The Conscription of Wealth:

Mass Warfare and the Demand for Progressive Taxation[1]

Kenneth Scheve
Yale University
kenneth.scheve@yale.edu

David Stasavage
New York University
david.stasavage@nyu.edu

December 2009

[1]We would like to thank Tony Atkinson, Neal Beck, Lawrence Broz, Andrea Campbell, Tom Cusack, Axel Dreher, Jim Fearon, John Ferejohn, Rob Franzese, Lewis Kornhauser, Yotam Margalit, David Mayhew, Thomas Piketty, Adam Przeworski, John Roemer, Ron Rogowski, Nicholas Sambanis, Joachim Voth, Stefanie Walter, two anonymous reviewers as well as seminar participants at Princeton, Rochester, Washington University in St. Louis, Columbia, UCSD, UCLA, NYU, Yale, UBC, and the Wiko in Berlin for comments on a previous draft. We thank Adam Berinsky for providing advice and data for our analysis of 1940s Gallup data. Brian Fried, Allison Sovey, and Suon Choi provided excellent research assistance. Finally, we are grateful for financial support from the Russell Sage Foundation, RSF Project #83-08-10, The Macmillan Center for International and Area Studies at Yale University, and the Institution for Social and Policy Studies.

Abstract

The dominant narrative of the politics of redistribution in political science and economics highlights the signature role of the rise of electoral democracy and the development of political parties that mobilize working class groups. We argue in this paper that this narrative ignores the critical role played by mass warfare in the development of redistributive public policies. Focusing attention on the determinants of progressive taxation, we argue that mobilization for mass warfare led to demands for increased taxation of the wealthy in order to more fairly distribute the burden for the war effort. We then show empirically that over the last century mass mobilization for war has been associated with a notable increase in tax progressivity. In the absence of war neither the establishment of universal suffrage, nor the arrival of political control by parties of the Left is systematically associated with large increases in tax progressivity. In making these arguments we devote particular attention to a "difference-in-differences" comparison of participants and non-participants in World War I.

> Those who have made fortunes out of the war must pay for the war; and Labour will insist upon heavily graduated direct taxation with a raising of the exemption limit. That is what Labour means by the Conscription of Wealth (Labour Party Manifesto, 1918).[1]

1 Introduction

For well over a century, debates about redistribution have focused, among other issues, on the question of progressive taxation. Should individuals pay a tax proportional to their income, or should the rate of taxation actually increase with income, and by how much? Normative discussions have focussed on the trade-off between the benefits of progressive taxation in terms of minimizing sacrifice and reducing income disparities—to the extent this is seen as desirable—while also considering the associated costs involving altered labor supply and investment incentives. But precisely because choices about progressive taxation can have major distributional implications, it also makes sense to ask what conditions in practice lead actual governments to adopt tax policies in which the rich pay a higher percentage of their income when compared with other groups.

One common, and very plausible, response to this question is to suggest that the rise of progressive taxation has depended on the development of electoral democracy characterized by universal suffrage, as well as on the presence of political parties that mobilize lower income groups.[2] This account has dominated political science and economics scholarship on the development of progressive taxation and redistributive policies more generally. We argue in this paper that this ignores the critical role of mass warfare in the development of redistributive policies. Specifically, we suggest that when governments demanded sacrifices from the mass of their citizens on the battlefield this led to demands for more progressive tax policies so that the sacrifices in the war effort were more fairly distributed throughout society. The conscription of wealth in the form of progressive taxation constituted part of a new social compact in which the mass of citizens agreed to fight while the rich agreed to bear

[1] For the full manifesto see Dale (2000, p.16).

[2] A prediction which could be derived from the conclusions of Acemoglu and Robinson (2000) and Boix (2003), as well as from the historical analysis of Lindert (2004).

a higher tax burden. Progressive taxation was certainly an idea that was championed above all by those on the left of the political spectrum, but war played a critical role in seeing that this idea of the left could actually be implemented.

Why would mobilization for war be associated with a shift in public attitudes towards progressive taxation? Our argument focuses on demands for progressive taxation as a means of ensuring what was seen as a more fair distribution of the overall burden for fighting a war. A long tradition of scholarship has suggested that fairness concerns are central to understanding redistributive politics generally and progressive taxation specifically.[3] It is a characteristic of modern mass warfare that very large numbers of individuals make a sacrifice of time, foregone income, and potentially their lives for a collective cause. It is also the case that these sacrifices are not borne equally in society. In the mass wars of the twentieth century, even under universal conscription, the young and less wealthy were often more likely to find themselves on the front lines. Further, some individuals who remained at home (or whose capital remained at home) earned higher incomes as a result of heightened demand for certain products in war time. As we will show, perceptions of war profits and war profiteering played a key role in debates about the progressive taxation, as the Labour Party manifesto of 1918 suggests. We argue that the perceived unfairness of a situation in which some sacrifice at the front while others earn profits at home led to demands for increased taxation of those with high incomes, and in particular those at the very top of the income distribution who derived earnings primarily from capital income.

It is important for us to emphasize that we are certainly not the first scholars to emphasize a link between mass warfare and redistributive or welfare state policies. In an early and penetrating discussion of the subject, in 1950 Richard Titmuss wrote about the way in which state interventions taken out of necessity during World War II helped pave the way for the development of Great Britain's National Health Service.[4] Likewise, Theda Skocpol's work has provided an important example of how demands made by soldiers returning from war

[3] See, for example, discussions in Musgrave (1985), Murphy and Nagel (2002), and Alesina and Angeletos (2005).

[4] See also Titmuss (1958) for a comparative discussion of war and social policy.

can have an effect on welfare state development.[5] In fact, as we will discuss below, the argument that when societies ask the mass of their citizens to fight, this leads to demands for new political rights extends back to the Fifth Century B.C. Our study is original in three key ways. First, we focus on the effect of mass warfare on political demands for progressive taxation, and we provide the most convincing comparative evidence to date that the history of progressive taxation would have been very different were it not for the mass wars of the twentieth century. Second, our argument and evidence emphasize how mass war mobilization influences progressive taxation through its effect on fairness concerns rather than its influence on political rights or regime type which are the most common narratives in the current literature. Third, we link our findings to recent discussions of the long run evolution of income inequality.

We present four types of empirical evidence to support our argument.

First, we discuss the historical context for the development of income taxation. This shows that while by 1914 the income tax was established in many countries, and many observers saw it as the wave of the future, at this stage in time top marginal rates of income tax universally remained extremely low (often in the single digits). The year 1914 proved to be a watershed in countries that underwent mass mobilization for the war. It proved to be a break point in terms of policies, as top tax rates in countries participating in the war rose dramatically to levels that seemed beyond the realm of imagination in 1914. It also proved to be a turning point in other terms, as debates about the appropriate levels of taxation on top incomes became inextricably linked with debates about burden sharing during wartime. Interestingly, we observe that taxes became more progressive and the terms of the debate changed even in war participants where parties from the right of the political spectrum held power. France provides one illustration of this phenomenon. When we look at countries that did not participate in the war, such as the Netherlands and Sweden, we observe trends also seen in war participants, including debates about expansion of the suffrage and the development of parties of the left that supported progressive taxation. But in these

[5] See Skocpol (1995).

countries there was no sharp break either in top income tax rates or, equally importantly, in the political debate about income taxation. The work of Sven Steinmo (2003, 1993) has been important in identifying the divergence between the Swedish, British, and American tax systems at this time. The empirical evidence we present in this paper suggests that this divergence was actually a more general phenomenon.

In addition to the qualitative evidence, we also make use of time-series data on top marginal rates of income tax to examine systematically whether war mobilization made a difference for progressive taxation. The bulk of the tax rate data, which covers eight countries, has been collected by authors involved in the project on top incomes over the twentieth century.[6] Top marginal tax rates are only a proxy for progressivity, but they are available at annual frequencies. It is also inherently interesting to identify the factors that may prompt a society to tax its richest members heavily. We devote particular attention to a difference-in-differences comparison involving World War I. Since four of the eight countries were significant participants in World War I and four were not, we can conduct an analysis where the counterfactual for countries that mass mobilized for World War I is provided both by their own experience prior to the war and by the experience of other countries that did not mass mobilize for the war.[7] Using this identification strategy we conclude that there was a very significant effect of war mobilization on top tax rates while there is much less evidence that either universal suffrage or strong representation of the left were sufficient conditions for tax progressivity to dramatically increase. We do not interpret this as meaning that partisanship did not matter. Progressive taxation was certainly an idea for which the earliest and strongest advocates were on the left of the political spectrum - socialist and social democratic parties in Europe and progressives in the United States. However, what our evidence does show quite clearly is that if left and right parties had different levels of enthusiasm for progressivity, in the context of mass warfare governments of both types felt

[6] Atkinson and Piketty (2007). A full list of sources is provided in the online appendix to this paper.

[7] Another benefit of the focus on World War I is that since it is known that redistributive spending through welfare state programs was limited at this time compared to the post-1945 period (see Lindert 2004), we are less subject to the problem that an absence of progressivity in taxation may have been compensated by progressivity in transfers.

compelled to respond to fairness demands by tilting policies in this direction.

As a third step in our empirical inquiry, we consider the direct evidence that is available on the extent to which taxation became more progressive in countries that participated in World War I and whether similar developments occurred in non-participants. This evidence serves to verify whether our tests using the top marginal tax rate are simply reflecting a general tax increase in war participants, as opposed to an increase in progressivity. The evidence strongly supports the latter interpretation. It also sheds further insights on the argument that increases in top income tax rates were dictated by the simple fact that governments needed money, and they took it where they could find it. If governments were seeking to use the income tax to raise the maximum amount of revenue at the minimum terms of administrative cost, then we might well have expected them to concentrate on the wealthy. This was in fact the pattern of income tax collection in the early decades of the twentieth century (though not in later decades). But within the limited group of individuals subject to the income tax, there would then be no logical reason to tax someone at the 90th percentile of the income distribution more lightly than someone at the 99th percentile. In fact, the pattern we observe for all World War I participants (but not for the non-participants) is that marginal rates of taxation rose very steeply even within the group of individuals subject to the income tax. If governments were concerned about the deadweight costs of taxation, we would also not have expected them to have opted for such a steeply progressive tax schedule, because it is suggested that elasticities of earnings with respect to taxation are the highest for those groups at the top of the income distribution. The contemporary literature on optimal taxation in fact suggests that a government seeking to maximize revenue should adopt something close to a flat tax, or even a regressive tax schedule. Contemporary observers did not have the benefit of modern econometric analysis, but as we will argue below they still shared a similar perception regarding these deadweight costs. If governments were also concerned about minimizing political costs of taxation, and such political costs were increasing in the number of citizens subject to income tax, this might create an incentive to tax the rich heavily, but this effect should apply to any country either at peace or at war. In the end, it is difficult

to explain the wartime emergence of steeply progressive tax schedules by referring simply to the fact that governments needed money and they took it where they could find it.

As a fourth step in our empirical inquiry, we examine observed changes in public opinion about taxation before and after the United States mobilized for World War II. We show that across all different economic groups, the war had virtually no impact on how much taxes respondents thought relatively low and middle income families should pay, but that mobilization for the war corresponded with substantially higher preferred income taxes for the rich—in most cases doubling at the higher income levels. In short, war mobilization was associated with greater demands for progressive taxation.

Our empirical findings cast new light on current debates about democracy, inequality, and redistribution. They suggest first that precisely because the rise of progressive taxation was a product of war, it was not an inevitable development. As such, we contribute directly to work on inequality by authors like Piketty (2003) who has suggested that much of the reduction in income inequality observed in advanced industrial countries during the twentieth century was an "accidental" product of war.[8] According to Piketty, the reduction in income inequality can be explained by a story where events like wartime destruction and economic depression helped to destroy great fortunes, and following these events the presence of high top rates of income tax and inheritance taxation prevented fortunes from becoming reconstituted. But his analysis leaves open the question—what force made it politically possible to sustain high top tax rates in the first place? Our contribution is to suggest how the particular wartime conditions of the twentieth century created political pressures for the adoption of high top rates of taxation.

A second important implication of our study, which follows immediately from the above point, is that electoral democracy may be insufficient to produce a reduction in income inequality in the absence of some event, like a war, that serves to heighten demands for taxation of the rich. If true then this would call for revisiting the assumption in theoretical models like those of Acemoglu and Robinson (2000) or Boix (2003) where the expansion of the suf-

[8] The phrase is used by Piketty (2003) to characterize the evolution of income inequality in France between 1901 and 1998.

frage represents a commitment to redistribute.[9] The same conclusion would apply to the assumption in Ticchi and Vindigni (2008) that wars generate incentives to expand the suffrage, precisely because suffrage expansions represent a commitment to future redistribution toward those who have fought for their country.

2 Mass Mobilization and Demand for Progressive Taxation

There is a long-standing argument that when states increase the extent to which they rely on the broad mass of citizenry for military service, then they also feel compelled to extend greater political rights to these same citizens.[10] We may also logically expect that a broader distribution of political rights will then be translated into redistributive policies. Perhaps the earliest example of this claim comes from an Athenian observer from the 5th century B.C. known to posterity as the Old Oligarch. In a short text entitled "The Constitution of the Athenians," (not to be confused with the similarly titled text associated with Aristotle) the Old Oligarch suggested with regard to Athens that it was just (*dikaios*) for the poor and the common people to be given rights of political participation and to be allowed to hold office

> "Because it is the common people who man the ships and confer power on the city - helmsman, signalmen, captains, look-out men, and shipwrights - these are the ones who confer power on the city much more than the hoplites, the well-born, and the better class."[11]

This same example no doubt provided the inspiration for Aristotle's later observations about reliance on naval power being associated with democracy.[12] Thus, one possible reason

[9] Ultimately, our results may point to a more prominent role of what Acemoglu and Robinson (2008) refer to as de facto political power.

[10] There is also a long-standing argument that warfare has been associated with an expansion in the efforts of states to raise revenue through taxation. This idea dates back at least to Otto Hintze (1906) and has more recently been expressed by Charles Tilly (1990) and Besley and Persson (2009), We fully acknowledge this point, but this argument does not suggest why, given a certain ability to tax, war mobilization might influence choices about the relative tax burden between different segments of the population. The importance of warfare in the secular growth of government expenditure has been suggested by Peacock and Wiseman (1961). Peacock and Wiseman do not refer to a secular shift in the tax burden from one group to another, but they do discuss the expansion of social services, which had clear redistributive effects.

