in war years and equal to 0 in all other years. Another alternative is a variable that indicates whether the country participated significantly in World War I and II. The advantage of this measure is that it avoids dealing with the measurement error present in the estimates of the population mobilized for war. The results are presented in Table A.1 using the 5-year data.

Table A.1: War Mobilization, Democracy, and Income Taxation, 1900-2000: Different War Mobilization Measures

| | 5-year data | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Country FE | | | | Lag DV | | | | Country FE | | | | Lag DV | | | | | | | |
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** | **(7)** | **(8)** | **(9)** | **(10)** | **(11)** | **(12)** | **(13)** | **(14)** | **(15)** | **(16)** | **(17)** | **(18)** | **(19)** | **(20)** |
| $TopRate_{t-1}$ | | | | | 0.828 | 0.821 | 0.824 | 0.813 | | | | | 0.830 | 0.835 | 0.826 | 0.829 | | 0.841 | | 0.841 |
| | | | | | (0.026)*** | (0.026)*** | (0.025)*** | (0.027)*** | | | | | (0.025)*** | (0.025)*** | (0.024)*** | (0.025)*** | | (0.025)*** | | (0.025)*** |
| $War_{t-1}$ | | | | | | | | | 15.978 | 17.964 | 15.781 | 18.265 | 17.375 | 17.345 | 17.374 | 17.732 | | | | |
| | | | | | | | | | (7.440)** | (6.796)** | (7.673)* | (6.938)** | (2.215)*** | (2.255)*** | (2.203)*** | (2.229)*** | | | | |
| $WarQual_{t-1}$ | 15.759 | 18.508 | 15.653 | 18.372 | 12.904 | 12.782 | 13.466 | 13.564 | | | | | | | | | | | | |
| | (5.711)** | (5.992)*** | (6.014)** | (6.347)** | (2.276)*** | (2.477)*** | (2.309)*** | (2.456)*** | | | | | | | | | | | | |
| $PropWar_{t-1}$ | | | | | | | | | | | | | | | | | 133.494 | 73.378 | | |
| | | | | | | | | | | | | | | | | | (79.587) | (24.334)*** | | |
| $PropWar2_{t-1}$ | | | | | | | | | | | | | | | | | | | 128.006 | 65.813 |
| | | | | | | | | | | | | | | | | | | | (73.936) | (23.090)*** |
| $UniSuff_{t-1}$ | -5.695 | | -5.760 | | -3.381 | | -4.112 | | -7.937 | | -7.973 | | -3.854 | | -4.494 | | -5.185 | -3.083 | -5.133 | -3.050 |
| | (6.715) | | (6.451) | | (1.370)** | | (1.339)*** | | (6.843) | | (6.687) | | (1.517)** | | (1.422)*** | | (6.505) | (1.332)** | (6.527) | (1.333)** |
| $CompElec_{t-1}$ | | 10.544 | | 10.405 | | 2.714 | | 3.736 | | 8.471 | | 8.496 | | 2.197 | | 3.052 | | | | |
| | | (4.894)** | | (4.816)** | | (1.183)** | | (1.235)*** | | (5.415) | | (5.329) | | (1.179)* | | (1.216)** | | | | |
| $LeftExec_{t-1}$ | | | 0.757 | 0.081 | | | 2.625 | 1.617 | | | 0.641 | 0.060 | | | 2.170 | 1.270 | 0.820 | 2.308 | 0.762 | 2.265 |
| | | | (3.609) | (3.705) | | | (1.004)*** | (1.031) | | | (3.620) | (3.735) | | | (1.007)** | (1.046) | (3.624) | (1.005)** | (3.637) | (1.004)** |
| $GDPpC_{t-1}$ | | | -0.001 | -0.001 | | | -0.000 | -0.000 | | | 0.000 | -0.000 | | | -0.000 | -0.000 | -0.001 | -0.000 | -0.001 | -0.000 |
| | | | (0.001) | (0.001) | | | (0.000) | (0.000)* | | | (0.001) | (0.001) | | | (0.000) | (0.000) | (0.001) | (0.000) | (0.001) | (0.000) |
| Period FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | Yes | Yes | Yes | Yes | No | No | No | No | Yes | Yes | Yes | Yes | No | No | No | No | Yes | Yes | Yes | Yes |
| $R^2$ | 0.818 | 0.825 | 0.815 | 0.821 | 0.887 | 0.887 | 0.885 | 0.885 | 0.813 | 0.815 | 0.813 | 0.815 | 0.884 | 0.883 | 0.885 | 0.884 | 0.810 | 0.880 | 0.810 | 0.880 |
| $N$ | 305 | 305 | 303 | 303 | 301 | 301 | 299 | 299 | 296 | 296 | 296 | 296 | 292 | 292 | 292 | 292 | 303 | 299 | 303 | 299 |

