Predistribution vs. Redistribution: Evidence from France and the United States *

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Abstract

We construct series of post-tax income for France over the 1900–2018 period and compare them with U.S. series. We quantify the extent of redistribution—the reduction from pretax to post-tax inequality—and estimate the contribution of redistribution in explaining differences in post-tax inequality. We find that differences in pretax inequality drive most of the differences in post-tax inequality between France and the U.S., and that changes over time in both countries are mostly due to changes in pretax inequality. We highlight that the concept of redistribution can be empirically misleading for judging how policies reduce inequalities. Policies which reduce pretax inequality, i.e., predistribution, will reduce the magnitude of redistribution, while still reducing effectively post-tax inequality. This suggests that more attention should be paid to policies affecting pretax inequality.

JEL Codes: D3, H2, H3, H5
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Introduction

The issue of how to select the most adequate policies to reduce inequalities has attracted considerable interest, both in academia and in the public debate. Most of the attention has been devoted to redistribution policies, i.e., policies like taxes, transfers and other public spending, which can reduce post-tax income inequality given a certain level of pretax inequality. The public economics literature has been largely influenced by an approach which treats pre-tax inequalities as given, and where the policy options for reducing inequalities largely rest on various combination of tax-and-transfers, with the constraints imposed by the behavioral responses to the tax and transfer system (e.g., this is the generic logic of optimal taxation literature).[1] However, public policies can also affect the pretax distribution of income, what has been called predistribution policies in political science (Hacker, 2011). For instance, the legal and social system contributes to determine the bargaining power of workers vis-à-vis firm owners and managers, via wage-setting rules, corporate laws, minimum wage regulations or labor unions' power. Education and health care policies impact the access to skills and jobs, and therefore the overall inequality of labor earnings. Stronger union power and sharper tax progressivity can also contribute to reduce how much top managers are able to extract from their company, and so on. Although these channels are known to impact inequalities, the lack of adequate data series with sufficient historical and comparative breadth has limited the ability to evaluate the contribution of these various public policy options on inequality.

This paper aims to quantify the amount of redistribution over time and across two countries, France and the United States, and estimate the relative magnitudes of redistribution and changes in pretax income in accounting for the observed evolution of post-tax inequality. France and the United States are good candidates for such a comparison, mainly because of data availability over a long period of time is still rare, but the two countries are comparable enough despite their difference in population size. We define redistribution in a broad sense by all the government policies affecting pretax income to obtain a post-tax income, including the impact of taxation and public spending. More specifically, we include in the measure of redistribution the large share of public spending—health, education and collective public expenditures—that are not often included in redistributive analyses. We

[1] See Mirrlees (1976), Kaplow (2008), Piketty and Saez (2013) and Tanninen et al. (2019) for surveys of this approach.

quantify the impact of redistribution on inequality dynamics using a battery of inequality indicators, like the ratio between average incomes of the top 10% and bottom 50% groups (ratio T10/B50), the Gini or the ratio between average incomes of the top 10% and bottom 90% groups (ratio T10/B90). We use these indicators to assess the magnitude of inequality reduction implied by redistribution in France and the U.S. by sub-periods. This is done by computing the relative variation in the inequality indicators when going from pretax to post-tax income, thus obtaining measures of redistribution which can be compared to other changes in pre-tax inequalities that also affect post-tax inequalities.

Our analysis leads to three main results. First, we document that the reduction of inequality implied by redistribution is significant in both countries and increasing throughout the entire 20th century, even though not at the same pace nor in the same period. As a case in point, redistribution measured by the T10/B90 ratio was similar in France and in the U.S. just before WWI (reducing pretax inequality by less than 10%), then increased appreciably in the U.S. in the 1940s, while France caught up later in the 1960s to reach a reduction of pretax inequality of 20%. Using the more precise indicator T10/B50 available from the 1970s, the level of redistribution is higher but also at similar level in both countries in 1975 (-35%), and increased in both countries throughout the last 40 years. At the end of the period (2010-2018), both France and the U.S. have reached considerably higher level of redistribution, with a slightly higher level in France (-51%) than in the U.S (-47%). The Gini indicator offers a similar picture—increasing redistribution in both countries–albeit with more pronounced increase for France than for the U.S. (-12% in the U.S. against -16% in France).

Second, we show that most of the changes in post-tax inequality, both overtime and across these two countries, are due to changes in pretax inequality and not so much to differences in redistribution. For instance, we show that the long-run decline in post-tax inequality in France over the 1900-2018 period (-75%) is due mostly to the fall in pretax inequality (-45%), and to a lesser extent to redistribution (-30%). By comparing France with the U.S., we find that most of the post-tax inequality differences across the two countries can be attributed to changes in pre-tax inequalities. The pattern of U.S. inequality over the period from 1913 to 2018 is one of a significant decline in post-tax inequality (-37%) up to the 1980s, followed by a steep increase since then, to end slightly below the inequality level of 1913 (-15%). This evolution is the result of two opposing factors: rising

pretax income inequality (+7%) and rising redistribution (-22%). These results show that if inequality has decreased much more in France than in the U.S. during the 1900-2018 period, this is not due to a relatively more important increase in redistribution by French tax and public spending. The major factor behind this differential trend comes from the differential evolution of pretax income inequality between the two countries. Pretax income inequality has decreased relatively more in France than in the U.S. over the 1900-1983 period and has increased relatively less since 1983. In other words, both changes in pretax inequality and redistribution have had a significant impact on the historical reduction of inequality, but the former is quantitatively about twice as large as the latter.

Third, we explain this seemingly paradoxical result—that the U.S. only redistribute marginally less than France—through a simple conceptual framework aiming to clarify what we really can measure empirically with redistribution, i.e., changes from pretax inequality to post-tax inequalities. We show that the magnitude of redistribution is positively related to the level and progressivity of taxation and public spending, but also to the level of pretax income inequality. This provides a warning against hasty cross-country comparisons, as high-tax countries with low pretax income inequality can display similar levels of redistribution to low tax countries with high pretax income inequality. We also highlight that, in addition to a direct mechanical effect to reduce post-tax income inequality, taxation and public spending could affect post-tax inequalities indirectly: if policies reduce pretax income inequality, they will reduce post-tax inequalities and could be thus described as predistribution policies. But, this predistribution will lead also, perhaps counter-intuitively, to a decrease in observed redistribution. All things equal, policies that reduce pretax inequalities will lead to a reduction in the magnitude of mechanical redistribution. As a result, comparison across time and countries that disregard the potential effects of predistribution could lead to misleading conclusions in confusing direct mechanical redistribution effects with the total impact of policies on inequalities.

While our analysis relies on many previous work from us or other scholars, this paper makes three key contributions to the literature. First, we bring new data estimates on a century of post-tax inequality measures in France. We construct micro-files of the distribution of post-tax, post-transfer and post public spending income by combining national accounts, administrative tax data and household survey data in a comprehensive and consistent manner following DINA methodology. We develop a microsimulation model

and use explicit tax incidence assumptions to impute all taxes, transfers and collective expenditures. The imputation of in-kind transfers and collective expenditures follows the best micro evidence to-date.[2] We also update previous work on pretax inequalities in France by Garbinti et al. (2018), as well as pretax and post-tax inequality series in the U.S. from Piketty et al. (2018b).[3] Second, we present a novel empirical method to quantify the extent of redistribution using a variety of inequality indicators. We show that the approach is robust to the use of a large variety of inequality measures, from Gini, Theil, Atkinson index, or income shares. Third, our conceptual framework allows to think more carefully about the potential impact of predistribution vs redistribution policies on inequality. By showing explicitly how much redistribution is likely to miss of the potential impact of policies on inequality, we highlight the need for future work to devote more effort in quantifying the impact of policies on pre-tax inequality.

Related literature. Our paper builds upon a long tradition of research studying the historical evolution of income inequality. Following the pioneering work by Kuznets and Jenks (1953) and Piketty (2001, 2003), a number of authors have used income tax data to construct long-run series of top income shares (see Atkinson and Piketty (2007, 2010) for a global perspective on top incomes). Several recent papers have attempted to combine the various available sources in a systematic manner in order to construct long-term income series of "distributional national accounts" (DINA) (see in particular Piketty et al. (2018b) for pre-tax and post-tax DINA in the U.S.; Garbinti et al. (2018) for pre-tax DINA in France). The present paper goes one step further by analyzing the respective role of redistribution and changes in pre-tax inequality in overall inequality dynamics.

Second, our paper relates to the large literature, initiated by Okner and Pechman (1974), that studies the progressivity and the tax burden of tax and transfer systems.[4]

[2]The imputation of in-kind transfers and collective expenditures is the most difficult part of this exercise. We present variants for imputing these public spending. We show that, if these variants have an effect on the magnitude of the reduction of inequality in France and in the U.S, they leave our conclusions unchanged.

[3]Note that this comparison is made possible by the fact that both series are based on the very same methodology and are anchored to national accounts. See Alvaredo et al. (2020) for a complete presentation of the general methodology to construct pre-tax and post-tax distributional national accounts. See also Blanchet et al. (2019) for an attempt to present DINA estimates for European countries using machine learning and survey calibration.

[4]Using French household surveys, Bourguignon (1998) and Accardo et al. (2009) estimate the progressivity of the tax and transfer system for one or two given years. Bozio et al. (2020) analyzes the impact of social security contributions on labor income inequality over the 1967-2015 period. The paper most directly related to ours is Landais et al. (2011), which combines tax data with national accounts to

Our key contribution to this literature is to construct long-term, annual series of post-tax income for France that provide a comprehensive view of how government redistribution affects inequality. Indeed, our French series cover the entire distribution, are fully consistent with national accounts, and consider all forms of taxes and government expenditure.

Third, our study complements the macro literature that analyzes the role of taxes and transfers on inequality dynamics (Kaymak and Poschke, 2016; Hubmer et al., 2017). The richness of our detailed micro series can offer a powerful guide to calibrate and quantify macroeconomic models and improve the ability of macroeconomic models to reproduce distributional dynamics over time (Ahn et al., 2018; Auray et al., 2022).

Fourth, our paper contributes to the broad literature on the determinants of pretax income inequality. This literature has typically discussed the relative role of education policies (Katz and Murphy, 1992; Chetty et al., 2017), minimum wage (Autor et al., 2016), union density (DiNardo et al., 1996; Farber et al., 2021), compensation bargaining (Piketty et al., 2014), international trade and technological change (Autor et al., 2014; Acemoglu and Restrepo, 2020), as driving forces of increased inequality. Our results suggest that such "predistribution"—policies, rules and mechanisms impacting pretax income inequality—could matter much more than direct redistribution in explaining differences in overall inequality between the U.S., France and possibly other European countries. Generally speaking, our findings contribute to the expanding policy debate on the notion of "predistribution" and call for a better comprehension of these mechanisms.[5]

The rest of this paper is organized as follows. In section 1, we present our conceptual framework where we define inequality measures, and the measure of redistribution. In section 2, we describe our data sources and methodology to compute post-tax income series for France. In section 3, we present time series of post-tax inequalities in France, which we compare to the ones available for the U.S. We then present our main results regarding the overall magnitude of redistribution (section 4). In section 5, we discuss the possible interpretation of these results and offer some research perspectives.

estimate tax rates by pretax income groups for a given year. See also Piketty and Saez (2007), Mirrlees et al. (2010), Figari and Sutherland (2013) with EUROMOD, Bengtsson et al. (2016), and OECD work by Zwijnenburg et al. (2017) for cross-country comparison exercises.

[5]The notion of "predistribution" has played an increasingly important role in policy debates since the 2000s, particularly in British policy debates (see e.g., O'Neill and Williamson, 2012; Thomas, 2017).

1 Conceptual framework

In this section, we present the conceptual framework which will lead to the specific empirical estimates of income inequalities series and measures of redistribution, that we present in this paper. Our analysis is grounded on the income concepts developed by national accounts, as they allow comparison across time and countries (section 1.1). We then describe formally how variations in the level of inequality indicators can be ascribed to redistribution, or predistribution (section 1.2).