[11] "The Constitution of the Athenians" printed in Gagarin and Woodruff (1995 pp.133-145).

[12] See p.271 in *The Politics*, edited by Ernest Barker, 1948.

that mass warfare may be associated with more progressive tax systems is that it makes democracy more likely which in turn leads to greater taxation of the wealthy.[13] The main problem with such an argument is empirical. Most importantly, as we will show below, there is little evidence that democracy is a sufficient condition for the development of the type of highly progressive tax systems which evolved in many countries during the twentieth century. In short, it is not at all clear that democratic government constitutes a commitment to significantly progressive tax systems.

Nonetheless, our argument follows the insights of the Old Oligarch by suggesting that when a society shifts from fighting wars using a small professional army to instead depending on a mass army, then this may change perceptions about the set of policies that are perceived as being just or fair. We suggest that redistribution in the form of progressive taxation emerged as part of a social compact in which the masses would fight in war, often by conscription, but in which there would also be conscription of wealth. This social compact may have been more likely to emerge in a democracy in which discontented citizens could pose an electoral threat to rulers and not simply a threat of unrest, but the more fundamental cause leading to redistribution involved changed mass attitudes about the fair burden of taxation between different social groups.

One potential objection to our account is why mass mobilization would lead to demands for conscription of wealth on fairness grounds if countries adopt conscription, as many did, and by the time of World War I, conscription was officially universal? Should not universal conscription ensure a fair distribution of the war effort as well as compliance in the manner described by Levi (1997a, 1997b)? We suggest two reasons why this would not be the case.

First, in practice those with high incomes and/or accumulated wealth were less likely to fight than were individuals lower down the income distribution. Even after the adoption of universal conscription, in the advanced industrial countries, individuals were conscripted on the basis of characteristics correlated with income and wealth. The most important of

[13] Ticchi and Vindigni (2008) formalize the argument that wars generate incentives to expand the suffrage because suffrage expansions represent a commitment to future redistribution toward those who have fought for their country.

these is age, and older individuals on average have higher incomes and more accumulated wealth than younger individuals. The existence of deferment policies for educational or other reasons also produced a de facto bias whereby those higher up the income distribution were less likely to be required to fight in the front lines.[14]

Second, those who remained at home (or whose capital remained at home) were perceived to have actually earned financial profits out of the war because of increased demand for certain goods and services. It has long been recognized that attitudes towards income inequality and redistribution depend on beliefs about the process through which inequality was generated. Opinions about tax progressivity are likely to depend on whether high incomes are thought to be attributable to merit, or whether they are instead the result of luck.[15] Opinions about progressivity may also depend on whether income is thought to be gained as a result of sacrifices of others. Writing on the taxation of war wealth, John Hicks noted that "a sense of unfairness is particularly aroused when the high incomes are earned, not by those who are in the centre of the war effort, but by those who are on the edge of it"(1942 p.5).

Thus, mobilization for mass warfare, with and without conscription, creates a situation in which governments are asking tremendous sacrifices on the part of some of their citizens while some others not only benefit from those sacrifices but actually gain financially from the war. Fairness concerns are central to all debates about taxation and war mobilization only accentuates these considerations, increasing demands for progressive taxation so that the sacrifices in the war effort are more evenly distributed throughout society.

Our argument does not apply to all wars – it applies to conflicts of mass mobilization in which a substantial proportion of the population are required to fight the war. In cases where a war is instead fought with a small portion of the population, potentially with individuals drawn primarily from groups lower down the socioeconomic ladder, there will be fewer people likely to demand policies that equalize the burden of a war. Further, it will be more difficult to claim that there should be heavy taxation of the rich, because only a small portion of the middle classes may have served. Although we expect our argument to apply to mass mobilized

[14] See Smith (1947) for evidence on this effect for US servicemen during World War II.
[15] See Piketty (1995) for the initial formalization of this idea.

wars with and without conscription, conscription is likely to magnify fairness concerns because service under conscription is more clearly a tax-in-kind on those who fight the war. Moreover, governments must be more sensitive to setting policies that address fairness considerations in order to ensure compliance with conscription.

The argument that we have laid out above refers to demands for tax progressivity that will emerge during wartime. Why would we not expect that after war's end, tax schedules will return back to their prior peacetime level? There are several reasons why the effect we describe is more likely to be long-lived. First, since wars are often financed by borrowing, the political debate over how to pay for them is often prolonged for a considerable time afterwards. This was certainly the case in countries like France and Great Britain after World War I. Second, if concerns about equalizing wartime sacrifice extend to subsequent obligations for war veterans, then this can also have direct implications for financing debates long after a war is over. Third and more speculatively, wartime sacrifices may have a permanent effect on perceptions of the generation that fought in the war about fair tax burdens for the wealthy, independent of what the revenue is spent on. All public goods must be eventually paid for, and the perceived fair distribution of these burdens may be permanently influenced for the generation that fought in the war. Finally, it may also be possible that the persistence of the war effect on progressive taxation has less to do with the endurance of beliefs forged during wartime than with a more conventional account involving a bias towards status quo policies. Even if this final mechanism provided the only reason why top tax rates remained high, our identification of the war effect is still a critical part of the story. If there is a status quo bias in policy, war is one reason why policy might move away from a low progressivity status quo in the first place.

One might ask how our argument is distinct from an account that simply says that taxes need to go up during wartime and that revenue maximizing governments will seek to raise funds both through taxation in kind and by taxation of income. The problem with this argument is that there is no particular reason to believe that a government seeking to raise the most revenue at minimum cost would necessarily decide to impose very high rates of

taxation on the rich. The modern literature on optimal taxation suggests that a government purely interested in maximizing revenue should impose a tax schedule that is either flat or regressive. This is because earnings elasticities with respect to taxation are observed to be larger for high income individuals, and thus the deadweight costs of taxation increase as one taxes individuals higher up the income distribution.[16] Even if government policymakers in 1914 did not have the benefit of modern econometric evidence, observers during this era were certainly aware of the incentive effects of taxation.[17] These incentive costs were emphasized in the popular debate by opponents of steeply progressive tax schedules, just as is the case today. So if taxes need to go up during wartime, it is not clear why the optimal choice would be to tax the rich heavily. Keeping these considerations in mind, we will nonetheless evaluate this argument empirically in this paper by examining whether the observed effect of mass mobilization on top tax rates is attenuated when including revenues as a share of GDP as an additional explanatory variable in our regressions.

3 Using World War I to Identify the Effect of Mobilization

Our principal goal in this paper is to empirically test the hypothesis that the experience of modern mass warfare produced new demands for progressive taxation. In the absence of this war effect, extensions of the suffrage and the rise of the political left may have produced less of an increase in redistribution through the tax system than would commonly be expected. For part of these tests we will adopt a long run view that helps establish the general applicability of our results. In this section, however, we will first consider developments with regard to progressive taxation prior to and around the time of the First World War.

[16] See Gruber and Saez (2000).

[17] For example, among late nineteenth century thinkers Henry Sidgwick demonstrated awareness of this issue in the following quote "...it is conceivable that a greater equality in the distribution of produce would lead ultimately to a reduction in the total amount to be redistributed..." (1883 p.520).

3.1 Pre-1914 Development of Progressive Taxation

Great Britain in 1799 was the first country to create something resembling a modern income tax, a measure adopted to raise war finance against the threat posed by Napoleon's armies. As a consequence, discussions of income taxation often begin with this event. The British income tax was not progressive to the extent that all households liable paid a single rate regardless of their level of income, a rate that reached a peak of 10%. The tax was progressive, however, to the extent there was an exemption limit that exempted all but high income households from the tax. This exemption of the large majority of households from tax would also be a hallmark of income tax systems in almost all other countries up to 1945. The British income tax had an uncertain initial history, as it was phased out completely between 1816 and 1843. The tax was reinstated for good in 1843, but rates were kept extremely low by modern standards. From the late nineteenth century there were heated debates over whether the income tax should be graduated, with higher income groups bearing a heavier burden than other taxpayers. The principle of graduation was first introduced as part of Lloyd George's "people's budget" in 1909 with the creation of a "super tax" that effectively raised the top tax rate to 8.33% (the standard rate stood at 5.83%). What is particularly striking here is that by modern standards both the level of rates and the extent of graduation seem extremely low.

During the nineteenth century the possibility of establishing an income tax also became a subject of debate in numerous other European countries, in no small part because of the perceived success of the British innovation. During periods of significant unrest some individuals even proposed graduated tax systems with top rates that resembled modern rates.[18] By all accounts, however, the idea that up to half of an individual's income might be drawn away in taxes was seen by most observers at the time as what *The Economist* called a "preposterous system of finance."[19] In the decades leading up to World War I a number

[18] In 1848 a deputy to the German Federal Assembly proposed a progressive income tax with a top rate of 33.3%. Also in 1848, Pierre-Joseph Proudhon proposed to the French Constituent Assembly that it establish an income tax with a top rate of 50%. See Seligman (1911 p.235 and p.279).

[19] *The Economist* March 10, 1883.

of states joined the United Kingdom by creating an income tax, including Japan in 1887, Prussia in 1891 (there was no German federal income tax until 1919), the Netherlands in 1893, and Sweden in 1903. The United States first adopted a federal income tax in 1862 in connection with the Civil War, but after 1872 the tax was not renewed by Congress, and a federal income tax was not reinstated until 1913.

So it seems clear from the above developments that there was a general trend towards the adoption of an income tax. It was also the case that a graduated income tax became the norm, and that many countries more of less simultaneously established graduated inheritance taxes. These developments were certainly significant, but what is most striking is that even after the adoption of graduated income taxes, during the pre-World War I era top earners paid only a small portion of their income in the form of tax. On the eve of World War I, among countries that had an income tax, the top rate stood at 7% in the United States, 8.33% in the UK, 12% in Sweden, and 3.2% in the Netherlands The extensive early study by Kennan (1910) presents information on income tax rates for different groups in a broad set of countries circa 1910. It confirms the initial impression that even when they had an income tax with a graduated rate schedule, it was very rare for countries at this time to adopt top rates of more than 10%. In sum, for an observer of international events in early months of 1914 it may have appeared that the income tax was the wave of the future, but it would have been seen as unlikely that within a matter of a few years, some countries would adopt taxes that saw the richest members of society pay as much as 50% of their income in taxes.

3.2 Progressive Taxation and World War I

World War I placed substantial financial demands on the countries that were major participants in the conflict. Governments needed to respond to this demand by some combination of an immediate tax increase and increased issuance of debt, which implied future tax commitments. What was new about this conflict, though, when compared with other wars, such as those waged during the eighteenth century, was that heavy burdens were placed on top income groups. Debates about top marginal tax rates also took on a new political salience.

Either during or soon after the end of the war, participant countries adopted steeply graduated rate schedules with top rates that *The Economist* had previously seen as "preposterous". In Great Britain a series of war budgets saw the top rate of income tax increased from 8.33% in 1914 to 60% by 1920. Observers at the time also suggested that in a country like the United Kingdom the changes in the tax system had an important effect on the distribution of both income and wealth.[20] In the United States the top marginal rate of income tax rose from 7% at the outset of the war to 77% by the end.[21] A very similar pattern of events took place in Canada which first established a federal income tax in 1917 with a top rate of 21.9% and which subsequently raised this rate to 72.5% by 1920.[22] In France, a national income tax was first implemented in 1915 with a top statutory rate of 2%. By 1919 the top rate had risen to 50%.

It should be emphasized that the top income tax rates that we refer to above certainly applied to a very small percentage of households, and more generally only a small fraction of households in these countries were liable for any income tax at this time. In the case of the United Kingdom the super tax was initially paid by something on the order of 0.1% of households, and the number of households paying the top rate of super tax was considerably smaller.[23] In other countries, such as France and Canada, the fraction of households liable at the top rate of income tax was on the order of 1000 households and 500 households respectively.[24] While this implies that the revenues generated by this top rate were certainly too small to solve France's post-war fiscal problems, the move to a high top marginal tax rate obviously had major implications for the large fortunes to which it applied.

One particularly interesting aspect of the World War I period is that at the same time we observe the evolution of tax systems in countries that mobilized heavily for the war, we can also observe what happened in those countries that either remained neutral or which

[20] For one early discussion of the effect of the increase in taxation on the distribution of incomes and wealth see Bowley (1930).

[21] The United States did increase its top marginal tax rate prior to World War I, from a prior rate of 7% to 15% in 1916. However, the increase upon entering the war was dramatically larger, moving from 15% to 67% in 1917.

[22] See Perry (1955 p.162).

[23] See Atkinson (2007 p.95).

[24] See Piketty (2001 p.556) and Saez and Veall (2007).

were relatively minor participants. Historical series on top income tax rates exist for four such countries: Sweden, the Netherlands, Spain and Japan. As noted above, Sweden, the Netherlands, and Japan had established income taxes at the end of the nineteenth century (Spain did not adopt an income tax until 1932). The Swedish and Dutch cases are particularly interesting for our purposes, because these two countries were subject to many of the same political developments that occurred in war participants like France and the United Kingdom. In both Sweden and the Netherlands universal male suffrage was adopted around this time.[25] In addition, in both of these countries parties of the political left first gained a significant share of parliamentary seats at this time, and both countries experienced episodes of working class unrest similar to those in participant countries.[26] Yet, despite these shared political conditions, outcomes with regard to top tax rates were very different in Sweden and the Netherlands when compared with France and the UK. For the Netherlands, Van Zanden (1997) emphasizes the lack of movement toward progressive taxation as right and center-right governments in the interwar period maintained a system based primarily on indirect taxation and relatively low top income tax rates. This raises the possibility that progressive income taxes failed to develop early in the Netherlands because the left was not yet in government. But among the war participant countries that adopted progressive tax systems, such as Canada, France, and the UK, parties of the left were not in power either.

