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**The Political Economy of Redistribution in the U.S. in the Aftermath
of World War II - Evidence and Theory***

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Abstract

We present legislative, historical and statistical evidence of a substantial upward ratchet in transfers and taxes in the U.S. due to World-War II. This finding is explained within a political-economy framework with defense spending responding to a war threat and a median voter in the population who interacts with a (richer) agenda setter in Congress in setting redistribution. While the setter managed to cap redistribution before the War, the War itself raised the status-quo tax burden and improved tax collection technology, strengthening the bargaining power of the median voter as defense spending receded. This permanently raised the level of redistribution.

Keywords: World-War II, Great Depression, ratchets, transfers, taxes, redistribution, agenda setter.

JEL codes: E62, E65.

1 Introduction

Major wars tend to cause an upward ratchet in the overall size of government. Although the GDP share of government recedes when the war is over, it usually does not go back all the way to its pre-war level. This type of ratchet has been well known for some time.¹ Relatively less attention has been paid to, potentially permanent, effects of wars on the composition of public expenditures, even though these effects may have important allocative consequences and, hence, are worthy of serious investigation. Using data from five World War-I (WW-I) belligerent countries (the U.K., the U.S., Germany, Canada and Denmark), Dudley and Witt (2004) note a permanent increase in the total share of civilian public expenditures (including transfers) in those countries. They argue that this phenomenon is due to increases in citizens' willingness to share during and following the war along with the introduction of mass communications.²

Obviously, by the government's budget constraint, increases in the share of civilian expenditures have to be accompanied by increases in the share of tax revenues or by decreases in spending on other components. Using data on top incomes in eight countries over the twentieth century from Atkinson and Piketty (2007), Scheve and Stasavage (2010) present convincing evidence that the necessary higher taxes during WW-I were obtained mainly by raising the tax burden on incomes at the higher end of the income distribution. In particular they find that, during and after WW-I top income tax rates rose dramatically more in countries that participated in the war than among non-participants. The U.K. Labour Party explicitly advocated highly progressive tax schedules referring to it in a 1918 Manifesto as the "conscription of wealth". Those results are consistent with the view that political systems in democratic societies are much more likely to substantially raise tax burdens on the upper classes in the face of major wars than to raise taxes in order to redistribute income from the rich to the poor during peace times.³

This paper investigates, first empirically (from various angles) and then theoretically, the relationship between defense expenditures and transfer payments in the U.S. during the dramatic years starting with the onset of the Great Depression (GD) and the post-World War-II (WW-II) era. Following a discussion of alternative transfer measures the paper opens by providing evidence of substantial ratchets in the shares of federal transfers and taxes (or revenues) following WW-II.⁴ The evidence draws on several sources. One source relies on the political and legislative developments leading to the emergence of new and the expansion of existing redistributive programs. Most notable are the Servicemen's

¹Higgs (1987) for the U.S. and Peacock and Wiseman (1961) for the U.K., among others, argue that the share of government in the economy rises permanently as a result of major wars.

²By contrast, Rockoff (1998), who explores war-related ratchets in civilian public spending for a number of U.S. wars, finds little evidence of a ratchet in this component of expenditures.

³We find a similar phenomenon for the U.S. during and following World War-II (see Subsection 2.4 below).

⁴In the following, "shares" for fiscal and related aggregate variables refer to shares of GDP, unless otherwise noted. Moreover, throughout, all fiscal variables refer to those of the federal government.

Readjustment Act of 1944 (known informally as the "G.I. Bill") and the 1950 Social Security Amendments. Next, regression analysis using NIPA data suggests that over the war cycle, the share of transfers is negatively related to the share of defense and that the share of taxes (or revenues) is positively related to the share of defense. The main finding of interest is that the increase in the share of transfers (per unit change in the share of defense) when the share of defense goes down after the War is significantly higher than the decrease in this share when defense expenditures go up at the beginning of the War. This finding is confirmed using the Historical Statistics of the United States (2006) as an alternative data source. To the best of our knowledge this finding has not been systematically documented before. We also provide an assessment of a longer-run legislative ratchet effect in social security. This assessment is motivated by the notion that the full impact of new programs and the expansion of existing programs materializes only in the longer run, because the eligible groups expand and precedent is taken for further expansions.

The existence of this transfers ratchet is consistent *inter alia* with the introduction of the G.I. Bill for returning WW-II veterans that provided a variety of benefits to this group, as well as with substantial increases in social security coverage and benefit rates and the federal minimum wage rate shortly after WW-II (McCarty et al., 2006). In parallel to the transfers ratchet, the increase in the share of taxes or revenues per unit increase in the share of defense at the beginning of WW-II is significantly higher than the decrease in those shares per unit of decrease in the share of defense when the War is over. The evidence for ratchets in taxes or revenues is supported by developments in tax collection technology and ratchets in statutory tax rates and the average tax burden around WW-II.

It is instructive to compare those war ratchets with the experience during and following the GD. At the time, the GD was widely viewed by policymakers as an emergency similar to war. One may therefore legitimately ask whether the GD led to a permanent expansion of the shares of revenues and, in particular, of transfers. The answer is that the share of federal revenues fell from around 3.7 percent of GDP in 1929 to a minimum of 2.6 percent two years later, after which it rose to over 7 percent and remained in this range till the end of the thirties. The share of transfers rose from less than 1 percent in 1929 to a peak of 3.3% in 1934, but fell back to about 2% around the end of the thirties. During and around WW-II, federal revenues rose from about 7.2% of GDP in 1939 to a peak of 19.6% in 1943. Although it receded after the war, the share of revenues during this after-war period fluctuated within a substantially higher band (between 14.5% and about 18%) in comparison to the immediate pre-war period. Transfers fell from 2% in 1940 to less than 1% in 1943, but went up after the war and stabilized around or above 5% over the several post-war years. Thus, while the decade following the onset of the GD was characterized by (roughly) a doubling in the shares of federal revenues and of transfers, there was a further doubling in those shares between the pre-war and the post-war periods.

Next, the paper presents a political-economy explanation for the WW-II ratchets in

transfers and tax revenues. An important element of this explanation is the war-induced change in the status-quo tax schedule of the type documented by Scheve and Stasavage (2010) for WW-I and in this paper for WW-II. The theoretical framework is characterized by micro-economic labor-leisure decisions (subject to tax distortions), defense spending responding to a war threat and a Congress in which a relatively wealthy agenda setter interacts with a poorer median voter to determine the magnitude of transfers. The formal model combines a microeconomic framework with an agenda setter of the type employed by Romer and Rosenthal (1982) to describe the choice of school expenditures by local governments in the U.S. This is one example of a framework in which political institutions affect policy outcomes in the spirit of "structure induced equilibrium" à la Shepsle and Weingast (1981, 2011). Under conditions of the type experienced by the U.S. economy at the eve of WW-II the model predicts upward ratchets in both transfers and taxes in the post-war period.

The interpretation of the actual course of history in terms of the model is as follows. The outbreak and persistence of the GD substantially raised the median voter's demand for redistribution and, by implication, for the taxes required to finance it. This popular demand was accommodated under Roosevelt's presidency largely through the creation of the social security system. However, due to the opposition of the relatively wealthier agenda setters in Congress who were concerned with the consequences of excessive increases in transfers for current and future tax burdens, and out of fear that too radical redistributive demands would prohibit the passage of the social security legislation, the accommodation of the popular demand for transfers was incomplete (see Orloff, 1988, p.80).⁵ Thus, the Meltzer and Richard (1981) type of conflict between wealthier and poorer individuals over the burden of taxation needed to finance transfer payments limited the satisfaction of popular demand for redistribution during the thirties. By contrast, in the face of the national emergency triggered by the outbreak of WW-II hostilities a solid majority supported higher (current and future) taxes to finance the defense effort, and taxes went up dramatically. WW-II ended, therefore, with a substantially higher status-quo tax burden than the status-quo burden prior to the war.

With the victory over Germany and Japan in sight the new status quo tax burden became too high for both the agenda setter in congress as well as for the median voter. Consequently, both had an interest in lowering taxes. The setter because of his traditional dislike for large government and the median because the war had pushed taxes even beyond his ideal point. Under those circumstances the setter could successfully propose a budgetary package that would cut taxes to some extent and use the remaining "peace dividend" resulting from the fall in defense spending to increase redistribution. This package benefited both the setter and the median relative to the post-war tax status quo. The upshot is that the post-WW-II ratchets in transfers and taxes constituted a

⁵Passage of the Social Security Act in the thirties was facilitated by the fact that old-age social security initially was a fully-funded program and was, therefore, perceived as an insurance scheme.

long-delayed reaction of the political establishment to the partially unsatisfied popular demand for redistribution in the aftermath of the GD. By raising the status-quo tax schedule (mainly on high incomes) WW-II provided the “supply” of taxes to satisfy this demand.^{6,7} Redistribution was initially focused on a large temporary program aimed at returning war veterans. The gradual phasing out of the G.I. bill expenditures along with the gradual weakening of the political resistance to further redistribution allowed legislators to permanently expand the social security system at the beginning of the fifties.

Thus, we provide political-economy underpinnings for the well-known "displacement effect" of Peacock and Wiseman (1961), whereby public expenditures remain high, though of a different composition, after the war, because individuals have become accustomed to the higher taxes that finance them. A corollary of our theory is that, if WW-II had not taken place, the GDP share of transfer payments in the post-war period would have been permanently lower.

The remainder of the paper is organized as follows. Following a discussion of alternative measures of transfers and of the institutional context of redistribution, Section 2 presents various types of empirical evidence on post WW-II ratchets in federal transfers and in tax revenues and discusses the related legislative steps taken by Congress. Section 3 introduces a model of political-economic interactions leading to post-war ratchet effects in transfers and taxes. Section 4 discusses some broader political and legislative aspects of the post WW-II bulge in redistribution and revenues. Section 5 concludes.

2 Background data and evidence on post WW-II ratchets in transfers and taxes

This section provides evidence for ratchets in transfers and taxes from various perspectives. To set the stage, Figure 1a plots the shares of federal transfers and defense expenditures between 1929 and 2003. Since our theoretical model below tries to capture the federal political decision making process, we use only data on federal transfers. Hence, in the following, when referring to transfers, we refer to federal transfers.

We use transfers data from two sources. While aggregate figures on transfers from the two sources provide similar broad pictures for the time path of transfers before, during and following WW-II, it is extremely difficult to pinpoint in detail the origin of the differences between the series extracted from the two sources. Hence, we use both of them in parallel to check the robustness of our findings. The first source is the National Income and Product Accounts (NIPA) (2009, Table 3.2, Column Z), which start in 1929.

⁶Hercowitz and Strawczynski (2004) document the existence of an expenditure ratchet in the OECD economies. As tax revenues go up due to a higher tax base during expansions some of the higher base is used to raise expenditures. However, when the tax base goes down during recessions only part of the additional appropriations are rolled back. Thus, as in our paper, but for different reasons, the existence of additional revenues generates additional expenditures.

⁷In a cross-country study of tax ratchets around wars, Scheve and Stasavage (2012) argue that status-quo bias may be one explanation of such ratchets.

The transfers depicted are the share of "current transfer payments", henceforth denoted TR , the most comprehensive transfers measure in the NIPA. Not surprisingly, given the relative magnitude of the "war shock", the negative relationship between the shares of transfers and defense expenditures seems strongest during and around WW-II, although it is also visible for the Korean War and, to a lesser extent, the Vietnam War.⁸

Figure 1a also depicts the share of "total public expenditures on social welfare", henceforth denoted SW , which is the most comprehensive measure of transfers from our second source, the Historical Statistics of the U.S. (2006, Table Bf 196). This line excludes the so-called 1936 veteran bonus, which provided for the immediate payment to WW-I veterans of a lump-sum benefit that was originally due only in 1945. The bonus is unrelated to the mechanisms highlighted in the paper and should be considered an outlier in the data.⁹ This line also excludes "public aid" (Historical Statistics of the U.S., 2006, Table Bf 198), which for the largest part is composed of expenditures on federal work programs (see Historical Statistics of the U.S., 2006, Tables Bf 673 - 678). The reason for excluding public aid is these latter expenditures were driven by the large fraction of needy and unemployed workers due to the GD and this was not supposed to last beyond the Depression. Indeed, from the mid-1940s and on public aid constituted a relatively small and rather constant addition to the remainder of the public expenditures on social welfare. Our second measure of transfers from the Historical Statistics also exhibits a clearly visible post WW-II ratchet.

Table 1, based on the NIPA data, provides some key background macroeconomic and budgetary figures for the period from the onset of the GD through WW-II and its aftermath. Unemployment rose dramatically during the early thirties, reaching a maximum of about 25% in 1933. During the entire decade of the thirties defense spending remained at a level of barely over 1.5% of GDP. It then took off rapidly from 1940 to reach a maximum of 43% of GDP in 1944. In the ensuing years, the share of defense spending declined rapidly, but with a minimum of 6.8% in 1948 it remained substantially above the pre-war levels. Most important from the perspective of this paper, while the share of federal transfers in GDP rose during the first couple of years of the GD, this share was invariably and substantially lower than the levels it attained after the war. The contrast is even more striking in view of fact that much of the rise in the share of transfers during the thirties occurred when output was low or even falling, while the post-war increase in the share of transfers materialized against the background of a rising level of output. This data raises the possibility that the increased popular demand for redistribution triggered by the GD

⁸The war years are 1942-1945 for WW-II, 1951-1953 for the Korean War and 1967-1970 for the Vietnam War.

