

## THE EFFECT OF LABOR'S BARGAINING POWER ON WEALTH INEQUALITY IN THE UK, USA, AND FRANCE

BY BEN TIPPET, ÖZLEM ONARAN and RAFAEL WILDAUER

*Department of Accounting Finance and Economics, University of Greenwich, London, UK*

This paper analyses the determinants of wealth inequality, measured as the share of wealth owned by the top 1 percent wealthiest individuals. We find that labor's bargaining power is a significant and important determinant of top wealth shares. Using a semi-structural vector autoregression (SVAR) model for the period 1970–2019, we estimate that shocks to labor's bargaining power explain 32 percent, 8 percent and 32 percent of the variation around the long-term trend in wealth inequality in the UK, USA and France, respectively.

**JEL Codes:** D31, J50, H24

**Keywords:** wealth inequality, income inequality, labor's bargaining power, technological change, globalization

### 1. INTRODUCTION

This paper analyzes the determinants of wealth inequality, measured as the share of the top 1 percent wealthiest individuals in total wealth, with a particular focus on the causal role played by labor's bargaining power. In the UK, the USA and France, changes in the top 1 percent share of wealth have followed a similar trajectory, albeit at different rates. As can be seen in Figure 1, wealth became more equally distributed throughout the 1970s. However, since the 1980s inequality has been rising, with the USA seeing the sharpest uptick.

In parallel to these trends, there have been significant institutional and structural changes impacting the bargaining power of labor. Figures 2 and 3 presents the union density rate and collective bargaining coverage rate for the three countries respectively. Union density increased or remained stable throughout the 1970s, with the UK having a higher rate. In all countries, however, unionization has decreased substantially starting from the 1980s. Collective bargaining coverage similarly dropped in the UK and US since the 1980's, although not in France, where increasingly more workers have been covered by agreements.

The idea that inequality is caused by changes in bargaining power, and not just by technological change or globalization, is familiar to economics. There

*Note:* The authors would like to thank the Editor (D.S. Prasada Rao), two anonymous referees and Rob Jump, *Alexander Guschanski*, Maria Nikolaidi and Jakob Kappeller for helpful comments.

\*Correspondence to: Ben Tippet, Department of Accounting, Finance and Economics, University of Greenwich, London, UK ([b.m.tippet@greenwich.ac.uk](mailto:b.m.tippet@greenwich.ac.uk)).

© 2022 The Authors. *Review of Income and Wealth* published by John Wiley & Sons Ltd on behalf of International Association for Research in Income and Wealth. This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

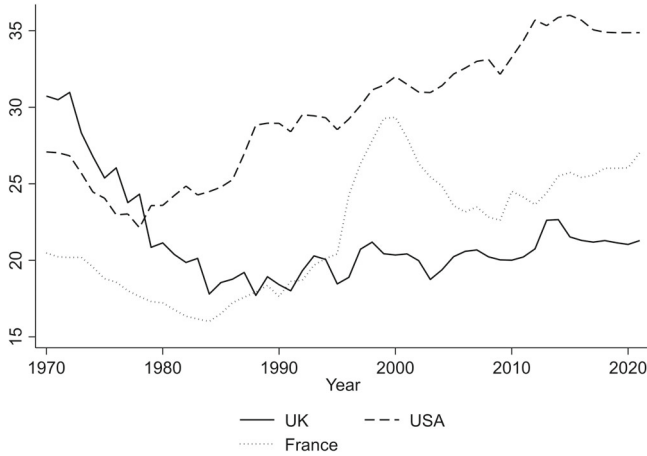


Figure 1. The Share of Wealth Owned by the Top 1 Percent Wealthiest Households in the UK, the USA and France (%).

Notes: Data from World Inequality Database.

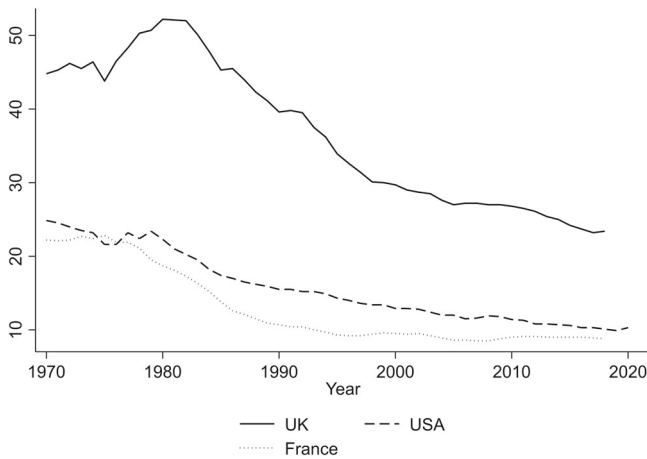


Figure 2. The Proportion of Workers who are Part of a Trade Union in the UK, the USA and France (%).

Notes: Data from OECD.

is a substantial literature analyzing how labor’s bargaining power determines personal income inequality via its impact on both wage inequality and the labor share of income (Ahlquist 2017; Bengtsson 2014; Bivens and Mishel 2013; Fichtenbaum 2009; Freeman and Medoff 1985; Guschanski and Onaran 2021; Hancké 2013; Kristal 2013; Kristal 2010; Levy and Temin 2007; Rosenfeld 2014; Stockhammer 2017; Stockhammer et al. 2009). When it comes to the determinants of wealth inequality, however, there are two gaps in the literature that we aim to address in this paper.

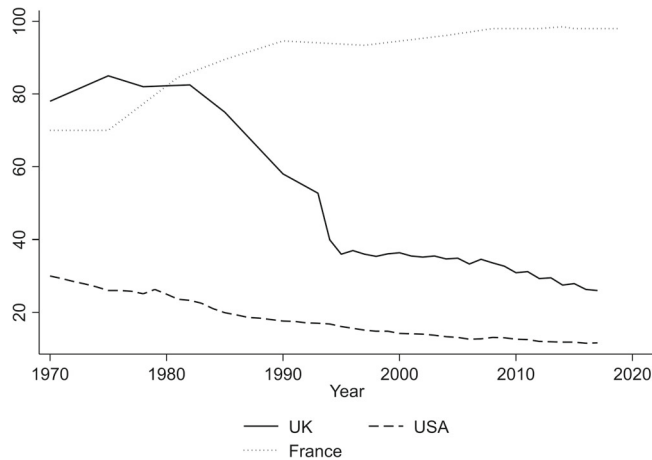


Figure 3. The Proportion of Workers Covered by Collective Bargaining Coverage Agreements in the UK, the USA and France (%).

Notes: Data from OECD.