Figure 1 presents the available information on top tax rates between 1900 and 1930 for our four sample countries that were heavily mobilized and that participated in World War I and in the four sample countries that were either neutral or which did not mobilize heavily. It is apparent that in participant countries World War I was accompanied by a huge shift towards greater tax progressivity, at least in terms of the willingness to tax the richest members of society. No such break is observable in any of the four non-participants.

There was an evident connection in political debates of the time between increases in tax progressivity and the idea of equalizing sacrifice in wartime. This pattern was typically

[25] In 1911 in Sweden and 1918 in the Netherlands.

[26] See, for example, Andre (1975) on labor unrest in Sweden in the 1917-1918 period, particularly in the wake of the Russian Revolution.

characterized by new demands for the taxation of "war wealth" and "war profits" often most vocally from labor organizations and left parties. What distinguished these demands from previous ones of a similar flavor was their connection to the war and the logic of equal sacrifice and their resonance with the public and governments across the political spectrum. There developed a perception in many countries that certain individuals were reaping large profits as a result of the increased demand for certain goods. In a context where many individuals were conscripted into service at the front, it became a common rallying cry that those who profited from the war should have their wealth conscripted in the same manner that others had been obliged to make more direct sacrifices. It is important to note that we are by no means implying that this perception was always completely accurate. In the case of Great Britain it is known that the upper classes volunteered heavily for the war.[27] What is also certainly true though is that in all countries older individuals were more likely to be exempted from military service, and older individuals tended on average to have higher incomes and higher levels of wealth. In English language countries frequent calls appeared for "the conscription of wealth", a phrase that seems to have in particular been used by groups that had originally been most reluctant in their support for the war. Elsewhere the language differed but the policy demands were similar. Grotard (1996) emphasizes how discussions of the war profits tax in France were linked in the popular press to the sacrifices of soldiers. She notes that during the parliamentary debate over the war profits tax, it was specifically stated that given that many individuals were sacrificing themselves at the front "it was necessary to reestablish equal sacrifice for all" (Grotard 1996, p. 264). After the conclusion of the war such calls continued as the issue shifted to being one of how to repay war debts. The issue of how to finance benefits for war veterans also rose to prominence, and in the case of the United States, Alstott and Novick (2006) have shown that debates about veterans benefits were explicitly linked with debates over tax progressivity.

All of the countries that mobilized heavily for World War I ended up adopting "excess profits" or "war profits" taxes of one form or another, in parallel with the major increases

[27] Marwick (1965 p.290) reports that Oxford University's had a roll of service of 14,561 individuals of which 2,680 became fatalities.

they adopted in top rates of income tax. In public debate these different types of taxes were often described as satisfying similar objectives. In the United Kingdom the government adopted an excess profits duty in 1915 that was maintained through 1921 at an average rate of 63 percent.[28] In the United States an excess profits tax was levied that by 1918 reached a rate of 80 percent.[29] Similar schemes were adopted in France where the top rate on this tax reached 80% by 1917, as well as in Canada. The Nordic countries also adopted windfall profits taxes during these years on companies for which revenues increased due to war demand. Importantly, however, these taxes were set at much lower marginal rates than in the case of the war participants.

Though we do not consider the tradeoff between funding wars with current taxation versus debt (deferred taxation assuming repayment), it is worth noting that political debates on this topic paralleled those with regard to progressive taxation. During the war those who argued in favor of progressive taxation also generally argued against heavy recourse to debt finance based on the supposition that instead of representing a conscription of wealth, borrowing meant giving additional profits in the form of interest payments to owners of capital.

One final question one might ask is whether the conclusion we draw from Figure 1, which will be supported by statistical tests in the next section, is biased by the omission of Germany from the sample. Germany did not have a federal income tax prior to 1919 though its constituent states did have income tax systems with generally low rates prior to the war. After 1919, however, Germany closely resembled other war participants as it created a federal income tax with a high top marginal rate of 60%. In introducing this new rate Minister of Finance Mathias Erzberger of the Weimar government made an explicit attempt to justify it based on the same solidarity among citizens as had been required during the war.[30] It should also be emphasized that the Weimar government's actions followed on the heels of significant war profits levies during the war itself.[31] Overall then, while no one would dispute the fact that the course of economic and political events in Germany was much different from that

[28] Hicks et al (1942 p.72).
[29] Hicks et al. (1942 p.121).
[30] *New York Times*, December 5, 1919 "Erzberger Offers Great Tax Budget"
[31] See Kuczynski (1923).

which took place in other war participants, we can nonetheless suggest that in Germany war participation also increased demands for tax progressivity.

To reiterate our main points, the evidence in Figure 1 supports our idea that participation in mass warfare was associated with dramatic increases in income tax rates on top income groups. In what follows we will consider this issue econometrically while controlling for other potential political factors that might influence the choice of progressive taxation including the extent of the suffrage and the extent to which parties of the left have representation in a country's legislature.

3.3 Difference-in-Differences Analysis, 1900-1930

We now evaluate the impact of mass mobilization in the First World War more formally by examining how top income tax rates were set in our full sample of eight countries. This difference-in-differences evaluation allows us to use the behavior of top rates in non-participant countries throughout the 1900 to 1930 period, in addition to the value of top rates before the war, to construct the counterfactual for what would have happened to top rates in participant countries had they not entered the war.[32]

For this analysis, we define the variable *Top Rate* equal to the highest marginal income tax rate for a country in a given year. This variable is set equal to zero for years in which a country did not yet have an income tax.[33] The key independent variable is *WWI Mobilization* which is set equal to 0 in each year before the country enters the war and 1 thereafter.[34] In some specifications, we include controls for levels of economic development, the representation of left parties in the legislature, the extent of the franchise, and the magnitude

[32] In a separate analysis supplied in the online appendix for this paper, available at `http://pantheon.yale.edu/~ks298/`, we report results of regressions where we conducted interrupted time series tests country by country in order to examine the effect of World War I. These regressions produced very similar substantive conclusions to those in our pooled analysis. The specific dates for the initial and final years of this analysis are somewhat arbitrary but do not influence the results. The key idea is to begin early enough to establish a baseline and to end before the new shocks of the 1930s and 1940s influence the tax policies of these countries. A long run analysis including a period of more than a century is presented below.

[33] See online appendix for sources and further description of this variable. For the analysis in this section, the values for *Top Rate* were missing for Sweden in a few selected years. We use linear interpolation to impute these values. The reported results are robust to dropping Sweden.

[34] For Canada, France, and the UK, the entry year is 1914 and for the US, it is 1917.

of government revenues. The variable *GDP per capita* is equal to gross domestic product divided by population.[35] The variable *Left Seat Share* is equal to the percent of seats in the national legislature held by a Left party in a given year.[36] To measure the extent of the franchise, we constructed the variable *Male Universal Suffrage* equal to 0 for each year preceding universal male suffrage and 1 for each year after the onset of universal male suffrage.[37] The variable *Revenue to GDP* is equal to the ratio of central government revenues to gross domestic product.[38] Note that we add this revenue measure separately from the other control variables because it is not clearly exogenous to the top rate and thus could bias the estimates. We are, nonetheless, interested in exploring this specification to evaluate the "need for financing" alternative explanation of the impact of war on progressivity. If the need for finance was driving the war effect, then we would expect our estimate of the war mobilization coefficient to be attenuated once we include the extent of government revenues relative to the economy.

The *Top Rate* is modeled as:

$$TopRate_{it} = \alpha + \beta WWI_{it} + \boldsymbol{\gamma}\mathbf{X}_{it} + \eta_i + \theta f(T_t) + \varepsilon_{it}$$

where i indexes each country and t indexes each year; *Top Rate* is the top tax rate measure; *WWI* is our measure of war mobilization, *WWI Mobilization*; X_{it} is a vector of control variables and is excluded in some specifications; $f(T_t)$ is a function of time, either a simple linear trend or vector of dummy variables for each year between 1900-1930; α, β, γ, and θ are parameters to be estimated; η_i are country fixed effects parameters also to be estimated; and ϵ_{it} is the error term. We report Newey-West standard errors to account for serial autocorrelation.[39] The initial specifications that exclude the control variables are essentially

[35] The source for the gross domestic product data is Angus Maddison, Historical Statistics of the World Economy, `http://www.ggdc.net/maddison/`. The source for the population data is Correlates of War Project, National Material Capabilities Data, Version 3.0 (2005).

[36] See online appendix for sources and further description of this variable.

[37] The sources for this variable are Caramani (2000) and Mackie and Rose (1982).

[38] The source for the revenue data is Mitchell (2003a, 2003b, 2007).

[39] The reported standard errors assume a single-period lag. The main results reported are robust to allowing for additional lags in the calculation of the Newey-West standard errors and for alternatively using robust standard errors clustered on country.

difference-in-differences tests that compare the changes before and after participation in the war for countries which mass mobilized for the war, compared with changes over the same period for countries that did not mobilize. The specifications that include the control variables make this same comparison but adjust for differences in the top rate that are a function of levels of economic development, the representation of Left parties in the legislature, the extent of the franchise, and the magnitude of government revenue extraction.[40]

Table 1 reports the ordinary least squares estimates for this analysis. The results in the first column include only the key war mobilization variable, a year trend, and country fixed effects. The estimated coefficient for the variable *WWI Mobilization* in this specification is equal to 32.8 with a standard error of 4.5. As indicated in the second column, the estimate for this coefficient is slightly higher once the controls *GDP per capita*, *Left Seat Share*, and *Male Universal Suffrage* are added to the specification (coefficient estimate is 36.4 with standard error of 4.1).[41] Adding the control for the magnitude of government revenues relative to the economy yields an almost identical estimate for the *WWI Mobilization* coefficient. Thus, across these specifications which include country fixed effects and a linear time trend, there is substantial evidence that the top rate increased significantly more over time in those countries that participated in the First World War than those that did not. Further, this difference remains significant even after we adjust for differences in economic development, the strength of Left parties, the extent of the franchise, and the magnitude of government revenues.

The estimates in the last three columns of Table 1 substitute dummy variables for each year for the linear time trend. The estimated coefficient for the variable *WWI Mobilization* is 31.1 with a standard error of 3.5 for the specification excluding the control variables and is of similar magnitude in the specifications including the control variables. Given that each

[40] One possible concern with this set of specifications is that it fails to explicitly account for the fact that in a number of years countries choose to have no income tax—a corner solution outcome. We estimated tobit models to explore this issue and found our main results robust to this alternative. Another possible concern which applies to both the linear specifications reported in the paper and the tobit models is that they assume that the data generating process that determines if an income tax is adopted at all is the same as the data generating process setting how progressive the system is. We adopted a hurdle analysis to explore this issue as well. Again, our main finding is robust to this possibility and the evidence suggests that participation in mass warfare is important both for the adoption of income tax systems and how progressive the system is.

[41] Note that the 20 missing observations in columns 2 and 5 in Table 1 are due entirely to missing GDP data for Canada prior to 1920.

specification includes both country fixed effects and year dummy variables, this is compelling evidence that mass mobilization for the First World War was associated with a statistically and substantively significant increase in the top tax rate.

Across both sets of specifications in Table 1, the results for the control variables are quite similar. There is little evidence of a significant partial correlation between the representation of Left parties in the national legislature and top tax rates. However, the estimated coefficient for the variable *Male Universal Suffrage* is positive and statistically significant in all four specifications. For example, the estimate is 7.0 with a standard error of 2.5 for the specification in column five with year dummy variables. But the magnitude of this effect is quite small compared to our estimated effect of war mobilization on the top tax rate. Table 1 also indicates a negative and significant partial correlation between *GDP per capita* and the *Top Rate*. Finally, there is some evidence in these estimates that as countries collected greater revenues relative to the size of their economies, they adopted more progressive income taxes with higher top rates. The estimated coefficient for the variable *Revenue to GDP* is positive and statistically significant in both specifications in which it is included. The inclusion of this variable does not, however, significantly attenuate the estimate for war mobilization. This result is therefore consistent with our view that while the need for finance was certainly part of the story of the adoption of progressive taxation during wartime, it does not account for dramatic impact of war mobilization on the willingness of governments to tax the rich at particularly high rates.

There are a couple of potential concerns about these estimates of the causal effect of war mobilization on progressivity. The implicit assumption in this approach is that, whatever the initial differences in top tax rates between participant and non-participant countries, absent mass mobilization for war these differences would have remained constant over the 1900-1930 period (i.e. these countries would have parallel trends) or at least that the differences after taking account of the time-varying control variables would have remained constant. Visual inspection of Figure 1 before the beginning of the war suggests that this assumption is at least plausible and is bolstered by the relatively good performance of the control variables.

Another potential concern about these estimates is the possibility that countries select into the war based on its anticipated impact on progressive taxation. A few considerations suggest that this is unlikely. First, a large literature on entry into the First World War suggests that few initial participants expected the long costly, mass mobilized war that ensued but rather anticipated a short and decisive conflict.[42] Second, it seems implausible given what was at stake that countries would choose to participate in the war even in part based on considerations about the impact of the war on the progressivity of taxation. Third, at least some accounts would suggest that with the partial exception of the US, that the participant countries in our sample did not select into the war at all much less as function of its anticipated effect on progressive taxation. A common account is that the event that precipitated the war was of course a political assassination and the participation of France, the UK, and Canada was not certain until Germany decided to follow the Schlieffen Plan for a general European war that started with a Western offensive.[43]

One might also ask whether the effect of the First World War on tax progressivity is limited to its impact on the very highest earners that pay the top rate. We think the result would be important even if this were true, but in our view, the finding indicates a larger impact of the war on progressivity.[44] To explore this claim further, we highlight three pieces of evidence.

First, and most simply, a complete assessment of British tax changes during World War I shows a marked increase in tax progressivity at almost all levels of income. Samuel (1919) conducted a painstaking analysis designed to estimate the tax burden including all types of national taxation and at all different levels of income before and after the war.[45] Figure 2 reports his main results. The overall picture is striking. The tax schedule on earned income

[42] The often cited quote from Kaiser Wilhem to the departing troops in August 1914 is "You will be home before the leaves have fallen from the trees."

[43] Even U.S. entry into the war does not seem likely to be a result of such a selection mechanism. Wilson won the 1916 election on a slogan of "he kept us out of war" and likely would have never entered the war if it were not for Germany's tactical decision to implement unrestricted submarine warfare.