1.1 Income definitions

In line with the DINA guidelines, we use three basic income concepts in our analysis: pretax income, post-tax disposable income and post-tax income. By definition, average income per adult is equal to average national income per adult for pretax and post-tax income.[6]

Pretax income inequality (I_{pre}). It is our benchmark concept to study the distribution of income. Pretax income is defined as the sum of all income flows going to labor and capital, after taking into account the operation of the pension and unemployment insurance systems, but before taking into account other taxes and transfers. That is, we deduct pension and unemployment contributions, and add pension and unemployment distributions. This concept should be benchmarked against the definition of factor income, which is equal to the sum of all income flows going to labor and capital, before considering the operation of the pension and unemployment system. One problem of that measure is that retired individuals typically have very small factor income in countries using pay-as-you-go pension systems. As a result inequality of factor income tends to rise mechanically with the fraction of old-age individuals in the population, which biases comparisons over time and across countries.[7] Pretax income inequality, by including all pension incomes from private or public sources, will be less affected by ageing population and by the design of the pension system. This approach has however a drawback, that is any redistributive impact of the

[6]National income is defined as GDP minus capital depreciation plus net foreign income, following standard national accounts guidelines (SNA 2008).

[7]Note that looking at the distribution of factor incomes among the working-age population can yield additional insights: it allows to better measure the distribution of labor costs paid by employers (see our companion paper Garbinti et al. (2018) for a presentation of factor income series).

design of the pension system or UI system, will impact pretax income and thus be excluded from our measure of redistribution.

Disposable income inequality (I_{disp}). It is defined as pretax income minus all forms of taxes plus all individualized monetary transfers. This income concept is the one used traditionally for measuring redistribution, as it is well defined in all institutional settings. The limitation of this concept is that it does not incorporate a large part of public spending, namely public services, whether in the form of in-kind transfers (e.g., education, health) or collective consumption expenditure (e.g., defense, police, justice).

Post-tax income inequality (I_{post}). Post-tax income is defined as the sum of all income flows going to labor and capital, after considering the operation of the pension and unemployment system, and also after taking into account all forms of taxes and transfers (monetary transfers, in-kind transfers, and collective consumption expenditure). In other words, post-tax income is defined as disposable income plus in-kind transfers and collective consumption expenditure.

1.2 Redistribution vs predistribution

Redistribution. In the literature, redistribution γ, i.e., the reduction in inequality due to a given tax and transfer system, is usually defined as $\gamma(I_{disp}, I_{pre}) = 1 - I_{disp}/I_{pre}$. If one defines T_t as the tax and monetary transfer system (with both level and progressivity), one can write γ as:

$$\gamma(T_t, I_{pre}) = 1 - \frac{I_{disp}(T_t, I_{pre})}{I_{pre}}.$$

The limitation of this measure of redistribution is that it fails to incorporate policies, like in-kind public spending, with a direct impact on post-tax inequalities. Our analysis follows the more ambitious objective to include such public spending, and therefore compares pretax inequalities to post-tax inequalities. Noting now T government tax and spending, i.e., the usual tax and monetary transfer system, to which we add public spending in kind, we can define redistribution γ as:

$$\gamma(T, I_{pre}) = 1 - \frac{I_{post}(T, I_{pre})}{I_{pre}}. \tag{1}$$

This way of writing the reduction in inequality when going from pretax to post-tax income allows to underline two mechanisms. First, there is a direct, or *mechanical*, positive effect of T on γ, which is rather intuitive: the higher the level and progressivity of tax and transfers T, the lower the level of post-tax inequality $I_{post}(T, I_{pre})$ and the higher the reduction in inequality. Second, there is a positive impact of the level of pretax inequality on redistribution γ as any reduction in inequality carried out by taxes and public spending is related to the level of pretax inequality. An additional mechanism comes from the fact that the progressivity of taxes and transfers reduce inequality more when the initial level of inequality is higher.[8]

Predistribution. While informative, the approach described above does not account for the fact that tax and spending T could have also an *indirect* effect on the distribution of pretax income. For instance, behavioral responses to a high level of taxation could lead to decreasing the amount of taxable income; education policies could lead to higher skills at the bottom of the income distribution, and thus lower pretax inequality, etc. Consequently, the *observed* level of pretax income inequality encompasses both the *indirect* effect of T on pretax inequality and the level of inequality that would prevail in the absence of any tax and transfer system I_0.

We can thus define *predistribution* α as the reduction in pretax income inequality compared to a counterfactual world without any tax and transfer system I_0:

$$\alpha(T, I_0) = 1 - \frac{I_{pre}}{I_0} \tag{2}$$

Ideally one would like to measure the total effect of government tax and spending on inequalities, i.e., how much counterfactual inequalities without any government interventions are reduced by all public policies. This measure, represented by the ratio of I_{post} to I_0 can be written as the product of redistribution and predistribution:

[8]For instance, it can be easily shown that the reduction in inequality due to a lump-sum transfer increases with the initial level of inequality. Let t (resp. b) be the average pretax income held by the top earners (resp. bottom earners) in a country. t/b is an indicator of pretax income inequality. If the government decides to add a lump-sum transfer a to each individual (funded on the discovering of a natural ressource), then post-tax income inequality is measured by $(t+a)/(b+a)$. The reduction in inequality γ due to this lump-sum transfer is such as $(t+a)/(b+a) = (1-\gamma) \times (t/b)$. So $\gamma = 1 - \frac{t+a}{t} \times \frac{b}{b+a} = 1 - \frac{1+\frac{a}{t}}{1+\frac{a}{b}}$. In this set-up, an increase in pretax income inequality can be either due to an increase in t or a decrease in b. γ turns out to be a decreasing function in t and an increasing function in b which means that when pretax income inequality increases, the measured reduction in inequality (γ) increases.

$$\frac{I_{post}}{I_0} = [1 - \gamma(T, I_{pre})] \cdot [1 - \alpha(T, I_0)] \tag{3}$$

The obvious problem is that I_0 is not observable, and therefore the level of predistribution is hard to assess.

In this paper, we aim to construct long series of pretax and post-tax inequalities for France, comparing them with the ones available for the U.S. The objective is to quantify redistribution γ and assess how much differences in post-tax inequalities can be attributed to redistribution vs changes in pre-tax inequalities. Let be clear from the onset that we will not be able to measure predistribution α, i.e., to estimate how much of the changes in pretax inequalities can be attributed to policies vs exogenous shocks. However, by establishing clearly the contribution of redistribution vs the potential role of predistribution, we provide a quantitative estimation of what we know about the level of redistribution and what we miss with potential impacts on pretax inequalities.

2 Data and methodology

In this section we describe the data sources and main steps of the methodology that we use in this paper in order to construct our post-tax income distribution series over the 1900–2018 period. Complete methodological details of our French specific data sources and computations are presented in the Online Appendix along with a wide set of tabulated series, data files and computer codes.[9]

2.1 Data sources

In order to construct our series of pretax and post-tax income, we combine three main types of data: national accounts, tax data and household surveys.

National accounts. We use the official national accounts established by the French national statistical office (INSEE) for the 1949-2018 period. For transfers, we rely on official statistics produced by Social Security agency (CNAF) and the ministry of Social Affairs (DREES) which report the number of beneficiaries and the aggregate amount of

[9] A longer and more complete discussion of the general methodological issues involved in creating DINA estimates (not specific to France) is presented in Alvaredo et al. (2020).

each transfer since 1946. For the 1900-1948 period, we use the historical series of national accounts reported in Piketty and Zucman (2014).

Tax data. Depending on the period covered the quality and details of the data vary. From 1988 onwards, we have access to large annual micro-files of income tax returns, produced by the French Ministry of Finance. These files include about 400,000 tax units per year, with large over-sampling at the top (they are exhaustive at the very top; since 2010 we also have access to exhaustive micro-files, including all tax units, i.e., approximately 37 million tax units). Between 1970 and 1988, we have access to micro-files only for a limited number of years (1970, 1975, 1979, and 1984) and these represent smaller sample (about 40,000 tax units per year). These micro-files allow us to estimate the distribution of fiscal income, i.e., income reported on income tax returns. In order to estimate the distribution of national income (pretax and post-tax), we need to combine income tax micro-files with other data sources, namely national accounts and household surveys, and to apply a number of imputation/simulation rules. While the micro-files are at the tax unit level, all our income series refer to the distribution of income among equal-split adults (i.e., the income of married couples is divided into two).[10]

Unfortunately, no income tax micro file is available in France before 1970, so we have to use income tax tabulations. Detailed income tax tabulations have been produced by the French Finance Ministry since the creation of income tax in France in 1914. These tabulations are available on an annual basis since 1915 and are based upon the universe of all tax units.[11] They report the number of taxpayers, total income and income taxes paid for a large number of income brackets. These tabulations were first used in a systematic manner by Piketty (2001, 2003) to estimate top shares of fiscal income and then by Garbinti et al. (2018) to estimate the complete distribution of fiscal and pretax income.

Household surveys. We exploit two household surveys produced by Insee to complete the distribution of income. First, we use the *enquête Patrimoine* (Wealth Survey) which details information on savings accounts and life insurance products, that are not available

[10]Alternative series of pretax income at the tax-unit level (married couples and singles) as well as individualistic-adults series (i.e., labor income is allocated to each individual income earner within the couple) could be found in our companion paper Garbinti et al. (2018).

[11]We also rely on the estimates of the distribution of income for years 1900 and 1910 produced by the French Finance Ministry in the context of the parliamentary debates about the creation of an income tax (using data from various sources, including property taxes and inheritance taxes).

in income tax records. Second, we use the *enquête Logement* (Housing Survey) which offers information on owner-occupied housing assets.

2.2 Construction of post-tax income series

For the methodology detailing the construction of pretax and post-tax income series, we refer to the Appendix B and C for the period 1970-2018 and to Appendix D for 1900-1969. We present below the main approach and method for computing post-tax income series.

Micro-simulation of tax and transfers (1970–2018). In order to simulate the French tax and transfer system, we proceed as follows. First, we exploit the richness of the income tax micro-files to simulate very precisely all monetary transfers and taxes levied on income (progressive and flat income taxes, and social security contributions). In particular, we are able to consider all changes in tax schedules or specific tax deductions, exemptions and credits over time. Second, when the appropriate tax base is not directly observable in income tax files—for instance for property tax, residence tax, and wealth tax—we use an estimate of wealth[12] and income as a proxy. Although imperfect, this methodology still allows us to simulate the different tax schemes and the specific exemptions.[13] Third, we must impute some taxes and transfers for which direct micro-simulation is not possible. For example, corporate taxes are assumed to be incident on capital income, i.e., allocated proportionally to dividends, life insurance income and interests. The incidence of corporate income tax (CIT) is probably one of the most contentious issue. Our assumption here implies less redistribution of CIT than traditional shareholder incidence, but more than estimates which attribute a significant share of CIT to labor income (e.g., Suárez Serrato and Zidar, 2016; Fuest et al., 2018).[14] We do not provide standard errors around the estimates from microsimulation as the sampling errors remain very low when we use these relatively large administrative data. On the other hand, there is more uncertainty surrounding some our estimates before 1970 and for the distribution of in-kind transfers.

[12] See Garbinti et al. (2021) for details about the construction of our wealth series.

[13] We should also stress that we have used additional information from official reports to check and improve our simulations. For example, our simulations of wealth taxes are fully consistent with wealth tax tabulations, which report the number of taxpayers as well as average taxable wealth and tax paid by tax bracket. The number of beneficiaries of each monetary transfer is also consistent with the statistics provided by official reports (CNAF and DREES files).

[14] As a robustness check, we also consider alternative imputations for corporate retained earnings and corporate taxes and show that the resulting series are almost identical (see Appendix Section C.6).