⁹The bonus was moved forward from 1945 to 1936 following veterans' violent demands triggered by their suffering during the Great Depression. By far most of the bonus was paid out in 1936 and a remaining small fraction in 1937. Therefore, we corrected welfare spending on veterans (Historical Statistics of the U.S., 2006, series Bf 200 or Bf 246) by subtracting for 1936 and 1937 the numbers for "Welfare and other" (series Bf 254) minus the average of "Welfare and other" spending in 1935 and 1938 (these being an estimate of non-bonus "Welfare and other" spending on veterans).

did not fully materialize until after WW-II, possibly creating a post-war ratchet in the share of transfers.

2.1 The redistributive nature of the transfers measures

An important element of this paper concerns the extent to which redistribution from richer to poorer segments of the population has changed between the pre-war and the post-war period. We focus on all the programs that produce such redistribution and argue below that all the transfers measures used in this paper from both the NIPA and the Historical Statistics of the U.S. possess this feature to a non-negligible extent, although obviously there may be certain specific components of these measures that produce only very little redistribution.

We thus start by discussing these transfers measures and to what extent they redistribute from the richer to the poorer groups in society. Such transfers may consist of benefits to certain eligible groups financed from the governments' general revenues. Tax payments by richer individuals generally exceed those by poorer individuals, while richer individuals typically make less use of benefit programs. However, also transfers paid from direct contributions are redistributive as long as they differ from the benefits that specific groups receive. An important case is when individuals contribute a fixed fraction of their income, but receive a flat benefit or a benefit that rises less than proportionally in income – which is the case under the old-age social security program discussed in more detail below. This gives rise to redistribution from high- to low-income groups.

To assess the redistributive character of our transfers measures, we explore the breakdown of the NIPA "current transfer payments". It is the sum of "government social benefits" and "other current transfer payments" (see NIPA, 2009, Table 3.2). The latter variable is composed of "grants-in-aid to state and local governments", which includes the federal matching grants as co-financing of state and local redistributive programs, and "(net) other current transfer payments to the rest of the world". In turn, the latter are the sum of U.S. government military and nonmilitary grants in cash and nonmilitary grants-in-kind to foreign governments. Government social benefits are composed of "government social benefits payments to persons" and "government social benefits payments to the rest of the world". The latter are U.S. government transfers, mainly social security benefits, to former residents of the United States. While the other components of "current transfer payments" contain parts that may not be entirely aimed at redistribution, the redistributive character of "government social benefits payments to persons" is rather undisputed. The NIPA defines it as income payments to persons, generally in monetary form, for which no current services are rendered. It makes up about two-thirds of "current transfer payments" and it can be broken down further into "benefits from social insurance funds", "veteran benefits", "food stamp benefits", "black lung benefits", "supplemental security income", "direct relief", "earned income tax credit" and a small residual component (see NIPA, 2009, Table 3.12). In fact, only the first two of these components were

present during and around WW-II.

Apart from benefits from social insurance funds, which are financed through payroll taxes and whose redistributive nature we discuss below, the remainder of "government social benefits payments to persons" are financed out of general government revenues. Since taxes, the main source of government revenues, fall disproportionately on higher-income people, while these benefits are mainly aimed at the poorer parts of the population, they are necessarily redistributive. This is true in particular for veteran benefits, whose volume increased enormously after WW-II as a result of the G.I. Bill that was signed into law in mid-1944. The redistributive character of the G.I. Bill, which we discuss further below, is strengthened by the fact that many veterans returned home without employment and had been unable to accumulate earnings capacity through education during the war years, so that they were unable to make a regular living immediately after returning.

Turning to the Historical Statistics of the U.S. (2006) "total public expenditures on social welfare" is the sum of "social insurance", "public aid", "health and medical programs", "veterans' programs", "education", "housing" and "other social welfare programs". We discuss social insurance below. The expenditures of the other programs are financed out of general government revenues to which the richer parts of the population contribute disproportionately. Not all expenditures concern monetary transfers to individuals. Part is spending on, for example, the construction of schools and hospitals. However, these items too are largely redistributive, given that access to them is more evenly distributed than the tax bases from which the government revenues are extracted. Hence, conceptually it is appropriate to include them as part of our transfers measure.

"Social insurance" is an item that is of particular interest, since much of the political struggle during the thirties centered around social insurance. The Social Security Act of 1935 introduced a federal old-age insurance program, a federal unemployment insurance program and federal subsidies for approved state programs of assistance to elderly poor, dependent children, blind people and maternal and child welfare. All these programs are redistributive from the richer to the poorer parts of the population. Federal funding of unemployment insurance is based on contributions by the employers. Hence, the program is redistributive to the extent that the owners of companies are unable to shift the entire contribution burden back to employees in the form of lower wages. This seems unlikely after the war when the economy was growing fast and the demand for labor was rising. The federal assistance subsidies (not part of "social insurance" in the Historical Statistics of the U.S., 2006) are non-contributory, while the costs are shared at the federal and state levels. Because these subsidies are financed from general resources, to which the richer parts of the population contribute relatively more, and the programs tend to be specifically targeted at the poorer groups in society, they are necessarily redistributive.

The Old Age Survivors Insurance (OASI) part of Social Security is financed through employee and employer contributions proportional to employee income. For a number of reasons, the program is redistributive from the richer to the poorer parts of the population,

especially early in its existence. First, the program was transformed from a fully-funded program into a pay-as-you-go program already in 1939. This made the program redistributive from people in working age towards individuals retiring in the first decades of the program, because an elderly person could obtain a benefit only when his income from work was very low (see DeWitt, 2010, p.9). Because benefits became linked to average monthly wages regardless of the number of years of contribution (although a 1% increment was added for each year of participation – see DeWitt, 2010), benefit recipients received a substantial windfall that persisted until long after WWII. Second, the contribution - benefit structure was conducive to redistribution. Employees' contributions were 1% of the annual wage up to 3000 dollars during the years 1937 - 1949 and 1.5% in 1950. With median annual income of covered workers ranging from \$761 in 1937 to \$1926 in 1950 (Social Security Administration, 2000, Table 4.B6), the contribution range covered a substantial fraction of the income distribution, with the highest earners always subject to the maximum contribution. While the contributions were proportional, the increase in benefits tapered off strongly with a rise in income and was capped at a maximum level. More precisely, over the period 1939 - 1950 (i.e., until the 1950 Amendments took effect), the maximum (baseline) primary insurance benefit, the monthly benefit a person would receive at his normal retirement age, was the sum of 40% of the first \$50 of the average monthly wage, plus 10% of the next \$200 of the average monthly wage, implying a cap at \$40 (see Social Security Administration, 2000, Table 2.A15). Hence, if life expectancies were independent of income, the contribution - benefit schedule would imply redistribution from individuals with higher to individuals with lower lifetime incomes.¹⁰ Of course, as is well-known, life expectancy rises with income. However, the difference in life expectancy between higher- and lower-income groups at the time was smaller than it is now. For example, for a male born in 1912, hence in his prime age during our period of interest, the difference in life expectancy at normal retirement age was less than a year (Baker and Rosnick, 2010), a difference far too small to undo the redistribution produced by the contribution - benefit schedule. Third, the redistributive effect of the program is strengthened further by the fact that the (richer) employers provide half of the contributions to the program. Again, this effect can only be undone in the unlikely situation that the latter can completely shift the cost back towards the employees in the form of lower wages.

Leimer (1999) summarises the results from the literature investigating the amount of intragenerational redistribution produced by the OASI program. This literature indicates that there is a non-negligible redistributive element in the OASI program by showing that the internal rates of return and lifetime benefit/tax ratios decline with earnings. Relatedly,

¹⁰After the 1950 Amendments, the program remained highly redistributive. For example, the primary insurance amount (which replaced the primary insurance benefit as the benefit upon retirement at the normal age) in 1951 of a person who had an average monthly wage of \$100 and 12 years of coverage prior to 1951 was \$51.5, while that of a person with an average monthly wage of \$200 was around \$63 (e.g., see Cohen and Myers, 1950).

the programme tends to be more favorable to women than to men and to non-whites than to whites. Women benefit relatively more, because they tend to earn less than men and live longer. While non-whites have a lower life expectancy than whites, the redistributive effects of the lower average earnings by the non-whites still dominate this effect.

In the following subsections we provide evidence to support the existence of ratchets in transfers and revenues during and around WW-II from various angles. The evidence has to be considered in combination. While records of legal and political developments underlying new redistributive programs provide some direct evidence of those ratchets, the ensuing quantitative analysis can not only provide further supportive evidence, but also an idea about the quantitative importance of the ratchet.

2.2 Legislative post-war expansion of redistribution

This subsection reviews the main legal changes leading to the substantial expansion of the federal government's redistributive role in the aftermath of WW-II. A milestone in the history of the development of U.S. redistributive policy was the Social Security Act of 1935. Because President Roosevelt was concerned with saddling future workers with large tax burdens, the old-age insurance component of social security was originally intended as a fully funded program. However, to ensure adequate benefits for the first recipients in 1940, the 1939 Amendments to the Social Security Act transformed old-age insurance into a pay-as-you-go scheme. The 1939 Amendments also added benefits for dependents and survivors of wage earners, while it raised the federal share of aid to dependent children from one-third to one-half (e.g., see Weir *et al.*, 1988).

The aftermath of WW-II was characterised by a substantial expansion of the redistributive capacity of the federal public sector. In this respect the main legal events were the G.I. Bill, which provided a range of benefits to returning World War II veterans, the 1946 Amendments to Social Security that increased the federal matching of state grants¹¹ and produced some extensions in coverage, the Housing Act of 1949 and the 1950 (H.R. 6000) Amendments to Social Security. As Amenta and Skocpol (1988, p.82) write "The enhanced fiscal capacity of the national government enabled it to fund postwar veterans' benefits, as well as to spend higher sums for defense. Also funded were new domestic policies that indirectly met social welfare needs. Such measures as federal subsidies for housing and hospital construction signaled the beginning of a trend; until the 1960s U.S. social provision would rely heavily on federal funds channeled through states, localities, and businesses."

¹¹In fact, there was substantial debate about the expansion of the federal matching grants. An important argument was that the expansion would stimulate the states to expand their programs. For example, quoting senator George "My hope is that all the States will bring their minimum payments to the aged and blind at least up to \$15. Only \$5 of it would be payable by the State during the next five quarters, and \$10 would be paid out of the Federal Treasury. That should act as an incentive to bring the minimum payments up to \$15." (Congressional Record – Senate August 2, 1946; source: <https://ssa.gov/history/pdf/Downey%20PDFs/Social%20Security%20Amendments%20of%201946-48.pdf>).

Although the G.I. Bill was signed into law in June 1944, it was clearly designed with a view towards the era after the War. Its five titles (SSA Bulletin, 1944) provided for enlarging and strengthening hospital facilities (Title I), educational and training opportunities (Title II), borrowing facilities for the purchase or construction of homes, farms or business property (Title III), assistance in obtaining employment (Title IV) and readjustment allowances (Title V). Overall, the G.I. Bill brought educational opportunities and home ownership that were the preserve of the richer parts of the population within the reach of broad groups of society. To emphasize the redistributive character of the Bill, which was widely seen as a reward for the efforts by the servicemen, the House Committee on World War Veterans' Legislation (SSA Bulletin, 1944, p.3) refers to it as "admittedly more extensive and generous in its benefits to returning veterans than any bill previously introduced as to this or any other war." Also, as Sparrow (1996) writes "Never in American history had the returning soldier and his family been treated so well." Veteran expenditures were kept apart from social security, except for the introduction of insurance benefits for qualified veterans' survivors in 1946 and a credit for wartime service.

The 1949 Housing Act foresaw, among other, the construction of more than 800,000 public housing units, expanded authorization of mortgage insurance by the Federal Housing Administration (FHA) and the provision of financing for rural homeowners by the FHA. It was part of Truman's "Fair Deal" and generally considered a landmark expansion of the federal government's involvement in the lower end of the housing market. The Hospital Survey and Construction Act of 1946 foresaw the improvement of the hospital system through the provision of federal grants and guaranteed loans. Funding was also conditional on providing a certain amount of care to those who could not afford it.

The 1950 Amendments to Social Security substantially increased coverage and individual benefits of old-age and survivors' insurance (Cohen and Myers, 1950). For example, the average monthly current-pay benefit of a retired worker jumped from \$26.00 to \$43.86 between 1949 and 1950 (Social Security Administration, 2000, p.190). The increases also established a precedent for the idea that benefits should be raised periodically (DeWitt, 2010). Coverage was extended by approximately 10 million people, including non-farm self-employed and regularly employed domestic and farm workers. Federal grants to the states for public assistance, for maternal and child health and for child welfare services were broadened and liberalised. The system of federal matching grants-in-aid to states was expanded in various ways, while new benefits were introduced, for example to dependent husbands and widowers. The estimated number of workers fully insured for retirement and/or survivor benefits rose from about 33 million in 1945 to about 60 million in 1950 (Social Security Administration, 2000, p.154), while the number of beneficiaries of the Old Age, Survivors and Disability Program (OASDI – the OASI program expanded with disability insurance) rose from 1.3 million in 1945 to 3.5 million in 1950 (Social Security Administration, 2000, p.173). Also, the Amendments introduced gratuitous social security wage credits for military service.

Important later expansions of the U.S. redistributive system were the 1954 Amendments to Social Security, which extended coverage by another 10 million people to include most farm workers who were still not covered, self-employed professionals and state and local government employees (on a voluntary group basis – see DeWitt, 2010). Benefits underwent another substantial increase, while a "disability freeze" was introduced to prevent years in which income was lost due to disability from influencing the benefit. Medicaid was introduced in 1965, which as part of Social Security brought health insurance for the poorer parts of the population. The federal government provided matching payments to states participating in the program.