*Notes:* The table reports the results of pooled cross sectional OLS regressions of the variable *Top Rate* on different measures of war mobilization. *War* is a dummy that indicates whether 5% or more of the population serve in the military. *War Qualitative* lagged one period corresponds to qualitative coding if the country participated in World War I and II. *PropWar* lagged one period corresponds to the proportion of the population mobilized in high fatality war years. *PropWar2* lagged one period corresponds to the proportion of the population mobilized in high fatality war years, with an alternative coding for years missing COW data. *Universal suffrage* lagged one period corresponds to whether the country had universal suffrage. *Competitive elections* lagged one period corresponds to whether the country had competitive elections.
* denotes significant at the 10% level, ** denotes significant at the 5% level, and *** denotes significant at the 1% level.

# B Sources for Income Tax Rates

**Australia:** The series for the top marginal income tax rate is taken from Atkinson & Leigh (2013), who use figures from the Commonwealth of Australia, *The Yearbook of Australia*, annual. They add federal and state taxes, on the assumption that taxpayers live in the largest state, New South Wales.

**Austria:** The series for the top marginal income tax rate was provided by Anton Rainer, from the Finance Ministry. Also, http://alex.onb.ac.at/ and http://www.bus.umich.edu/otpr/otpr/default.asp post-1975.

**Canada:** The Canadian income tax data is taken mainly from Saez & Veall (2005), who report the top marginal tax rate on any type of income. The 1942 datapoint was interpreted as an outlier and replaced using Atkinson & Leigh (2013).

**Denmark:** The series for the top marginal income tax rate in Denmark is taken from Atkinson & Soogard (2013)'s "equilibrium marginal tax rate" series. This rate refers to the effective marginal tax rate taking into account the effect of the tax allowance under the assumption of a constant income level. Until 1987 the marginal tax rate applies to basically all income types. After this point capital income is taxed at a lower rate. There was a removal of the tax allowance in 1967 and a change from family to individual taxation in 1970. The bottom marginal tax rate is also obtained from (Atkinson & Soogard, 2013).

**France:** The series for the top marginal personal income tax rate is taken from Piketty (2014), Chapter 14. The rate reported here includes general income tax supplements (i.e. surtaxes applying to all incomes above a certain level) and the CSG (a proportional income tax applying to all incomes), but excludes all other taxes (e.g. corporate taxes) and social contributions (except the CSG). Between 1919 and 1958, top rates were higher for single taxpayers (e.g. during the interwar period, singles paid a 25% tax surcharge, so that the top rate was 62.5% rather than 50% in 1919-1922, 75% rather than 60% in 1923, etc.); there were also smaller tax surcharges for married taxpayers with no children after three years of marriage. All these tax surcharges were excluded here, because they apply only to a minority of top income taxpayers. For complete details about the history of income tax law in France, see Piketty (2001), Chapters 3-4. Finally, both the bottom marginal tax rate and the share of the population subject to the income tax are taken from Piketty (2001), Chapters 3-4.

**Germany:** The series for the top marginal personal income tax rate is taken from Piketty (2014), Chapter 14. The rate reported here includes general income tax supplements (i.e. surtaxes applying to all incomes above a certain level), but excludes all other taxes and social contributions. In 1946-1948 the top rate was set by the Allied Control Council. See Dell (2008) for more details.