Estimation of tax and transfers before 1970. Before 1970, we rely on detailed income tax tabulations produced by the French Finance Ministry. We follow Garbinti et al. (2018) for estimates of pretax income, and we develop a simple procedure to estimate the distributions of disposable income. This procedure consists in computing correction factors (for each year and each percentile) to go from fiscal to disposable income, using all available information. Although this method should be seen as exploratory, we argue that it should reproduce accurately the long-run trend.[15]

Distribution of in-kind transfers and collective expenditure. Few studies provide detailed measures of the redistributive impact of non-monetary transfers, and even fewer offer estimates of changes over time.[16] As we know relatively little about who benefits from this government spending, we need to make some assumptions about their distribution. Our baseline scenario assumes i) a lump-sum imputation of health care expenditures and public spending on education to individuals[17], and ii) a proportional imputation to post-tax disposable income for collective expenditures. A lump-sum imputation attributes the same average monetary value to each adult individual, and is therefore characteristics of a strong redistributive impact of these expenditures. A proportional imputation to post-tax disposable income is, on the contrary, neutral to the measurement of inequality. In all cases we assume that public expenditures are valued at their dollar equivalent.[18]

Finally, in order to ensure that aggregate pretax and post-tax national incomes match exactly with aggregate national income, we follow Piketty et al. (2018b) and attribute 50% of government deficit (or surplus) in proportion to taxes and 50% in proportion to transfers and expenditures. This assumes that fiscal adjustment will be borne equally by taxes and spending. In practice, this makes very little difference (except in years with very large deficit or surplus).

[15] In particular, we show in Appendix Figure E8 that disposable and pretax income shares are very close over the 1900-1969 denoting a small impact of taxes and monetary transfers on inequality. These results are in line with the estimates of pretax and disposable income shares over the 1970-1975 period where a microsimulation exercise is conducted on micro-files.

[16] For France we rely on the few studies done on health expenditures (e.g., Lardellier et al., 2011; Jusot et al., 2016) or education expenditures (Conseil de l'Emploi, des Revenus et de la Cohésion sociale, 2003).

[17] For France which is characterized by a single-payer system where almost all health spending is paid for by the government, healthcare spending is attributed as a fix lump sum to all adults. For the U.S., healthcare spending is assigned on a lump sum basis to the beneficiaries.

[18] We acknowledge that we miss differences in the efficiency of public expenditures: for instance, if the U.S. is especially good (relative to France) in producing high utility with health care spending, one would underestimate the impact of those public health care spending.

3 A Century of Post-tax Income Inequalities

We start by comparing the long-run evolution of post-tax income inequality between France and the U.S., before comparing these trends to pretax income inequalities.

3.1 The long-run evolution of post-tax income inequality

We report on Figure 1 the evolution of post-tax income inequality in France and the United States over the 1900-2018 period, as measured by the shares of total post-tax income going to the top 10%, the middle 40%, and the bottom 50%. For France, we observe a large decline of the top 10% post-tax income share (T10) from about 48% in 1900-1910 to 23% in 1983. This fall has been at the advantage of both the bottom 50% (B50), whose post-tax income share increased from 15% to 31%, and the middle 40% (M40), whose post-tax income share increased from 37% to 46%. Since 1983, this trend halted, with a slight increase in the top 10% income share (+2 percentage points, from 23% in 1983 to 25% in 2018) and a corresponding erosion of the middle 40% income shares.

The comparison with post-tax series from the U.S. is interesting both for the similarities and divergence between the two countries. First, the share of post-tax income of the top 10% (T10) is very similar in both countries from the start of the period until 1974-75, when a marked divergence starts to emerge. Whereas the share of T10 continues to fall in France, the U.S. experiments a steep rise in the share of post-tax income going to that group, from 28% in 1974 to 37% in 2018. These gains are made almost uniquely at the expense of the bottom 50% which experiences an increase in France and a marked decrease in the U.S. from 27% in 1974 to 22% in 2018. The middle group (M40) appears largely unaffected by these changes and represents in both countries a very similar share of post-tax income around 43%.

3.2 Post-tax vs pretax income inequality

Figure 2 compares the evolution of pretax and post-tax income inequality in France (Panel A) and in the U.S. (Panel B) over the 1900-2018 period. Two stylized facts are worth highlighting from these series. First, the evolution of pretax and post-tax income inequality has been far from steady and differs strongly between the two countries. While pretax inequality has followed a U-shaped pattern in both countries, post-tax inequality is

L-shaped in France and U-shaped in the U.S. The increasing progressivity of the French tax and transfer system has been able to counteract the gradual rise in pretax income inequality, leading to a relatively constant level of post-tax income inequality since the early 1980s. This contrast strongly with the U.S. case, where rising redistribution has not matched the dramatic increase in pre-tax inequality. Second, the difference between pretax and post-tax affects mostly the top 10% and bottom 50% income shares in both countries, leaving almost unchanged the middle 40% share. By contrast T10 income share is reduced significantly by redistribution, for instance in 2018 from 33% to 25% in France and from 45% to 37% in the U.S., while B50 income share rises from 21% to 32% in France, respectively from 14% to 21% in the U.S.

Figure 3 presents long-term change in the relative position of France with respect to the U.S. Panel A presents the ratio of French national income per capita relative to the U.S. level from 1962 to 2018. This ratio rose from 60% in the early 1960s to 85% in 1982, then decreased to 70% at the end of the period. To understand this relative income performance, it has been usual to relate it to both productivity catch-up in the first half period, and to a relative decline in hours of work in France relative to the U.S. which has been well documented.[19] What has not been yet documented is how the average national income trend can be split into distributional analysis. Panel B presents such decomposition between B50, M40 and T10 income groups, comparing relative level of pretax and post-tax income (in constant 2018 euros PPP) by income group between France and the U.S. This period is of particular interest as the level of inequality is similar between the two countries in the early 1960s and diverge dramatically since then. Table 1 provides absolute numbers for 1962 and 2018.

Two significant results emerge from this analysis. First, post-tax income of the French bottom 50% group was 39% lower than its U.S. counterpart in 1960, it is now 4% higher. Second, the ratios France/U.S. of pretax and post-tax income has remained very similar during the entire period, suggesting that redistribution has not been the main driver of these changes.

[19]See for instance Blundell et al. (2011, 2013) for an in-depth comparison of the U.K., the U.S. and France. They show for instance that the decline in relative employment ratio between France and the U.S. is entirely explained by differences at younger and older ages, while prime age workers exhibit similar employment ratios in both countries.

4 Quantifying Redistribution

In this section we present the main results of the paper, i.e., a quantification of the amount of redistribution in France and the U.S. over the last century, and an estimation of the contribution of redistribution vs changes in pretax inequalities to explain changes in post-tax inequalities.

4.1 Measuring the extent of redistribution

Current level of redistribution (2010-2018). Following equation (1), we compute the extent of redistribution γ, i.e., the difference between pretax and post-tax inequalities over pretax inequality. Table 2 presents key results for France and the U.S. in the recent period (2010-2018).

One simple inequality indicator which can be used to assess the extent of redistribution is the ratio between the average income of the top 10% income group and the average income of the bottom 50% income group (T10/B50). In terms of pretax income, this ratio is equal to 8.0 in France, i.e., on average top 10% income earners make eight times more than bottom 50% income earners, compared to a ratio of 15.7 in the U.S. In terms of post-tax income, this ratio is reduced to 3.9 in France, i.e., a reduction of 51%, compared to 8.4 in the U.S., i.e., a reduction of 47%. In that sense, one can say that redistribution reduced pretax inequality by 51% in France against 47% in the U.S. over the 2010-2018 period.

Using other inequality indicators does not change qualitatively the picture: both countries carry out similar level of redistribution whatever the inequality indicator used. For instance, the reduction in pretax Gini is 16% in France compared to 12% in the U.S., while the T10/B90 index is reduced by 33% in France vs 29% for the U.S.[20]

We prefer to highlight income ratios as inequality indicator for several reasons. First, they are intuitive and transparent statistics whose interpretation is straightforward. Second, they are not data-demanding and can therefore be used over historical data, which are usually not available at a very disaggregated level. Finally, they allow for a clearer decomposition of the role played by redistribution on inequality in the upper and lower

[20]We also present alternative inequality indicators such as Palma ratio, Atkinson index, Theil and other generalized entropy indexes for different sub-periods over the 1970-2018 period in Appendix Table A.1. See also Appendix Table A.2 for alternative variants for the imputation of non-monetary transfers.

segments of the distribution (while synthetic indexes like Gini and Theil tend to blur these distinctions). For instance, one can see that the 51% reduction in inequality in France comes primarily from the decline from bottom-end inequality. That is, top-end inequality (as measured by the ratio T10/M40) is reduced by 21% on average over the 2010-2018 period, while bottom-end inequality (as measured by the ratio M40/B50) is reduced by 38%. A very similar pattern is found for the U.S., where top-end inequality (ratio T10/M40) is reduced by 20%, while bottom-end inequality (M40/B50) is reduced by 33%.

How much does redistribution reduce inequality over time? We now turn to an analysis of long-term changes in redistribution between France and the U.S. Figure 4 presents the evolution of inequality ratios for pretax and post-tax income over the 1900-2018 period for the two countries. Panel A presents the evolution of the ratio T10/B50, which is available only from 1962 onwards for the U.S. Panel B presents the indicator T10/B90 available for the entire period while panel C presents the Gini indicator from 1970 onwards. Although these three indicators are available for different time periods, they present a consistent picture: for most of the period under study post-tax inequality is similar in France and in the U.S., i.e., until the mid-1970s when the two countries' indicators diverge markedly. In 1975, T10/B50 ratios is for both countries around 8 for pretax and 5 for post-tax ratios, implying a reduction of 35% of this indicator of inequality. Forty years later, in 2015, the pretax ratio has jumped to 16 for the U.S., while is still at 8 in France. Post-tax ratios are respectively 8 and 4, implying a large increase in redistribution in both countries.

Figure 5 presents the annual evolution of our redistribution indicator γ, i.e., the percentage reduction from pretax to post-tax inequalities for T10/B50 (panel A), T10/B90 (panel B) and the Gini (panel C). The T10/B50 indicator highlights the massive shock that WWI represents for France. During the war, and the following years, the very large health care spending and monetary transfers to veterans and widows, funded by debt and increased taxation have all contributed to that temporary spike in redistribution. From 1945 onwards, the extent of redistribution has been almost continuously increasing in France. The U.S. presents a similar picture of increasing redistribution, with very similar levels in both countries in the 1970s (around 35% reduction of pretax inequality), and reaching 50% of reduction at the end of the period in both countries. Interestingly,

redistribution appears a lot more contra-cyclical in the U.S., compared to France. If one looks at the T10/B90 indicator (panel B), the shock represented by wars is evident in both countries—WWI for France and WWII for the U.S.—but contrary to France, the U.S. maintained after the war a high level of redistribution through the 1950s, 1960s and 1970s. Apart from these specific periods, the level and trend of redistribution are similar for both countries. The Gini indicator (panel C) presents similar evolution from the 1970s, with increasing level of redistribution in both countries, but a higher increase in France than in the U.S. The Gini presents relatively more marked differences across France and the U.S. as the Gini gives more weight to the very bottom of the income distribution, compared to T10/B50 indicator.

Overall, the impact of redistribution on inequality has increased dramatically over time. Over the 1900-1914 period, redistribution played a modest role by reducing inequality between the top 10% and the bottom 90% income groups by 8-10% in France and in the U.S. In contrast, it reduced the same inequality indicator by 33% in France vs 29% in the U.S. over the 2010-2018 period.

4.2 The contribution of redistribution to changes in inequalities

In order to quantify the respective role of falling pretax income inequality and rising redistribution in the long-term decline of post-tax inequality in the U.S and in France, we rely on the following formula:

$$\frac{I_{t2}^{post}}{I_{t1}^{post}} = \frac{I_{t2}^{pre}}{I_{t1}^{pre}} \times \frac{\frac{I_{t2}^{disp}}{I_{t2}^{pre}}}{\frac{I_{t1}^{disp}}{I_{t1}^{pre}}} \times \frac{\frac{I_{t2}^{post}}{I_{t2}^{disp}}}{\frac{I_{t1}^{post}}{I_{t1}^{disp}}} \tag{4}$$

Where I^{pre}, I^{disp} and I^{post} are the inequality indicators (e.g., ratio T10/B50) computed using either the concept of pretax (pre), disposable (disp) or post-tax (post) income, and $t1$ and $t2$ are the beginning and the end of the period considered. Equation (4) formalizes the decomposition of post-tax inequality into three terms: i) changes in pretax inequality, ii) changes in redistribution due to taxes and monetary transfers, and finally iii) changes in redistribution due to in-kind and collective expenditures.