[44] We choose to focus our main econometric analysis on top rates because it is for these that we have the most complete data across countries and time. Moreover, given that there are exemptions for low income citizens, the top rate provides a linear approximation of the degree of progressivity of the income tax.

[45] Taxes included in the analysis are income and super tax, death duties, inhabited house duty, and numerous indirect taxes such as those on purchases of tea, sugar, tobacco, and alcohol.

for 1913-1914 was essentially flat over most of the income distribution though moderately progressive for those with the highest incomes. By the end of the war it was significantly progressive across the entire distribution.[46] Overall, Samuel's evidence rules out the possibility for the British case that even if income taxes on the rich increased, other forms of taxation, the incidence of which fell primarily on the poor, may have increased even more.[47]

Second, we replicated our statistical analysis for an alternative measure of tax progressivity, *Income Tax Share*, equal to the percentage of central government revenues raised by the income tax.[48] Use of this measure depends on the assumption that income taxes are more progressive than alternative sources of revenue such as customs, excise, and general sales taxes. It should be remembered that 10% or less of the population was subject to income taxation at this time. In the specification with country and year fixed effects and control variables for *GDP per capita*, *Left Seat Share*, and *Male Universal Suffrage,* the estimated coefficient for *WWI Mobilization* is equal to 6.87 with a standard error of 2.20 (p-value is equal to 0.002). This estimate is statistically and substantively significant as mass mobilization for the war is associated with an increase of about 7 percentage points (a bit over one standard deviation of the variable *Income Tax Share*) in the percent of central government revenues raised by the income tax. Again, to the extent that war profits taxes fell more heavily on the wealthy, and certainly in light of the fact that it does not take into account increased inheritance taxes, this figure underestimates the effect of the war on progressivity. The result is consistent with the claim that mass warfare has a general impact on tax progressivity that is not limited to the highest income tax rates.

Third, we examined changes in progressivity within the top ten percent of income earners. Table 2 reports the changes in participant and non-participant countries in average marginal income tax rates for individuals at the 90th, 99th, and 99.9th percentiles and in top rates

[46] For earned income, the ratio of effective rates for 50,000 pounds to 100 pounds in income increased from 1.4 in 1913/1914 to 4.6 in 1918/19.

[47] Shirras (1943) conducts a similar analysis of overall changes in effective tax rates before and after the UK's entry into World War II (1937-38 versus 1941-42) and finds a significant increase in progressivity.

[48] The main source for this variable is Flora et al (1983). The source for Canada is Perry (1955, pp. 626-7). The source for the United States is the *Historical Statistics of the United States.* The source for Japan is Shiomi (1957, pp. 136-7).

before and after World War I.[49] The table shows that the war was associated with increased taxes in participant countries compared to non-participants at all of these high income levels but that these differences increased as incomes increased. For example, effective taxes at the 90th percentile increase by 3.8 percentage points more in participant than non-participant countries compared to a difference of 20.6 percentage points at the 99.9th percentile (51.8 percentage points for top rates). The tax rates reported here make it clear that the increases in income tax rates adopted as a result of World War I involved the very rich being asked to pay a much larger fraction of their incomes than were individuals who merely had incomes within the top decile. As we have already noted, very high top marginal tax rates adopted during World War I were generally paid by a small number of individuals, numbering in the hundreds. But when we look at a larger grouping, such as the top 0.1% of earners (generally 30,000 to 50,000 individuals in the countries considered here), the increase in taxes was also dramatic. In sum, we have every indication from the above information that the interpretation we have given to our analyses of top tax rates is accurate—mobilization for World War I was associated with a dramatic increase in tax progressivity.

3.4 Further Evidence on the Demand for Progressive Taxation

In this section, we consider how evidence on the timing of policymaking in participant countries and the political debates surrounding war finance lends additional support to our argument. Among our participant countries, Canada and the UK, are particularly enlightening because the extent and nature of mobilization for the war effort varied significantly within each. Each country relied on a volunteer army for a significant portion of the war before introducing conscription. While our argument suggests that mass mobilization under a volunteer army is likely to push attitudes about taxation toward greater progressivity, the logic of the argument implies that conscription will generate further pressures toward progressive taxation.

In Canada, the war arrived with a Conservative government led by Robert Borden.

[49] See the online appendix for information on the calculation of these rates.

Canada was initially quite successful in recruiting volunteers with many of them being recent immigrants from the United Kingdom. To finance the war, the government relied at first on tariffs, increased consumption taxes, and debt. As the war progressed, Canada did adopt a war profits tax in 1916, which in 1917 was revised to have a progressive scale.[50] Interestingly, it did not initially enact an income tax, and as late as April 1917, the Minister of Finance Thomas White noted the use of the income tax in Great Britain and the United States in his annual budget remarks, but citing a number of considerations such as administrative expense and fairness in a time of rising prices, he concluded that in Canada "it would appear to me that income tax should not be resorted to."[51] However, at the end of July 1917 White yielded to increasing pressure to tax the wealthy more heavily and introduced income tax legislation. Two characteristics of this policy change are significant. First, it followed the government's announcement in May that it intended to introduce conscription.[52] Second, it was adopted in a political environment demanding greater sacrifices on the part of the wealthy in response to war sacrifices. For example, Canadian Trade and Labor Congress leaders met with Borden in December 1916 seeking a commitment from him to not implement conscription and to equalize war burdens. Borden refused to tie his hands on conscription but even then acknowledged that "the government accepted and acted on the principle that the accumulated wealth of the country should bear its due proportion of contributions and sacrifices in the war."[53] Once the government enacted conscription, organized labor pushed even harder for various versions of the "conscription of wealth."[54] Though the more radical proposals did not find mainstream acceptance, arguments for greater sacrifices on the part of the wealthy certainly did. The Liberal Platform for the election in the fall of 1917 argued, even after the government had introduced the income tax and war profits tax, that "A fundamental objection to the government's policy of conscription is that it conscripts human life only,

[50] Hicks et al. (1942, p. 171).

[51] April 24, 1917 speech in House of Commons printed in The Globe, April 25, 1917, p.4.

[52] The Military Service Act was passed on July 6, 1917. Note that conscription was not implemented until a bitter election was fought in December 1917 primarily over the issue of conscription. Borden, running in coalition with many Liberal MPs under the Unionist Party label but against the Liberal Party's leader Wilfred Laurier, won a landslide victory.

[53] Borden Papers, cited in Robin (1966), p. 63.

[54] See Robin (1966).

and that it does not attempt to conscript wealth..."[55] The government's Unionist Platform, however, clearly also recognized the importance of the principle as it promised that "In order to meet the ever-increasing expenditure for war purposes and also to ensure that all share in common service and sacrifice, wealth will be conscripted by adequate taxation of war profits and increased taxation of income."[56] In short, in Canada, with greater mobilization from conscription, across the political spectrum support for progressive taxation on fairness grounds increased.

In the United Kingdom, the government at the start of the war was led by Herbert Asquith and the Liberal Party, though by May 1915, Asquith was forced to form a new coalition government with the Conservatives. Further

setbacks in the war led in 1916 to yet another coalition government with Lloyd George as the new Prime Minister. Like Canada, but on a much larger scale, the United Kingdom began the war with a successful voluntary recruitment campaign. The effect of the war on the progressivity of taxation was nonetheless more immediate than in Canada. Prior to the outbreak of hostilities, the government's 1914 budget proposal slightly reduced the income tax rate and proposed a combination of increased customs and excise taxes and reduced spending to balance the accounts.[57] It is clear that at least for 1914, the UK was not going to have a more progressive tax system absent the war. With the war, however, the first and second war budgets in 1914 and 1915 increased income tax rates significantly making the tax system more progressive.

In January 1916, the government introduced the Military Service Bill adopting conscription which passed quickly into law and was expanded several times throughout the remainder of the war. Importantly, once conscription was adopted it became central to political debates about how the war was to be financed and certainly appeared to lead to policy changes that made taxation even more progressive. Calls for progressive taxation to equalize sacrifices in the war, particularly those associated with conscription, came primarily in two forms. The

[55] Liberal Party Platform in Carrigan (1968), p. 72.
[56] Unionist Platform in Carrigan (1968), p. 77.
[57] "The Income-Tax Muddle," *The Times*, June 24, 1914, p. 9, col. G.

first was simply more progressive income taxation, the "conscription of income," while the second was a capital levy or literally the "conscription of wealth." These demands came in part from the expected places, such as the Trades Union Congress, which held "that, as the manhood of the nation has been conscripted to resist foreign aggression ... this Congress demands that such a proportion of the accumulated wealth of the country shall be immediately conscripted..."[58] but they were also reflected in publications like *The Economist,* which, as indicated above, previously opposed high levels of income taxation. To be clear, *The Economist* opposed a capital levy but supported "direct taxation heavy enough to amount to rationing of citizens' incomes" and explicitly endorsed an article in the *Economic Journal* by Harvard Economist O.M.W. Sprague entitled "The Conscription of Income,"[59] in which he argued that "Conscription of men should logically and equitably be accompanied by something in the nature of conscription of current income above that which is absolutely necessary."[60]

In the United Kingdom policy responded to demands for greater progressivity in income taxation. The third war budget, introduced in April of 1916 just after the conscription bill was passed, significantly increased the income tax with revenues from higher income taxes expected to generate over twice as much additional revenue as increases in indirect taxes.[61] The capital levy debate also intensified following the introduction of conscription though the levy was never adopted.[62]

4 War and Progressive Income Taxation in the Long Run

In this section we analyze the impact of mass warfare on progressive taxation for the period 1850 to 1970. The main objective of this analysis is to evaluate whether our findings for

[58] Trade Union Congress resolution, September 1916, cited in Daunton (1996), p. 890.

[59] *The Economist*, March 31, 1917, p. 579.

[60] Sprague (1917, p. 5). Note also that Sprague played an important role in the U.S. debate about funding the war lobbying publicly for high income and profits taxes.

[61] *The Economist,* April 8, 1916, p. 663.

[62] This was in part because the UK Treasury judged that the imposition of a levy of this type would actually significantly reduce the revenues generated from the recently adopted high top rates of income tax and estate duty. See Daunton (1996) on this subject.

the First World War generalize to a much longer time period. The pattern of participation and non-participation in World War I may be helpful in cleanly identifying the effect of mass warfare on demands for progressive taxation, but ultimately we are also of course interested in knowing whether mass warfare more generally might have had such an effect. In what follows we focus on reporting the results of our analyses pooling the eight countries in our sample together.[63]

To indicate whether or not a country engaged in mass warfare between 1850 to 1970, we constructed the variable *War Mobilization* equal to 1 if in a particular year, the country was engaged in an interstate war and at least 2 percent of the population was serving in the military and equal to 0 otherwise.[64] This variable captures the key characteristics necessary for conflict to have its hypothesized effect on progressive taxation. There must be an active war being 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 operationalization captures not only the high mobilization years during the First World War featured in the previous section but also country years for many of the participants in the Second World War as well as the Franco-Prussian and Korean wars.[65] Our data do not track civil conflicts.

The dependent variable for this analysis is the *Top Rate* variable described above. The

[63] We also conducted time series analyses for each country individually that allow for heterogeneity in the impact of war mobilization across cases. The results, reported in the online appendix, are consistent with the main claim of the paper that mass warfare raises the demand for progressive income taxation. For the analyses in this section, the values for *Top Rate* were missing for the Netherlands and Sweden in a few selected years and in Japan in a single year. We use linear interpolation to impute these values. The main results are robust and if anything stronger for the sample limited to the non-interpolated tax rate data. The starting and ending date for this analysis are somewhat arbitrary but generally determined by not wanting to extend the analysis too much before or after the first and last mass mobilization conflicts in our sample countries. To the extent possible with our data, we have experimented with different sample years, for example including the 1971-2000 period, and found the main results to be robust.

[64] Our data for incidents of war comes from the Militarized Interstate Dispute Data, Version 3.0 (2003). Our data on mobilization is from the Correlates of War Project, National Material Capabilities Data, Version 3.0 (2005).

[65] More precisely, our war mobilization variable is coded one for Canada in 1941-1945 (mobilization data is missing for Canada before 1920 and these years are not included in the analysis for this measure; adding these years for Canada by using other sources to code the mobilization variable does not substantially affect our estimates); for France in 1871, 1914-1920, 1940-1943; for Japan in 1941-1945; for the Netherlands in 1951-1952; for the UK in 1915-1918, 1940-1945; and for the US in 1918, 1942-1945, 1951-1953. Note also that the mobilization data is missing for Japan for 1850-1859. The early Canadian and Japanese missing mobilization data account for the missing 80 observations from our baseline estimates in Table 3.

main independent variable is *War Mobilization* and the control variables are *GDP per capita*, *Left Seat Share*, *Male Universal Suffrage*, and *Revenue to GDP* as defined above.

The *Top Rate* is modeled as:

$$TopRate_{it} = \rho TopRate_{it-1} + \alpha + \beta WarMobilization_{it} + \boldsymbol{\gamma}\mathbf{X}_{it} + \eta_i + \theta f(T_t) + \varepsilon_{it}$$

where i indexes each country and t indexes each year; *Top Rate* is the top tax rate measure; *War Mobilization* is the key measure of participation in mass warfare in a given year; X_{it} is a vector of control variables and is excluded in some specifications; $f(T_t)$ is a function of time, either a simple linear trend or vector of dummy variables for each decade between 1850-1970; ρ, α, β, γ,and θ are parameters to be estimated; η_i are country fixed effects parameters also to be estimated;[66] and ϵ_{it} is the error term. Because some countries experience more than one case of mass warfare in this analysis, our modeling strategy has changed in at least two important ways from the World War I analysis. First, rather than coding mass mobilization in terms of before and after, the variable *War Mobilization* is simply equal to one for mass mobilization war years and zero otherwise. Second, we include a lagged dependent variable to model the dynamics for the top rate series as an autoregressive process in which current realizations of the top rate variable depend on past realizations. These two changes in the specification are important for interpreting the results. Any shift in the top rate of taxation due to mass mobilization from war has a long run impact that is a function of precisely how responsive current values are to past realizations.[67]

Table 3 reports the ordinary least square regression estimates for this analysis with panel-corrected standard errors. The results in the first three columns use a common linear trend for the $f(T_t)$ function with and without control variables.[68] The estimates in the last three

[66] We omit one country due to the constant.