The discussion of the main expansions of transfers programs raises a question about what should be taken as the proper "after-war period". It is difficult to give a clear cut answer to this question. On the one hand it is likely that the influence of the fiscal room created by the termination of WW-II has affected the structure of public expenditures for a good number of years, since it may have taken time to overcome conservative forces opposing increases in redistribution. One possibility is to cap the "after-war period" in 1951 – the year in which a large part of the 1950 Amendments to Social Security took effect. An advantage of this cut-off is that it does not mix up the effects of WW-II with those of the Korean War. On the other hand, since the WW-II war shock was many times larger than that of the Korean War, it is likely that WW-II still had a non-negligible effect on legislation also during the fifties. In the spirit of robustness we present two alternative ways for the evaluation of potential transfer ratchets. One, which is based on regressions of transfers on defense expenditures and controls, considers the post WW-II period as ending in 1951. Controlling for aging another method directly evaluates the cumulative impact of social security legislation on the share of OASDHI (social security spending on old age, survivors, disability and health insurance) through 1960.

2.3 Estimates of the ratchet in transfers

We have argued above that movements in war spending have likely had permanent effects on the transfers share of GDP. These permanent effects may take several forms. A new benefits program or the expansion of an existing program can have a "level effect", because a previously uncovered group of people become covered. However, if this newly-eligible group grows faster than the economy, then the war would also have a longer-term "growth effect" on the transfers share, an effect that may be compounded if the expansion sets a precedent for further expansive measures. Both effects operated simultaneously. For the level effect and part of the growth effect we provide evidence from regressions. This is followed by calculations that quantify the full cumulative effect of post-1941 legislation on OASDHI expenditures.

Our regressions are annual using data from the NIPA (2009) and from the Historical Statistics of the U.S. (2006). Based on the NIPA (2009), Table 2 presents various regressions of the change in federal transfers on the change in defense expenditures, controlling

for economic expansions and contractions and for changes in the unemployment rate and the population share that is 65 and older. The last two variables are introduced in order to control for autonomous forces driving the take up of transfers. We also control for serial correlation of the residuals. The regressions are done for variables expressed as shares of GDP. Major movements in defense expenditures are associated with wars or war threats and can be reasonably assumed exogenous, as is standard in fiscal policy analysis (e.g., Ramey, 2011). We start with regressions based on NIPA's most comprehensive "current transfer payments" measure.

Column (1) presents the combined effect, i.e. without allowing for the possible existence of a ratchet, of changes in defense spending on changes in current transfers. Defense spending exerts a statistically significant negative effect on transfers. Broadly speaking, when the GDP share of defense goes up, the GDP share of transfers goes down, and vice versa. The remaining regressions in the table allow the impact of defense expenditures to differ depending on whether the share of defense expenditures goes up or down, in order to test for the possible existence of ratchets. To this end, two new variables are defined. One is equal to the change in the share of defense expenditures when this variable is positive and zero otherwise, and the other is equal to the change in this share when it is negative and zero otherwise.¹² The regression in Column (2), which repeats the regression in Column (1) in all other respects, reveals a significantly negative coefficient on defense spending when its share goes down, implying an increase in the transfers share, while there is no effect on the transfers share when the share of defense spending goes up. Furthermore, the F-test that the coefficients of the up and down movements in the share of defense are equal is rejected at the 1% level. These findings support the existence of a significant ratchet in the effect of defense on transfers. Column (3) of Table 2 repeats the regression in Column (2), except that, now, the dependent variable is the change in the share of "government social benefits payments to persons", whose redistributive character might be more evident than some other parts of "current transfer payments". We find that the ratchet remains significant at the 1% level.

A legitimate question is whether veteran benefits should be excluded from the measure of transfer payments, because a rise in veteran benefits is a natural consequence of the termination of a war. In fact, the ratchet effect is still present if we repeat the regression excluding veteran benefits. However, in our view, veteran benefits ought to be included, because the far majority of these benefits is driven by benefits to WW-II veterans under the new G.I. Bill (the number of returning WW-II veterans was on the order of 16 million, while the number of WW-I veterans was on the order of 4 million at the end of WW-II). Scott (2012) estimates that in constant dollar terms, the budget authority for veterans programs in the fiscal year 1947 was around 10 times that of the fiscal year 1940. Indeed,

¹²We also experimented with specifications in which the regression constant was allowed to vary depending on whether the share of defense goes up or down. Since the difference between the intercepts was not significant and the coefficients of the other variables remained virtually the same, we do not present those results.

as we argued above, the generosity of the G.I. Bill was unprecedented in history and was made possible by the budgetary space created by the termination of WW-II as the above quote from Amenta and Skocpol (1988, p.82) suggests (see second paragraph of Subsection 2.2).

We repeat the regression in Column (2) for two different subperiods to examine whether the existence of the ratchet depends on the presence of the GD and of WW-II. Correspondingly, in Column (4) we omit the period of the GD (1929-1936), while Column (5) reports the regression with data starting in 1952, in order to exclude WW-II and its immediate aftermath, which includes the 1950 Social Security Amendments that took their full effect in 1951. Exclusion of the GD does not change the finding that there is a significant ratchet. However, when WW-II and its aftermath are excluded from the sample, the ratchet disappears, supporting the conclusion that the ratchet in transfers is strongly related to this particular war.

One may wonder whether regressions at the annual level can properly capture the effects of changes in defense expenditures on transfers, given the potential political resistance to changes and the tardiness of the political process. Therefore, we repeat the regressions reported in Table 2 by replacing the current variables with their three-years moving averages.¹³ We choose three years as a compromise in order to be able to capture the aforementioned decision-making lags, while avoiding that the relationship between transfers and defense spending is affected too much by unrelated events when we take longer moving averages. Column (6) of Table 2 repeats the regression in Column (2) using the three-years moving averages of the independent and dependent variables (with due Newey-West correction of the standard errors). We observe that the upward ratchet in transfers resulting from an up-down cycle in defense spending remains highly significant, although the averaging makes it slightly smaller in magnitude. We have also repeated all the other regressions in this table and the ensuing tables with three-years moving averages (not reported), finding that the results are qualitatively unaffected. Those results are available upon request.

The regression results allow us to gauge the size of the ratchet effect. Obviously, we can only assess an order of magnitude. We take the estimated baseline coefficients on the up and down movements in the shares of defense spending reported in Column (2) of Table 2 and multiply these by the up and down changes themselves over the period 1940 - 1950. This way we capture the period when defense spending was already going up in response to the war threat, the war years and the post-war period. The net effect over the full period of all up and down movements in the shares of defense spending is an increase in the share of transfers over the full period of almost 4% of GDP.

In the spirit of robustness we repeat similar regressions with transfers data from the Historical Statistics of the U.S. (2006). We use "total public expenditures on social wel-

¹³The period t three-years moving average of a variable is calculated as an average of this variable in year t and in the two preceding years.

fare" (Table Bf 196) as an alternative proxy for transfers. As explained above, we exclude the veteran bonus and public aid. While the NIPA data are based on calendar years, the data from the Historical Statistics of the U.S. are based on fiscal years, which for most of our sample differ from calendar years. We obtain defense data based on the fiscal year from the U.S. Census Bureau (2009b) and fiscal-year GDP data from Bohn (2008). The correlation between the NIPA and Census defense series as shares of GDP is 0.86. The format of the regression equations is the same as that based on the NIPA data. However, the sample now ends in 1995, the final year for which total public expenditures on social welfare are available from the Historical Statistics. The estimates in Column (1) in Table 3 confirm the presence of a ratchet also for the share of this alternative measure of transfers, as the equality of the coefficients on the up and down movements in the defense share is rejected at the 1% level. Given our particular interest in "social insurance spending" as a component of total spending on social welfare, Column (2) in Table 3 repeats the regression in Column (1), but with the change in the federal share of "social insurance spending" as the dependent variable. Again, we observe a clear upward ratchet around WW-II.

As before, the ratchet is preserved when the Great Depression is dropped from sample period (Column (3)), while it vanishes when the sample is limited to the period 1952 and later (Column (4)). Because we find that, excluding WW-II from the sample, the transfers ratchet disappears in the regressions based on both the NIPA data and the data from the Historical Statistics, most of the ensuing discussion and the theoretical model will focus on the periods during and around WW-II.

Next, we present an alternative way to estimate the relation between post-war induced legislation and the share of OASDHI programs. This estimate, to which we refer as a "legislative ratchet effect" is interpreted as the full, long-run ratchet effect on the share of OASDHI expenditures resulting from war-induced legislation. Although our calculation does not include all transfers, the advantage of focussing on OASDHI expenditures is that it is possible to establish a relatively clean connection between post-war legislation and the subsequent evolution in the share of those programs. The calculations are done under the assumption that all OASDHI legislation between 1941 and 1951 is induced by WW-II and all legislation up to and including 1960 is induced by a combination of WW-II and the Korean War. This may not be such a strong assumption, because the first piece of major social security legislation after 1941 was in 1950 and the other main pieces of legislation that extended its coverage substantially were enacted in 1952 and 1954 (see DeWitt, 2010, Chart 2).¹⁴ We assess the ratchet for the year 1951 (rather than 1950), as this is the first year of full implementation of the 1950 Amendments. For 1960, we do not attempt to disentangle the relative shares of WW-II and the Korean War, because we

¹⁴Part of the fiscal space created by the war was initially used to finance the extremely generous, but temporary G.I. Bill. It is argued in Subsection 2.5 and in Section 4 below that, as expenditures on this program receded, they freed the resources that provided the financing base for the 1950 Social Security Amendments.

have no reliable way of doing so. However, it should be noticed that the number of WW-II casualties was more than ten times larger than the number of casualties of the Korean War (https://en.wikipedia.org/wiki/United_States_military_casualties_of_war). Hence, it may well be possible that the OASDHI expansions in the 1950s are as much a response to the events of WW-II as to the Korean War.

Using the Historical Statistics, we construct a counterfactual evolution of the OASDHI share based on legislation enacted up to 1941 and compare this with the actual OASDHI share. Total OASDHI spending is obtained by taking the sum of the series Bf292 (retirement programs), Bf298 (disability programs), Bf308 (survivor programs) and Bf316 (lump-sum payments) from the Historical Statistics, and dividing by nominal GDP. This yields an OASDHI share in 1941, denoted as $OASDHI_{1941}$, of 0.037%. In fact, since it was the GD that gave rise to social security, one could view the OASDHI share in 1941 as the size of the legislative OASDHI ratchet associated with the GD. In the following years this share goes up, both because of aging even in the absence of new legislation as well as due to additional expansionary legislation. In order to calculate the effect of new legislation net of the impact of aging we form a counterfactual that estimates the evolution of OASDHI spending in the absence of new legislation. The period- t counterfactual share based on 1941 legislation is denoted by $OASDHI_CF_{1941,t}$ and calculated as:

$$OASDHI_CF_{1941,t} = OASDHI_{1941} (P65PLUS_t / P65PLUS_{1941}),$$

where $P65PLUS_t$ is the period- t share of the population that is 65 years or older. The assumption behind this expression is that, for given legislation, OASDHI expenditures grow proportionally with the number of 65 and older. This seems to be a reasonable approximation, since it is the retirees who receive the lump-sum benefits, while the number of survivors grows with the size of the elderly population. Moreover, the Historical Statistics report zero disability payments in 1941 (and, in fact, up to and including 1956). The legislative ratchet in any year t is then calculated as the difference between the actual and the counterfactual shares, $OASDHI_t - OASDHI_CF_{1941,t}$. With $OASDHI_{1951} = 0.60$ and $OASDHI_CF_{1941,1951} = 0.096$, we obtain a 1951 legislative ratchet of roughly 0.50% of GDP. The corresponding number for 1960 is slightly over 2%. A more conservative estimate of this long-run legislative ratchet is obtained if we start from legislation that existed in 1945. Using $OASDHI_{1945} = 0.12\%$, we obtain a 1951 legislative ratchet of 0.46% of GDP and again a 1960 ratchet of slightly over 2%.

One may be tempted to conclude from the preceding discussion that the entire legislative ratchet in federal public expenditures on social welfare (Historical Statistics, 2006, Item Bf196) is due to OASDHI. To test whether this is the case, Column (5) in Table 3 repeats the regression in Column (2) with the change in SW net of $OASDHI$.¹⁵ For robustness purposes Column (6) repeats this regression with the change in SW net of

¹⁵The estimation is done over a shorter period since the Historical Statistics report OASDHI spending only over the period 1940 - 1988.

SI , the share of federal social insurance (Historical Statistics, 2006, Item Bf197). Social insurance includes OASDHI expenditures along with several other expenditure items. In both regressions the ratchet effect turns out to be highly significant. It remains significant when we run the same regressions using three-year moving averages of the variables, while it disappears when the sample period starts only in 1952. These results support the conclusion that post WW-II ratchets are not limited to social security programs.

Figure 1b shows SW minus $OASDHI$ and SW minus SI . In both cases the big bulge between 1945 and 1950 reflects mainly the G.I. Bill. The share of expenditures under this bill first rose dramatically after its passing and then gradually receded. It is consistent with the short- to intermediate-term ratchet detected by the regressions. Eyeballing suggests that, although this bulge disappears over the first half of the fifties, both SW minus $OASDHI$ and SW minus SI in 1955 are larger than in 1941. This is consistent with the regression results and supports the view that there is a long-run ratchet also in social welfare expenditure net of OASDHI or social insurance.

2.4 Evidence on ratchets in revenues and taxes

This subsection approaches the hypothesis of war-related ratchets from the other side of the public budget and explores their potential presence in the shares of federal taxes and federal revenues.¹⁶ Again, it does so from different angles. We start by describing evidence from regressions. This is followed by a description of historical developments in the tax collection technology and the tax code that support the hypothesis of a ratchet in taxes and revenues.

Our empirical evidence of ratchets in taxes and revenues is based on regressions of alternative indicators of the change in the GDP share of federal receipts on the change in the share of defense, while controlling for the phase of the business cycle, serial correlation, unemployment and the population share of 65 and older. As before, all regressions allow the coefficient on the change in the share of defense to differ depending on whether this share goes up or down.