Table 3 presents this decomposition for the T10/B50 indicator (panel A), the T10/B90 indicator (panel B) and the Gini (panel C) for both France and the U.S. For France, the overall decline in post-tax T10/B50 inequality over the 1900-2018 period (-75%) can

be ascribed mostly to a decline in pre-tax inequality (-45%), and somewhat to tax and monetary transfers (-21%). Reduction of inequality from in-kind transfers or collective expenditures is comparatively small (-9%). The evidence is qualitatively similar using the indicator T10/B90 with respectively an overall decline in inequality of -64%, explained mostly by pretax inequality changes (-43%) and taxes and monetary transfers (-13%). For the U.S., the overall reduction in post-tax T10/B90 inequality over the 1913-2018 period (-15%) is the result of an increase in pretax inequality (+7%) corrected by an increasing redistribution from taxes and monetary transfers (-9%) and in-kind transfers and collective expenditures (-13%).

However, this long-term analysis masks two very different underlying dynamics. The decline in post-tax income inequality happens during the 1900-1983 period. It is mostly due to the fall in pretax income inequality (84% of the total decline for France, and 78% for the U.S.) and, to a lesser extent, to the rise in redistribution. In contrast, the 1983-2018 period is characterized by a moderate increase in post-tax income inequality in France (+10% in T10/B90). This stability is the result of two opposing forces: rising pretax income inequality (+26% in T10/B90) compensated largely by rising redistribution (-16%). For the same period, the contrast with the U.S. is startling. The overall increase in post-tax inequality (+35%) can be decomposed into an even higher increase in pretax inequality (+50%) only partially reduced by an increase in redistribution (-16%), even if that latter increase is of the same magnitude as the one observed in France. The Gini indicator, available only for the period 1983-2018, gives more weight to the redistribution carried out in the bottom of the income distribution, and thus leads to milder increases in post-tax inequality (null in France, +7% in the US) and a bigger role of redistribution, without changing the main stylised facts.

To sum up, these results show that if inequality has decreased much more in France than in the U.S. during the 1900-2018 period, this is not due to a larger increase in redistribution by the French tax and transfer system. The major factor behind the differential trend in post-tax income inequality comes from the differential evolution of pretax income inequality between the two countries.[21] Over the recent period, the rise in redistribution was similar in both countries. However, it was able to annihilate the slight rise in pretax inequality in France, but not in the U.S. where the increase in pretax income

[21] In the last panel of Table 3, changes in redistribution account for only 3% of the differential evolution of post-tax inequality between France and the United States over the 1900-2018 period.

inequality has been much steeper.

Formula (4) can easily be extended to cross-country comparisons to assess the relative contribution of redistribution and pretax income inequality to the gap in post tax income inequality between countries. With two countries A and B:

$$\frac{I_B^{post}}{I_A^{post}} = \frac{I_B^{pre}}{I_A^{pre}} \times \frac{\frac{I_B^{post}}{I_B^{pre}}}{\frac{I_A^{post}}{I_A^{pre}}} \tag{5}$$

Following equation (5), Figure 6 presents the relative contribution of pretax inequality versus redistribution to the gap in post-tax inequality between France and the U.S., with the ratio T10/B50 (panel A), the ratio T10/B90 (panel B), and the Gini (panel C). Since the mid-1970s, it is very clear that most of the differences in post-tax inequality between France and the U.S. should be accounted for by differences in pretax inequality. This has not always been the case, as for instance the higher level of redistribution in the U.S. in the 1940s and 1950s did play a significant role, but overall the contribution of pretax inequality in driving post-tax inequality is clearly the dominant force.

4.3 Robustness checks

We carry out a number of robustness checks. First, we test the sensitivity of our results to our distributive assumptions relative to non-monetary transfers. Although we have used well informed studies about the redistributive power of each type of public spending, it is also clear that these public expenditures could vary by design in their redistributive power, both across time and across the two countries of study. In Figure 7, we show the robustness of our findings using six different assumptions about the redistributive power of non monetary transfers.[22] Panel A represents the contribution of redistribution to the gap in post-tax inequality between France and the U.S. in the recent period. It leads to an estimate of 0 if differences in pretax inequality explain all the difference in post-tax inequality between the two countries, and 1 if redistribution explains all the difference.

[22]First, in Alternative scenario 1 we assume lump-sum gains of in-kind transfers and collective expenditures. In Alternative scenario 2 we assume that in-kind transfers and collective expenditures are allocated proportionally to disposable income. In Alternative scenario 3, we assume that in-kind transfers are attributed on a lump-sum basis, while collective expenditures are attributed only to the top 10 group on a lump-sum basis. In Alternative scenario 4, we assume on the opposite that in-kind transfers are attributed on a lump-sum basis, and collective expenditures are attributed only to the bottom 50 on a lump-sum basis. In the last alternative scenario, we make the rather extreme assumption that collective expenditures are attributed to the top 10 in France and to the bottom 50 in the U.S. (on a lump-sum basis).

For most cases the contribution of redistribution is below 30%, and even in the extreme scenario where collective expenditures benefit the top 10% in France and the bottom 50% in the U.S. do we find only 50% contribution of redistribution to the difference in post-tax inequality. Panel B represents the contribution of redistribution to the differential evolution in post-tax inequality between France and the U.S. over the 1983–2018 period. It leads to an estimate of 0 if the differential evolution in post-tax inequality between the two countries is entirely explained by the differential evolution in pretax income inequality, and 1 if the differential evolution in redistribution explains all the difference. Again, the assumption variants do not change our findings about the limited role of redistribution.

Second, we use a larger variety of inequality indicators than the ones presented in the main text. The absolute level of redistribution differs across indicators, but the main conclusions with respect to the limited contribution of redistribution to changes in post-tax inequality is robust to the choice of inequality measures.[23]

Third, we test our results with regards to our definition of pretax income, which incorporates income from Old-age pensions and UI benefits. As we mentioned earlier, we miss thus the redistribution carried out through these social insurances, as their will be incorporated into the pretax inequality. We test the impact of this assumption with a variant definition of pretax and post-tax income inequalities taking into account the redistributive aspect of pension system and UI for France (see Online Appendix Section C.6). This variant does not change the main message of the paper as the amount of direct redistribution remains limited in the French pension system.

5 Discussion: From Redistribution to Predistribution?

To summarize our main results, pretax income inequality appears to be the main factor accounting for differential level and trend in inequality between France and the U.S. over the 20th century. Redistribution plays an important role today in reducing post-tax inequalities in both the U.S. and France, by 47% vs 51% using our benchmark measure

[23] In Appendix Table A.1, we present redistribution measures for France and the U.S. using 10 different indicators like Theil, Atkinson index, log deviations, etc. In Appendix Figure A.1 and A.2, we investigate how the choice of alternative inequality indicators affects the contribution of redistribution to changes in post-tax inequality.

of the ratio T10/B50. But this reduction of inequalities by direct redistribution has only contributed for a third of the total change in inequalities over the period. In this last section, we discuss the interpretation that one can draw from these results.

5.1 A limited role for redistribution?

The limited role of redistribution in explaining post-tax inequality differences can be puzzling given the large differences in terms of policies between countries like France and the U.S. We discuss the interpretation one can make of our results in light of the fact that the measure of redistribution is directly affected by the magnitude of pre-tax inequality and that the potential impact of government tax and spending on pretax inequality is another mechanism that can reduce the impact of redistribution.

Following our conceptual framework from section 1, if one wants to compare how a given tax and transfer system T_1 in one country reduces pretax income inequality compared to a system T_2 in another country, then the differences between T_1 and T_2 will not only affect post-tax income distribution through *redistribution* $\gamma(T, I_{pre})$, but also through its effect $\alpha(T, I_0)$ on pretax income (*predistribution*). If T_1 induces more changes in pretax inequality than T_2 then $\alpha(T_1, I_0) > \alpha(T_2, I_0)$ and the direct comparison between $\gamma(T_1, I_{pre})$ and $\gamma(T_2, I_{pre})$ will not account for how each system reduces inequality.

This *predistribution* effect will mechanically leads to misleading comparisons. For instance take two countries with similar levels of post-tax inequality I_{post}, I_0 and T. In a country A, an important part of T is used to finance public education, while it is not the case in a country B. Pretax income inequality is then likely to be lower in country A ($I^A_{pre} < I^B_{pre}$). Consequently, for similar level of post-tax income inequality, $\gamma^A = 1 - I_{post}/I^A_{pre} < \gamma^B = 1 - I_{post}/I^B_{pre}$ which could be interpreted as a lower redistribution in country A relative to B while this lower γ^A observed would only be the result of the *predistribution* effect of the public funding of education.

A similar problem arises by comparing reduction in post-tax inequality over time within one single country. One could attribute lower levels of redistribution γ for a period of time when policies were mostly directed at reducing pretax inequalities. Again, as an example, a country A investing in education in period t leading to a reduction in pretax inequality in $t + 10$ without any change in the level of redistribution from pretax to post-tax inequalities would see its estimate of redistribution be reduced over the period, while the total effect

of these policies on pretax inequalities leads to a reduction in post-tax inequalities.

Overall, our framework makes clear that it should not be surprising to find countries with high pretax inequality exhibiting higher redistribution than lower pretax inequality countries, even if the latter have higher tax and spending policies.

5.2 Predistribution or other pretax changes?

In section 1, we have defined predistribution α as the impact of government interventions that lead to changes in pre-tax inequalities compared to a counterfactual case of no intervention. One immediate question is the share of pretax inequality changes one can attribute to taxation and public spending. One polar alternative would be to assume that all changes in pretax inequalities are exogenous—this is the traditional approach in public economics, which focuses therefore only on redistribution—, and another polar alternative would assume that all changes to pretax inequalities are due to government interventions. In this paper, we are unable to identify the role played by predistribution to account for differential level and trend in pretax inequality between France and the U.S.

Nevertheless, our framework allows a better understanding of the apparent puzzle that France and the U.S. appear to perform rather similar level of redistribution γ while having very different public spending. First, since the U.S. has higher pretax inequality, its redistribution level is mechanically higher. Second, and perhaps more importantly, the lower level of pretax inequality in France could be due, at least in part, to the policies implemented, and their predistribution effects. One immediate lesson from our paper is thus to warn against hasty cross-country comparisons in terms of redistribution. The amount of mechanical redistribution might not capture well the true impact of these policies on post-tax inequalities.

However, our findings clearly show that differences in post-tax income inequality between the two countries are explained by differences in pretax inequality rather than differences in redistribution. This implies that research and policy discussions should, in the future, focus on predistribution as much as on redistribution. In particular, a greater attention should be devoted to the study of the various policies and rules that can account for the fact that pretax inequality is so much larger in the U.S. than in France.

What could determine differences in pretax inequality? Before examining how policies could affect pretax inequalities, it is worth stressing that some inequalities could stem from historical developments of each country that can only hardly be linked to current policies (e.g., war, emigration, colonization, slave trade, etc.). Specific geographical constraints or advantages could also have a long-term impact on pretax inequality (e.g., natural ressources, access to commercial routes, etc.). None of these factors should be seen as natural or totally exogenous, but they differ from the impact that current policies can have on pretax inequalities.

Which policies are likely to impact pretax changes? The set of policies that can affect the distribution of pretax income is potentially large. It includes the education system (particularly the inequality in education spending across social groups), labor market regulations (e.g., the level of the minimum wage and the various legal rules affecting the role of unions and the bargaining power of workers), and other policies affecting the distribution of primary assets and capabilities (including the health care system, the inequality of wealth and inheritance, etc.). The tax system has also an influence on pre-tax income: first, because taxation can lead to behavioral responses affecting labor and capital income, and second because progressive taxation of income and wealth can also affect the formation of top end compensation packages and wealth inequality (see e.g., Piketty et al., 2014; Piketty, 2014; Piketty et al., 2018a).