[67] Note again here that we explored alternative specifications that take into account censoring and that model adoption of an income tax and the degree of progressivity separately. Our main finding is robust to both these alternative specifications.

[68] Note that the 10 additional missing observations in columns 2 and 5 are due to missing *GDP per capita* data for 1860-1869 in Japan (there are some small number of additional missing values for GDP but in these cases it was reasonable to fill them in by interpolation). Missing values were also interpolated for the variable *Left Seat Share* for 1941-1945 France. There were more substantial missing data problems for the *Revenue to GDP* variable, especially for the 19th century. Although we used interpolation where possible, observations

columns use decade dummy variables for the $f(T_t)$ function.[69] Across all six specifications, the estimated coefficient for the variable *War Mobilization* is positive and statistically and substantively significant. In the specification reported in column two with a linear trend and control variables, the estimated coefficient is 4.16 with a standard error of 1.15. This estimate implies a long-run effect of 67.0. In the analogous specification with decade dummy variables, the implied long-run effect is 38.1. This is strong evidence consistent with the main argument of the paper.

Across the specifications in Table 3, the results for the control variables are negative. There is little evidence of a significant partial correlation between *GDP per capita*, *Left Seat Share*, *Male Universal Suffrage* and *Revenue to GDP* and top tax rates. This lack of evidence of a partial correlation between *Revenue to GDP* and top tax rates undermines the idea that over the course of the twentieth century, variation in top marginal income tax rates has been determined above all by changes in the need for revenue, and not the type of political changes associated with war that we emphasize. The explanation for this null result no doubt lies in the fact that if during the first half of the twentieth century top marginal tax rates rose along with the overall ratio of revenues to GDP, during the latter half of the twentieth century revenues have continued to increase while top income tax rates have almost invariably been reduced.

One interesting possibility we explored is whether the impact of war mobilization is greater in countries for which the left is well represented or for which suffrage rights are more extensive. We might, for example, expect the effect of mass wars on progressive taxation to operate more clearly or even exclusively in democratic regimes. We explored these hypotheses by adding interaction terms between the war mobilization measures and the suffrage and partisanship variables. While the estimate for the interaction term for mobilization and partisanship was in the hypothesized positive direction, it was not statistically significant. The estimate for the interaction term between mobilization and male universal suffrage was not

with missing data early in the time period were generally omitted. This accounts for the further decrease in observations in columns 3 and 6.

[69] Our key results are robust to substituting separate year dummy variables for the decade dummy variables.

in the anticipated direction nor was it statistically significant. Given the limited sample and intuitive appeal of these ideas, both hypotheses, nonetheless, merit further investigation.

In assessing these results, it is also useful to consider alternative measures of participation in mass warfare. We explored three. The first, *War Mobilization 2,* simply adjusts the threshold that needs to be mobilized for the war to count as a mass mobilization war up to five percent. The second, *War Mobilization 3,* codes only the two twentieth century world wars as mass mobilization conflicts. The third, *War Mobilization 4,* is equal to one if the country experienced a war year for which fatalities in the conflict exceeded one thousand deaths.

In specifications that mirror those reported in Table 3 but which substitute these alternative measures of mass warfare for *War Mobilization*, the results are substantively quite similar. The coefficient estimates for each of the alternative measures is positive and statistically significant. Perhaps more important than the robustness of the results is how variation in the magnitude of the estimates reflects the logic of the main argument of the paper. Focusing attention on the results with decade dummy variables and control variables included, the implied long-run effect for the most restrictive definition of what constitutes a mass war, *War Mobilization 2,* is equal to 51.1 and is the largest of the estimates for the alternative measures. The estimate for *War Mobilization 3*, which is the alternative measure closest to our preferred definition, is 41.5 which is somewhat larger than the estimate reported in Table 3 for *War Mobilization.* Finally the coefficient estimate for *War Mobilization 4*, the least restrictive definition of what counts for a mass mobilized war is 23.0. One interpretation of this pattern of estimates is that the more extensive is mobilization for a war, the greater is the impact on progressive income taxation.

This pattern is consistent with the key claim of the paper and is also helpful in thinking about the potential effects of participation by some of our sample countries in recent interstate conflicts such as the Gulf War, Iraq War, and Afghanistan War. Importantly, these wars were fought by relatively small, professional armies and did not involve mass mobilization on the scale of World War I and World War II. As such, it is not surprising that at least to date

participation in these wars has not seemed to increase progressive taxation.

5 Evidence on Individual Attitudes

One observable implication of our claim that mobilization for mass warfare increases demands for progressive taxation as a means of ensuring equal sacrifice is that war mobilization should lead citizens to prefer more progressive tax policies. While a complete evaluation of this implication is beyond the scope of this paper, we present in this section one such test using survey data for the United States during World War II.[70]

In July 1941, when U.S. participation in World War II was still an open question, Gallup asked the following question to a sample of the national adult population:[71]

> "In order to help pay for defense, the government will be forced to increase income taxes. If you were the one to decide, how much income tax, if any, would you ask a typical family of four with an income of $X to pay?"

Using a split ballot questionnaire, the survey elicited preferred tax rates for eight different income categories ranging from $1,000 per year to $100,000 per year.[72] Then in March 1942, after the attack on Pearl Harbor lead the U.S. to mobilize for the war, Gallup asked the identical questions with the exception that the words "the war" were substituted for "defense". The timing of the surveys and the corresponding difference in question wording allow for a before and after test of our claim that mobilization for mass warfare increases public demands for progressive taxation. Did the public's preferred tax schedule become more progressive?

Figure 3 presents the observed changes in opinions about taxation after the U.S. mobilized for the war. The three panels in Figure 3 report data for respondents in different socioeconomic status (SES) groups as determined by the interviewer's coding of the respondent on a

[70] For context on American public opinion about taxation, see Campbell (Forthcoming).

[71] See Berinsky (2006) on the methodological issues involved with using U.S. public opinion data from the 1930s and 1940s.

[72] Note that in the 1941 survey, the data were top coded for the lower income categories. This is why we report the median responses to measure central tendencies in the data. The results look quite similar when making a few assumptions and analyzing mean responses.

subjective class scale. The scale ranged from "poor" to "average" to "wealthy" and the "low", "middle", and "high" SES respondents in Figure 3 correspond to these categories.[73] In each panel, the preferred effective tax rate of the median respondent is plotted against the income of the hypothetical family of four referred to in the question. There are several important features of the data. First, across all three SES groups, the war had virtually no impact on how much taxes respondents thought relatively low and middle income families should pay. Second, across all respondents, mobilization for the war corresponds with substantially higher preferred income taxes for the rich—in most cases doubling at the higher income levels. Third, the increased progressivity in these tax schedules is, if anything, larger for middle and high SES respondents. This final observation is important because it is consistent with the claim that war sacrifices changed beliefs about what constituted a fair tax system across all income groups not just the poor. The evidence in Figure 3 is strongly consistent with the main argument of this paper.

6 Conclusion

We have argued that mobilization for mass warfare produces demands for progressive taxation as a means of ensuring greater equality of sacrifice in the war effort. There is substantial evidence consistent with this hypothesis. Focusing attention on the First World War, we find a significant upward shift in top tax rates in those countries that participated and mobilized for the war. Further, we find a substantial positive war mobilization effect based on difference-in-differences estimates that compare changes in top rates from 1900 to 1930 in participant and non-participant countries. This effect is not limited to top tax rates but reflects changes in other measures of progressivity as well. The paper also reports several forms of additional evidence to support our argument. First, the timing and political rhetoric of war financing debates during World War I is consistent with our claim that progressive taxation was a response to demands for equalizing war-time sacrifice. Second, we provide

[73] The intermediate category "poor plus" was coded with "poor" and "average plus" was coded with "wealthy".

evidence of an effect of mass warfare on top income tax rates over a much longer period from 1850 to 1970. Finally, we also report an analysis of survey data from the World War II era that is consistent with our argument.

Our argument and empirical results have important implications for debates about the determinants of redistribution and progressive taxation. It is often suggested that the rise of progressive taxation has depended on the development of electoral democracy as well as on the presence of political parties that mobilize lower income groups. Our findings are at best mixed on the claim that these developments alone account for the pattern of progressive taxation observed over the course of the twentieth century. Within this literature it is also often asked why there isn't more progressive taxation, that is why don't the poor soak the rich in electoral democracies? An important class of answers to this question focuses on beliefs about fairness. Our argument and evidence about the influence of war contribute to this class of answers by suggesting that financial sacrifices required of the wealthy depend on the type of sacrifices society demands from the rest of its citizens.

Finally, our findings also cast new light on current debates about progressive taxation and income inequality. Recent work on income inequality over the twentieth century has argued that much of the reduction in top income shares can be explained by events like wartime destruction and economic depression, which helped to destroy great fortunes, and that following these events the presence of high top rates of income tax and inheritance taxation prevented fortunes from becoming reconstituted. Our paper sheds light on the unanswered question of what force made it politically possible to sustain higher top tax rates. In the absence of mass warfare there may have been nothing inevitable about the development of highly progressive tax systems.

References

[1] Acemoglu, Daron, and James A. Robinson. 2000. "Why Did the West Extend the Franchise? Democracy, Inequality, and Growth in Historical Perspective." *The Quarterly Journal of Economics* 115 (4):1167-99.

[2] Acemoglu, Daron and James Robinson. 2008. "Persistence of Power: Elites and Institutions", *American Economic Review.*

[3] Alesina, Alberto, and G.M. Angeletos. 2005. "Fairness and Redistribution." *American Economic Review* Vol. 95 No. 4:960-80.

[4] Alstott, Anne, and Benjamin Novick. 2006. "War, Taxes, and Income Redistribution in the Twenties: the 1924 Veterans' Bonus and the Defeat of the Mellon Plan.", Yale Law School.

[5] Andre, Carl-Göran. 1975. "The Swedish Labor Movement and the 1917-1918 Revolution." In *Sweden's Development from Poverty to Affluence 1750-1970*, ed. S. Koblik. Minneapolis: University of Minnesota Press.

[6] Atkinson, Anthony and Thomas Piketty. 2007. *Top Incomes Over the Twentieth Century.* Oxford: Oxford University Press.

[7] Berinsky, Adam. 2006. "Public Opinion in the 1930s and 1940s: The Analysis of Quota Controlled Sample Survey Data." *Public Opinion Quarterly* 70(4):530-564.

[8] Besley, Timothy and Torsten Persson. 2009. "The Origins of State Capacity: Property Rights, Taxation, and Politics." *American Economic Review.* 99(4):1218-1244.

[9] Boix, Carles. 2003. *Democracy and Redistribution.* Cambridge: Cambridge University Press.

[10] Bowley, Arthur. 1930. *Some Economic Consequences of the Great War.* London: Butterworths.

[11] Campbell, Andrea. Forthcoming. *How Americans Think About Taxes.* Princeton: Princeton University Press.

[12] Caramani, Daniele. 2000. *Elections in Western Europe since 1815: Electoral Results by Constituencies.* London, Macmillan Reference.

[13] Dale, Iain. 2000. *Labour Party General Election Manifestos, 1900-1997.* London, Routledge.

[14] Daunton, M. J. 1996. "How to Pay For The War: State, Society and Taxation in Britain, 1917-24." *English Historical Review* 111 (443):882-919.

[15] Flora, Peter et al. 1983. *State, Economy, and Society in Western Europe since 1815.*

[16] Gagarin, Michael and Paul Woodruff. 1995. *Early Greek Political Thought from Homer to the Sophists.* Cambridge: Cambridge University Press.

[17] Grotard, Sandrine. 1996. "Le Premier Impôt sur les Bénefices d'Entreprises en France. La Contribution Extraordinaire sur les Bénéfices de Guerre." *Etudes et Documents, Comité pour l'Histoire Economique et Financière de la France* VIII:259-80.

[18] Gruber, Jonathan, and Emmanuel Saez. 2002. "The Elasticity of Taxable Income: Evidence and Implications." *Journal of Public Economics* 84:1-32.

[19] Hicks, J.R., U.K. Hicks, and L. Rostas. 1942. *The Taxation of War Wealth.* Oxford: Clarendon Press.

[20] Hintze, Otto. 1906. "Military Organization and the Organization of the State." In *The Historical Essays of Otto Hintze.*

[21] Kennan, Kossuth Kent. 1910. *Income Taxation: Methods and Results in Various Countries.* Milwaukee: Burdick and Allen.

[22] Kuczynski, R. R. 1923. "German Taxation Policy in the World-War." *The Journal of Political Economy* 31 (6):763-89.

[23] Levi, Margaret. 1997a. *Consent, Dissent, and Patriotism.* Cambridge: Cambridge University Press.

[24] Levi, Margaret 1997b "Conscription: The Price of Citizenship" in Robert Bates, Avner Greif, Margaret Levi, Jean-Laurent Rosenthal, and Barry Weingast (eds.) *Analytic Narratives*, Princeton, Princeton University Press.

[25] Lindert, Peter. 2004. *Growing Public: Social Spending and Economic Growth Since the Eighteenth Century.* New York: Cambridge University Press.

[26] Mackie, Thomas T., and Richard Rose. 1974. *The International Almanac of Electoral History.* London: Macmillan.

[27] Marwick, Arthur. 1965. *The Deluge: British Society and the First World War.* New York: W.W. Norton.

[28] Mitchell, B.R. 2003. *International Historical Statistics,* Basingstoke: Palgrave Macmillan.

[29] Murphy, Liam, and Thomas Nagel. 2002. *The Myth of Ownership.* Oxford: Oxford University Press.

[30] Musgrave, R.A. 1985. "A Brief History of Fiscal Doctrine." In A.J. Auerbach and M. Feldstein (eds.) *Handbook of Public Economics, Vol. I.* North-Holland: Elsevier Science Publishers.

[31] Peacock, Alan and Jack Wiseman. 1961. *The Growth of Public Expenditure in the United Kingdom.* Princeton: Princeton University Press.