**Ireland:** The series for the top marginal income tax rate in pre-1960 is compiled directly from Irish legislation, available online at http://www.acts.ie/ and http://www.irishstatutebook.ie/. The series includes both income tax rates, super-tax rates (renamed sur-tax in 1928) and extra sur-tax rates. The series post-1960 is taken from Nolan (2007).

**Italy:** The series for the top marginal income tax rate between 1923 and 1974 was obtained by researching Italian legislation and information published in the *Gazzetta Ufficiale*. It does not include the *imposta di famiglia* that existed until the 1971 reform, which consisted of progressive rates with a top rate of 8%. The series for the top marginal income tax rate post-1974 is taken from Piketty *et al.* (2014) and cross-checked with the World Tax Database.

**Japan:** The series for the top marginal income tax rate was taken from Moriguchi & Saez (2008). Top marginal tax rate is the highest statutory marginal tax rate from the National individual income tax stipulated by the law before exemptions and deductions.

**Netherlands:** The series for the top marginal income tax rate pre-1960 is taken from Flip de Kam, using information obtained from the Royal Library in The Hague. It represents the rate levied on single individuals. The series post-1960 is taken from Piketty *et al.* (2014), and represents the rate levied on both individuals and families.

**New Zealand:** The series for the top marginal income tax rate is taken from Atkinson & Leigh (2013), who themselves obtain top marginal tax rates from New Zealand Government, *The New Zealand Official Yearbook*, annual.

**South Korea:** The series for the top marginal income tax rate is taken from Kim & Kim (2013), and cross-checked with data from the Korean Institute of Public Policy, itself is based on the National Tax Service's yearly report of national tax statistics.

**Sweden:** The series for the top marginal income tax rate is taken from DuRietz *et al.* (2014).

**Switzerland:** The series is taken from Schaltegger & Gorgas (2011) and represents the unweighted average across the 26 Swiss cantons of the effective income tax rate paid by the top 0.01%. It excludes the federal top marginal income tax rate.

**United Kingdom:** The series for the top marginal personal income tax rate is taken from Piketty (2014), Chapter 14, itself taken from Atkinson's work on top incomes in the UK. The top marginal income tax rates on earned and investment income in the UK are from Inland Revenue Annual Reports and Inland Revenue Statistics, various years. The super-tax was introduced in 1908 and was renamed surtax with effect from 1928-9. The income tax does not include National Insurance contributions. No account is taken of the Special Contribution levied on investment income in 1949. No account is taken of the Special Charge on investment income in 1968. The investment income surcharge was abolished in 1984. For 1971/2 and 1972/3 earned income relief (EIR) applied to all earnings; in all other years, there was a maximum. EIR is therefore only taken into account for these years, reducing taxable earned income by 15 per cent. Tax rates refer to the year of assessment; the income subject to the tax may have arisen in a previous year.

**United States:** The series for the top marginal personal income tax rate is taken from Piketty (2014), Chapter 14. The top marginal income tax rate reported here includes general income tax supplements (i.e. surtaxes applying to all incomes above a certain level), but excludes all other taxes and social contributions (the uncapped rate of social security contributions on top earnings has been 2.5% since 1994 and was 0% before). Between 1971 and 1981, the top rate applying to earned income was lower than the top rate applying to ordinary unearned income (e.g. capital income). Also, between 1944 and 1963, there was a maximum top effective rate. The reduced rates applying to capital gains are excluded. See Saez *et al.* (2012), Table A1, for more details. See also Tax Policy Center website. Finally, the bottom marginal income tax rate is taken from the National Taxpayers Union website, available at http://www.ntu.org/tax-basics/history-of-federal-individual-1.html After earned-income deduction is equal to 25 percent of earned income in 1924-1931, and 10 percent in 1934-1943. Beginning in 1975, a refundable earned-income credit is allowed for low-income individuals. After tax credit is 1.25 percent against regular tax in 1981.