As a result, the fact that non-monetary transfers (e.g., education spending, public goods) have only a small impact on redistribution, does not imply that they do not have a large impact on the evolution of inequality within country or on the differences in inequality across countries. Our analyses highlight that a large set of policies can have an impact on pre-tax inequality (within country and over time) that would not be captured with the usual concept of redistribution because this analytical tool can only capture direct redistribution from a given pre-tax income inequality.

Conclusion

In this paper, we have presented post-tax Distributional National Accounts (DINA) for France. That is, we have combined national accounts, tax and survey in a comprehensive and consistent manner to build homogenous annual series on the post-tax, post-transfer

distribution of national income by percentiles over the 1900–2018 period, with detailed breakdown by age, tax and transfer categories over the 1970–2018 period. Our main conclusion is that changes in pretax inequality levels seem to play the central role in explaining the long-term evolution of the distribution of post-tax income in France. The same conclusion also applies if one attempts to account for the difference in inequality levels between France and the United States.

This paper offers also new avenue for future research. First, by adding countries with detailed pretax and post-tax inequality, one is likely to assess more widely the role of redistribution in explaining post-tax inequality. Second, by stressing that measures of redistribution are influenced by pretax inequality and policies are likely to influence indirectly pretax inequality, our paper suggests to review the classical political economy literature which tests for the link between inequality and redistribution, in the spirit of the Meltzer-Richard hypothesis. Third, our findings suggest that policy discussions on inequality should in the future pay more attention to policies affecting pretax inequality and should not focus exclusively on redistribution.

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Tables and Figures

Table 1 – Average Real Income by Income Group, France vs. United States, 1962–2018

	1962			2018		
	Pretax Income	Post-tax Income	Ratio $\frac{Post-tax}{Pretax}$	Pretax Income	Post-tax Income	Ratio $\frac{Post-tax}{Pretax}$
Panel A: France						
Full Population	€14 730			€38 548		
Bottom 50%	€5 386	€7 038	131%	€16 038	€24 486	153%
Middle 40%	€16 761	€16 238	97%	€44 132	€41 783	95%
Top 10%	€53 326	€47 161	88%	€128 762	€95 916	74%
Panel B: United States						
Full Population	€24 153			€55 301		
Bottom 50%	€9 813	€11 406	116%	€15 735	€23 459	149%
Middle 40%	€26 768	€27 525	103%	€56 466	€58 032	103%
Top 10%	€85 373	€74 392	87%	€248 472	€204 273	82%
Panel C: Ratio France/US						
Full Population	61%			70%		
Bottom 50%	55%	62%		102%	104%	
Middle 40%	63%	59%		78%	72%	
Top 10%	62%	63%		52%	47%	

NOTES: The unit is the adult individual (20-year-old and over; income of married couples is split into two). Income corresponds to pretax or post-tax income expressed in 2018 Euros (PPP for the US). Fractiles are defined relative to the total number of adult individuals in the population.

Table 2 – How Much Does Redistribution Reduce Inequality, France vs. United States, 2010–2018 ?

	France			United States		
	Pretax	Post-tax	γ	Pretax	Post-tax	γ
Income shares (averages 2010–2018)						
Top 10%	33%	25%	25%	44%	36%	19%
Middle 40%	46%	44%	5%	41%	42%	-2%
Bottom 50%	21%	32%	-52%	14%	22%	-53%
Inequality indicators (ratios between average incomes)						
Total inequality (T10/B50)	8.0	3.9	51%	15.7	8.4	47%
Upper inequality (T10/M40)	2.9	2.3	21%	4.3	3.4	20%
Lower inequality (M40/B50)	2.8	1.7	38%	3.7	2.4	33%
Simplified Total inequality (T10/B90)	4.5	3.0	33%	7.2	5.1	29%
Gini (Reynolds-Smolensky index)	0.45	0.28	16%	0.57	0.45	12%

NOTE: The level of redistribution γ is computed as the reduction in inequality when going from pretax to post-tax income. A positive number should be interpreted as a positive level of redistribution. For instance, total inequality, as measured by the ratio between the average incomes of the top 10% and the bottom 50%, drops from 8.0 in pretax income to 3.9 in post-tax income in France on average over the 2010-2018 period. This translates into a measure of our redistribution indicator γ of 51%, i.e., a reduction of 51% of the T10/B50 inequality indicator. See Appendix Tables A.1 and A.2 for alternative inequality indicators and alternative variants for the imputation of non-monetary transfers, respectively.

Table 3 – Decomposition of the Evolution of Post-tax Income Inequality: France vs. United States

	France			United States		
	1900–2018	1900–1983	1983–2018	1913–2018	1913–1983	1983–2018
Panel A: T10/B50 inequality indicator						
Changes in post-tax income inequality	-75%	-76%	4%			42%
Due to changes in pretax inequality	-45%	-59%	29%			66%
Due to changes in redistribution due to taxes and cash transfers	-21%	-11%	-20%			-10%
Due to changes in in kind and collective expenditures (relative to disposable income)	-9%	-7%	-4%			-14%
Panel B: T10/B90 inequality indicator						
Changes in post-tax income inequality	-64%	-67%	10%	-15%	-37%	35%
Due to changes in pretax inequality	-43%	-56%	26%	7%	-29%	50%
Due to changes in redistribution due to taxes and cash transfers	-13%	-5%	-12%	-9%	-3%	-7%
Due to changes in in kind and collective expenditures (relative to disposable income)	-8%	-6%	-4%	-13%	-5%	-9%
Panel C: Gini (Reynolds-Smolensky index)						
Changes in post-tax income inequality			-0.4%			7%
Due to changes in pretax inequality			5%			10%
Due to changes in redistribution due to taxes and cash transfers			-4%			-1%
Due to changes in in kind and collective expenditures (relative to disposable income)			-1%			-2%

	Contribution of redistribution to the differential evolution of post-tax inequality between France and the United States		
	1900-2018	1900-1983	1983-2018
T10/B50 inequality indicator			0.4%
T10/B90 inequality indicator	3%	9%	2%
Gini			34%

NOTES: Post-tax inequality relies on the benchmark scenario which allocates health-care expenditures and education spending on a lump-sum basis, and collective expenditures proportionally to post-tax disposable income. See Appendix Table A.3 for alternative variants for the imputation of non-monetary transfers.

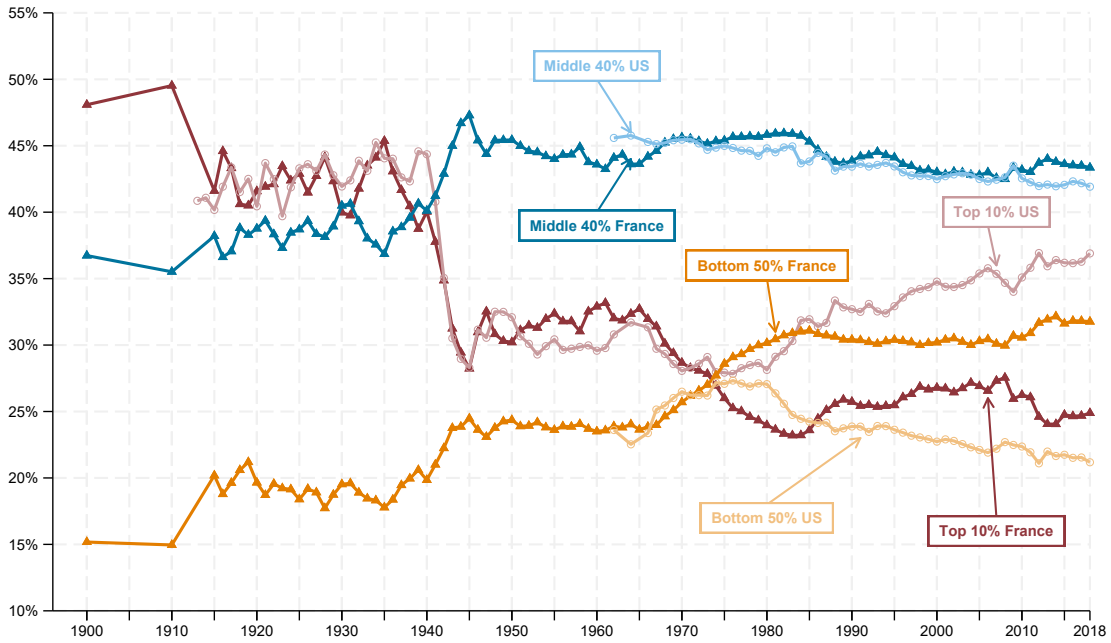
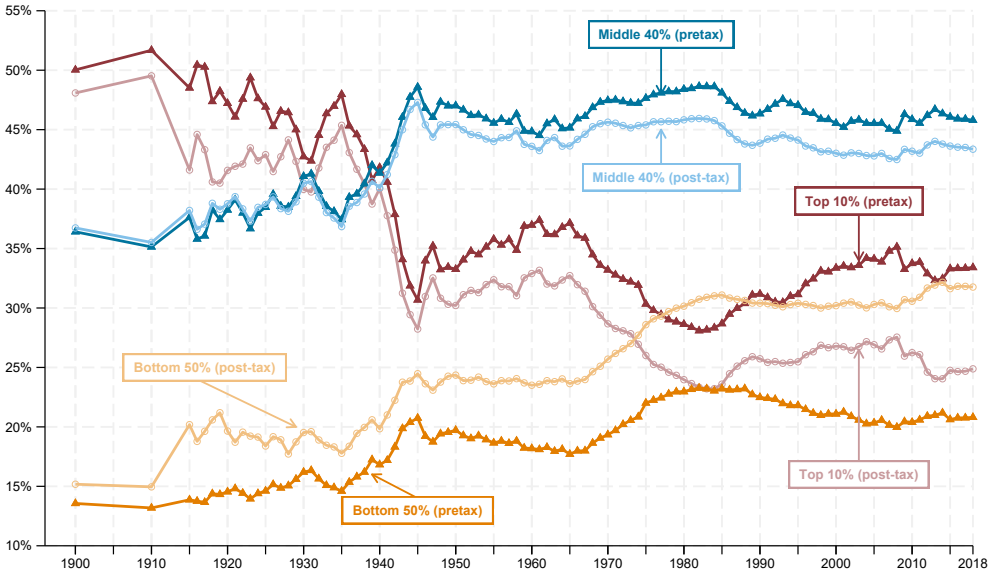


Figure 1 – Post-tax Income Shares: France vs. the United States, 1900–2018

NOTES: Distribution of post-tax income among equal-split adults (income of married couples divided by two). For the U.S.: authors' computations using the data from Piketty et al. (2018b).