Since, during wars, the national debt goes up and needs to be repaid after the war, it is natural to expect that the share of taxes or revenues will not go down all the way to its pre-war level.¹⁷ Thus, a ratchet in taxes or revenues may be caused solely by the need to amortize the debt that has been accumulated during the war. To examine whether wars induce a ratchet beyond this mechanism, we also estimate regressions with an "adjusted" share of taxes (TAXADJ) or revenues (REVADJ) as the dependent variable. Variable TAXADJ (or REVADJ) is defined as total federal taxes (or revenues) minus interest

¹⁶In addition to taxes, federal revenues include various fees and income from assets owned by the federal government.

¹⁷A formalization of this idea is Barro's (1979) tax smoothing hypothesis. In the extreme case in which a war is a total single surprise it implies that from that point in time and on the tax rate jumps up to a new higher and constant level and remains there until new information about public spending needs becomes available.

payments on the public debt, minus debt repayment, and minus defense expenditures as shares of GDP.¹⁸ Hence, this adjusted share of taxes or revenues measures, in each year, the amount of resources left for transfers and civilian government expenditures, after debt service and defense expenditures have been taken care of.

Table 4 shows the impact of defense spending on federal taxes, federal revenues, and on the adjusted values of those two variables. For unadjusted taxes and revenues (Columns (1) and (2)) the impact of defense is positive and significant both in the case in which the share of defense goes up, as well as in the case in which it goes down. Strikingly, the coefficient of defense is at least five times higher when the share of defense goes up than when the share of defense goes down. The last row of the table confirms that this difference is statistically significant, implying that this ratchet is unlikely to be a statistical artifact.

However, as argued above, this ratchet may just reflect the debt service associated with war deficits. The regressions for adjusted taxes and revenues in Columns (3) and (4), respectively, make it possible to examine whether the ratchet survives when the needs created by debt service and defense expenditures are neutralized. The impact of the share of defense, although still positive, is no longer significant when this share goes up. Interestingly, the coefficient on defense is now negative and significant when the share of defense goes down. The last row of the table shows that the difference between the “defense up” and the “defense down” coefficients is statistically significant, implying that there is a ratchet in adjusted federal taxes and revenues as well. The broader meaning of this finding is that a symmetric war cycle in which the share of defense first goes up and then comes back down to the pre-war level is associated with an increase in the share of taxes or revenues available to finance non-defense spending and transfers.

We also explored whether the ratchets in adjusted taxes and revenues are preserved when we change the sample period. Leaving out the period of the GD (1929-1936) preserves these ratchets (not shown), while they vanish if we also leave out WW-II. Hence, the upward ratchet in resources available for non-defense spending and transfers must be due to developments in defense spending and taxation during and around WW-II.

The evidence of ratchets in taxes and revenues around WW-II is also supported by developments in the tax collection technology and the tax code. Before WW-II relatively few people, and mainly the higher income groups, paid income taxes. A first development contributing to a ratchet in taxes was the extension of filing requirements to lower taxable

¹⁸Debt repayment is defined as end-of-current-year nominal debt minus end-of-previous year nominal debt divided by nominal GDP. While all other variables refer to calendar years, the original debt data refers to the end of the fiscal year. The fiscal year ends on June 30 during 1929-1952, on December 31 during 1953-1985 and on September 30 between 1986 and 2003. We construct end-of-calendar-year outstanding nominal debt figures for the periods 1929-1952 and 1986-2003 in two steps. First, the rate of growth of the nominal debt between the end of the fiscal year that occurs within calendar year j and the end of the fiscal year that occurs within calendar year $j + 1$ is calculated. Second, an appropriately prorated value of this growth rate is applied to the debt figure available at the end of the fiscal year that occurs within calendar year j to calculate the debt figure at the end of this calendar year.

incomes at the end of the thirties and its gradual extension over the war period. In 1942 Roosevelt proposed and managed to enact the Revenue Act of 1942 (also known as the Victory Tax). This was the broadest and most progressive tax in American history. The number of income taxpayers increased from 4 millions in 1939 to 43 millions in 1945 (U.S. Treasury, 2009). Before the war less than 15 millions individuals filed an income tax return. After the war this number rose to about fifty millions. The federal government was now covering more than half of its expenditures with the new income tax revenue. A second development was the establishment of income tax withholding at source during WW-II.¹⁹ This eased the collection of (direct) taxes for both taxpayers and the IRS during WW-II. It also reduced taxpayers' awareness of the amount of taxes being collected, which made it politically easier to maintain higher taxes in the post-war period (U.S. Treasury, 2009).

The permanent broadening of the personal filing requirements during WW-II was accompanied by a substantial increase in statutory federal tax rates. To illustrate, Table 5 reports statutory income tax rates during and around WW-II for some specific nominal income levels, taken from The Tax Foundation (2014). Reporting the full tax schedule would require too much space, as the tax schedule at the time was characterised by a large number of tax brackets. Incomes of the far majority of the tax payers fell in the first or first two tax brackets in this period. The lowest and highest statutory tax rates went up from 4% and 79% in 1939 to values of 23% and 94%, respectively, in 1944 and 1945. Interestingly, compared to the pre-war situation, the marginal tax rate at *any* given nominal income level went up substantially over the course of the war, while it came down only marginally in 1946 with minimum and maximum statutory rates of 20% and 91% respectively. In fact, the tax schedule remained completely unaltered in nominal terms over the years 1946-1950. Due to inflation, the tax brackets were shifting down in real terms, thereby making it hard for marginal tax rates at given real income levels to come down during the first several post-war years. Table 6, which is based on calculations by The Tax Foundation (2014), supports this conclusion.

The evidence for a tax ratchet from the behavior of the statutory tax schedule can be supplemented with evidence on the evolution of average income tax burdens at various levels of income during and around WW-II – see Table 7.²⁰ The table shows that, as the U.S. went into the war, average tax burdens at all income levels increased and the tax base widened as well (for example, individuals with taxable incomes of \$1,000 who did not pay taxes during the thirties started paying taxes as of 1940). This process was reversed only marginally after the war; at all income levels average income taxes in 1948 were substantially higher than in 1939.

All the evidence reported in this subsection strongly supports the view that the post-

¹⁹General tax withholding in the U.S. was established by means of the Current Tax Payment Act of 1943.

²⁰The figures in the table are calculated as tax payments divided by taxable income, where taxable income is income minus deductions.

WW-II ratchet in the share of federal taxes is largely due to a parallel ratchet in federal tax legislation.

2.5 The political context of legal expansions

The legal expansions of redistributive programs have been made possible by the budgetary leeway created by the termination of WW-II. The first program to benefit from the additional budgetary space was the G.I. Bill. The budgetary leeway produced by the termination of WW-II combined with other (political) factors to lead to a further expansion of the welfare state after WW-II. First, as Fishback and Thomasson (2006, p.715) note "pensions for Civil War veterans set precedents for establishing old-age pensions for the general public". Hence, it is likely that the facilities created for the war veterans helped to bring along a further broadening of welfare programs to other parts of the population. Second, the gradual phasing out of the benefits resulting from the G.I. Bill from the late forties and on enhanced the budgetary space for such an expansion. Third, and probably most importantly, the GD ended with an incomplete welfare state (Orloff, 1988, p.80). In his State of the Union (January 7, 1948), President Truman said "We should now extend unemployment compensation, old age benefits, and survivors' benefits to millions who are not now protected. We should also raise the level of benefits." Fear that the Social Security Act would not pass Congress had led to the exclusion of certain sectors of the economy and to various omissions, such as health insurance and assistance to some groups of needy children. Further social reform initiatives were prevented as a coalition of conservatives in Congress gained power towards the late 1930s. Such conservative forces operated not only from within the Republican Party, but also from within the Democratic Party, where conservative Southern Congressmen exerted substantial influence (see Quadagno, 1988). Indeed, the reformers hoped to exploit WW-II to complete Roosevelt's New Deal (Amenta and Skocpol, 1988). However, despite the Democratic dominance in Congress for part of the post-war period (the Democrats won both the House of Representatives and the Senate in 1944 and 1948), Congress featured insufficient liberal strength to engage in general social reform. Yet, after the Republican-dominated Congress limited coverage of social security in 1948, social insurance was made a major issue in Truman's presidential campaign later that year. In addition, the opposition of members of the Social Security Board to an expansion of coverage vanished and, after Truman's election, Congress accepted H.R. 6000. The preceding description of events lends credence to the view that the budgetary space generated by the emergence and termination of WW-II led to a delayed fulfillment of an excess demand for redistribution created by the Great Depression.

3 A political-economy model of interactive fiscal decisions about transfers and defense expenditures

3.1 General structure

The model extends the static framework of Meltzer and Richard (1981) – henceforth MR – and adapts it to economic developments prior to, during and following WW-II.²¹ The format of the tax-transfer system in MR is broadly consistent with that of the various redistributive programs in the U.S. described above: tax payments or social security contributions are increasing in income either over the entire range of incomes or a substantial fraction of the range of incomes, while benefits are substantially flatter functions of income. During the Great Depression and WW-II most people in the U.S. did not have access to credit, implying that a static framework is not unreasonable for the periods under consideration. The main extensions include: 1. incorporation of defense (a public good) into the analysis, 2. incorporation of endogenous changes in those expenditures across the three periods due to changing security threats, and 3. determination of transfers through a strategic interaction between an agenda setter in Congress and the median voter rather than by the latter alone.

It is well known from the work of Romer and Rosenthal (1978, 1979) and others that political outcomes in the presence of an agenda setter depend on the status quo. Changes in status-quo tax rates during and after the war play an important role in our explanation of the post WW-II ratchet in transfers and taxes. The role of the status-quo tax rate is supported by a number of observations. First, it naturally arises, because, absent a new vote, existing taxes or tax rates are normally maintained as a default. Hence, it is natural for congressmen to compare any new tax proposal with the status quo.²² Second, the importance of the status quo is nicely illustrated by a quote from Herman Eberharter,²³ who defends existing social security arrangements by saying "When did you ever need legislation to keep the status quo? 'Status quo' means 'as is'. Did you ever pass any measure to keep things as is? You pass laws when you want to change things." In later debate (Congressional Record – House, 1948, April 12) he said "As I pointed out on the House floor, we do not require legislation to maintain the status quo."

²¹The literature has studied other extensions of the Meltzer and Richard (1981) model. For example, Krusell and Ríos-Rull (1999) simulate a dynamic version of the model with capital and inequality in wealth and skill levels. Hassler *et al.* (2003) present an overlapping-generations model in the spirit of Meltzer-Richard with repeated voting about redistribution and the possibility to privately invest in human capital. Persson and Tabellini (2000) incorporate microeconomic trade-offs in settings with voting about taxation and redistribution.

²²The role of the status quo is also exemplified by the fact that it took some time after WW-II to end all emergency and war powers of the President (see Report No.799 on "Terminating Certain Emergency and War Powers", presented to the House of Representatives, July 7, 1949).

²³Eberharter, Democratic member of the House of Representatives for Pennsylvania, was responding to House Joint Resolution 296 "A joint resolution to maintain the status quo in respect to certain employment taxes and social-security benefits" (Congressional Record – House, 1948, February 27; see <http://www.ssa.gov/history/pdf/Downey%20PDFs/Social%20Security%20Amendments%20of%201946-48.pdf>).

There are three periods: pre-war, war and post-war, which we label by 1, 2 and 3, respectively. Further, there is a continuum of individuals, whose quantity is normalized to one, with three types of productivity levels, or wage rates x , such that

$$x_H > x_M > x_L, \quad (1)$$

where subscripts H , M and L denote, respectively, the "high", "medium" and "low" type. All individuals possess the same utility function given by

$$u(c, l), \quad (2)$$

where c and l are consumption and leisure. Utility is increasing and strictly concave in both consumption and leisure, which are both normal goods. Within each period, each individual possesses one unit of time that he can allocate to either work, n , or leisure, l . Hence, $n + l = 1$.

There is a proportional tax, t , on labor income and a per-capita transfer, $r \geq 0$. The government's budget constraint is

$$t\bar{y}(t, r) = r + \theta g, \quad 0 \leq t < 1, \quad 0 \leq \theta \leq 1, \quad (3)$$

where $\bar{y}(t, r)$ is average income when the tax schedule is $\{t, r\}$ and $g \geq 0$ are defense expenditures. Those expenditures are financed by a combination of current and future taxes and θ is the fraction of defense expenditures financed by current taxes. We discuss the determination of θ further below. Defense expenditures are normalized to zero during peace times, implying that in both the pre-war and post-war periods the government's (per-capita) budget constraint is

$$t_s \bar{y}(t_s, r_s) = r_s, \quad s = 1, 3. \quad (4)$$

Given the tax schedule, income of individual i , $y(x_i; t, r)$, depends on his individually-chosen number of work hours, $n(x_i; t, r)$, on his productivity, x_i , and on the tax schedule.²⁴ More precisely,

$$y(x_i; t, r) = x_i n(x_i; t, r), \quad i = H, M, L. \quad (5)$$

Throughout we confine ourselves to schedules in which the tax rate does not exceed the revenue-maximizing tax rate.