Firstly, the econometric literature analyzing the determinants of wealth inequality is underdeveloped. Rather than analyzing the deep determinants of wealth inequality, the existing literature has tended to focus on understanding the composition of wealth inequality, that is the accounting factors that make up wealth shares (Blanchet and Martinez-Toledan 2022). These components include differential capital gains (Kuhn et al. 2020), top 1 percent income shares, differential saving rates (Lieberknecht and Vermeulen 2018; Saez and Zucman 2016) and inheritance flows (Boserup et al. 2016; De Nardi and Yang 2016). The determinants of these components, however, are often left out of the analysis. One exception is Piketty (2014) who discusses why wealth inequality changes over time, although largely based on descriptive rather than econometric methods. Furthermore, while a related literature introduces wealth inequality into a general equilibrium framework, such models tend to be static and focus on reproducing the top 1 percent wealth share for a given year in the USA (see De Nardi and Fella (2017) for review). The need for econometric analysis on the determinants of wealth inequality is particularly apparent when compared to the well-developed econometric research on the determinants of income inequality, which has highlighted the role of several causal factors including technological change (Autor 2015; Bassanini and Manfredi 2014; Goos et al. 2014), globalization (Heimberger 2020; Jaumotte et al. 2013), taxation (Piketty et al. 2014) and labor's bargaining power (as mentioned above).

Secondly, the specific link between labor's bargaining and wealth inequality has not been properly explored. While some papers have analyzed the link between labor's bargaining power and aggregate wealth as a ratio to income (Naidu 2018), or included wealth distribution in macroeconomic models (Ederer and Rehm 2020; Onaran et al. 2019; Palley 2012; Taylor et al. 2015), a detailed theoretical and econometric analysis of how labor's bargaining power impacts wealth inequality is absent. Incorporating the effects of bargaining power

into the analysis to wealth inequality is non-trivial, as labor's bargaining may impact the components of wealth inequality, that is, differential capital gains and savings rates, in different ways—amplifying or diminishing the effect on income inequality.

This paper aims to address both these gaps. We first present a theoretical analysis of the channels through which labor's bargaining power is likely to impact wealth inequality via its effects on the components of wealth inequality. We then empirically estimate these channels using a semi-structural vector autoregression analysis using data from the UK, the USA and France for the period of 1970–2019.<sup>1</sup> To the best of our knowledge this is the first paper to empirically estimate the effects of shocks to labor's bargaining on the top 1 percent share of wealth across the three countries.

We estimate the model using a semi-structural VAR, as we are primarily concerned with analyzing a particular shock to bargaining power. To identify this shock, we use short run restrictions and assume that the indicators capturing bargaining power<sup>2</sup> are contemporaneously exogenous to wealth inequality. This assumption is justified by the fact that the top 1 percent is likely to only impact these labor institutions via a political channel that takes time to materialize. For example, if the top 1 percent aims to politically leverage its wealth to influence trade union legislation, such lobbying will take time to come into effect and this reverse causality will only occur with a lag.

Our estimations indicate that a positive shock to the bargaining power of labor significantly reduces top 1 percent wealth shares across all three countries. Quantitatively, shocks to labor's bargaining power explain 32 percent, 8 percent and 32 percent of the variation in top wealth shares in the UK, the USA and France, respectively. We show that these results are robust to alternative specifications and control variables. The reason why bargaining explains a significantly smaller proportion of the variation in top wealth shares in the USA compared to the UK and France is not because bargaining shocks have a smaller impact in the USA. Using impulse response functions, we demonstrate that a 1 percent-point positive shock to labor's bargaining power reduces top 1 percent wealth shares by similar magnitudes across all three countries. We therefore interpret these two findings—that bargaining explains a smaller proportion of top 1 percent share variation but has a comparable absolute effect size in the USA—as the result of higher volatility of wealth inequality (a stronger decline in top wealth shares since 1980) in the USA compared to the UK and France.

The rest of the paper is organized as follows: Section 2 provides a theoretical overview of the components of wealth inequality and how they are impacted by labor's bargaining power. Sections 3 and 4 present the data and estimation methodology. Section 5 discusses the estimation results and Section 6 concludes.

<sup>1</sup>The sample period is determined by data availability. Our baseline estimation is estimated on data from 1970 to 2015, although we estimate robustness tests for the period 1970–2019.

<sup>2</sup>Labor's bargaining power is captured using trade union density in the UK and USA and collective bargaining coverage in France due to the different bargaining regimes in each country, which we discuss in more detail in section 3.

## 2. THEORETICAL FRAMEWORK

2.1. *The components of wealth inequality*

We first derive the components of the top 1 percent wealth share from an accounting framework. We then outline how labor bargaining power impacts the top 1 percent share of wealth via these components. Building on the accounting framework used by several papers (Hubmer et al. 2020; Kuhn et al. 2020; Lieberknecht and Vermeulen 2018; Mian et al. 2020; Saez and Zucman 2016) wealth  $W_t^f$  of fractile  $f$  (e.g., the top 1 percent wealthiest households) in period  $t$  is given by

$$(1) \quad W_t^f = W_{t-1}^f (1 + q_t^f) + s_t^f Y_t^f + h_t^f$$

where  $q_t^f$  denotes the return on wealth due to capital gains,  $Y_t^f$  is pre-tax personal income (from both capital and labor but excluding capital gains),  $s_t^f$  is the saving rate and  $h_t^f$  is the net inheritances, gifts and inter vivos transfers from the rest of society to fractile  $f$ . These refer to synthetic rather than actual values, as it does not account for the fact that over time the top 1 percent is made up of different individuals entering and leaving the group.<sup>3</sup>

The capital gains component ( $q_t^f$ ) is a weighted change in the price of assets in a portfolio. Consider a portfolio of assets  $\{A_{j,t}^f\}$ , where asset  $j$  is held by fractile  $f$  in period  $t$  and liabilities are shown as negative values. For each fractile  $f$  we can measure the capital gain  $q_t^f$  as the change in the asset prices, weighted by the assets they hold as a fraction of their wealth:

$$(2) \quad q_t^f = \sum_{j=1}^J \left( \frac{P_{j,t} - P_{j,t-1}}{P_{j,t-1}} \right) \frac{A_{j,t-1}^f}{W_{t-1}^f}$$

Given that we do not have data on the composition of portfolios or asset price changes for all assets in the countries in our estimation, we simplify the analysis by making three assumptions. Firstly, we assume that there are only two assets in the economy—equities and housing—as these are the two assets for which we have long run data. Secondly, we assume that over time the composition of assets held by fractile  $f$  changes in line with the population as a whole.<sup>4</sup> Lastly, we assume that the top 1 percent capital gains can be approximated by the capital gains of

<sup>3</sup>The approach of Saez and Zucman (2016) is therefore to think of the saving and capital gains for fractile  $f$  as synthetic rates, which will approximate the actual average rates of the top 1 percent so long as the households entering and exiting are relatively similar to each other.