(a) France (1900–2018)



(b) United States (1913–2018)

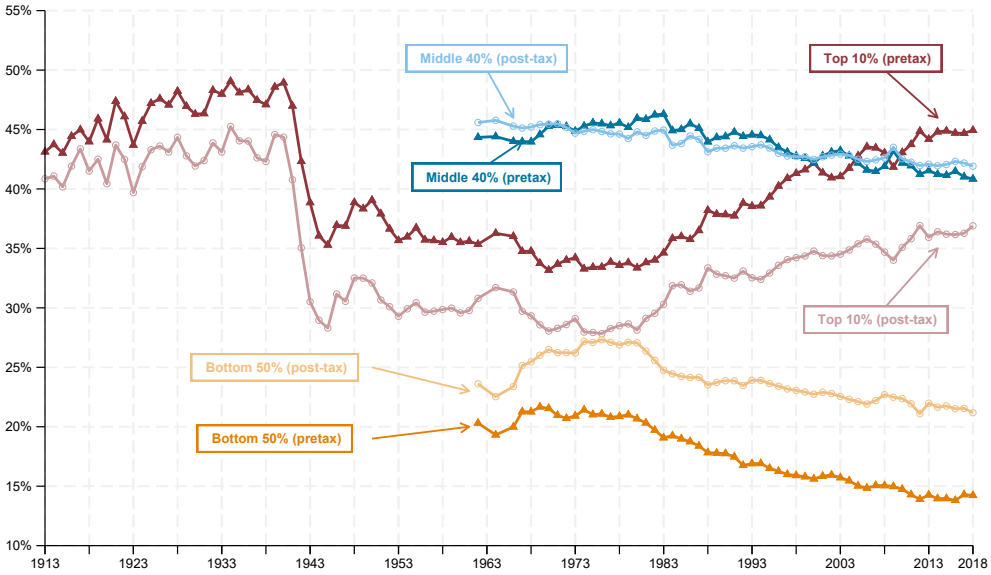
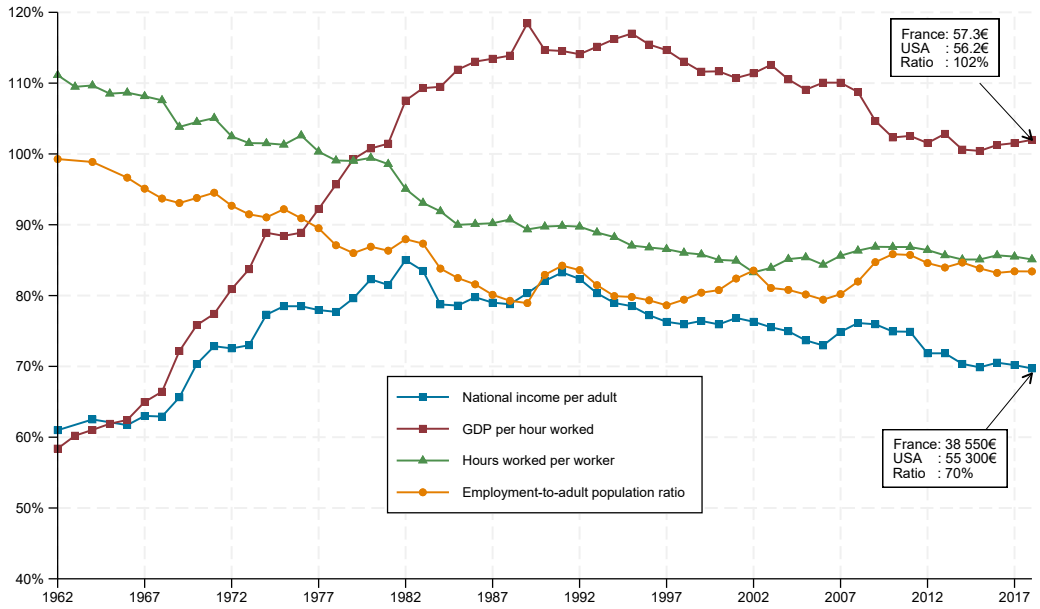


Figure 2 – Pretax vs Post-Tax Income Shares

NOTES: Distributions of pretax national income and post-tax income among equal-split adults (income of married couples divided by two). For the U.S.: authors' computations using the data from Piketty et al. (2018b).

(a) Average Income and Productivity (Ratio France/United States)



(b) Average Real Income by Income Group (Ratio France/United States)

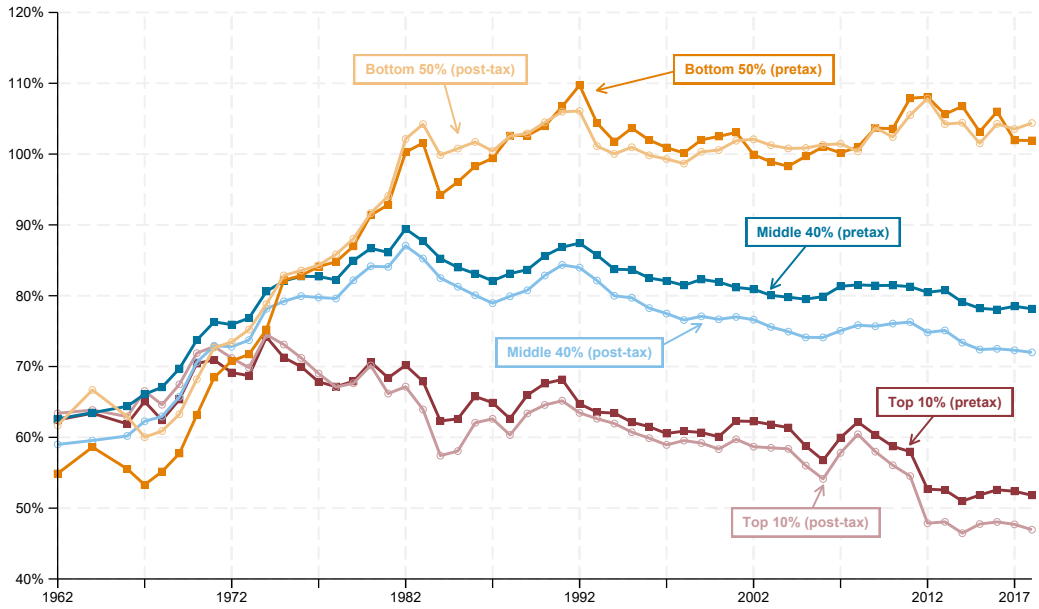
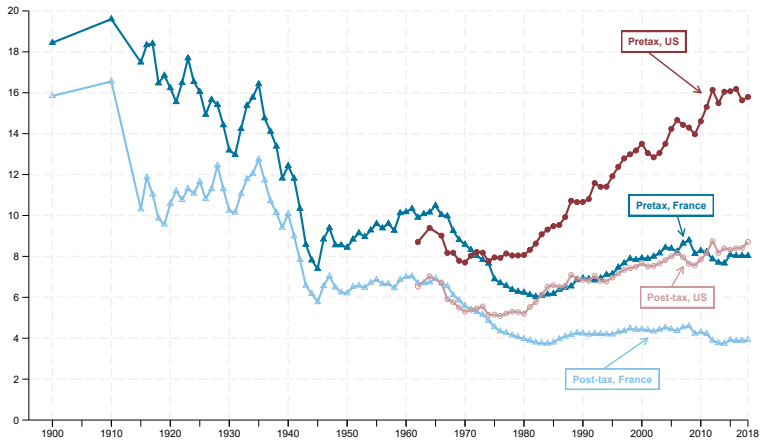


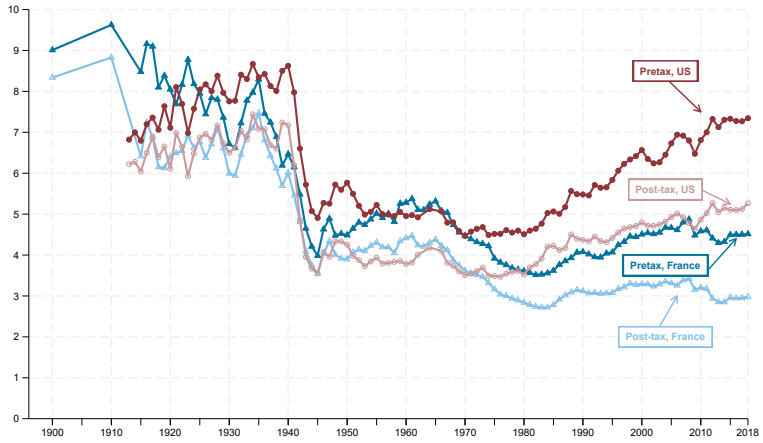
Figure 3 – Relative Pretax and Post-tax Income, France vs United States

NOTES: For Panel A, GDP per hour worked, hours worked per worker, and employment-to-adult population ratio are computed using the OECD series. All relevant series are expressed in PPP 2018 Euros.

(a) Ratio T10/B50



(b) Ratio T10/B90



(c) Gini

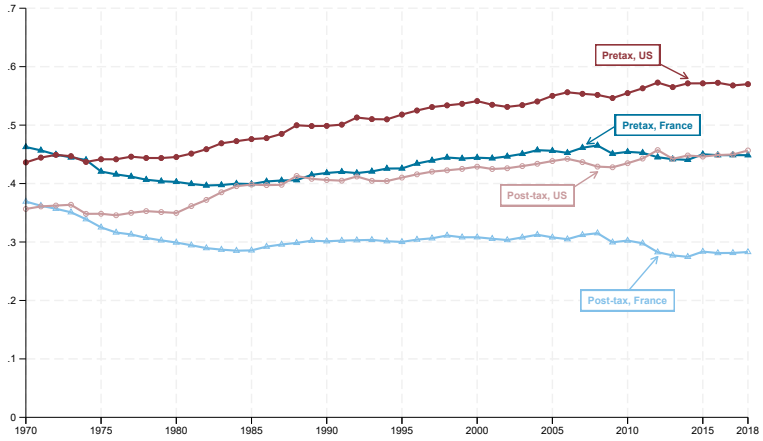
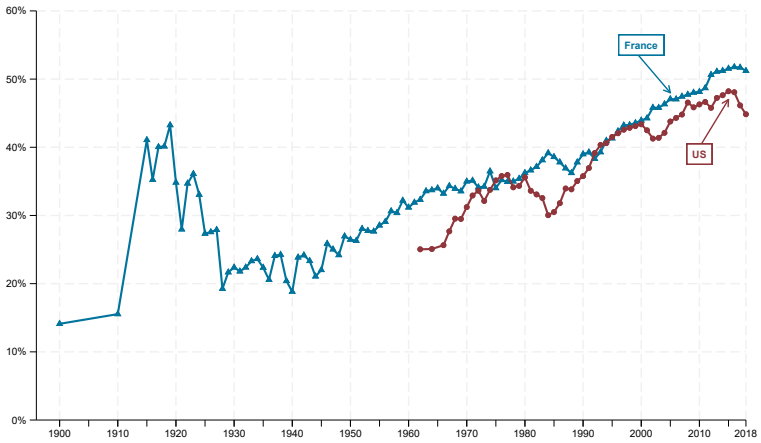


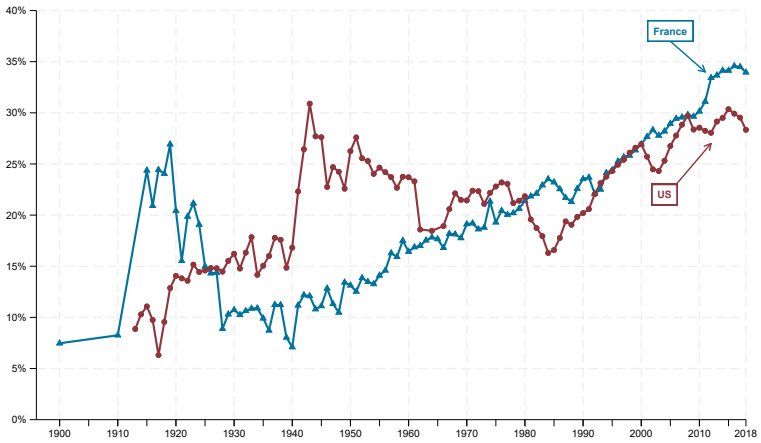
Figure 4 – Pretax vs Post-tax Income Inequalities: France vs. United States.

NOTES: For the U.S.: authors' computations using the data from Piketty et al. (2018b).