MR (p. 919), show that the normality of consumption implies that

$$y(x_H; t, r) > y(x_M; t, r) > y(x_L; t, r), \quad (6)$$

²⁴Formally, individual's i maximization problem is to choose n_i (and, therefore, c_i and l_i) to

$$\begin{aligned} & \text{Max } u(c_i, l_i) \\ \text{s.t. } & c_i = (1-t)x_i n_i + r, \quad n_i + l_i = 1 \text{ and } n_i, l_i \geq 0. \end{aligned}$$

Since the chosen number of work hours depends on the parameters of the tax schedule $\{t, r\}$, the individually-optimal level of income also depends on $\{t, r\}$.

for all values of t and r . That is, whatever the tax structure, higher-productivity individuals earn in equilibrium higher incomes than lower-productivity individuals. Let α , β and $1 - \alpha - \beta$ be the fractions of high-, medium- and low-productivity individuals in the economy, respectively. Then, in each period, average income in the economy is

$$\bar{y} = \alpha y_H + \beta y_M + (1 - \alpha - \beta) y_L, \quad (7)$$

where $y_i \equiv y(x_i; t, r)$, $i = H, M, L$.

Lemma 1 in Roberts (1977, p. 334) along with the incomes ranking in equation (6) imply that, for any exogenously given level of g , the ranking of the welfare systems and the associated tax rates preferred by each type of individual is

$$\begin{aligned} r_L^*(g) &> r_M^*(g) > r_H^*(g) = 0, \\ t_L^*(g) &> t_M^*(g) > t_H^*(g) = \theta g / \bar{y}, \end{aligned} \quad (8)$$

where, given g , r_i^* and t_i^* , $i = H, M, L$ are the most-preferred values of r and t of a type i individual.²⁵ The two equalities at the extreme right-hand side of equation (8) state that all high-income individuals prefer to abolish redistribution and the taxes required to finance it altogether – retaining only the taxes needed to finance defense expenditures, g , when necessary. The reason is that, since his income is higher than mean income and taxation is proportional, a high-income individual contributes more in taxes to the financing of redistribution than the per-capita amount, r , he obtains in return. Hence, all type- H individuals are better off in the absence of redistribution, and of the taxes required to finance it, than in its presence. Note that due to the government's budget constraint and the positive association between t and r , voting over alternative pairs of $\{r, t\}$ can be reduced to voting over the tax rate t alone (further details appear below).

An important advantage of this specification is that conflicts regarding taxation and redistribution among different income classes are captured very simply through the differing interests between the uniform classes of low-income, middle-income and high-income individuals. We assume that the interests of low-income individuals are represented by a party called PL and those of the medium-income class by a party called PM . The high-income class is not organized as a party, but it possesses gate-keeping authority over budgetary decisions. Shepsle and Weingast (1981) and others have emphasized the fact that various political institutions moderate some of the inherent instabilities associated with direct democracy. In the case of the U.S. specialized committees in Congress typically possess the power to set legislative agendas in their respective areas. In the area of appropriations the roles of the Appropriations and the Ways and Means Committees

²⁵The ideal point in $\{r, t\}$ space of each type is obtained by letting each individual choose this pair subject to the government's budget constraint in equation (3), so as to maximize his utility subject to the additional proviso that, given any pair (r, t) , he chooses his individual labor input optimally. The positive association between the ideal values of r and t is implied by the assumption that leisure is a normal good. Further details appear in Footnote 8 of MR.

are central. Detailed accounts of the operation and power of those committees appear in Fenno (1966, 1973).

We model this state of affairs here by assuming that the individual interests of the agenda setter in Congress are identical to those of the high-income class, while the general floor of Congress represents the preferences of the entire population.²⁶ In other words, the agenda setter represents the views and/or interests of more fiscally-responsible and wealthier individuals, while the median voter in the population is decisive on the general floor of Congress. The assumption of a financially more conservative agenda setter is broadly supported during the thirties and the forties by comparing average estimated DW-NOMINATE scores of the members in each of those committees with the corresponding averages for the entire House of Representatives and the entire Senate.²⁷

The resistance of the agenda setters to expansion of social security and income tax increases is also clearly revealed in descriptive accounts of the history of legislation in these areas. For example, in defending flexibility in calculating the excess profits tax on business adopted in the 1940 Act, Chairman Robert Doughton of the House Ways and Means Committee observed "Our taxes must follow the intricacies of business and not attempt to bend business to the pattern of simplicity we should all like to see in taxation" (Bank et al., 2008, p.90). As another example, Walter George, Chairman of the Senate's Finance Committee suggested that "federal taxes have now reached 'near-maximum' levels and cannot be increased much more without weakening the whole economy" (New York Times, December 5, 1941 – see Bank et al., 2008, p.92). Sparrow (1996) describes how conservative leaders from the Senate torpedoed the financing of social security out of general revenues. Obviously, their concern was that, due to the progressivity of income taxes and the absence of a cap on those taxes, such a move would likely render social security even more redistributive, while the impact of direct contributions as a limit to its growth would vanish.

To capture the fact that in reality the middle-income class is the largest of the three

²⁶To avoid a further increase in the model's complexity we assume that in capturing the U.S. situation the two Houses of Congress take their decisions in unison.

²⁷Such a comparison of ideological positions appears in Poole and Rosenthal (2007) for the post-war period. For earlier periods data on these ideological leanings for each member of Congress is summarized in Carroll *et al.* (2011). For the pre-war and the war period the above comparisons are obtained by using this data along with data on committee memberships from Canon *et al.* (2011). To compare the mean ideological positions of the relevant committees with the means of the general floor we combine the first (economic) dimension of the DW-NOMINATE scores taken from Carroll *et al.* (2011) with the data from Canon *et al.* (2011) on the composition of the committees. We do this for Congresses 71-79 that cover the period 1929 - 1946. (During this period a Senate Ways and Means Committee did not exist.) The average scores indicate that the House Appropriations and Ways and Means Committees were almost always more conservative than the full House of Representatives, and that the Senate Appropriations Committee was in most cases more conservative than the full Senate. A Student T-test on the equality of the average scores of the Appropriations Committee and the full House over the entire sample period yields a p-value of 10.7%, while the same test over the period 1933-1946 yields a p-value of 5.9%. Poole and Rosenthal (Table 9.2, 2007) show that the Appropriations Committee in the 80th House (1947-1948) is close to being significantly more conservative than the full House, while the Ways and Means Committee of the 80th House is significantly more conservative than the full House (assuming conventional significance levels).

classes and the high-income class is the smallest, we assume

$$\frac{1}{2} > \beta > 1 - \alpha - \beta > \alpha. \quad (9)$$

The extreme left-hand inequality in the first equation implies that the middle class alone is not decisive. The inequalities together also imply that $1 - \alpha > 1/2$ and $\alpha + \beta > 1/2$, which, along with Roberts' Lemma 1, implies that, by forming either a coalition with the low income group or a coalition with the high-income setter class, the middle class is decisive under unhindered direct democracy.

The legislative interaction between the agenda setter and the median voter on the floor of Congress operates as follows. In any given period there is a status-quo redistributive tax rate determined by past fiscal decisions. If the agenda setter does not issue a proposal in the current period the existing status quo prevails. If he does, the median voter in the population as proxied by the full assembly of Congress votes for or against the new tax schedule. If the median votes yes, the new proposal replaces the existing status quo. Otherwise, the existing status quo prevails.²⁸

Substitution of the individually-optimal levels of consumption, work and leisure back into the utility function in equation (2) yields the indirect utility functions of the three types. Since consumption, work hours and leisure have been maximized away the indirect utility functions depend only on the parameters of the tax schedule and on the productivity of each type. Formally,

$$V(x_i; t, r) \equiv u((1 - t)x_i n(x_i; t, r) + r, 1 - n(x_i; t, r)), \quad i = H, M, L. \quad (10)$$

As in MR individuals are aware of government's budget constraint and internalize it. Substitution of equation (3) into equation (10) yields individual's i indirect utility function after his internalization of the government's budget constraint

$$V_I(x_i; t, g) \equiv u((1 - t)x_i n(x_i; t, r(t, g)) + r(t, g), 1 - n(x_i; t, r(t, g))), \quad i = H, M, L, \quad (11)$$

where, using equation (3),

$$r(t, g) \equiv t\bar{y}(t, r(t, g)) - \theta g.$$

3.2 Political equilibrium in the pre-war period

Equation (4) states that in the pre-war period defense expenditures are zero implying, from equation (11), that the indirect utility function $V_I(x_i; t_1, g_1 = 0)$ of each of the

²⁸The status-quo tax rate is the previous period's tax rate, unless it is insufficient to finance some minimum level of redistribution (to be introduced below). In that case, the status-quo is either the previous period's tax rate and redistribution is correspondingly adjusted or it is the tax rate needed to finance the minimum level of redistribution. In any case, as shown below, the equilibrium tax schedule during the war period is the same whether voters believe the status quo is maintained in terms of the tax rate or in terms of redistribution. This multiplicity of possible status quos occurs only during the war period.

three types of individuals depends explicitly only on the tax rate, t_1 . Given $g_1 = 0$, it is therefore possible to draw the indirect utility function of each type as a function of only t_1 . In such a diagram the ideal tax rate of each type is the tax rate at which the individual's indirect utility function is maximized. The ranking of those ideal points in the $\{t, r\}$ space is given by equation (8). We assume that the pre-war status quo tax rate, t_1 , (and therefore redistribution) is located between the tax rate preferred by the median and the one preferred by the setter. Formally

$$t_{M1}^* > t_1 > t_{H1}^* = 0. \quad (12)$$

Here t_{H1}^* and t_{M1}^* are the ideal tax rates of the high- and the middle-income class individuals in the pre-war period.²⁹ This essentially amounts to assuming that in the pre-war period the agenda-setter was able to block redistributive proposals that fully matched the preferences of the median voter (an incomplete welfare state).

Since conventional wisdom is that the welfare state was born during the thirties this may appear somewhat controversial at first blush. However a closer look at the economics and politics of the thirties lends credence to this view. Admittedly, following the outbreak of the Great Depression (GD) and Roosevelt's ascend to the Presidency in 1933, there was a change in approach to the role of government in providing a minimal level of well-being under hard economic conditions. This led Roosevelt to establish the social security system as a permanent program in 1935, putting a permanent lower bound, \bar{r} , on the institutionally feasible level of redistribution and, by implication, on the redistribution tax rate, \bar{t} , required to finance it. During the late thirties, parts of Congress and Roosevelt himself became concerned with excessive deficits and the size of government (Fishback, 2007). But popular demand for redistribution remained high and might even have increased as the ramification of the GD extended into the later part of the thirties. It is therefore likely that the minimal redistribution tax rate, \bar{t} , although higher than the status-quo level before the creation of social security (and higher than the setter's ideal rate), was nonetheless lower than the tax rate required to finance the demand for transfers by the median voter during the immediate pre-war years. Orloff's (1988) account of the politics surrounding the adoption of the Social Security Act supports this view. In any case, all that is needed for our main result to go through is that, in line with the basic logic of the setter framework, $t_{M1}^* > \bar{t} > t_{H1}^*$. In the sequel we assume for simplicity and without much loss of generality that $t_1 = \bar{t}$.

3.3 Political equilibrium during the war period

Equation (3) implies that the government's budget constraint during the war period is

$$t_2 \bar{y}(t_2, r_2) = r_2 + \theta g_2. \quad (13)$$

²⁹Recall that the restrictions on the shares of individuals in each income class, equation (9), imply that the decisive voter under unhindered direct democracy is always a member of the middle class.

We assume that when external threats become imminent, individuals in the economy have the choice between two options: (1) raise the level of defense spending to $\bar{g} > 0$ in order to win the war, or (2) keep defense spending at its pre-war level of zero. The spending level \bar{g} is exogenous and assumed to be determined by the strength of the external threat, which is beyond the control of the national authorities. If defense spending remains at zero, the war is lost and personal gross income of each individual in the economy shrinks by a factor $\delta = \bar{\delta}$ to

$$\bar{\delta}x_i n(\bar{\delta}x_i; t_2, r(t_2, g_2 = 0, \delta = \bar{\delta})), \text{ for } i = H, M, L, \quad (14)$$

where $0 \leq \bar{\delta} < 1$ and the notation for the function $r(\cdot)$ now takes account of the fact that the relation between redistribution and the tax rate is affected by defense spending, as well as by average income which depends, in turn, on $\bar{\delta}$. However, by spending \bar{g} on defense the country can ensure that the war is won, implying that the shrinkage in gross income is avoided and individual's i gross income remains at $x_i n(x_i; t_2, r(t_2, g_2 = \bar{g}, \delta = 1))$. In the face of external threats an individual will vote for raising defense spending to \bar{g} provided the utility of winning the war given $g_2 = \bar{g}$ is larger than the utility of leaving g_2 at zero and suffering the shrinkage in gross income.

Let $\bar{t}_{2\bar{g}}$ and \bar{t}_{20} be the tax rates implied by government's budget constraint when redistribution is maintained at the minimum level, \bar{r} , and defense expenditures are \bar{g} and 0, respectively. We assume that, given $r = \bar{r}$, in order to win the war the required increase in defense spending is so large that the tax rate $\bar{t}_{2\bar{g}}$ is larger than \bar{t}_{20} in spite of the higher income associated with not losing the war.³⁰ Correspondingly, let $t_{2\bar{g}}$ and t_{20} be an arbitrary pair of tax rates with a common value of redistribution \tilde{r} and defense expenditures \bar{g} and 0, respectively. Obviously, if $\tilde{r} \geq \bar{r}$, then $t_{2\bar{g}} \geq \bar{t}_{2\bar{g}}$ and $t_{20} \geq \bar{t}_{20}$. Given $\tilde{r} \geq \bar{r}$, for any vote between the tax rates $t_{2\bar{g}}$ and t_{20} such that $t_{2\bar{g}} \geq \bar{t}_{2\bar{g}}$ and $t_{20} \geq \bar{t}_{20}$, a type i will favor raising defense expenditures to \bar{g} if

$$V_I(x_i; t_{2\bar{g}}, g_2 = \bar{g} \mid r = \tilde{r}; \delta = 1) > V_I(x_i; t_{20}, g_2 = 0 \mid r = \tilde{r}; \delta = \bar{\delta}), \quad i = H, M, L, \quad (15)$$

where

$$V_I(x_i; t_2, g_2 \mid \tilde{r}; \delta) \equiv u \left(\frac{(1 - t_2)\delta x_i n(\delta x_i; t_2, \tilde{r}) + t_2 \bar{y}(t_2, \tilde{r}) - \theta g_2}{1 - n(\delta x_i; t_2, \tilde{r})} \right), \quad (16)$$

subject to the condition

$$\tilde{r} = r(t_2, g_2, \delta),$$

which states that, given t_2, g_2 and δ , \tilde{r} satisfies the government's budget constraint.