<sup>4</sup>In other words,  $\frac{A_{j,t}^f}{W_t^f} - \frac{A_{j,t+i}^f}{W_{t+i}^f} = \frac{A_{j,t}}{W_t} - \frac{A_{j,t+i}}{W_{t+i}}$ . Taking data from the UK, this assumption is relatively justified. Between 2015 and 1971, the aggregate share of housing assets as a percentage of total net personal wealth has gone up from 42 percent to 70 percent. For the wealthiest 1 percent, housing share has gone from making up 10 percent of wealth to 30 percent of wealth over the same period.

stocks, while the aggregate capital gains can be approximated by the capital gains on housing. From these simplifying assumptions, it follows that

$$(3) \quad q_t^f \approx \left( \frac{P_{\text{stocks},t} - P_{\text{stocks},t-1}}{P_{\text{stocks},t-1}} \right)$$

and the rate of return on wealth for the population on aggregate  $q_t$  is given by the following equation.

$$(4) \quad q_t \approx \left( \frac{P_{\text{housing},t} - P_{\text{housing},t-1}}{P_{\text{housing},t-1}} \right)$$

Lastly, we integrate both inheritance and income taxes into the model. We first decompose the saving rate into the saving rate out of post-tax income  $s_{\text{post},t}^f$  and average income tax rate across all income sources  $T_y^f$  for fractile  $f$ .

$$(5) \quad s_t^f = s_{\text{post},t}^f - T_y^f$$

We then decompose net inheritance, gifts and inter vivos transfers into the post-tax net transfers  $h_{\text{post},t}^f$  and average inheritance tax rate across all transfers  $T_h^f$  for fractile  $f$ .

$$(6) \quad h_t^f = h_{\text{post},t}^f (1 - T_h^f)$$

Rearranging, we can write the law of motion for top wealth shares i.e. the ratio of wealth held by the top 1 percent of the wealth distribution to the rest of the population as

$$(7) \quad \frac{W_t^f}{W_t} = \frac{\left(1 + q_t^f\right) \frac{W_{t-1}^f}{W_{t-1}} + s_t^f \frac{Y_t^f}{Y_t} \frac{Y_t}{W_{t-1}} + \frac{h_t^f}{W_{t-1}}}{1 + q_t + \frac{s_t Y_t}{W_{t-1}} + \frac{h_t}{W_{t-1}}}$$

Equation 7 shows that top wealth shares in period  $t$  is a positive function of  $q_t^f$ ,  $\frac{Y_t^f}{Y_t}$ ,  $s_t^f$ ,  $\frac{Y_t}{W_{t-1}}$ ,  $\frac{h_t^f}{W_{t-1}}$ ,  $\frac{W_{t-1}^f}{W_{t-1}}$  and is a negative function of  $q_t$ , and  $s_t$ . We focus on the four main factors.

A positive shock to differential capital gains ( $q_t^f - q_t$ ), all else being equal, leads to an increase in top wealth shares. This means that an increase in the capital gains of stocks relative to housing will lead to an increase in top 1 percent wealth shares.

A positive shock to the share of personal income going to the top 1 percent ( $\frac{Y_t^f}{Y_t}$ ) all else being equal, leads to an increase in top wealth shares as the wealthiest households earn more income which is saved over time into new wealth.

A positive shock to differential saving rates ( $s_t^f - s_t$ ), all else being equal, increases the top 1 percent share of wealth. As shown in Equation 7, differential

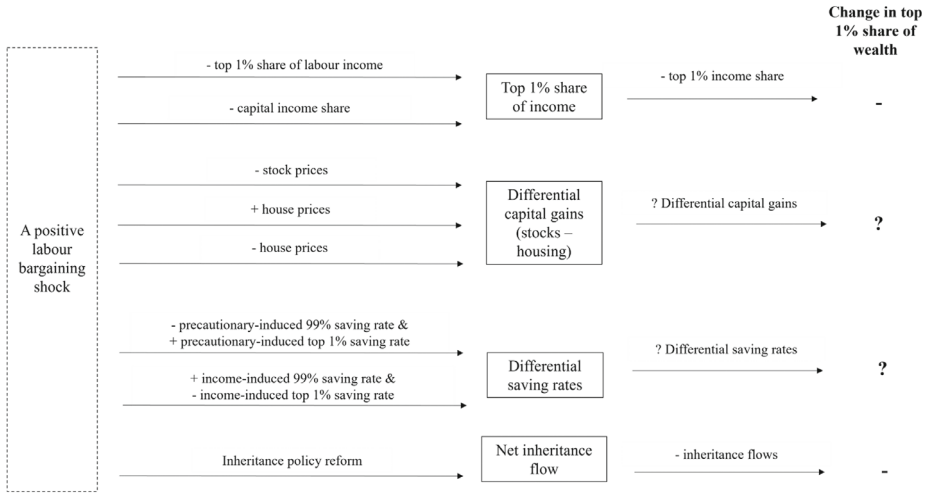


Figure 4. The Theoretical Impact of a Positive Labor Bargaining Shock on The Top 1 Percent Share of Wealth

saving rates are a positive function of differential saving rates out of post-tax income and a negative function of progressive income taxes.<sup>5</sup>

Lastly, a positive shock to top 1 percent net inheritance, transfer and inter vivos flows as a ratio to aggregate wealth ( $\frac{h_t^f}{W_{t-1}}$ ) leads to an increase in the top 1 percent wealth share. As shown in Equation 6, net inheritance, transfer and inter vivos flows are a positive function of post-tax flows and a negative function of progressive inheritance taxes.

### 2.2. The theoretical impact of the bargaining power of labor on the components of wealth inequality

How does a positive shock to labor’s bargaining power (e.g. an exogenous increase in union density or collective bargaining coverage) impact these components of wealth inequality? The consequent causal effects of changes in labor’s bargaining power are summarized in Figure 4.

A positive labor bargaining shock impacts the top 1 percent share of income via two channels. The first channel works via wage inequality and top managerial pay.<sup>6</sup> Jensen and Murphy (1990) argue that labor bargaining shocks, in the form of higher trade union density, reduce top managerial pay, as unions set fairness concerns and threaten to take industrial action if executive compensation becomes

<sup>5</sup>From Equation 7,  $s_t^f - s_t = (s_{post,t}^f - s_{post,t}) - (T_y^f - T)$  where  $T_y^f - T$  is the difference in average tax rate of fractile  $f$  and the average tax rate of the whole economy. The greater  $(T_y^f - T)$  the more progressive the income tax system.