[32] Perry, J. Harvey. 1955. *Taxes, Tariffs, and Subsidies: A History of Canadian Fiscal Development.* Toronto: University of Toronto Press.

[33] Piketty, Thomas. 1995. “Social Mobility and Redistributive Politics.” *Quarterly Journal of Economics* Vol. 110 No. 3 (August):551-584.

[34] Piketty, Thomas. 2003. "Income Inequality in France, 1901-1998, *Journal of Political Economy*, vol.111 pp.1004-1042.

[35] Piketty, Thomas. 2001. *Les hauts revenus en France au XXème siècle*. Paris: Grasset.

[36] Robin, Martin. 1966. “Registration, Conscription, and Independent Labour Politics, 1916-1917." *Canadian Historical Review,* XLVII (2), Reprinted in *Conscription 1917,* Toronto, University of Toronto Press.

[37] Roine, Jesper, and Daniel Waldenström. 2008. "The Evolution of Top Incomes in an Egalitarian Society: Sweden, 1903-2004", *Journal of Public Economics*. vol.92 pp.366-387.

[38] Saez, Emmanuel and Michael Veall. 2007. "The Evolution of High Incomes in Canada: 1920-2000", in A.B. Atkinson and Thomas Piketty (eds.) *Top Incomes Over the Twentieth Century: A Contrast Between Continental and English-Speaking Countries*, Oxford University Press.

[39] Samuel, Herbert. 1919. "The Taxation of the Various Classes of the People." *Journal of the Royal Statistical Society* 82 (2):143-82.

[40] Skocpol, Theda. 1992. *Protecting Soldiers and Mothers: The Political Origins of Social Policy in the United States*. Cambridge: Harvard University Press.

[41] Seligman, Edwin R.A. 1908. *Progressive Income Taxation in Theory and Practice*: *American Economic Association Quarterly.*

[42] ———. 1911. *The Income Tax: A Study of the History, Theory, and Practice of Income Taxation at Home and Abroad*. New York: Macmillan.

[43] Sidgwick, Henry. 1883. *The Principles of Political Economy*. London: Macmillan.

[44] Smith, Mapheus. 1947. "Population Characteristics of American Servicemen in World War II". *Scientific Monthly.*

[45] Sprague, O.M.W. 1917. "The Conscription of Income a Sound Basis for War Finance." *Economic Journal* 27 (105):1-17.

[46] Steinmo Sven 2003. "The Evolution of Policy Ideas: Tax Policy in the 20th Century." *British Journal of Politics and International Relations* 5 (2):206-36.

[47] Steinmo, Sven. 1993. *Taxation and Democracy*. New Haven: Yale University Press.

[48] Ticchi, Davide, and Andrea Vindigni. 2008. "On Wars and Political Development: The Role of International Conflicts in the Democratization of the West." Princeton.

[49] Tilly, Charles. 1990. *Coercion, Capital, and European States*. Cambridge: Blackwell.

[50] Titmuss, Richard. 1950. *Problems of Social Policy.*

[51] Titmuss, Richard. 1958. "War and Social Policy" in *Essays on the Welfare State*. London: George Allen and Unwin.

[52] van Zanden, Jan Luiten. 1997. "Old Rules, New Conditions, 1914-1940." In *Financial History of the Netherlands,* Hart, Jonker, & van Zanden (eds.), Cambridge: Cambridge University Press.

WWI Mobilization	32.811	36.378	32.882	31.068	34.006	30.722
	(4.461)	(4.115)	(4.410)	(3.503)	(3.408)	(3.603)
	0.000	0.000	0.000	0.000	0.000	0.000
GDP per capita		-10.317	-9.638		-5.943	-5.606
		(2.427)	(2.405)		(2.418)	(2.494)
		0.000	0.000		0.015	0.026
Left Seat Share		-0.123	-0.156		-0.087	-0.127
		(0.099)	(0.096)		(0.117)	(0.119)
		0.214	0.108		0.460	0.291
Male Universal Suffrage		7.856	6.097		6.998	5.466
		(2.356)	(2.326)		(2.514)	(2.642)
		0.001	0.009		0.006	0.040
Revenue to GDP			58.287			48.269
			(18.690)			(17.359)
			0.002			0.006
Linear Trend	Yes	Yes	Yes	No	No	No
Year Fixed Effects	No	No	No	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	248	228	222	248	228	222

Table 1: World War I and Progressive Income Taxation, 1900-1930, Pooled Estimates. The Table reports the results of OLS regressions for the variable *Top Rate* on the indicator variable for mass mobilization in World War I, *WWI Mobilization*, and various control variables for the years 1900-1930 for the eight countries in our sample. Each specification includes fixed effects for each country. The first three specifications condition on a common linear trend and the last three specifications include indicator variables for each year. The table reports the OLS coefficient estimates for each variable, their Newey-West standard errors in parentheses, and p-values. A constant term is included in each regression but not reported in the table.

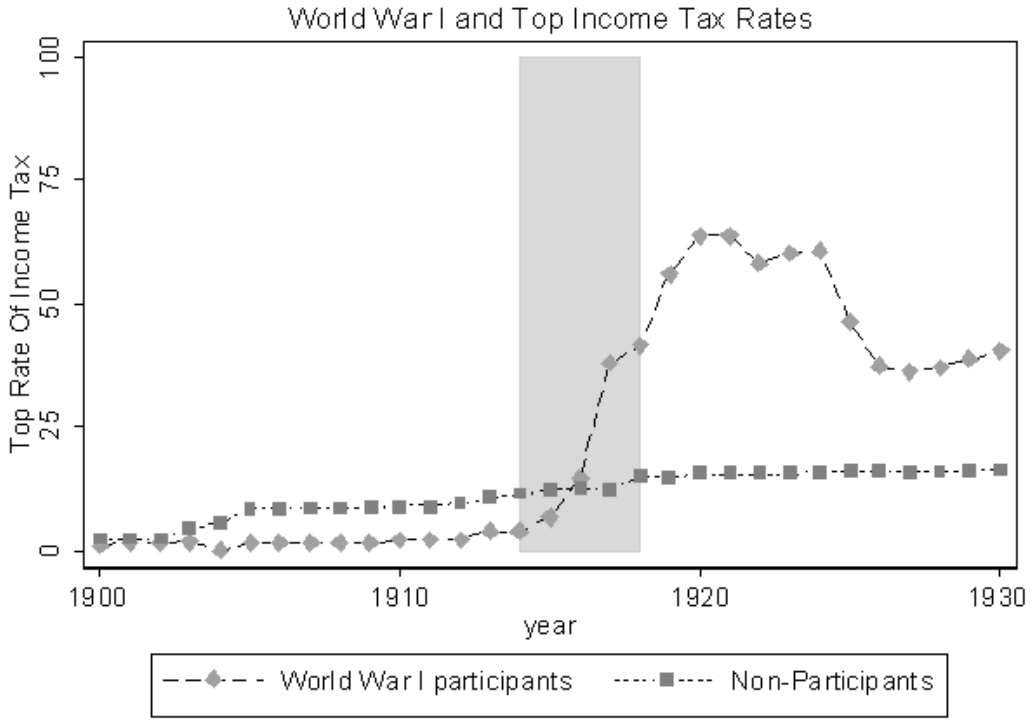

Figure 1: Compares average top marginal income tax rate in four high mobilization countries (US, UK, France, Canada) and four low mobilization countries (Sweden, Netherlands, Japan, and Spain). High mobilization is defined as participation and mobilization of more than 2.0% of population. See data appendix and text for full description of rate definitions and sources.

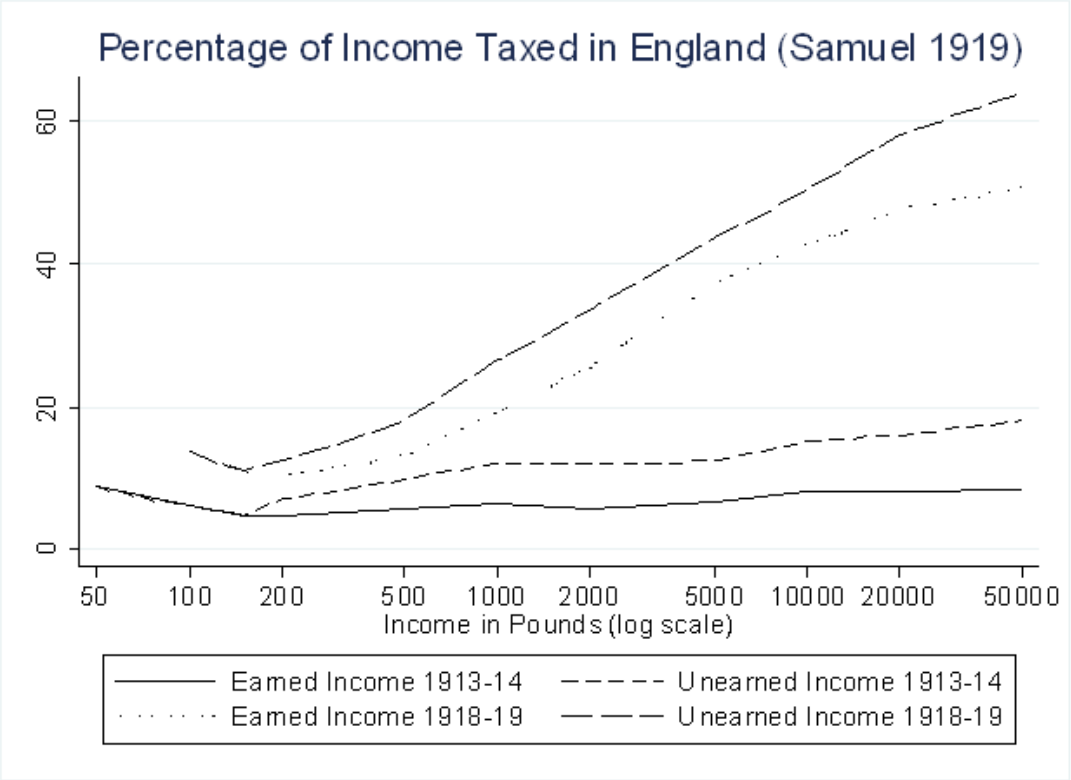

Figure 2: Reports Samuel's (1919) estimates of total taxes paid as a percentage of income before and after World War I. Includes income taxation, inheritance taxation, and all forms of indirect taxation. These calculations do not include the incidence of excess (war) profits duties.

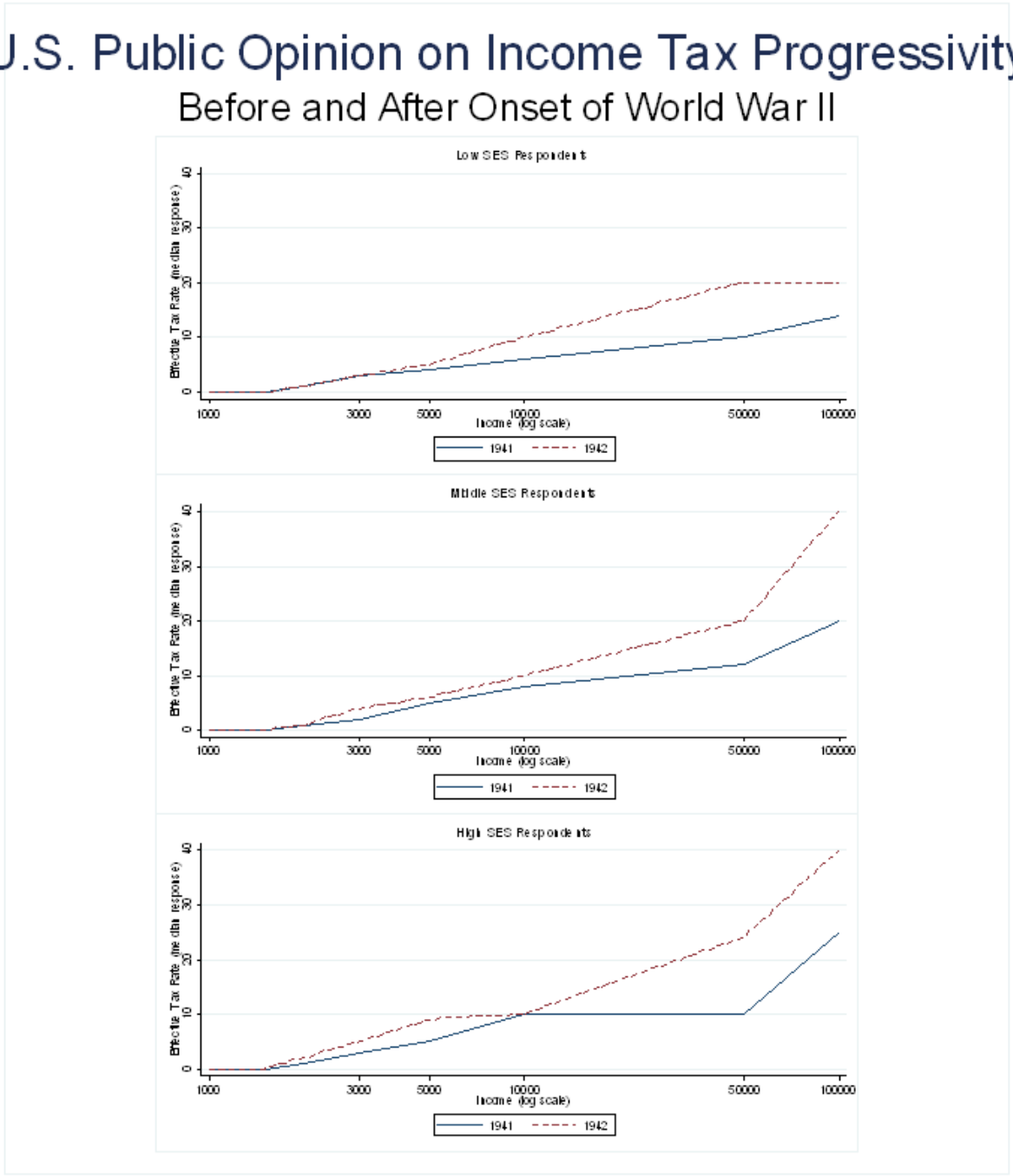

Figure 3: Reports median responses to Gallup questions eliciting effective income tax preferences in the U.S. public before and after the onset of World War II for a family of four with various levels of income. Preferred tax schedules are reported separately for low, middle, and high SES respondents as determined by the interviewer's coding of the respondent on a subjective class scale. The data sources are Gallup Poll #1941-0242 and Gallup Poll #1942-0263.