(a) Redistribution γ for T10/B50



(b) Redistribution γ for T10/B90



(c) Redistribution γ for Gini

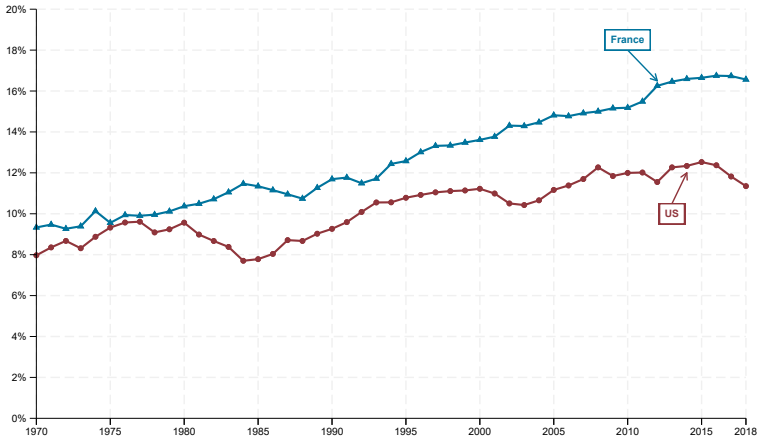
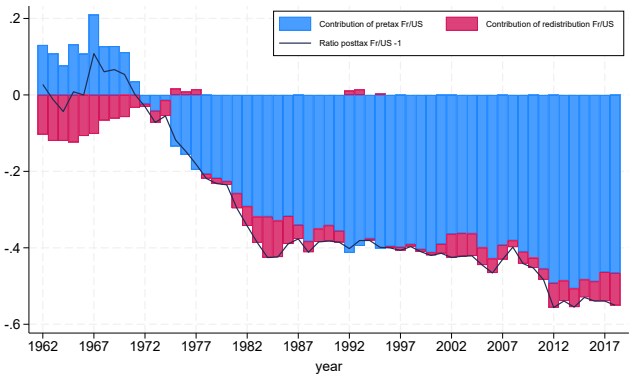


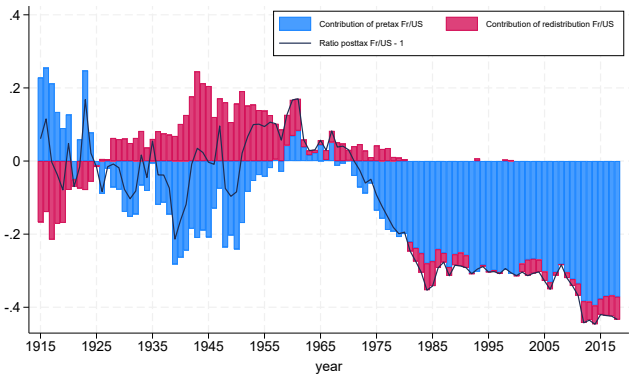
Figure 5 – Extent of Redistribution: France vs. United States, 1900–2018

NOTES: Redistribution γ is computed as the reduction in inequality when going from pretax to post-tax income. For the U.S.: authors' computations using the data from Piketty et al. (2018b).

(a) Ratio T10/B50



(b) Ratio T10/B90



(c) Gini

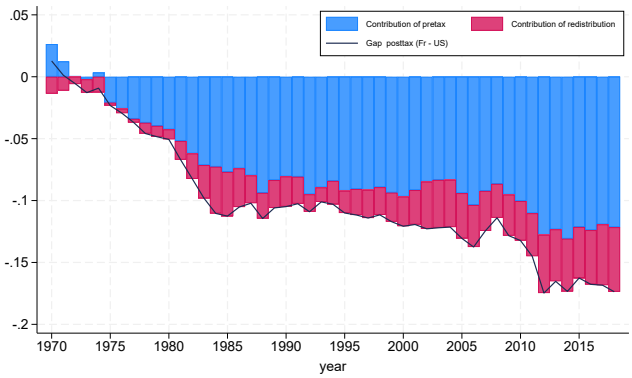
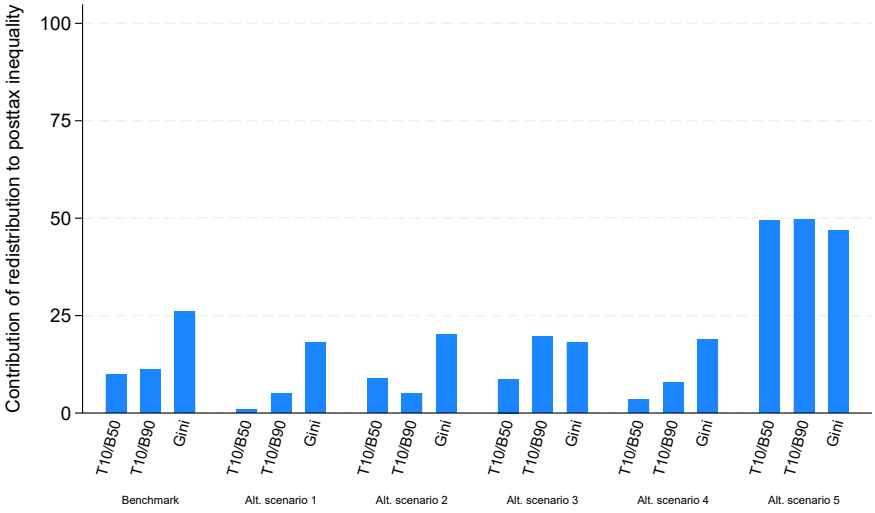


Figure 6 – Contribution of Redistribution vs. Pretax Inequality to Post-Tax Inequality

NOTES: The black line shows the gap in post-tax inequality measures between France and the U.S. Bars in blue represent the contribution of pretax inequality in explaining the FR/US gap, while bars in red represent the contribution of redistribution to that gap. For the U.S: authors' computations using the data from Piketty et al. (2018b).

(a) Contribution of Redistribution to Post-tax Inequality



(b) Contribution of Redistribution to the Differential Evolution of Post-tax Inequality between France and the U.S. (1983–2018)

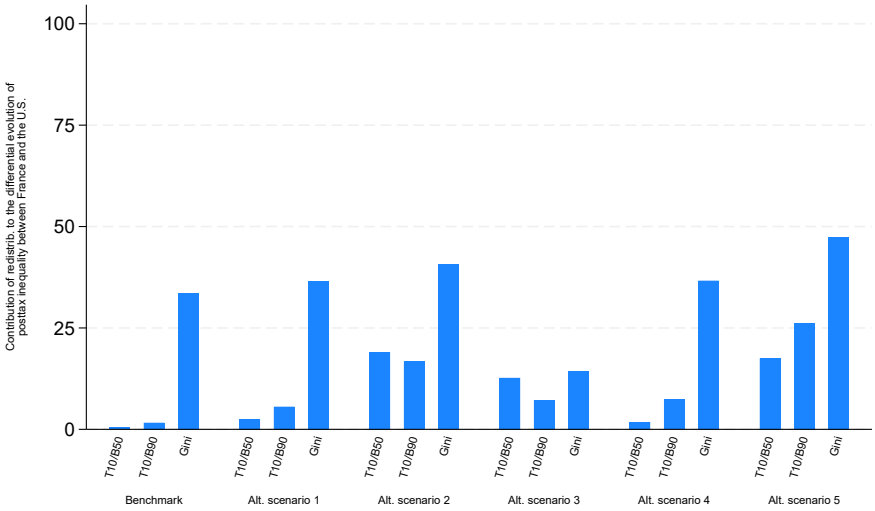


Figure 7 – Robustness checks to alternative assumptions and inequality indicators

NOTES: This figure investigates the robustness of our main results to alternative variants for the imputation of non-monetary transfers. Panel A represents the contribution of redistribution to the gap in post-tax inequality between France and the U.S. in the recent period (2010–2018 period). Panel B represents the contribution of redistribution to the differential evolution in post-tax inequality between France and the U.S. over the period 1983–2018.
Benchmark: In-kind transfers (health-care expenditures and education spending) on a lump-sum basis, and collective expenditures proportionally to post-tax disposable income ; Alternative scenario 1: lump-sum method (lump-sum gains of in-kind transfers and collective expenditures); Alternative scenario 2: proportional method (in-kind transfers and collective expenditures are allocated proportionally to disposable income); Alternative scenario 3: In-kind transfers attributed on a lump-sum basis, and collective expenditures are attributed only to the top 10 (on a lump-sum basis); Alternative scenario 4: In-kind transfers attributed on a lump-sum basis, and collective expenditures are attributed only to the bottom 50 (on a lump-sum basis) ; Alternative scenario 5: In-kind transfers attributed on a lump-sum basis, and collective expenditures are attributed to the top 10 in France and to the bottom 50 in the U.S. (on a lump-sum basis). See Appendix Figures A.1 and A.2 for the full set of inequality indicators.

Appendix Tables and Figures

Table A.1 – Complementary indicators for redistribution: France vs. U.S, 1970-2018

Inequality indicators: Post-tax/Pretax income (in %)					
France	1970-1979	1980-1989	1990-1999	2000-2009	2010-2018
Total inequality (T10/B50)	-35	-37	-41	-46	-51
Total inequality (T10/B90)	-20	-22	-24	-29	-33
Upper inequality (T1/M40)	-10	-12	-13	-16	-21
Lower inequality (M40/B50)	-27	-29	-32	-36	-38
Palma ratio (share T10/share B40)	-40	-43	-47	-52	-56
Gini (Reynolds-Smolensky index)	-10	-11	-12	-15	-16
Atkinson index	-8	-8	-9	-11	-12
Theil	-39	-45	-43	-47	-55
Mean log deviation	-58	-63	-70	-74	-80
GE(2)	-46	-42	-37	-44	-54
U.S	1970-1979	1980-1989	1990-1999	2000-2009	2010-2016
Total inequality (T10/B50)	-34	-33	-41	-44	-47
Total inequality (T10/B90)	-22	-19	-24	-27	-29
Upper inequality (T1/M40)	-15	-11	-15	-18	-20
Lower inequality (M40/B50)	-22	-25	-30	-31	-33
Palma ratio (share T10/share B40)	-38	-38	-46	-49	-52
Gini (Reynolds-Smolensky index)	-9	-9	-11	-11	-12
Atkinson index	-7	-7	-9	-10	-11
Theil	-38	-32	-36	-36	-37
Mean log deviation	-44	-49	-55	-55	-59
GE(2)	-59	-46	-53	-52	-51

NOTES: This Table extends Table 2 for the full set of inequality indicators. Mean log deviation is the generalized entropy index with a parameter 0 (the Theil index being the generalized entropy index with a parameter 1). "GE(2)" stands for the generalized entropy index with a parameter 2. "Atkinson" is the Atkinson index with a parameter 0.5.

Table A.2 – Testing varying assumptions for imputations of non-monetary transfers

Variants	Inequality indicators	France			United States			Comparison France/U.S.		
		Pretax	Post-tax	γ	Pretax	Post-tax	γ	Pretax	Post-tax	γ
Benchmark										
	Ratio T10/B50	8.0	3.9	51%	15.7	8.4	47%	0.51	0.47	1.08
	Ratio T10/B90	4.5	3.0	33%	7.2	5.1	29%	0.62	0.58	1.14
	Gini (Reynolds-Smolensky index)	0.45	0.28	16%	0.57	0.45	12%	-0.12	-0.16	1.35
Alt. scenario 1										
	Ratio T10/B50	8.0	3.4	58%	15.8	6.7	58%	0.51	0.51	1.00
	Ratio T10/B90	4.5	2.7	40%	7.2	4.5	38%	0.62	0.60	1.04
	Gini (Reynolds-Smolensky index)	0.45	0.25	20%	0.57	0.40	17%	-0.12	-0.15	1.16
Alt. scenario 2										
	Ratio T10/B50	8.0	5.4	33%	15.6	11.2	28%	0.51	0.48	1.17
	Ratio T10/B90	4.5	3.6	19%	7.2	6.0	16%	0.62	0.61	1.14
	Gini (Reynolds-Smolensky index)	0.45	0.36	9%	0.57	0.51	6%	-0.12	-0.15	1.52
Alt. scenario 3										
	Ratio T10/B50	8.0	5.6	30%	15.6	10.2	35%	0.51	0.54	0.87
	Ratio T10/B90	4.5	4.2	5%	7.2	6.1	15%	0.62	0.70	0.32
	Gini (Reynolds-Smolensky index)	0.45	0.34	11%	0.57	0.49	8%	-0.12	-0.15	1.32
Alt. scenario 4										
	Ratio T10/B50	8.0	2.9	63%	15.9	5.7	64%	0.50	0.52	0.99
	Ratio T10/B90	4.5	2.5	43%	7.2	4.3	41%	0.62	0.59	1.06
	Gini (Reynolds-Smolensky index)	0.45	0.20	24%	0.57	0.35	22%	-0.12	-0.15	1.13

NOTES: This Table extends Table 2 using alternative variants for the imputation of non-monetary transfers. Benchmark: In-kind transfers (health-care expenditures and education spending) on a lump-sum basis, and collective expenditures proportionally to post-tax disposable income ; Alternative scenario 1: lump-sum method (lump-sum gains of in-kind transfers and collective expenditures); Alternative scenario 2: proportional method (in-kind transfers and collective expenditures are allocated proportionally to disposable income); Alternative scenario 3: In-kind transfers attributed on a lump-sum basis, and collective expenditures are attributed only to the top 10 (on a lump-sum basis); Alternative scenario 4: In-kind transfers attributed on a lump-sum basis, and collective expenditures are attributed only to the bottom 50 (on a lump-sum basis).