<sup>6</sup>See Frydman and Jenter (2010) section four for a literature review and McCall and Percheski (2010) for a summary of the debate. There is also a large literature on how unions impact the dispersion of wages within the 99 percent which is less important for our analysis (Farber et al. 2021).



excessive. DiNardo et al. (1997) find that a 10 percent increase in trade union density reduces the pay of CEOs by 2.5 percent or more using US firm level data. Gomez and Tzioumis (2006) find similar results, while Sjöberg (2009) in a 15 country panel regression between 1979 and 2000 find that union density significantly reduces top wage shares. These studies build on the wider literature establishing that top managerial pay is not set competitively and is subject to bargaining effects between managers, shareholders, and workers (Bebchuk and Fried 2003; Kuhnen and Zwiebel 2008).

The second channel works by decreasing the capital share of income. In an economy with imperfect competition, a positive bargaining shock pushes up wages and redistributes income from capital to labor. In such an imperfectly competitive framework, increasing wages does not simply lead to higher prices or increased unemployment (Bivens and Mishel 2013; Blanchard and Katz 1997; Furceri et al. 2018). As capital income is more concentrated than labor income, a decline in the capital income share decreases the top 1 percent share of income. Several empirical papers establish such a negative relationship between trade union density and the capital income share (Bivens and Mishel 2013; Fichtenbaum 2009; Guschanski and Onaran 2021; Hancké 2013; Kristal 2013; Kristal 2010; Stockhammer 2017; Stockhammer et al. 2009).

A positive labor bargaining shock impacts differential capital gains via three channels. The first is via a negative impact on stock prices. At the level of the firm, a significant number of US studies have documented the negative relationship between unionization and stock prices (Abowd and Tracy 1989; DiNardo and Lee 2004; Lalonde et al. 1996; Ruback and Zimmerman 1984). Lee and Mas (2012) estimate that a union election victory in a firm leads to a 10 percent decline in the market value of the company. In particular, trade unions that push for industrial action in the form of strikes are shown to significantly reduce stock prices (Davidson et al. 1988; DiNardo and Hallock 2002; Kramer and Vasconcellos 1996; Nelson et al. 1994; Ruback and Zimmerman 1984). Becker and Olson (1986) estimate that a single strike reduces a firm's stock price by 4.1 percent. In addition to the extent that stock prices reflect the perceived future profitability of a company, stronger unions are likely to reduce a company's profitability in favor of higher wages and benefits for its employees and thus reduce stock prices.

Labor bargaining shocks could also increase house prices. Arundel and Doling (2017) argue that a positive labor bargaining shock could lead to higher homeownership and house price growth, as labor market insecurity, associated with a low bargaining power of labor, could impact homeownership (with a lag) by reducing the prevalence of secure, stable incomes needed for a mortgage.

However, a positive bargaining shock may also reduce house prices. Stronger labor bargaining institutions tend to push for more redistributive policies and public spending in social housing rather than private homeownership, as shown by Camilli (2020) who finds that union density is negatively correlated with homeownership rates in a panel regression on 19 OECD countries from 1965 to 2014. As an outcome of these opposing effects on house prices, the overall effect of labor's bargaining power on differential capital gains is ambiguous.

The impact of a positive labor bargaining shock on differential saving rates is also ambiguous due to two opposing effects. An increase in labor's bargaining



power increases differential saving rates via a change in the relative precautionary saving motives between the top 1 percent and the bottom 99 percent. As the motivation to save for precautionary reasons is driven by one's sense of security, a shift in power to the bottom 99 percent should in theory lead to a decrease in their saving rate relative to the top 1 percent (Fessler and Schürz 2015). For example, if unions push for more public state pensions, workers will be less incentivized to save for a private pension. On the other hand, a positive labor bargaining shock could reduce differential saving rates due to the change in the distribution of income between the two groups. It is well established that saving rates increase the more income a household receives (Dynan et al. 2004). Therefore, a positive labor bargaining shock which redistributes income from the top 1 percent to the bottom 99 percent, should also reduce the differential saving rate of the top 1 percent relative to the rest.

Lastly, a positive labor bargaining shock should reduce inheritance flows to the top 1 percent via a political channel. Unions and collective bargaining agreements set fairness norms throughout not just in an industry but also the economy (Western and Rosenfeld 2011). Often these fairness norms are directed towards the supposed unjust earnings of the wealthiest groups, including those with inherited wealth (Anderson 1992). A positive bargaining shock may therefore push for more redistributive policies, such as changes to inheritance laws and taxation policies (Acemoglu et al. 2015; Ahlquist 2017; Scruggs and Lange 2002; Volscho and Kelly 2012).

In addition to labor bargaining shocks, other factors are also significant in determining these components of wealth inequality. Firstly, technological change leads to an increase in top 1 percent income shares through either labor-saving automation which increases the capital share of income or skill biased automation which increases wage inequality (Acemoglu and Autor 2011; Autor et al. 2008; Autor 2015; Bassanini and Manfredi 2014; Berman et al. 1994; Goldin and Katz 2007; Goos et al. 2014). Financial and trade globalization also push up income inequality through similar channels, with the additional effect of offshoring on labor's bargaining power. An increase in top marginal inheritance tax rates on the other hand reduces wealth inequality by decreasing the net inheritance and inter vivos transfers to the top 1 percent as a ratio of aggregate wealth.

### 3. DATA

Table A1 and Table A2 present the variable definitions, data sources and summary statistics for the components and determinants of wealth inequality respectively. Both the share of net personal wealth held by the top wealthiest 1 percent of individuals and the share of pre-tax national income of the top 1 percent of the income distribution are based on data provided by the World Inequality Database (WID).<sup>7</sup> The top 1 percent income share includes both capital and labor income but

<sup>7</sup>This is the share of income going to the top 1 percent of the income distribution, rather than the top of the wealth distribution, as we do not have long run data on the latter variable. As Kuhn et al. (2018, p. 53) shows the two distributions follow the same trend over time for the USA; we therefore follow the literature (Saez and Zucman 2016; Lieberknecht and Vermeulen 2018) and use the top 1 percent share of the income distribution as a proxy.

does not include capital gains. The data on differential capital gains (the real rate of return for stocks minus that for housing) is based on the Macro History Database (Jordà et al. 2019). The capital gain for each asset is measured as the change in its nominal price, deflated by the consumer price index. We do not have data for differential saving rates or inheritance flows to the top 1 percent—these components are captured by the direct shocks to wealth inequality as discussed below.

Regarding the direct measures of labor's bargaining power, we use different variables for decentralized bargaining systems in the UK and USA versus the coordinated bargaining system in France based on the industrial relations literature (Jensen 2006). In a decentralized system, wages are negotiated at the firm or company level. In a coordinated or centralized system, bargaining over wages is coordinated at the sectoral or national level (Ferreiro 2004). In the UK and USA, the bargaining power of labor depends on the power they have at the firm or company level and is therefore directly tied to whether they are unionized at the firm level. In a coordinated or centralized system, the state takes a more active role in regulating labor market conditions and industrial relations and so collective bargaining coverage may be substantially higher than union density (Ebbinghaus and Visser 2000, p. 238). Therefore, the bargaining power of labor depends on the extent to which they are covered by the negotiations and regulations coordinated at the state level, for which collective bargaining coverage is a better measure. France, despite having one of the lowest union density rates in the OECD has a very high collective bargaining coverage and is widely considered to have more favorable industrial relations for labor. Therefore, union density in France does not capture the extent of labor's bargaining power (Guschanski and Onaran 2021).