³⁰Due to the income shrinkage when the war is lost, maintenance of redistribution at the mandated minimum level, \bar{r} , necessitates an increase in the tax rate above the prewar rate implying that $\bar{t}_{20} > \bar{t}$. We thus assume that, when the war is lost, \bar{t}_{20} suffices to finance \bar{r} even at the shrunk level of mean income.

If $\bar{\delta}$ is sufficiently low, condition (15) will be satisfied for all types of individuals for all relevant values of \bar{g} and \bar{r} .³¹ We assume that the magnitude of \bar{g} is not prohibitive for the economy in the sense that the economy is sufficiently large to finance \bar{g} . More precisely,

Assumption 1:

- (i) Condition (15) is satisfied for all types of individuals for $t_{2\bar{g}} = \bar{t}_{2\bar{g}}$ and $t_{20} = \bar{t}_{20}$.
- (ii) At the lower level of income $\delta = \bar{\delta}$ the median prefers the tax schedule (\bar{t}_{20}, \bar{r}) to the tax schedule $(\bar{t}, r(\bar{t}, 0, \bar{\delta}))$ in which both the tax rate and redistribution are lower.

Part (i) of Assumption 1 states that, subject to the constraint $r = \bar{r}$, all individuals prefer to pay the higher tax rate and win the war than to pay the lower tax rate and lose the war. Part (ii) states that, in the face of lower income, the median prefers to maintain the pre-war minimum level of redistribution even at the cost of a tax rate that is higher than \bar{t} .

We turn next to the determination of the equilibrium tax rate in period 2. Given that $g_2 = \bar{g}$ and that r is bounded from below by \bar{r} , the ideal tax rate of a type i individual ($i = H, M, L$) is obtained by maximizing the left-hand side of (15) subject to those constraints. Lemma 1 in Roberts (1977) implies the following ranking for the resulting ideal tax rates,

$$t_{L2}^*(\bar{g}) > t_{M2}^*(\bar{g}) > t_{H2}^*(\bar{g}) = \frac{\theta\bar{g} + \bar{r}}{\bar{y}(t_2, \bar{r})} = \bar{t}_{2\bar{g}}, \quad (17)$$

implying that,

$$r_{L2}^*(\bar{g}) > r_{M2}^*(\bar{g}) > r_{H2}^*(\bar{g}) = \bar{r}. \quad (18)$$

Assumption 1 implies that the equilibrium tax rate during the war period is $t_{H2}^*(\bar{g})$. The demonstration of this statement follows. Given the consensus for raising defense expenditures direct democracy in the absence of an agenda setter would have led to a political equilibrium in which $t_2 = t_{M2}^*(\bar{g})$, implying that redistribution would have been $r_{M2}^*(\bar{g}) > \bar{r}$. However, the existence of a setter alters this result. In particular, the equilibrium tax rate in period 2 is reached through a strategic interaction between the agenda setter who proposes a new tax rate and the population median, who either votes in favour of the setter's proposal or rejects it, in which case the status quo with $g_2 = 0$ prevails. Given the lower bound on redistribution, the ideal point of the setter subject to this constraint is given by $t_{H2}^*(\bar{g})$ from equation (17). Provided the setter believes that the median will vote for $t_{H2}^*(\bar{g})$ if he proposes it, his individually rational strategy is to propose his own ideal point, implying that $t_{H2}^*(\bar{g})$ is a candidate for being period's 2 equilibrium tax rate.

To complete the demonstration of the fact that $t_{H2}^*(\bar{g})$ is indeed the equilibrium tax rate during the war period it remains to show that, when faced with a choice between

³¹Notice that, since the condition in equation (15) is formulated in terms of indirect utility functions it takes into consideration the changes in the labor supply between the states of winning and losing the war.

$t_{H2}^*(\bar{g})$ and the pre-war status quo in terms of either the tax rate or redistribution, the median prefers $t_{H2}^*(\bar{g})$. When $g_2 = 0$, output is smaller so that the status-quo tax rate, \bar{t} , from the pre-war period does not suffice to maintain redistribution at its pre-war lower bound \bar{r} . Thus, rejection of the setter's proposal by the median voter leads to a loss of the war along with an associated shrinkage of output implying that both of the pre-war tax rate, \bar{t} , and the pre-war redistribution, \bar{r} , cannot be maintained simultaneously. In what follows we show that, irrespective of whether the status quo is maintained in terms of the tax rate or in terms of redistribution, the median prefers to vote for $t_{H2}^*(\bar{g})$.

When the status quo is maintained in terms of the pre-war redistribution, \bar{r} , the government's budget constraint implies that the tax rate has to be increased to $\bar{t}_{20} > \bar{t}$ to compensate for the loss of output due to losing the war. Part (i) of Assumption 1 implies that the median prefers the tax rate $t_{H2}^*(\bar{g})$ to \bar{t}_{20} . Intuitively, under both tax rates he gets the minimum redistribution \bar{r} , but under $t_{H2}^*(\bar{g})$ he avoids the reduction in output due to losing the war. If the status quo is maintained in terms of the tax rate, \bar{t} , redistribution is reduced to $r(\bar{t}, 0, \bar{\delta}) < \bar{r}$. By part (ii) of Assumption 1 the median prefers (\bar{t}_{20}, \bar{r}) to $(\bar{t}, r(\bar{t}, 0, \bar{\delta}))$ and by part (i) of this assumption he prefers $(t_{H2}^*(\bar{g}), \bar{r})$ to (\bar{t}_{20}, \bar{r}) , implying that he prefers $(t_{H2}^*(\bar{g}), \bar{r})$ to the status quo $(\bar{t}, r(\bar{t}, 0, \bar{\delta}))$. The upshot is that

$$t_2 = t_{H2}^*(\bar{g}) = \frac{\theta\bar{g} + \bar{r}}{\bar{y}(t_2, \bar{r})}. \quad (19)$$

Thus, as was the case in the pre-war period the rich setter prefers to maintain redistribution at the minimum possible level, \bar{r} , also in the presence of defense expenditures and he manages to enforce this equilibrium on the median and the low-income individuals, since the pre-war status quo in which defense expenditures are kept at zero is the worst outcome also from their points of view.

We close this subsection with a remark on the determination of the fraction $1 - \theta$ of defense expenditures that is financed by debt or future taxes. Although the model does not determine the allocation of taxes between the present and the future from first principles, tax-smoothing considerations of the type suggested in Barro (1979) imply that, when government expenditures rise substantially above their permanent normal range, it is optimal to spread the associated tax distortions over both current and future periods. In our model this is a consequence of the decreasing marginal utilities of consumption and leisure.

This point of view implies that it is optimal to finance a large increase in defense expenditures, such as the one that occurred during WWII, by raising both current and future taxes. Correspondingly, $1 - \theta$ can be thought of as the fraction of defense expenditure financed by future taxes that minimizes welfare losses caused by the war. The upshot is that the increase in g should be accompanied by substantial increases in both current taxes and debt issuance as has actually been the case during WWII.³²

³²Over the war years (1942-1945) the average shares of current tax revenues and deficits in GDP were 17.5 and 22.6 percent, respectively.

3.4 Post-war political equilibrium and the ratchets

Once the war has been won, external threats recede and defense expenditures are no longer useful. Hence, there is a consensus that they have to be cut back to zero.³³ Consequently, the government's budget constraint in equation (4) reverts back to

$$t_3 \bar{y}(t_3, r_3) = r_3. \quad (20)$$

Since $g_3 = 0$, it follows from equation (8) that the ideal points of the three types in the tax-rate space satisfy

$$t_{L3}^* > t_{M3}^* > t_{H3}^* = 0. \quad (21)$$

However, now the status-quo tax rate inherited from the war period, $t_2 = (\theta \bar{g} + \bar{r}) / \bar{y}(t_2, \bar{r})$, is higher than $t_1 = \bar{t} = \bar{r} / \bar{y}(\bar{t}, \bar{r})$.³⁴ Table 1 showed that during the peak of the war period (1943-1945) the GDP share of (current) taxes climbed from around 5% in the pre-war period (1937-1939) to over 16%. The corresponding approximate figures from the NIPA for the share of transfers are 2% and on average 1.5%, respectively. Since most, if not all, of the 11%-points increase in the share of taxes from the pre-war to the war period is due to defense expenditures, those figures support the view that, in terms of the model, $\theta \bar{g}$ is at least five times larger than \bar{r} . It follows that t_2 is larger than t_1 by several orders of magnitude implying that it may be even larger than t_{M3}^* , which we assume to be the case. That is,

Assumption 2: $t_2 = (\theta \bar{g} + \bar{r}) / \bar{y}(t_2, \bar{r}) > t_{M3}^*$.

Under Assumption 2 the setter can entice PM to vote for a decrease in the tax rate up to t_{Me} , where t_{Me} is a tax rate smaller than t_{M3}^* at which the indirect utility of PM is the same as at the status-quo tax rate t_2 (see Figure 2).³⁵ We further assume:

Assumption 3: $t_{Me} > \bar{t}$.

Since $t_{M3}^* > t_{Me}$ implying $t_{M3}^* > \bar{t}$, Assumption 3 states that the welfare state is incomplete in the post-war period. Assumption 3 is more likely to be satisfied, the steeper is the indirect utility function of a representative individual in the middle class in the neighborhood of his ideal point. This, in turn, is more likely to be the case when the median voter has relatively low productivity, since a low productivity individual would be hurt relatively more by a reduction in the tax rate due to the associated fall in redistribution.³⁶ Assumption 3 implies that $t_{Me} > t_{H3}^* = 0$. Hence, the setter optimally proposes

³³Qualitatively, our results are unaffected if, instead, the optimal level of defense expenditures in the post-war period is positive, but smaller than \bar{g} . For example, quite shortly after World War II, the threat of the Cold War emerged.

³⁴This follows from the fact that $\theta \bar{g} + \bar{r} > \bar{r}$, provided $\bar{y}(t, \bar{r})$ is decreasing in the tax rate given \bar{r} . The latter is the case if the substitution effect on labor supply of a change in the tax rate dominates the income effect at the individual level.

³⁵The subscript "e" that is attached to t_{Me} stands for "equivalent" in terms of the median's indirect utility function.

³⁶Inspection of Figure 2 suggests that a necessary precondition for the fulfillment of Assumption 3 is the existence of an incomplete welfare state prior to the war – notice that $t_{M1}^* = t_{M3}^* > \bar{t}$. This issue is discussed further in Section 4.

the tax rate $t_3 = t_{Me}$. Proposing a higher tax rate is obviously against his own interest and proposing a lower tax rate will induce a rejection by the median implying that the inefficiently high status-quo tax rate t_2 prevails. Consequently, the setter proposes t_{Me} and the median votes for this proposal implying that the equilibrium post-war tax rate is

$$t_3 = t_{Me}. \quad (22)$$

At the tax rate t_3 the setter is better off than at t_2 and the median is indifferent.³⁷

The discussion preceding Assumption 2 established that between the pre-war and the war period the GDP share of taxes increased approximately by a gigantic factor of 3. Assumption 3 implies

$$t_3 = t_{Me} > \bar{t} = t_1. \quad (23)$$

The large increase in the status-quo tax rate induced by the war led to a new political equilibrium in which both taxes and transfer payments became permanently higher in comparison to the pre-war period. Essentially, prior to the war the wealthy setter managed to partially block PM 's desire for redistribution by using his gate-keeping authority to prevent the associated increase in the tax rate (equation (12)). The war produced a consensus for raising the tax rate to fend off external threats. As a consequence, the status-quo tax rate t_2 in the post-war period was much higher than the tax rate in the pre-war period. This raised the bargaining power of PM vis-à-vis the wealthy setter and enabled the median voter to permanently raise the level of transfers.

The main results of the section can now be summarized as follows:

Proposition 1 (i) *In comparison to their pre-war levels, WW-II produced a permanent post-war increase in the GDP shares of transfers and taxes.*³⁸

(ii) *The ratchet increase was made possible by the increase in the post-war status-quo tax rate induced by the war.*

³⁷More generally, all the tax rates in the interval $\{t_{Me}, t_{M3}^*\}$ are in the bargaining set between the setter and the median. We focus in the text on an equilibrium in which the setter, who is the first mover, gets all the surplus. However, in the presence of alternative forms of bargaining other solutions within the bargaining set may arise.

³⁸This conclusion is immediate for the share of taxes, since t_3 is specified as a share of GDP and $t_3 > t_1 = \bar{t}$. Rearranging equation (4) for $s = 1, 3$

$$\begin{aligned} \frac{r_3}{\bar{y}(t_3, r_3)} &= t_3, \\ \frac{r_1}{\bar{y}(t_1, r_1)} &= t_1. \end{aligned}$$

The left-hand sides of these two equations are the GDP shares of transfers in the post- and pre-war periods, respectively. Since $t_3 > t_1 = \bar{t}$, the post-war share of transfers is larger than the pre-war share.