	Pre-War	Post-War	Difference
90th Percentile			
Participant Countries	0.0	4.3	4.3
Non-Participant Countries	2.8	3.3	0.5
Difference-in-differences			3.8
99th Percentile			
Participant Countries	1.4	12.1	10.7
Non-Participant Countries	3.7	5.0	1.3
Difference-in-differences			9.4
99.9th Percentile			
Participant Countries	2.6	25.0	22.4
Non-Participant Countries	5.7	7.6	1.9
Difference-in-differences			20.6
Top Rate			
Participant Countries	4.3	63.0	58.7
Non-Participant Countries	9.7	16.5	6.8
Difference-in-differences			51.8

Table 2: World War I and Progressive Income Taxation, Changes in Average Marginal Tax Rates. The table reports pre- and post-war average marginal income tax rates for the 90th, 99th, and 99.9th percentiles in participant and non-participant countries. See Data Appendix for sources.

Top Rate$_{t-1}$	0.935	0.938	0.905	0.913	0.912	0.883
	(0.014)	(0.015)	(0.021)	(0.018)	(0.018)	(0.023)
	0.000	0.000	0.000	0.000	0.000	0.000
War Mobilization	4.136	4.156	3.991	3.290	3.354	3.166
	(1.146)	(1.146)	(1.130)	(1.142)	(1.152)	(1.146)
	0.000	0.000	0.000	0.004	0.004	0.006
GDP per capita		-0.173	-0.344		-0.078	-0.269
		(0.176)	(0.190)		(0.214)	(0.231)
		0.323	0.069		0.714	0.243
Left Seat Share		0.021	0.008		0.006	-0.011
		(0.017)	(0.020)		(0.017)	(0.020)
		0.216	0.679		0.713	0.600
Male Universal Suffrage		-0.522	0.054		-0.832	-0.439
		(0.727)	(0.827)		(0.763)	(0.914)
		0.472	0.948		0.275	0.631
Revenue to GDP			6.039			3.790
			(4.858)			(4.818)
			0.214			0.431
Linear Trend	Yes	Yes	Yes	No	No	No
Decade Fixed Effects	No	No	No	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	888	878	726	888	878	726

Table 3: War Mobilization and Progressive Income Taxation, 1850-1970, Pooled Estimates. The Table reports the results of OLS regressions for the variable *Top Rate* on its lagged values, the indicator variable for war mobilization, *War Mobilization*, and various control variables for the years 1850-1970 for the eight countries in our sample. Each specification includes fixed effects for each country. The first three specifications condition on a common linear trend and the last three specifications include indicator variables for each decade. The table reports the OLS coefficient estimates for each variable, their panel-corrected standard errors in parentheses, and p-values. A constant term is included in each regression but not reported in the table.

A Electronic Appendix for "The Conscription of Wealth: Mass Warfare and the Demand for Progressive Taxation"

A.1 Data Description for Marginal Tax Rates

United States - We use the top marginal tax rate as reported in Joint Committee on Taxation (2001) for the years 1913-1970 and Kennan (1910) for 1862-1872. In both cases the rates presented are statutory top marginal tax rates, and these include any surtax. In order to estimate marginal tax rates at the 90th, 99th, and 99.9th percentiles of the income distribution we use the information in Piketty and Saez (2007) on the total number of tax units. McCubbin and Scheuren (1989) provide information on the number of individuals with income above specific levels. We have used rates in 1914 for pre-war and 1918 for post-war World War I.[1]

United Kingdom - For the top rate during the period between the inception of the income tax in 1799 and 1919 we refer to the standard rate of income tax as reported in Mitchell (1988) and to super tax rates as reported by Mallett and George (1929 p.399). For the period between 1920 and 2002 we use data on the top marginal tax rate on wage income provided by Anthony Atkinson and Andrew Leigh. In order to provide an estimate of marginal tax rates facing individuals at the 90th, 99th, and 99.9th percentiles we used Atkinson (2007), who provides an estimate of the total number of tax units, and Mallett and George (1929), who provide information on marginal rates for income tax and super tax, as well as information on the number of individuals earning income above specific levels. We have used rates for 1913/1914 for pre-war and 1918/1919 for post-World War I.

Netherlands -For the top rate Salverda and Atkinson (2007 p.455) report effective top share tax rates for the period following the establishment of the modern Dutch income tax 1914-1999. We use the series for the effective tax rate on the top 0.05% income group. For the period prior to 1914 we rely on Seligman (1908 p.79) and Kennan (1910 pp.135-145) who suggest a top rate of 3.2% on business (including salaried income) for this period. For tax

[1] As described in the paper, the analysis reported in Table 2 selects the pre-war and post-war years for each country that constitute troughs and peaks in rates near the beginning and end of the war.

rates at the 90th, 99th, and 99.9th percentiles we use the data in Salverda and Atkinson (2007 p.455). It should be noted that the rates they report are for effective tax rates for all individuals at or above a specific point in the income distribution, a measure that differs from one reporting the marginal rate faced by an individual at a specific point in the income distribution. We have used rates for 1914 for pre-war and 1921 for post-World War I.

Japan - Moriguchi and Saez (2007 Table A0) report statutory top marginal tax rates for Japan for all years 1886-2005. In order to estimate marginal rates facing individuals at the 90th, 99th, and 99.9th percentiles prior to and following World War I we use data from Shiomi (1957) who reports marginal tax rates in 1914 and 1918, the total number of taxpaying families, and a breakdown of the number of taxpaying families by income level. We have referred only to rates on Class III income.

Canada - Saez and Veall (2007 p.301) report a top marginal tax rate series for the period 1920-2000 calculated by taking the income for someone at a given threshold and then calculating tax liability by consulting the income tax schedule applicable in the given year. We use the maximum rate reported for each year (column 10). For 1917-1920 we refer to the top statutory marginal tax rate reported in Perry (1955 ch.10). For the pre and post-World War I comparison of marginal tax rates at the 90th, 99th and 99.9th percentile, rates are zero in the pre-war period due to the absence of a federal income tax. For the post-war rates we use the rates for 1920 reported in Saez and Veall for each of these income levels.

Sweden - Roine and Waldenström (2008) report top share tax rates for the years 1903-2004 including both the state (national) income tax and the communal (local) income tax. We use their series for the highest marginal tax rate. We also use their series for the marginal tax rates facing individuals at the 90th, 99th, and 99.9th percentiles of the income distribution. Sweden had no income tax prior to 1903. We used rates in place in 1911 for pre-World War I and 1920 for post-World War I.

France - For purposes of measuring the top marginal tax rate in France Piketty (2001 ch.4) provides full schedules showing marginal income tax rates for France for the years 1915 to 1998. He also reports a series for the top marginal tax rate that takes into account

surcharges (*majorations*), including those levied only on certain types of households, such as those without children (p.325, 566). His goal is to consider the marginal tax rate faced by the household in the most unfavorable position. Our goal is slightly different in that we seek exclusively to measure the marginal tax rate faced by the richest households. In addition, we also face some uncertainty whether any surcharges of the sort reported by Piketty for France have been taken into account in the other country series that we use. In order to maximize the likelihood of inter-country comparability, we constructed a top rate series for France based exclusively on the top marginal rates (*barèmes d'imposition*) reported in Piketty (2001 Tables 4-1 to 4-5). The main difference between the two series is that focusing exclusively on the *barèmes d'imposition* results in a lower tax rate for the period immediately after World War I and for the Second War War. As a result, our choice here would if anything bias our results against finding a significant effect of war mobilization on tax progressivity. In order to obtain an estimate of the marginal tax rate faced by individuals at the 90th, 99th, and 99.9th percentiles prior to and following World War I we used the tax schedules reported by Piketty, his figures for the total number of tax units (p.566 Table A1), as well as his figures for the number of tax units by income threshold (p.566 Table A-2 column 1). For the pre-WWI rate we have used the earliest available rate (1915) and the rate in 1920 for the post-war rate, the year in which a very sizeable increase in income taxation was implemented as part of a package to finance war debts.

Spain - Alvaredo and Saez (2007 Table F1) report top statutory marginal income tax rates for Spain for 1933-1973 onwards. Prior to this date Spain did not have a national income tax, implying that pre and post World War I rates were set at the same level (zero).

A.2 Interrupted Time Series Analysis, 1900-1930

In this section we report an analysis of the determinants of top marginal tax rates over the 1900-1930 period in which we allow for heterogeneity in the effect of mass mobilization across the cases. This approach allows for differences in the tax systems that might make comparisons across countries misleading.

For this analysis, we define the variable *Top Rate* equal to the highest marginal tax rate for a country in a given year. This variable is set equal to zero for years in which a country did not yet have an income tax. The key independent variable is *WWI Mobilization* which is set equal to 0 in each year before the country enters the war and 1 thereafter.[2] In some specifications, we include controls for levels of economic development, the representation of left parties in the legislature, and the extent of the franchise. The variable *GDP per capita* is equal to gross domestic product divided by the population.[3] The variable *Left Seat Share* is equal to the percent of seats in the national legislature held by a Left party in a given year.[4] The definition of the variable *% Electorate* varies across the four participant countries and as such is only used in the individual country analyses. For France and the UK, it is equal to the percent of the enfranchised population defined by age and sex that is eligible to vote.[5] For the US, *% Electorate* is equal to the percent of adults 21 years of age or older that are eligible by law to vote.[6] For Canada, *% Electorate* is equal to the percent of the total population that is registered to vote.[7]

The *Top Rate* series for each country is modeled as:

[2]For Canada, France, and the UK, the entry year is 1914 and for the US, it is 1917.

[3]The source for the gross domestic product data is Angus Maddison, Historical Statistics of the World Economy, `http://www.ggdc.net/maddison/ Mitchell`. The source for the population data is Correlates of War Project, National Material Capabilities Data, Version 3.0 (2005).

[4]As this variable is used elsewhere in the paper for all eight countries in our sample, this footnote describes the sources and coding for all eight cases. We adopt a relatively strict definition of a "Left" party that generally includes Socialists, Social Democratic, and Communist parties only. For France, Netherlands, Sweden, and UK, the source for this data is Flora et al (1983). French parties of the left include the Socialist Party, Independent Socialist Party, Socialists, Communist Party, and the United Socialist Party. Dutch parties of the left include the Social Democratic League, Social Democratic Workers, Socialist Party, Communist Party, Revolutionary Socialist Party, and the Pacifist Socialist Party. Swedish left parties include Social Democrats, Left Socialists, Communists, Hoglund Communists, Socialists, and Kilborn Communists. Left parties in the UK include Independent Labour Party, Labour Party, National Labour, Communist Party, and Social Democratic and Labour Party. For Canada, the source for this data is Mackie and Rose (1991). The Canadian Labour Party is coded a left party but the Candian Liberal Party is not. For Japan, the source for this data before 1945 is Scalapino (1968) and after 1945 is Mackie and Rose (1991). The Japanese Socialist Party is coded as a left party. For Spain, the source for this data is Caramani (2000). Spanish left parties include the Socialists and the Communists. Following Bartolini's classification, the Democratic party is not coded as a left party and therefore the US is always coded a zero.

[5]The source of this data is Flora et al (1983).

[6]The source for this data is Rusk (2001, p. 50).

[7]The source for this data is Elections Canada, A History of the Vote in Canada, Appendix Voter Turnout Since Confederation, `http://www.elections.ca`.

$$TopRate_t = \alpha + \beta WWI_t + \boldsymbol{\gamma}\mathbf{X}_t + \varepsilon_t$$

where t indexes year; *Top Rate* is the top tax rate measure; *WWI* is the key measure of war mobilization, *WWI Mobilization*; X_t is a vector of control variables and is excluded in the initial regression for each country; α, β,and γ are parameters to be estimated; and ϵ_t is the error term. We report Newey-West standard errors to account for serial autocorrelation.[8] The initial specifications that exclude the control variables are essentially difference-in-means tests before and after the start of the war. The specifications that include the control variables make this same comparison but adjust for before and after differences in the top rate that are a function of levels of economic development, the representation of Left parties in the legislature, and the extent of the franchise.

Table A1 reports the ordinary least square estimates for this analysis for each country. In the specifications without control variables, the estimated coefficient for the variable *WWI Mobilization* (β) is positive, statistically significant, and ranges in magnitude between 35.5 for France and 45.7 for the US. This confirms the before and after differences apparent in Figure 1 in the paper. Participant countries raised their top marginal tax rates during the war and kept them at higher levels throughout the decade that followed. The resulting average increase was quite large—around 40 percentage points.

A strength of this initial analysis is that the comparisons are within countries and not threatened by unobserved country differences. A weakness of the analysis is that for it to be a reliable estimate of the effect of the war, one must assume that top income tax rates would have remained approximately the same had each country not participated.

We can relax this assumption somewhat by including time-varying control variables for levels of economic development, the representation of left parties in the legislature, and the extent of the franchise. Table A1 reports these results for each of our four cases. Inclusion of the control variables has a substantial effect on the magnitude of the estimates for Canada,

[8] The results reported assume a single-period lag in the calculation of the Newey-West standard errors though they are robust to longer lag structures.

the UK, and the US, but in all four cases the differences in top rates after entry into the war are positive and statistically significant at least at the 0.10 level.[9]

For Canada, the available GDP per capita data does not start until 1920 and so this variable is omitted from the analysis. The estimates for *Left Seat Share* and *% Electorate* are not statistically significant, but their inclusion reduces the estimate for *WWI Mobilization* to 23.2 with a standard error of 12.5 (p-value is 0.075). For France, all three control variables are available, but none of the coefficient estimates for these measures are statistically significant and their inclusion has no impact on the estimated effect of *WWI Mobilization* (34.9 with a standard error of 6.7 and p-value equal to 0.000). For the UK, again all three controls are available. In this case, there is some evidence of the expected positive correlation between the percent of the electorate enfranchised and the level of the top income tax. The estimate for *% Electorate* is 1.0 with a standard error of 0.4 indicating that a 1 percentage point increase in the eligible electorate is associated with a 1 percentage point increase in the tax rate. This is a relatively large and substantively meaningful estimate. The inclusion of the control variables results in a coefficient estimate for *WWI Mobilization* of 19.7 with a standard error of 10.3 (p-value is equal to 0.067). Finally, given that our coding of *Left Seat Share* is constant throughout for the US, this variable cannot be included in the US analysis. For the specification with control variables for the US, the coefficient estimate for *WWI Mobilization* increases to 83.7 and is precisely estimated.