Regarding the other determinants of wealth inequality, technological change is measured as the aggregate real ICT capital stock as a ratio to real value added based on data provided by the EU KLEMS for the period of 1970–2015. This variable has been used to capture both labor saving and skills biased technological change in the literature on the determinants of capital income shares (Bassanini and Manfredi 2014; Guschanski and Onaran 2021; Stockhammer 2017).

Globalization is captured using both the KOF de jure measures of financial and trade globalization (Gygli et al. 2019). We focus primarily on financial globalization as this is expected to have a more direct impact on financial assets, returns and wealth than trade globalization. This is a composite index incorporating laws on investment restrictions, capital account openness, international investment agreements and international voice traffic. We prefer de jure measures as these, being policy variables, tend to be the most exogenous. We test the robustness of our results using other KOF indices of globalization.

Progressive taxation is measured by both the top marginal inheritance tax rate and the top marginal income tax rate, both of which are provided by WID.

#### 4. ESTIMATION METHODOLOGY

Our empirical methodology estimates the impact of a labor bargaining shock on wealth inequality using a semi-structural or partially identified VAR model for each country. We use VARs for three reasons. Firstly, unlike autoregressive

$$\begin{pmatrix} e_{0t}^{\text{top inheritance tax rate}} \\ e_{1t}^{\text{financial globalisation (KOF)}} \\ e_{2t}^{\text{real ICT capital intensity}} \\ e_{3t}^{\text{union density or collective bargaining coverage}} \\ e_{5t}^{\text{differential capital gains}} \\ e_{5t}^{\text{top 1\% income share}} \\ e_{6t}^{\text{top 1\% wealth share}} \end{pmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ b_1 & 1 & 0 & 0 & 0 & 0 & 0 \\ b_2 & b_3 & 1 & 0 & 0 & 0 & 0 \\ b_4 & b_5 & b_6 & 1 & 0 & 0 & 0 \\ b_7 & b_8 & b_9 & b_{10} & 1 & 0 & 0 \\ b_{11} & b_{12} & b_{13} & b_{14} & b_{15} & 1 & 0 \\ b_{16} & b_{17} & b_{18} & b_{19} & b_{20} & b_{21} & 1 \end{bmatrix} \begin{pmatrix} u_{0t} \\ u_{1t} \\ u_{2t} \\ u_{3t}^{\text{bargaining shock}} \\ u_{4t} \\ u_{5t} \\ u_{6t} \end{pmatrix}$$

Figure 5. Model Identification Matrix.

Notes: Given the semi-structural VAR approach, the only shock that is identified is the labor bargaining shock  $u_{3t}^{\text{bargaining shock}}$ . The labor bargaining shock is defined as the residual change in union density/collective bargaining coverage after accounting for all endogenous variation in union density/collective bargaining coverage due to taxation, globalization and technological change.

distributed lag models (ARDL), the SVAR approach models the feedback effects of wealth inequality on unionization and collective bargaining. Secondly, we do not have enough countries to estimate a panel data model, as long-term time series data for wealth distribution exists only for the UK, the USA and France. Lastly, rather than finding average effects across the three countries in a panel SVAR, the country specific estimations make it possible to explicitly compare cross country differences in the estimated parameters.

In order to identify the labor bargaining shock, we impose short-run restrictions via a Cholesky Decomposition. We use a semi-structural model as we are primarily interested in identifying and analyzing one structural shock—the bargaining power shock (Kilian and Lütkepohl 2017, p. 227). We can write the data generating process according to the following structural equation:

$$(8) \quad B_0 y_t = B_1 + B_2 y_{t-1} + B_3 y_{t-2} + u_t$$

where  $y_t$  is a  $K \times 1$  vector of a set of determinants;  $B_i$  are the model coefficients,  $i = 0, \dots, p$  which are interpreted in the same way as any normal OLS regression coefficient;<sup>8</sup> and  $u_t$  is a  $K \times 1$  vector of structural shocks. Below we present  $e_t = B_0^{-1} u_t$  for each model, where  $e_t$  are the reduced-form errors for the underlying VAR and  $B_0$  denotes the contemporaneous relationships between the variables.

Theoretically, a Cholesky Decomposition imposes both a lower triangular matrix on  $B_0$  and leaves the diagonal of C unrestricted in addition to restrict its off-diagonal elements to zero. Intuitively, this assumes that if a variable is ordered above another in the system, the variable above has a contemporaneous impact on all variables below without any contemporaneous feedback effects, i.e. the variables ordered above are contemporaneously exogenous to those below. The orderings of the variables for the baseline model are shown via the identification matrix in Figure 5.

As outlined by Kilian and Lütkepohl (2017, p. 227), the benefit of the semi-structural approach is that by not identifying the remaining shocks, less

<sup>8</sup>  $B_2$  gives the partial effect of a one-unit shock of a lagged variable in vector  $y_{t-1}$  on a dependent variable in vector  $y_t$ .

identification restrictions are needed. In other words, we do not analyze the impact of globalization, technological change, or any other variable in our analysis on wealth inequality. As such we do not attempt to construct a structural aggregate model as there is only one identified shock, compared to the seven variables in our system derived from the theoretical framework (Forni et al. 2018; Forni and Lippi 1997).

To identify the labor bargaining shock, we assume that trade union density and collective bargaining coverage are contemporaneously exogenous to wealth inequality and its components.<sup>9</sup> While wealth inequality may impact labor market institutions, this reverse causality will likely occur only with lag. An increase in wealth inequality, or its components, may lead to changes to trade union legislation, union density or collective bargaining coverage, if the newly acquired wealth at the top is used to make legislative or institutional changes. Such political capture and the role of monied interests in legislative and political institutional change is well documented (Jacobs 2018). However, economic wealth does not instantly create political power, as campaigns to influence public opinion or lobbying to change laws take time to materialize. Given this delay, we therefore assume that trade union density and collective bargaining coverage are contemporaneously exogenous to wealth inequality and its components.

Furthermore, we order trade union density or collective bargaining coverage after the control variables (technology, globalization and inheritance taxes) given the fact that union density or collective bargaining coverage may be impacted by these structural and institutional changes. For example, Acemoglu et al. (2001) argue that skill biased technological change causes de-unionization as it increases the outside option of skilled workers, undermining the coalition among skilled and unskilled workers in support of unions. Furthermore, globalization increases the likelihood of shifting investment and production abroad which in turn may lead to de-unionization and the breakup of collective bargaining agreements (Ebbinghaus and Visser 2000; Rodrik 1998; Visser 2012). As a robustness check we also report all possible orderings of the bargaining variables with respect to the control variables, following the methodology adopted in the literature (Diebold and Yilmaz 2009; Henly and Wolman 2005; Klößner and Wagner 2014).