Table A.3 – Decomposition of the evolution of post-tax income inequality: France vs. U.S.

		Benchmark			Alt. scenario 1: Lump-sum			Alt. scenario 2: Proportional		
	Panel A: T10/B50 indicator	1900-2018	1900-1983	1983-2018	1900-2018	1900-1983	1983-2018	1900-2018	1900-1983	1983-2018
France	Changes in post-tax income inequality	-75%	-76%	4%	-77%	-78%	6%	-71%	-73%	9%
	Due to changes in pretax inequality	-45%	-59%	29%	-44%	-57%	29%	-48%	-62%	29%
	Due to changes in redistribution due to taxes and cash transfers	-21%	-11%	-20%	-21%	-10%	-20%	-23%	-11%	-20%
	Due to changes in in kind and collective expenditures (relative to disposable income)	-9%	-7%	-4%	-12%	-11%	-3%	0%	0%	0%
U.S.	Changes in post-tax income inequality			42%			45%			60%
	Due to changes in pretax inequality			66%			67%			70%
	Due to changes in redistribution due to taxes and cash transfers			-10%			-10%			-10%
	Due to changes in in kind and collective expenditures (relative to disposable income)			-14%			-12%			0%
	Panel B: T10/B90 indicator	1900-2018	1900-1983	1983-2018	1900-2018	1900-1983	1983-2018	1900-2018	1900-1983	1983-2018
France	Changes in post-tax income inequality	-64%	-67%	10%	-66%	-69%	10%	-59%	-64%	14%
	Due to changes in pretax inequality	-43%	-56%	26%	-42%	-55%	26%	-46%	-58%	26%
	Due to changes in redistribution due to taxes and cash transfers	-13%	-5%	-12%	-13%	-5%	-12%	-14%	-6%	-12%
	Due to changes in in kind and collective expenditures (relative to disposable income)	-8%	-6%	-4%	-12%	-9%	-4%	0%	0%	0%
U.S.	Changes in post-tax income inequality	-15%	-37%	35%	-20%	-41%	36%	-3%	-33%	45%
	Due to changes in pretax inequality	7%	-29%	50%	7%	-27%	50%	7%	-30%	52%
	Due to changes in redistribution due to taxes and cash transfers	-9%	-3%	-7%	-9%	-4%	-7%	-9%	-3%	-7%
	Due to changes in in kind and collective expenditures (relative to disposable income)	-13%	-5%	-9%	-17%	-10%	-8%	0%	0%	0%
France	**Panel C: Gini**			1983-2018			1983-2018			1983-2018
	Changes in post-tax income inequality			-0.4%			0.003%			1%
	Due to changes in pretax inequality			5%			5%			5%
	Due to changes in redistribution due to taxes and cash transfers			-4%			-4%			-4%
	Due to changes in in kind and collective expenditures (relative to disposable income)			-1%			-1%			0%
U.S.	Changes in post-tax income inequality			7%			8%			9%
	Due to changes in pretax inequality			10%			10%			10%
	Due to changes in redistribution due to taxes and cash transfers			-1%			-1%			-1%
	Due to changes in in kind and collective expenditures (relative to disposable income)			-2%			-2%			0%

Notes: This Table extends Table 3 using alternative variants for the imputation of non-monetary transfers. Benchmark: In-kind transfers (health-care expenditures and education spending) on a lump-sum basis, and collective expenditures proportionally to post-tax disposable income ; Alternative scenario 1: lump-sum method (lump-sum gains of in-kind transfers and collective expenditures); Alternative scenario 2: proportional method (in-kind transfers and collective expenditures are allocated proportionally to disposable income)

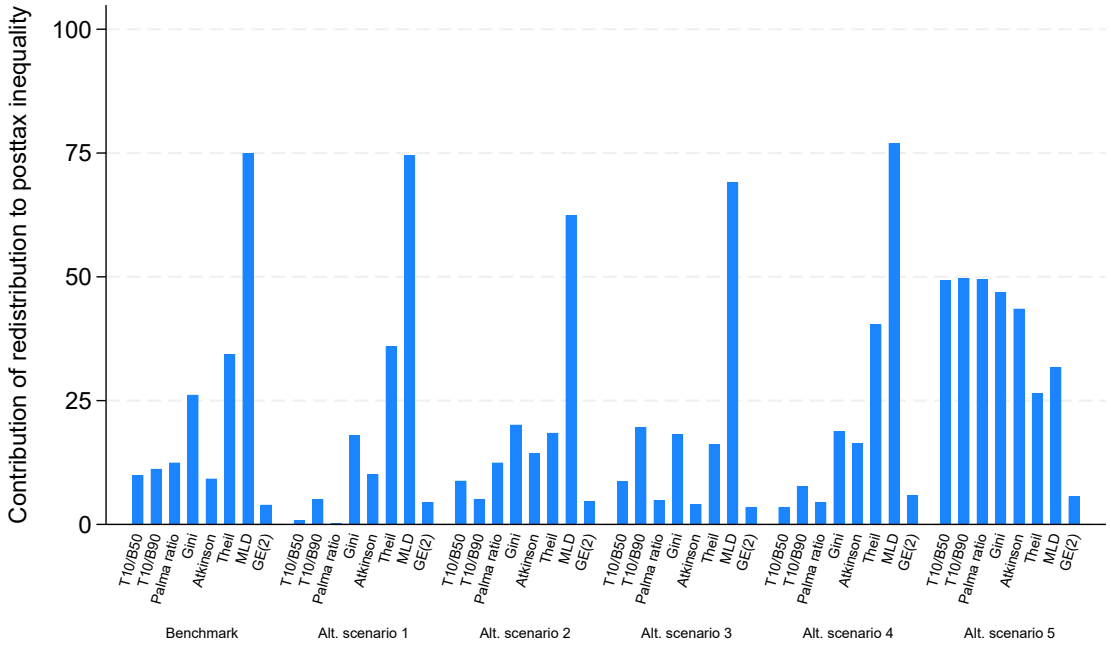
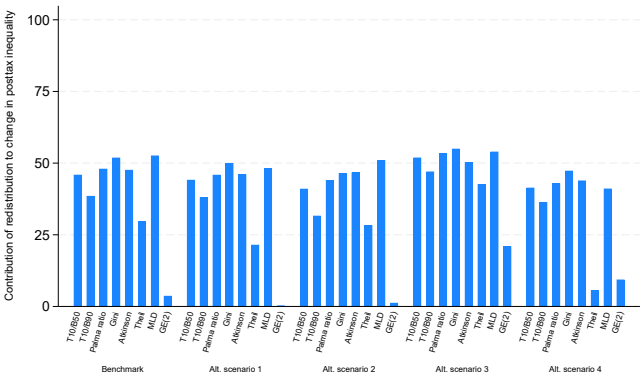


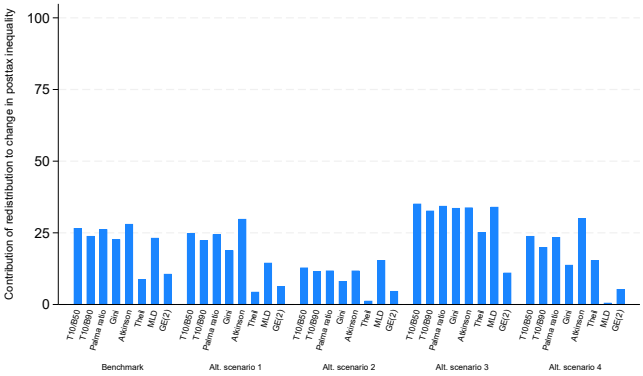
Figure A.1 – Robustness Check: Complementary Indicators for the Contribution of Redistribution to Post-tax Inequality

NOTES: This figure extends Figure 7.A for the full set of inequality indicators. It depicts the contribution of redistribution to the gap in post-tax inequality between France and the U.S in the recent period (2010-2018 period), by inequality indicator and variants for the imputation of non-monetary transfers. Benchmark: In-kind transfers (health-care expenditures and education spending) on a lump-sum basis, and collective expenditures proportionally to post-tax disposable income ; Alternative scenario 1: lump-sum method (lump-sum gains of in-kind transfers and collective expenditures); Alternative scenario 2: proportional method (in-kind transfers and collective expenditures are allocated proportionally to disposable income); Alternative scenario 3: In-kind transfers attributed on a lump-sum basis, and collective expenditures are attributed only to the top 10 (on a lump-sum basis); Alternative scenario 4: In-kind transfers attributed on a lump-sum basis, and collective expenditures are attributed only to the bottom 50 (on a lump-sum basis) ; Alternative scenario 5: In-kind transfers attributed on a lump-sum basis, and collective expenditures are attributed to the top 10 in France and to the bottom 50 in the U.S. "MLD" stands for the "mean log deviation", i.e. the generalized entropy index with a parameter 0 (the Theil index being the generalized entropy index with a parameter 1). "GE(2)" stands for the generalized entropy index with a parameter 2. "Atkinson" is the Atkinson index with a parameter 0.5.

(a) Evolution in France



(b) Evolution in the United States



(c) Differential Evolution between France and the U.S.

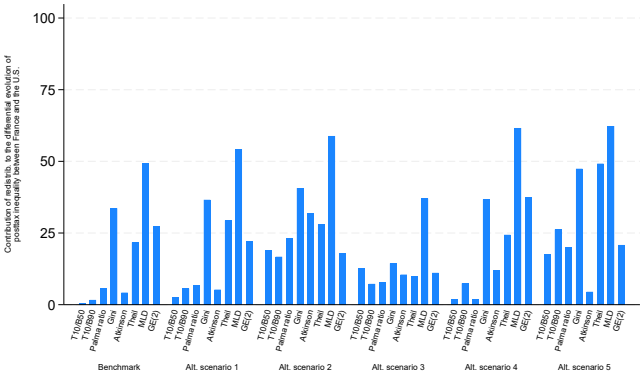


Figure A.2 – Robustness Check: Complementary Indicators for the Contribution of Redistribution to the Evolution of Post-tax Inequality (1983–2018)

NOTES: This figure extends Figure 7.B for the full set of inequality indicators. Benchmark: In-kind transfers (health-care expenditures and education spending) on a lump-sum basis, and collective expenditures proportionally to post-tax disposable income ; Alternative scenario 1: lump-sum method (lump-sum gains of in-kind transfers and collective expenditures); Alternative scenario 2: proportional method (in-kind transfers and collective expenditures are allocated proportionally to disposable income); Alternative scenario 3: In-kind transfers attributed on a lump-sum basis, and collective expenditures are attributed only to the top 10 (on a lump-sum basis); Alternative scenario 4: In-kind transfers attributed on a lump-sum basis, and collective expenditures are attributed only to the bottom 50 (on a lump-sum basis) ; Alternative scenario 5: In-kind transfers attributed on a lump-sum basis, and collective expenditures are attributed to the top 10 in France and to the bottom 50 in the U.S. (on a lump-sum basis). "MLD" stands for the "mean log deviation", i.e. the generalized entropy index with a parameter 0 (the Theil index being the generalized entropy index with a parameter 1). "GE(2)" stands for the generalized entropy index with a parameter 2. "Atkinson" is the Atkinson index with a parameter 0.5.