4 Discussion

Our model predicts ratchets in taxes and transfers under Assumption 3, which requires that the post-war welfare state was sufficiently incomplete relative to the preferences of the median voter. In fact, in the model we have abstracted, for simplicity, from the possibility that the fundamental preferences for redistribution may have changed during WW-II. However, it is likely that the existence of a post-war unsatisfied demand for redistribution was reinforced by the fact that during wars individual fortunes depend less on private effort and talent and more on luck and social action than in peace time. Hence, attitudes to government intervention and redistribution are more favorable during wars and their immediate aftermaths than during normal times.³⁹ Obviously, by raising the median's post-war demand for redistribution the inclusion of this factor would reinforce the plausibility of Assumption 3 and the main conclusion of the formal analysis. Indeed, the post-war incomplete welfare state view is consistent with responses to public opinion polls in the Fall of 1945. When asked about their post-war expectations from public policy, more than 75% of individuals backed up the extension of social security to cover everybody that had a job (Public Opinion Quarterly, Fall 1945).

Since our model does not allow for changes in the median voter preferences, Assumption 3 requires that the pre-war welfare state too was sufficiently incomplete. This view is supported by at least three arguments. First, prior to the war large groups were not covered by the Social Security Act, while benefits to those who were covered were relatively limited. In its initial phases the Social Security Act was limited on purpose due to fear that Congress would reject it otherwise (see Orloff, 1988). Second, as a result of the Great Depression large parts of the population became unemployed, which naturally increased pressure for redistribution. By the end of WW-II unemployment was much lower than during the Great Depression. However, initially there was a fear that the WW-II demobilization would create substantial unemployment.

Third, there is little doubt that the gradual lifting of restrictions on the franchise and of registration requirements between the two World Wars operated to raise the active political participation of lower-income groups like women and blacks. As argued by Meltzer and Richard (1981), this increased pressure for redistribution by lowering the relative position of the median voter in the distribution of income.⁴⁰ However, the process of increasing political participation of the aforementioned groups occurred only gradually and was not necessarily bunched in the post-war period. Hence, although it contributed to increase the unsatisfied demand for redistribution, it cannot provide a stand-alone explanation for the *timing* of the post-war ratchet.

³⁹Alesina and Angelotos (2005) show that, when a majority of individuals in a country believe that income inequality is mainly due to factors like luck and social action that is largely independent of individual effort and talent, redistribution tends to be larger.

⁴⁰Lott and Kenney (1999) discuss consequences of this development for the size of government. They argue that even women that share a household's budget with their husband tend to be more in favor of redistribution than their husbands, because of the risk of divorce or of becoming a widow.

By contrast, the war bonanza that became available at the end of the war freed tax revenues previously allocated to defense for redistribution. Truman used part of this bonanza already in 1944 to pass the unusually generous GI bill. As documented in Section 2, this bill disbursed most of its funds through the second part of the forties, which freed, in turn, government revenues to contribute to financing the substantial expansion of social security through the 1950 Amendments to Social Security (H.R.6000). Thus, the fiscal space created by the war was initially used to focus redistribution on a large temporary program aimed at returning war veterans. In the second stage, the fiscal space created by the phasing out of the G.I. bill expenditures was used by legislators to permanently expand the social security system. Combined with the time it took to overcome the political resistance described in Subsection 2.5, this helps to explain why the substantial expansion of social security benefits under H.R. 6000 took place only five years after the end of WW-II.

The mechanism underlying our model implies that the resources freed up through the termination of the war would be used to trade more redistribution for lower taxes. Several observations support this mechanism. First is the quote from Amenta and Skocpol (1988) about enhanced fiscal capacity allowing for additional redistributive spending (see Subsection 2.2). Further, as Thorndike (2006) writes "As World War II drew to a close, American political leaders of almost every stripe agreed that taxes were too high".⁴¹ Indeed, in 1946 taxes were reduced by almost 6 billion dollars, the sum of a reduction of over 3 billion for business and over 2.5 billion for individuals. Moreover, this reduction contained an element of redistribution towards the poor. As the New York Times (January 1, 1946) wrote "Taxes on all individual incomes will be reduced, but the country's corporations, along with 12,000,000 persons of low incomes who are to be excused entirely from Federal income tax, will be the principal beneficiaries." As Thorndike (2006) also writes, after two sustained vetoes by Truman and after introducing exemptions especially for the blind and the elderly, an early 1948 Congress managed to enact a tax reduction package overriding a third veto by Truman. Finally, as Amenta and Skocpol (1988, p.121) document: "After the war, the Social Security Board formed ties to the congressional taxing committees; it provided technical assistance to a Senate Advisory Council on Social Security and was able to influence the direction of its recommendations." (see also DeWitt, 2010.)

As documented in Subsection 2.4 the huge expenditures required to finance the war effort led to important reforms in the tax collection machinery. Before WW-II relatively few people, and mainly higher income groups, paid income taxes. Although the extension of filing requirements to lower taxable incomes was enacted at the end of the thirties, major additional steps including the further broadening of filing requirements were taken over the war period with the Revenue Act of 1942, the broadest and most progressive tax in American history, and the establishment of general tax withholding through the Current

⁴¹Source: <http://www.taxhistory.org/thp/readings.nsf/ArtWeb/A5D6660DCA2B62D98525730800064E65?OpenDocument>.

Tax Payment Act of 1943.

Those changes in tax-collection technology potentially provide an alternative explanation for the post-WW-II transfer cum tax ratchets, as they may have eased the satisfaction of popular demand for transfers by facilitating tax collections.⁴² However, as suggested by the preceding discussion, a non-negligible part of the change in the state tax collection capacity was itself endogenous to the war in the sense that, in the absence of WWII, the increase in the state capacity to tax would not have taken place. Or, in other words, the change in the status-quo tax technology, which was not politically feasible in the face of an unsatisfied popular demand for transfers during peace times, became politically feasible in the face of a large threat to national security. Thus, rather than constituting an alternative explanation for the ratchets, the WW-II increase in the state capacity to tax complements our theory. The upshot is that the post-war transfer ratchets materialized through both war-induced changes in the status-quo tax burden as well as in the status-quo tax collection technology. Indeed, while we are not aware of an obvious way in which we can formally test the relative role of the status-quo in the tax burden against the changes in the tax collection technology, the fact that the main innovations in the latter took place early during the war, while tax schedules came down only marginally directly after the war and then remained unchanged for some years, suggests that the status-quo tax burden must have played a significant role in explaining the tax ratchet.

5 Concluding remarks

This paper provides evidence supporting the existence of substantial ratchets in transfers and revenues in the U.S. around and following WW-II. The evidence is based on political and legal developments, as well as on regression analysis using data from the NIPA and the Historical Statistics of the U.S. The paper explains these findings in the context of a politico-economic model with defense spending and a Congress in which a relatively wealthy agenda setter interacts with a poorer median voter to determine the amount of transfers. Our reading of the historical developments is that the outbreak and persistence of the GD combined with preceding expansions of general suffrage substantially raised the median voter's demand for redistribution, but that agenda setters in Congress managed to partially prevent this demand from materializing. However, by raising the tax schedule and re-enforcing the machinery of direct taxation, WW-II created a new taxation status quo in terms of both tax rates and tax collection capacity. As a consequence, the post-war decrease in defense spending induced a new political equilibrium in which part of the peace dividend was channelled towards more redistribution. The paper thus provides a political mechanism through which the permanent increases in transfers and the taxes needed to finance them took place. Although part of the increases in post-war taxes-cum-redistribution relative to their pre-war levels might have been motivated by a war-induced

⁴²We thank Torsten Persson for drawing our attention to this potential alternative explanation.

increase in the willingness to share, it is hard to believe that in the absence of the war-induced change in the status-quo tax schedule top-income individuals would have been willing to pay over 90 percent of their marginal incomes in order to finance higher transfers to individuals below them in the distribution of income. While beyond the scope of the present paper, a direct test of the role of changes in redistribution preferences could be conducted by exploring the frequency with which the item of redistribution was raised in the polls and the media after WW-II.

The wider conclusion supported by the paper's results is that the evolution of redistribution in the US would have been substantially slower and possibly permanently lower if WW-II had not occurred. A tracking counterfactual experiment based on the regression analysis with the NIPA data showed that the share of transfers would have been lower by 4%-points of GDP had the 1940-1950 period been excluded. Using only data on OASDHI to calculate a counterfactual in the absence of new post-war legislation yielded by 1960 a long-run legislative OASDHI ratchet of 2%.

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Tables

Table 1: Key figures during and around the GD and WW-II

year	u	DEF	$NDEF$	$TRANS$	TAX	REV
1929	3.2	0.87	0.77	0.77	3.38	3.67
1930	8.7	0.99	0.99	0.88	3.07	3.29
1931	15.9	1.18	1.18	2.61	2.35	2.61
1932	23.6	1.53	1.53	1.70	2.56	2.90
1933	24.9	1.60	2.48	1.95	4.26	4.61
1934	21.7	1.21	3.79	3.33	4.85	5.30
1935	20.1	1.36	3.14	3.14	4.77	5.32
1936	16.9	1.43	5.13	3.22	5.01	5.97
1937	14.3	1.41	4.13	1.63	5.44	7.62
1938	19.0	1.63	5.11	2.09	4.99	7.43
1939	17.2	1.63	4.88	2.17	4.77	7.16
1940	14.6	2.47	3.94	2.07	6.11	8.38
1941	9.9	11.3	2.92	1.50	9.79	12.1
1942	4.7	31.6	1.85	1.30	11.9	14.0
1943	1.9	42.4	1.16	0.96	17.3	19.6
1944	1.2	43.0	1.09	1.09	16.1	18.5
1945	1.9	36.8	0.94	2.33	16.0	18.9
1946	3.9	11.3	1.66	5.35	14.7	18.1
1947	3.9	7.45	1.80	4.87	15.2	17.9
1948	3.8	6.80	2.19	4.75	14.0	16.1
1949	5.9	7.41	2.96	5.69	12.3	14.4
1950	5.3	6.67	2.21	5.34	14.7	16.8
1951	3.3	11.6	1.71	3.86	16.6	18.7
1952	3.0	14.6	1.90	3.46	16.4	18.6
1953	2.9	14.7	2.24	3.43	16.2	18.3
1954	5.5	12.9	2.13	3.89	14.3	16.7
1955	4.4	11.3	1.90	3.86	14.9	17.4

Notes: u = unemployment measured in percent of the labor force. Other variables are in percent of GDP, where DEF = federal defense spending, $NDEF$ = federal non-defense (i.e. civilian) public spending, $TRANS$ = federal spending on transfers, TAX = federal tax revenues and REV = total federal revenues. Source of data: NIPA (2009) for all series, except for unemployment, which is from the U.S. Census Bureau (2009a).

Table 2: Effects of defense spending on federal transfers – NIPA data

	(1)	(2)	(3)	(4)	(5)	(6)
	ΔTR	ΔTR	ΔSBP	ΔTR	ΔTR	ΔTR
Period	1931- 2002	1931- 2002	1931- 2002	1937- 2002	1952- 2002	1931 2002
ΔDEF	-0.065 (-1.86)					
ΔDEF_U		0.0026 (0.11)	-0.0092 (-0.49)	0.0033 (0.12)	0.38 (1.36)	-0.029 (-1.15)
ΔDEF_D		-0.11 (-8.38)	-0.079 (-5.91)	-0.11 (-12.2)	-0.079 (-0.47)	-0.080 (-6.62)
$\Delta Y_U(-1)$	-0.067 (-1.01)	-0.076 (-1.24)	-0.013 (-0.35)	-0.086 (-1.59)	-0.16 (-2.78)	-0.052 (-1.05)
$\Delta Y_D(-1)$	-0.018 (-0.21)	0.0044 (0.049)	0.063 (1.17)	0.068 (1.88)	-0.15 (-1.14)	0.016 (0.35)
ΔPOP_{65}	1.37 (1.18)	0.79 (0.70)	1.06 (1.25)	0.75 (0.60)	1.07 (0.77)	0.35 (0.26)
$\Delta u(-1)$	-0.087 (-0.69)	-0.043 (-0.31)	0.041 (0.41)	-0.067 (-0.65)	-0.31 (-2.44)	-0.034 (-0.37)
R^2	0.27	0.35	0.25	0.45	0.26	0.70
DW	1.87	1.87	1.87	1.81	2.18	1.65
H_0 : no ratchet	–	p=0.00	p=0.01	p=0.00	p=0.18	p=0.03

Notes: (1) All budgetary variables are at the federal level. (2) The regressions are based on the calendar year. They all include a constant, of which for brevity we do not report the estimate. (3) ΔTR = change in GDP share of transfers; ΔSBP = change in GDP share of social benefits to persons; ΔDEF_U = change in share of defense spending when change is positive and zero otherwise; ΔDEF_D = idem, when change is negative and zero otherwise; ΔPOP_{65} = share of population of 65 and older; $\Delta Y_U(-1)$ = one-period lagged difference in log of real per-capita GDP, when this is positive and zero otherwise; $\Delta Y_D(-1)$ = idem, when this is negative and zero otherwise; and $\Delta u(-1)$ = the lagged change in unemployment rate. We use lags to rule out any potential endogeneity bias. (4) Data source is NIPA (2009) and the U.S. Census Bureau (2009a). (5) Estimation is by OLS with a Newey-West correction for heteroskedasticity and serial correlation. (6) All regressions are based on an AR(1) error structure – this suffices to remove any serial correlation in the errors. (7) Column (6) is based on three-year moving averages of the independent and dependent variables. (8) Numbers in parentheses are t-statistics. (9) DW = Durbin-Watson test statistic. (10) In relevant cases, the last row provides the p-value of the F-test statistic of the null hypothesis that there is no ratchet in the effect of defense expenditures on transfers.