In addition, we test whether the model suffers from non-fundamentalness, i.e. when the variables in the VAR do not convey enough information to recover the structural shocks (Forni et al. 2019). In this case non-fundamentalness may be an issue, given that trade union legislation and collective bargaining agreement take time to come into effect (Leeper et al. 2013). Given the likelihood of non-fundamentalness in our model, we follow Forni et al. (2019) who argue that so long as the key shocks of interest in a VAR are informationally sufficient, non-fundamentalness is not a concern.<sup>10</sup> A VAR is sufficient for a shock if such a shock is a linear combination of the current and past values of the variables

<sup>9</sup>Hence, trade union density or collective bargaining coverage are ordered above wealth inequality and its components.

<sup>10</sup>Beaudry et al. (2019) take a different approach and propose a simple diagnostic test for the quantitative importance of non-fundamentalness in structural VARs.

included in the VAR (Forni et al. 2019).<sup>11</sup> Hence, we follow the procedure outlined by Forni and Gambetti (2014) for testing whether the labor bargaining shock is informationally sufficient.<sup>12</sup> The basic intuition is that structural shocks are informationally sufficient, if they are orthogonal to the lags of a set of state variables that capture all relevant information about the economy (assuming the identification scheme is correct). The procedure has four steps. Firstly, we construct a large macroeconomic database of 50 variables to capture the relevant information about the economy. We use all variables from both the Penn World Table and the Macroeconomic History Database, deleting all duplicate or irrelevant variables. We also transform the relevant variables in line with the transformations made by Forni and Gambetti (2014). Secondly, we run a principal component analysis to reduce these macroeconomic variables down to a smaller number of principal components. Following Forni and Gambetti (2014), we construct four principal components. Thirdly, we estimate the labor bargaining shock as a function of the lags of these principal components. We run two estimates with both 2 lags and 4 lags for each country. Lastly, an F-test is performed on this regression. If the labor bargaining shock is informationally sufficient, the lags of these components should have no explanatory power, which can be tested via an F-test. Table A3 in the online appendix presents the data used for the principal component analysis. Table A4 presents the F-test results. As can be seen in Table A4, the F-test fails to reject the null hypothesis of insignificant coefficients on the principal component lags. Given correct identification, we can therefore conclude that the labor bargaining shock is informationally sufficient and therefore can be used in our analysis.

In section 5 below on the estimation results, we present both structural impulse response functions (IRF) and forecast error variance decompositions (FEVD). The IRF plots the response of top wealth shares over time to a 1 percent-point increase in labor's bargaining power. The FEVD shows how much of the unconditional variance in top wealth shares is explained by labor bargaining shocks.

We estimate the SVAR models in levels with an intercept. Even if some of the variables are integrated of order one or potentially cointegrated, estimating an SVAR in levels with an intercept remains consistent, while imposing unit roots and/or cointegration restrictions when they do not actually hold leads to inconsistent estimates (Kilian and Lütkepohl 2017, p. 373).

We present 95 percent confidence interval bands, using conventional residual-based bootstrap confidence intervals, which are more accurate in small samples than the standard asymptotic confidence intervals (Kilian and Lütkepohl 2017, p. 340). We include two lags in both models based on information criteria and autocorrelation tests, which are presented in Table A5 in the online appendix. The models satisfy the eigenvalue stability condition and normality tests at the 1 percent significance level.

<sup>11</sup>Fundamentalness holds if and only if the VAR is informationally sufficient for all of the structural shocks.

<sup>12</sup>We use the procedure set out in Forni and Gambetti (2014) as it is designed for VARs which are not derived from a well-defined theoretical model of reference.

TABLE 1  
FEVD RESULTS—VARIATION OF TOP WEALTH SHARES EXPLAINED BY A ONE PERCENTAGE SHOCK TO LABOR  
BARGAINING POWER (%)

Time since shock (Years)	UK	USA	France
1	6%	1%	13%
7	27%**	4%	32%**
11	32%**	8%*	32%**

\*10% significance level. \*\*5% significance level.

Finally, we only analyze the results up to 11 years after the shock for both the IRF and FEVD to keep the bootstrap inference valid (Kilian and Lütkepohl 2017, p. 377).

## 5. ESTIMATION RESULTS

We first present the estimation results for the impact of the labor bargaining shock on the top 1 percent wealth share for all countries using the semi-structural VAR outlined above. This model is estimated for the period of 1970–2015.<sup>13</sup> We then undertake five robustness tests to show that our main results are robust to alternative orderings, system sizes and control variables.

Table 1 presents the FEVD, which shows how much of the variation in top wealth shares around its long-term trend is explained by labor bargaining shocks over the given time horizons. Labor bargaining shocks are significant across all three countries after 11 years. The magnitude of the effects in the UK and France are almost identical. In the UK, labor bargaining shocks explain 28 percent and 32 percent of the variation in top wealth shares after 7 and 11 years, respectively. In France, labor bargaining shocks explain 32 percent of the variation after 7 and 11 years. In the USA on the other hand, labor bargaining shocks explain only 8 percent of the variation in top wealth shares after 11 years.

The results from the impulse response functions are consistent across all three countries. Figure 6 presents the IRF analyzing the effect of a positive 1 percent-point shock to bargaining power on the top 1 percent wealth share. We find that across all three countries, a shock to labor's bargaining power significantly reduces top 1 percent wealth shares of roughly similar magnitudes. In the UK and the USA, a 1 percent-point increase in union density leads to a 0.29 percent-point and 0.32 percent-point decline in top wealth shares after 8 years, respectively. In the USA the effect becomes significant later than in the UK. In France, a 1 percent-point increase in collective bargaining coverage also leads to a 0.38 percent decline by the 8<sup>th</sup> year, although there is a much bigger drop in the short run (1.8 percent-points after 3 years) which dies out beyond the 8th year.

<sup>13</sup>1970 is the first year of data available for the ICT capital intensity series and the KOF index. 2015 is the last year of data available for the ICT capital intensity series. Below we estimate a robustness test for the period of 1970–2019 excluding the ICT capital intensity series.