Overall the evidence in Table A1 indicates that there remain, consistent with our argument, significant differences in top income tax rates before and after mass mobilization for the First World War controlling for levels of economic development, the representation of Left parties in the legislature, and the extent of the franchise. The weak results with respect to the extent of the franchise are undoubtedly explained by the fact that in all four war participants a large fraction of the adult male population had the right to vote well before

[9] It is worth noting that further inclusion of the *Revenue to GDP* variable discussed in the paper generates somewhat mixed results. With this measure added to the single country analyses for 1900 to 1930, war mobilization is significantly associate with a higher top rate in France and the U.S. but not in Canada and the U.K. It is again worth noting that inclusion of the revenue variable does not significantly influence the pooled estimates in Table 1 in the paper.

the onset of the war. The results with regard to Left parties are more surprising given the common assessment that the aftermath of World War I was associated with the rise of the Left.[10]

A.3 Interrupted Time Series Analysis, 1850-1970

In this section, we analyze the impact of mass warfare on progressive taxation for the period 1850 to 1970 and allow for heterogeneity in the effect of mass mobilization across the cases. We model the top rate of income taxation for the four countries in our sample that have experienced wars that required mass mobilization and for which we have data for nearly the entire 120 year period.

To select these cases, we construct a variable indicating whether or not a country engaged in mass warfare between 1850 to 1970. We constructed the variable *War Mobilization* equal to 1 if in a particular year, the country was engaged in an interstate war and at least 2 percent of the population was serving in the military and equal to 0 otherwise.[11] The merits of this measure and the alternatives that we examined are discussed in the main text of the paper.

For our eight countries, six—Canada, France, Japan, the Netherlands, UK, and the US—experience mass interstate wars and two do not—Spain and Sweden. Our series for Canada is missing both mobilization data and *GDP per capita* data before 1920, and so we omit it from our individual country time series analysis. Similarly, the Netherlands has missing data problems that prevent an ideal time series analysis.

The dependent variable for this analysis is the *Top Rate* variable described above. The main independent variable is *War Mobilization* and the control variables are *GDP per capita*, *Left Seat Share*, and *% Electorate* as defined above.

The *Top Rate* series for each country is modeled as:

[10] Our results regarding the absence of an effect of partisanship on top tax rates parallel those of Atkinson and Leigh (2007).

[11] Our data for incidents of war comes from the Militarized Interstate Dispute Data, Version 3.0 (2003). Our data on mobilization is from the Correlates of War Project, National Material Capabilities Data, Version 3.0 (2005).

$$TopRate_t = \rho TopRate_{t-1} + \alpha + \beta WarMobilization_t + \gamma X_t + \theta T + \varepsilon_t$$

where t indexes year; *Top Rate* is the top tax rate measure; *War Mobilization* is the key measure of participation in mass warfare; X_t is a vector of control variables and is excluded in the initial regression for each country; T is a linear trend variable; $\rho, \alpha, \beta, \gamma$, and θ are parameters to be estimated; and ϵ_t is the error term. Note that because some countries experience more than one case of mass warfare in this analysis, our modeling strategy has changed in at least two important ways. First, rather than coding mass mobilization in terms of before and after, the variable *War Mobilization* is simply equal to one for mass mobilization war years and zero otherwise. Second, we include a lagged dependent variable to model the dynamics for the top rate series as an autoregressive process in which current realizations of the top rate variable depend on past realizations. These two changes in the specification are important for interpreting the results. Any shift in top rate taxation due to mass mobilization from war has a long run impact that is a function of precisely how responsive current values of the top rate are to past realizations.

Table A2 reports the ordinary least square estimates for the analysis for each country. Across all eight specifications, the coefficient for the variable *War Mobilization* (β) is positive and in all but one—Japan in the specification without controls—statistically significant.[12] These results are consistent with the main claim of the paper that mass warfare raises the demand for progressive income taxation. The estimate of β divided by one minus the coefficient on the lagged dependent variable yields the implied long-run effect of war mobilization on top tax rates. In the specifications with control variables, this estimate is equal to 53.8, 21.6, 108.3, and 74.1 for Canada, Japan, the UK, and the US respectively. Although there is significant variation in the magnitude of these estimates across countries, the substantive size of the estimated effects is quite large. At least for these cases, it appears that mass warfare matters a lot for how progressive the tax system is and that these effects persist. It

[12] Note that in specifications which also add the variable *Revenue to GDP,* the positive coefficient estimate for *War Mobilization* remains for all four countries.

is particularly interesting that we observe this effect, though somewhat smaller in magnitude, for Japan which would not conventionally be described as democratic for the years in which it experienced mass warfare.[13]

The results for the control variables are generally negative. There is little evidence in the individual country time series that *GDP per capita*, *Left Seat Share*, and *% Electorate* are systematically related to the top tax rate measure. Two partial exceptions to this generalization are the estimate for *% Electorate* for France and the estimate for *Left Seat Share* for Japan. The estimated coefficient for *% Electorate* for France is equal to 0.345 with a standard error of .191 and p-value equal to 0.074 and the estimate for *Left Seat Share* for Japan is 0.114 with a standard error of 0.068 and p-value equal to 0.099. Each of these estimates is suggestive of the expected impact of the expansion of the franchise and political representation of the Left on progressive taxation.

Overall, the evidence in Table A2 resonates strongly with our analysis of the First World War and with the pooled analysis in the text. Examining the record of income taxation from 1850-1970 suggests that countries that experience wars that require mass mobilization increase their top income tax rates substantially, and this response has long run consequences for the progressivity of the tax system. There is much less evidence consistent with the usual claim that expansion of the franchise and the rise of Left parties have driven progressive income taxation over the long run. As we pointed out in the discussion of the First World War results, the country time series analysis has the advantage of allowing heterogeneity in the impact of war on taxation but relies heavily on assumptions about how well we can project what would have happened to tax rates in the absence of mass warfare. In this long run analysis, we rely on the assumption of an autoregressive process with a single lag, a linear time trend, and our control variables. The analysis in the text pooling the data from all eight of our cases including information from countries that did not participate in mass warfare in the same years as others to construct an alternative set of comparisons for

[13] The smaller magnitude but significant effect for Japan is consistent with the main argument of the paper that mobilization for mass warfare increases tax progressivity generally but is also consistent with the possibility that this effect may be greater in democracies, a possibility for which the test discussed in the paper does not find evidence for but for which the paper suggests merits further research.

estimating the effect of war mobilization.

References

[1] Alvaredo, Facundo and Emmanuel Saez. 2007. "Income and Wealth Concentration in Spain in a Historical and Fiscal Perspective", CEPR Discussion Paper no.5836, revised version.

[2] Atkinson, A.B. 2007. "The Distribution of Top Incomes in the United Kingdom: 1908-2000" in Atkinson, A.B., and Thomas Piketty. 2007. *Top Incomes Over the 20th Century.* New York: Oxford University Press.

[3] Atkinkson, A.B., and A. Leigh. 2007. "The Distribution of Top Incomes in Five Anglo-Saxon Countries over the Twentieth Century." Mimeo.

[4] Caramani, Daniele. 2000. *Elections in Western Europe since 1815: Electoral Results by Constituencies.* London, Macmillan Reference.

[5] Flora, Peter et al. 1983. *State, Economy, and Society in Western Europe since 1815.*

[6] Joint Committee on Taxation. 2001. *Overview of Present Law and Economic Analysis Relating to Marginal Tax Rates and the President's Individual Income Tax Rate Proposals* (JCX-6-01) March 6th.

[7] Kennan, Kossuth Kent. 1910. *Income Taxation: Methods and Results in Various Countries.* Milwaukee: Burdick and Allen.

[8] Mackie, Thomas T., and Richard Rose. 1974. *The International Almanac of Electoral History.* London: Macmillan.

[9] Mallett, Bernard, and C. Oswald George. 1929. *British Budgets: Second Series 1913-14 to 1920-21.* London: Macmillan.

[10] Mitchell, B.R., 1988. *British Historical Statistics.* Cambridge: Cambridge University Press.

[11] McCubbin, Janet and Fritz Scheuren. 1989. "Individual Income Tax Shares and Average Tax Rates, Tax Years 1916-1950", *Statistics of Income Bulletin*, Vol.8. no.3.

[12] Moriguchi, Chiaki and Emmanuel Saez. 2007. "The Evolution of Income Concentration in Japan, 1886-2005: Evidence from Income Tax Statistics", working paper, Northwestern University and University of California Berkeley.

[13] Perry, J. Harvey. 1955. *Taxes, Tariffs, and Subsidies: A History of Canadian Fiscal Development.* Toronto: University of Toronto Press.

[14] Piketty, Thomas. 2001. *Les hauts revenus en France au XXème siècle.* Paris: Grasset.

[15] Piketty, Thomas and Emmanuel Saez. 2007. "Income and Wage Inequality in the United States, 1913-2002" in Anthony Atkinson and Thomas Piketty (eds.) *Top Incomes over the Twentieth Century.* Oxford: Oxford University Press.

[16] Roine, Jesper, and Daniel Waldenström. 2008. "The Evolution of Top Incomes in an Egalitarian Society: Sweden, 1903-2004", *Journal of Public Economics*. vol.92 pp.366-387.

[17] Rusk, Jerrold G. 2001. *A Statistical History of the American Electorate*. Washington, DC: CQ Press.

[18] Saez, Emmanuel and Michael Veall. 2007. "The Evolution of High Incomes in Canada: 1920-2000", in A.B. Atkinson and Thomas Piketty (eds.) *Top Incomes Over the Twentieth Century: A Contrast Between Continental and English-Speaking Countries*, Oxford University Press.

[19] Salverda W. and A.B. Atkinson. 2007. "Top Incomes in the Netherlands over the Twentieth Century" in A.B. Atkinson and Thomas Piketty (eds.) *Top Incomes Over the Twentieth Century: A Contrast Between Continental and English-Speaking Countries*, Oxford University Press.

[20] Scalapino, Robert. 1968. "Elections and Political Modernization in Prewar Japan." In *Political Development in Modern Japan*, ed. R. E. Ward. Princeton: Princeton University Press.

[21] Seligman, Edwin R.A. 1908. *Progressive Income Taxation in Theory and Practice*: *American Economic Association Quarterly*.

[22] Shiomi, Saburo. 1957. *Japan's Finance and Taxation, 1940-1956*, New York, Columbia University Press.

	Canada		France		UK		US	
WWI Mobilization	42.012	23.162	35.529	34.915	41.246	19.694	45.740	83.667
	(8.500)	(12.512)	(6.692)	(6.749)	(4.763)	(10.295)	(8.104)	(9.393)
	0.000	0.075	0.000	0.000	0.000	0.067	0.000	0.000
GDP per capita				2.906		-0.699		-14.459
				(10.168)		(5.317)		(8.175)
				0.777		0.896		0.088
Left Seat Share		-21.236		-0.183		-0.052		
		(32.364)		(0.606)		(0.212)		
		0.517		0.765		0.807		
% Electorate		1.936		1.455		1.046		-0.570
		(1.435)		(1.166)		(0.436)		(0.222)
		0.188		0.223		0.024		0.016
Observations	31	31	31	31	31	31	31	31

Table A-1: World War I and Progressive Income Taxation, 1900-1930, Individual Country Estimates. The Table reports the results of OLS regressions for the variable *Top Rate* on the indicator variable for mass mobilization in World War I, *WWI Mobilization*, and various control variables for the years 1900-1930. The table reports the OLS coefficient estimates for each variable, their Newey-West standard errors in parentheses, and p-values. A constant term is included in each regression but not reported in the table.

	France		Japan		UK		US	
Top Rate$_{t-1}$	0.923	0.925	0.827	0.730	0.963	0.952	0.912	0.922
	(0.036)	(0.037)	(0.052)	(0.067)	(0.015)	(0.022)	(0.034)	(0.048)
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
War Mobilization	6.364	4.036	2.740	5.823	4.831	5.198	4.938	5.780
	(1.614)	(1.780)	(2.392)	(2.830)	(0.923)	(1.020)	(2.786)	(2.864)
	0.000	0.025	0.255	0.042	0.000	0.000	0.079	0.046
GDP per capita		0.253		-0.304		-0.373		-0.774
		(0.482)		(0.445)		(0.532)		(0.496)
		0.601		0.496		0.485		0.122
Left Seat Share		0.036		0.114		0.030		
		(0.058)		(0.068)		(0.037)		
		0.530		0.099		0.414		
% Electorate		0.345				0.010		0.004
		(0.191)				(0.038)		(0.078)
		0.074				0.799		0.959
Year	0.051	0.017	0.151	0.233	0.039	0.046	0.076	0.136
	(0.028)	(0.043)	(0.046)	(0.065)	(0.017)	(0.058)	(0.036)	(0.058)
	0.069	0.687	0.001	0.001	0.021	0.428	0.036	0.020
S.E.R.	5.222	4.709	4.681	4.811	2.720	2.736	6.980	6.966
Observations	121	116	111	101	121	121	121	121

Table A-2: War Mobilization and Progressive Income Taxation, 1850-1970, Individual Country Estimates. The Table reports the results of OLS regressions for the variable *Top Rate* on its lagged value, the indicator variable for mass mobilization in war, *War Mobilization*, a year trend, and various control variables for the years 1850-1970. The table reports the OLS coefficient estimates for each variable, their standard errors in parentheses, and p-values. A constant term is included in each regression but not reported in the table.