Table 3: Effects of defense spending on federal transfers – Historical Statistics data

	(2)	(3)	(4)	(5)	(6)	
	ΔSW	ΔSI	ΔSW	$\Delta SW - \Delta OASDHI$	$\Delta SW - \Delta SI$	
Period	1931-1995	1931-1995	1937-1995	1952-1995	1942-1988	1931-1995
ΔDEF_U	0.018 (2.38)	0.0043 (0.99)	0.018 (1.90)	0.036 (1.28)	0.021 (1.89)	0.012 (1.75)
ΔDEF_D	-0.058 (-4.95)	-0.021 (-4.02)	-0.057 (-4.59)	0.045 (0.68)	-0.060 (-4.94)	-0.042 (-5.15)
$\Delta Y_U(-1)$	0.014 (1.10)	-0.0057 (-0.64)	0.0095 (0.54)	-0.011 (-0.27)	0.024 (1.53)	0.021 (3.00)
$\Delta Y_D(-1)$	0.039 (2.23)	0.025 (3.33)	0.030 (1.24)	0.037 (1.17)	0.033 (1.18)	0.006 (0.39)
ΔPOP_{65}	-0.79 (-0.67)	0.39 (0.45)	-0.70 (-0.57)	0.011 (0.0079)	-1.07 (-0.83)	-1.02 (-2.62)
$\Delta u(-1)$	0.077 (2.89)	0.026 (1.90)	0.069 (1.32)	0.086 (2.51)	0.098 (1.94)	0.049 (2.53)
R^2	0.42	0.43	0.40	0.35	0.46	0.48
DW	2.01	1.86	2.03	2.08	2.00	1.94
H_0 : no ratchet	p=0.00	p=0.00	p=0.00	p=0.91	p=0.00	p=0.00

Notes: (1) Regressions are based on the fiscal year. (2) ΔSW = change in GDP share of total public expenditures on social welfare excluding the veteran bonus and public aid; ΔSI = change in GDP share of social insurance; $\Delta OASDHI$ = change in the GDP share of federal social security spending on old age, survivors, disability and health insurance. (3) Data sources are the Historical Statistics of the U.S. (2006), the U.S. Census Bureau (2009b) and Bohn (2008). (4) Further, the notes to Table 2 apply.

Table 4: Ratchets in federal taxes and revenues

	(1)	(2)	(3)	(4)
	ΔTAX	ΔREV	$\Delta TAX ADJ$	$\Delta REV ADJ$
Period	1931- 2002	1931- 2002	1931- 2002	1931- 2002
ΔDEF_U	0.20 (4.80)	0.17 (3.83)	0.13 (1.28)	0.093 (0.84)
ΔDEF_D	0.040 (2.77)	0.022 (1.24)	-0.15 (-2.81)	-0.18 (-3.07)
$\Delta Y_U(-1)$	0.087 (1.83)	0.15 (2.40)	-0.34 (-2.08)	-0.27 (-1.55)
$\Delta Y_D(-1)$	-0.032 (-0.59)	0.034 (0.53)	-0.22 (-2.06)	-0.14 (-1.12)
ΔPOP_{65}	-0.93 (-0.50)	-0.32 (-0.17)	-0.88 (-0.47)	-0.31 (-0.17)
$\Delta u(-1)$	0.076 (0.63)	0.17 (1.17)	-0.19 (-0.93)	-0.089 (-0.38)
R^2	0.41	0.38	0.45	0.42
DW	1.96	1.98	1.99	1.97
H_0 : no ratchet	p=0.00	p=0.00	p=0.02	p=0.04

Notes: (1) ΔTAX = change in GDP share of federal taxes. (2) ΔREV = change in GDP share of federal revenues. (3) $\Delta TAX ADJ$ ($\Delta REV ADJ$) = change in GDP share of adjusted federal taxes (revenues). Adjusted federal taxes (revenues) are defined as federal taxes (revenues) minus interest payments on the public debt, minus debt repayment, and minus defense expenditures as shares of GDP. (4) Data are from the NIPA (2009) and the Bureau of the Public Debt (2009). (5) Further, see *Notes* to Table 2.

Table 5: Marginal statutory income tax rates at specific nominal income levels during and around WW-II

year	1000	2000	5000	10,000	25,000	50,000	100,000
1939	4.0%	4.0%	8.0%	10.0%	21.0%	31.0%	59.0%
1940	4.0%	4.0%	8.0%	12.0%	31.0%	44.0%	60.0%
1941	10.0%	10.0%	17.0%	25.0%	48.0%	59.0%	68.0%
1942	19.0%	19.0%	26.0%	34.0%	58.0%	69.0%	83.0%
1943	19.0%	19.0%	26.0%	34.0%	58.0%	69.0%	83.0%
1944	23.0%	23.0%	29.0%	37.0%	62.0%	75.0%	90.0%
1945	23.0%	23.0%	29.0%	37.0%	62.0%	75.0%	90.0%
1946	20.0%	20.0%	26.0%	34.0%	59.0%	72.0%	87.0%
1947	20.0%	20.0%	26.0%	34.0%	59.0%	72.0%	87.0%
1948	20.0%	20.0%	26.0%	34.0%	59.0%	72.0%	87.0%
1949	20.0%	20.0%	26.0%	34.0%	59.0%	72.0%	87.0%
1950	20.0%	20.0%	26.0%	34.0%	59.0%	72.0%	87.0%
1951	20.4%	20.4%	27.0%	35.0%	60.0%	73.0%	87.0%

Notes: Tax rates and brackets apply to all taxpayers, whether single, head of household, married and jointly filing, or married and separately filing. As of 1949, applicable marginal tax rates to married and jointly filing were determined by the bracket corresponding to one-half of taxable income. Source: The Tax Foundation (2014).

Table 6: Marginal statutory income tax rates at specific real income levels during and around WW-II

year	10,000	25,000	50,000	100,000	200,000	500,000
1939	4.0%	4.0%	4.0%	9.0%	12.0%	23.0%
1940	4.0%	4.0%	4.0%	10.0%	16.0%	34.0%
1941	10.0%	10.0%	13.0%	21.0%	33.0%	54.0%
1942	19.0%	19.0%	22.0%	30.0%	46.0%	64.0%
1943	19.0%	19.0%	22.0%	30.0%	46.0%	64.0%
1944	23.0%	23.0%	25.0%	33.0%	50.0%	72.0%
1945	23.0%	23.0%	25.0%	33.0%	50.0%	72.0%
1946	20.0%	22.0%	26.0%	34.0%	50.0%	69.0%
1947	20.0%	22.0%	26.0%	34.0%	53.0%	72.0%
1948	20.0%	22.0%	26.0%	38.0%	56.0%	75.0%
1949	20.0%	22.0%	26.0%	38.0%	56.0%	75.0%
1950	20.0%	22.0%	26.0%	38.0%	56.0%	75.0%
1951	20.4%	22.4%	27.0%	39.0%	60.0%	75.0%

Notes: The table is based on real incomes expressed in 2013 dollars. For further information, see Table 5.

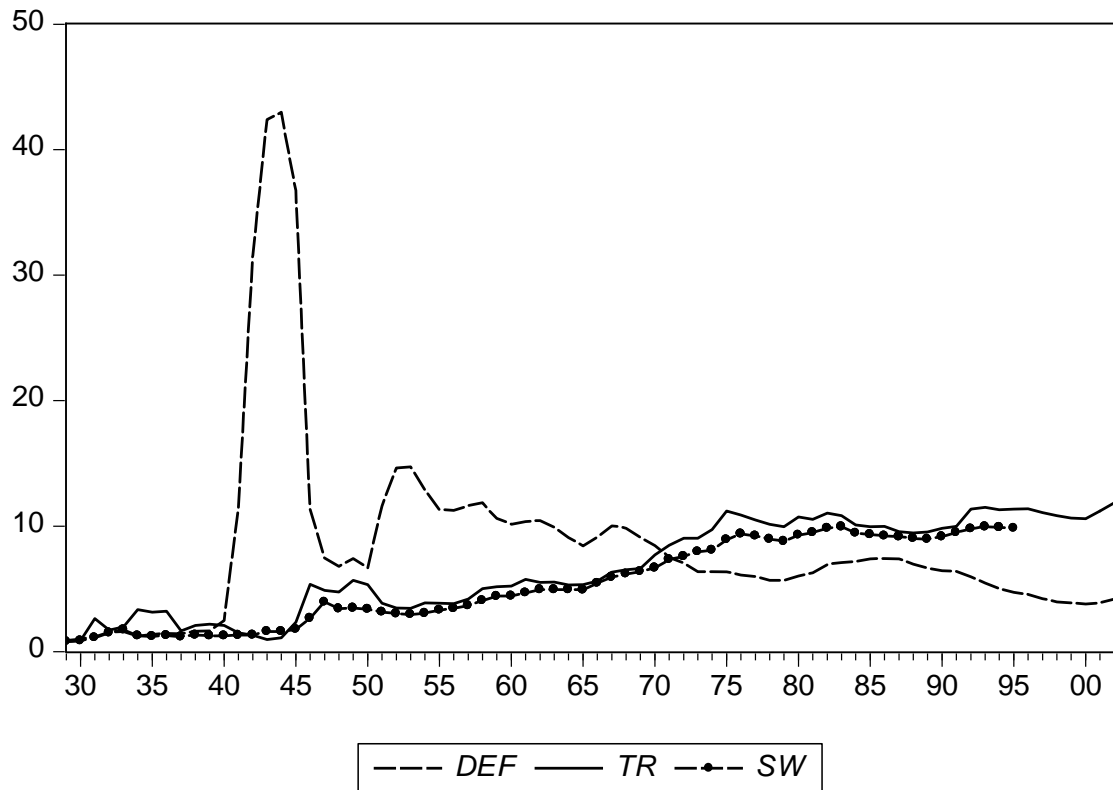
Table 7: Average income taxes at specific income levels during and around WW-II

year	1000	2000	5000	10,000	25,000	50,000	100,000
1939	0.0%	1.6%	2.8%	5.6%	11.2%	18.7%	33.4%
1940	0.4%	2.2%	3.4%	6.9%	17.0%	29.4%	44.3%
1941	2.1%	5.9%	9.7%	14.9%	28.9%	41.8%	53.2%
1942	8.9%	13.7%	18.4%	23.9%	38.5%	51.6%	64.6%
1943	10.7%	16.7%	22.1%	27.8%	42.6%	56.1%	69.7%
1944	11.5%	17.3%	22.1%	27.6%	42.4%	55.9%	69.9%
1945	11.5%	17.3%	22.1%	27.6%	42.4%	55.9%	69.9%
1946	9.5%	14.3%	18.4%	23.5%	37.5%	50.3%	63.5%
1947	9.5%	14.3%	18.4%	23.5%	37.5%	50.3%	63.5%
1948	6.6%	11.6%	16.2%	21.2%	34.4%	46.4%	58.8%

Notes: Figures are average taxes, i.e. taxes divided by taxable income. Taxable income is income minus deductions. Rates are calculated for a single individual with one exemption. Source: Wallis (2006), page 5-114.

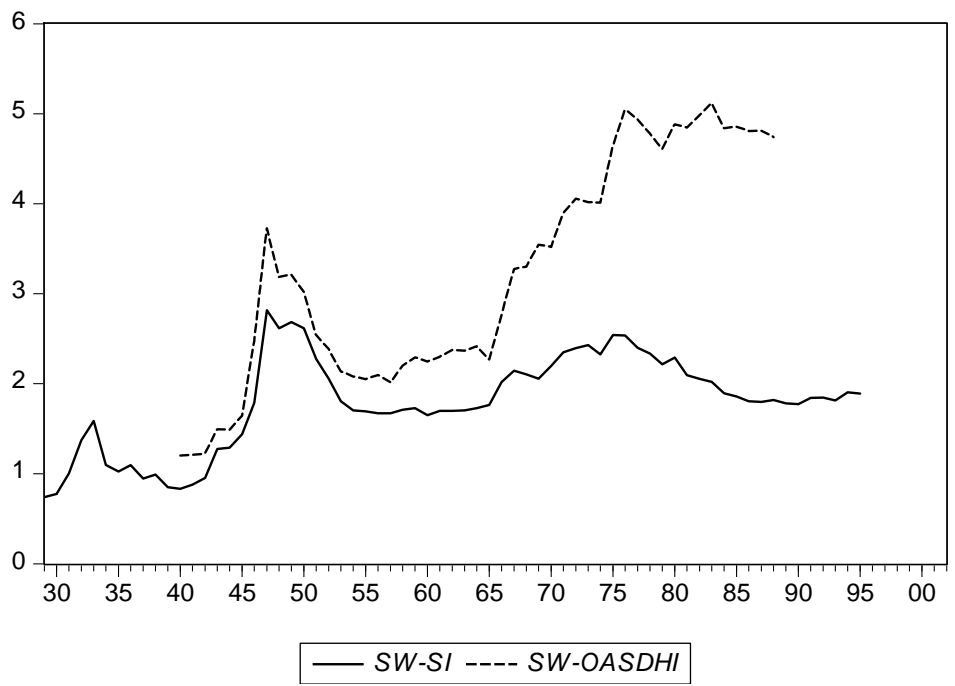
Figures

Figure 1a: GDP shares of federal transfers and defense spending



Notes: “DEF” is federal defense spending as a share of GDP from the NIPA (2009), “TR” is current federal transfer payments as a share of GDP from the NIPA (2009) and “SW” is public expenditures on social welfare (excluding the veteran bonus and public aid) as a share of GDP from the Historical Statistics of the U.S. (2006).

Figure 1b: public expenditures on social welfare excluding social insurance or OASDHI



Notes: “SW-SI” and “SW-OASDHI” are public expenditures on social welfare (excluding the veteran bonus and public aid) minus social insurance, and minus OASDHI spending, respectively, as shares of GDP. All data are from the Historical Statistics of the U.S. (2006).

Figure 2: Determination of the Post WW-II Equilibrium Tax Rate (t_3)