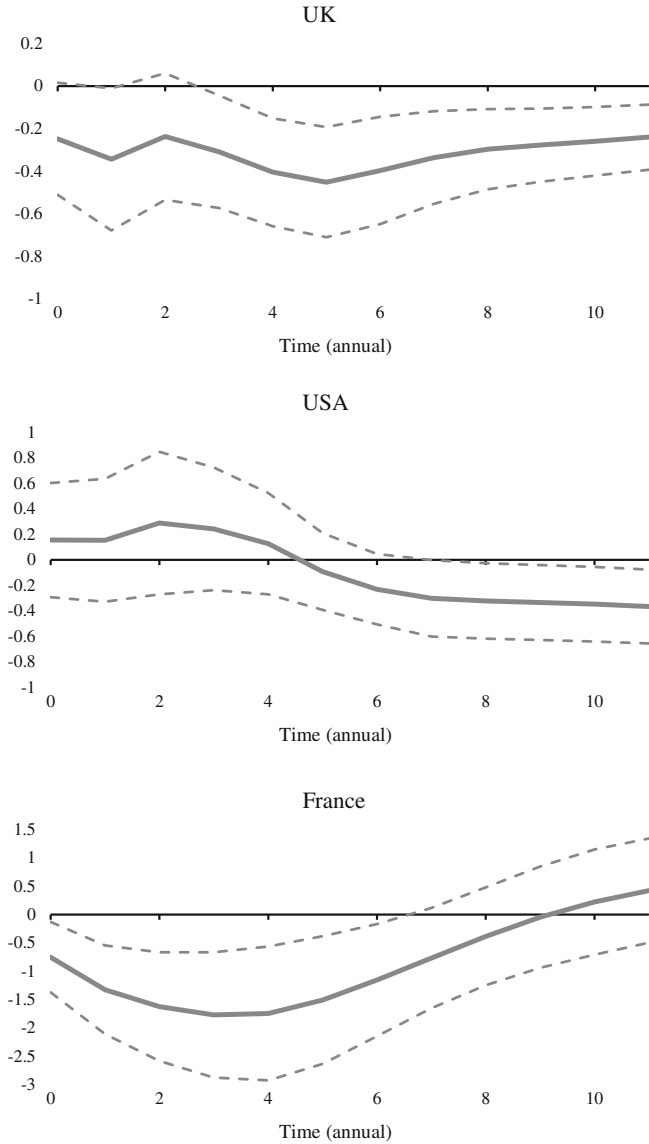


Figure 6. Structural Impulse Response Function: Effects of a 1 Percent Point Increase in Union Density or Collective Bargaining Coverage on Top Wealth Shares in the UK, USA and France. Notes: Sample period: 1970–2015. Solid black line: structural impulse response function. Blue dotted line: the residual-based 95 percent level bootstrapped confidence intervals. Legend: x axis: years. y axis: percent-point change in the top 1 percent wealth share.



What accounts for these cross-country differences in the FEVDs but not the IRFs? The interesting starting point is that based on the IRFs, the absolute effect size of a 1 percent-point increase in bargaining power is very much the same in the USA and the UK at about 0.3 percent. Given that we use trade union membership as the bargaining measure in both countries and we have very similar levels and trends in this measure the underlying shocks are also closely comparable. The finding that these similar shocks account for 8 percent and 32 percent of the total variation in top wealth shares in the USA and UK implies that there is a larger amount of variation in top 1 percent wealth shares in the USA. This latter point is consistent with the observation that wealth inequality increased to much higher levels in the USA compared to the UK. In this sense, the seemingly contradictory results between the FEVDs and IRFs are very much in line with the trends in our data.

How does this relate to the overall aggregate trends in wealth inequality that we see in Figure 1? Since the 1980s, wealth inequality has increased the most in the USA, followed by France and the UK. We find that unionization declined in the USA, driving up income and wealth inequality. In France on the other hand, the increase in wealth inequality has been less dramatic because collective bargaining coverage has *increased* since 1985 (see Figure 2)—preventing income inequality from rising as much. Wealth, however, still became more concentrated in France because of other factors. In other words, without the rise in collective bargaining coverage, wealth inequality (and income inequality) in France would have been much higher than it currently is. In the USA, if unionization had not fallen, wealth inequality may have still risen but not by as much. Using a novel dataset, Blanchet and Martinez-Toledan (2022) analyze drivers of wealth inequality in France and the USA and provide results which are highly consistent with our analysis. They focus on three components of wealth inequality (differential rates of return, differential saving rates and income inequality)<sup>14</sup> and analyze which of those have driven wealth inequality since 1985 in each country. Blanchet and Martinez-Toledan (2022) conclude that in the USA, wealth inequality has risen since 1985 because all three components have risen—i.e. savings, returns and income have all become more unequal. In France on the other hand, income inequality has not increased as much, but wealth inequality still rose because differential saving rates increased substantially. The authors do not present results for the UK.

At the heart of both of these stories is the effect of labor's bargaining power on income inequality. The FEVD in Table 2 summarizes how much of the variation in top 1 percent *income* shares is driven by labor bargaining power shocks. As can be seen, bargaining shocks explain the same amount of variation in income inequality across all three countries—namely 18 percent of the variation in top 1 percent income shares after 11 years.

We estimate five alternative specifications to check the robustness of these results. Firstly, we reorder union density/collective bargaining coverage with respect to the control variables, estimating three separate SVARs with the bargaining variable ordered in the first, second, third and fourth places. As can be seen in Figure 7,

<sup>14</sup>They do not include inheritance flows in their analysis.

TABLE 2  
FEVD RESULTS—VARIATION OF TOP INCOME SHARES EXPLAINED BY A ONE PERCENTAGE SHOCK TO LABOR  
BARGAINING POWER (%)

Time since shock (Years)	UK	USA	France
1	4%	3%	13%
7	18%*	10%	18%*
11	18%*	18%**	18%*

\*10% significance level. \*\*5% significance level.

the impact of a labor bargaining shock on wealth inequality is robust to these alternative orderings and remains significant at the 5 percent significance level.

Secondly, we reduce the size of the system, dropping the least significant variable first. This aims to test whether our results are biased due to the large number of variables in our system with respect to the relatively small number of annual observations. We estimate three alternative specifications, dropping first differential capital gains, top rate inheritance taxes and ICT capital intensity. As can be seen in Figure 8, the impulse response functions do not significantly change. In all specifications, labor bargaining shocks have a significant negative impact on top wealth shares.

Thirdly, we replace our de jure measure of financial globalization with a de jure measure of trade globalization. As can be seen in the impulse response functions in Figure 9, the impact of a labor bargaining shock on top wealth shares remains significant at the 5 percent level.

Fourthly, we replace top inheritance tax rates with top income tax rates, to test whether a different measure of progressive taxation changes the results. As can be seen in the impulse response functions in Figure 10, the impact of a labor bargaining shock on top wealth shares remains significant at the 5 percent level.

Lastly, we extend the dataset to estimate the model for the period of 1970–2019 rather than 1970 to 2015. As we do not have data for ICT capital intensity beyond 2015, we exclude this variable from the estimations. Figure 11 presents the impulse response functions for this specification. Labor bargaining shocks are still significant and with the same order of magnitude as before.

## 6. CONCLUSION

This paper analyses the determinants of the top 1 percent wealth share in the UK, the USA and France using a semi-structural vector autoregression (SVAR) estimation for the period 1970–2019 with a focus on the effects of labor's bargaining power. Such an analysis is particularly crucial, given the extensive literature showing that labor's bargaining power significantly impacts income inequality, and yet there is little theoretical and empirical research analyzing its role in determining wealth inequality.

The results indicate that the bargaining power of labor is a significant and robust determinant of the top 1 percent wealth share across all the countries in

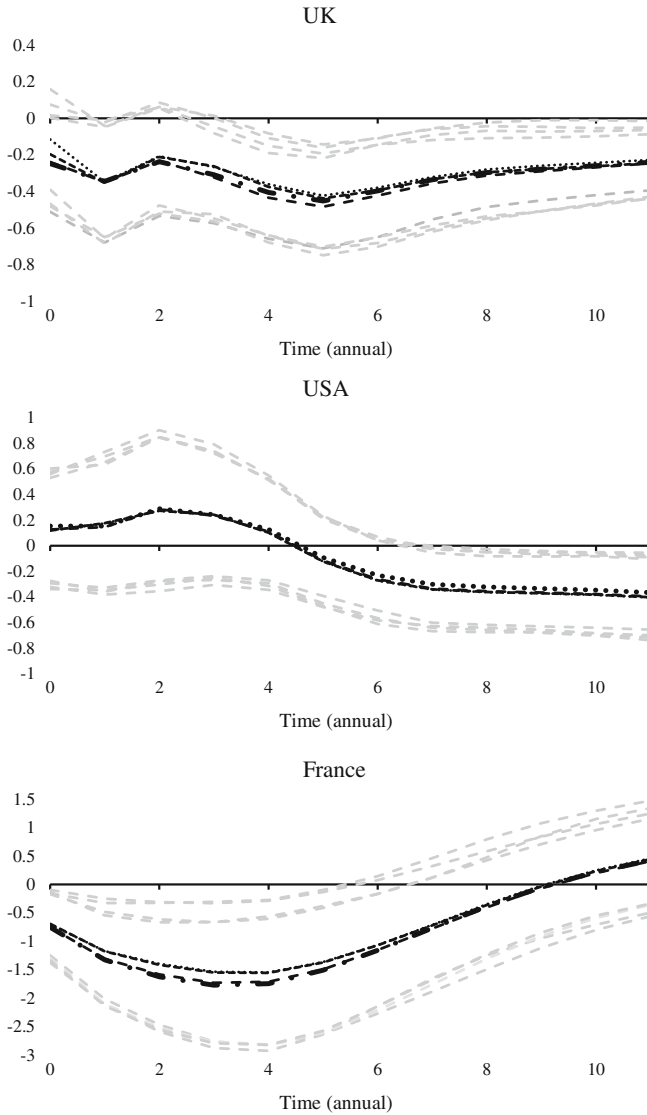


Figure 7. Structural impulse response function: Effects of a 1-% point increase in union density or collective bargaining coverage on top wealth shares in the UK, USA and France with alternative orderings.

Notes: Sample period: 1970–2015. Solid blue line: structural impulse response function. Grey dotted line: the residual-based 95% level bootstrapped confidence intervals. Legend:  $x$  axis: years.  $y$  axis: %-point change in the top 1% wealth share. Star: Union density/collective bargaining coverage is ordered first. Dot: Union density/collective bargaining coverage is ordered second. Dashed small: Union density/collective bargaining coverage is ordered third. Dashed large: Union density/collective bargaining coverage is ordered fourth.

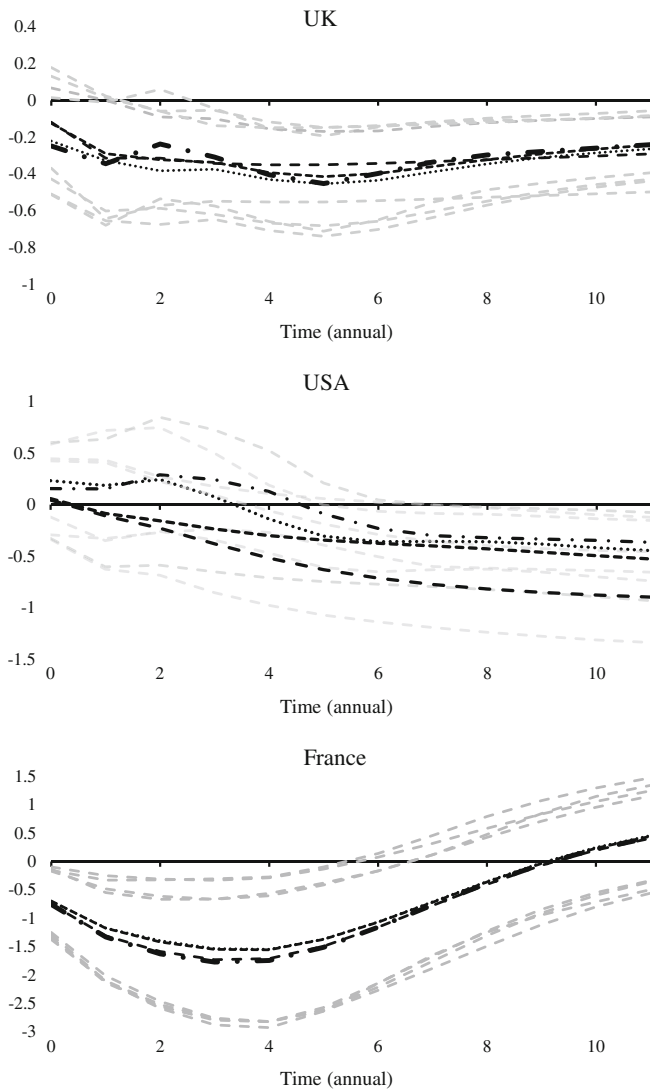


Figure 8. Structural impulse response function: Effects of a 1-% point increase in union density or collective bargaining coverage on top wealth shares in the UK, USA and France with smaller systems.

Notes: Sample period: 1970–2015. Solid blue line: structural impulse response function. Grey dotted line: the residual-based 95% level bootstrapped confidence intervals. Legend: *x* axis: years. *y* axis: %-point change in the top 1% wealth share. Black Star: Top rate inheritance tax, financial globalisation, technological change, Union density/collective bargaining, top income share, top wealth share. Black Dot: Financial globalisation, technological change, Union density/collective bargaining, top income share, top wealth share. Black Dashed small: Financial globalisation, Union density/collective bargaining, top income share, top wealth share. Black Dashed large: All variables.

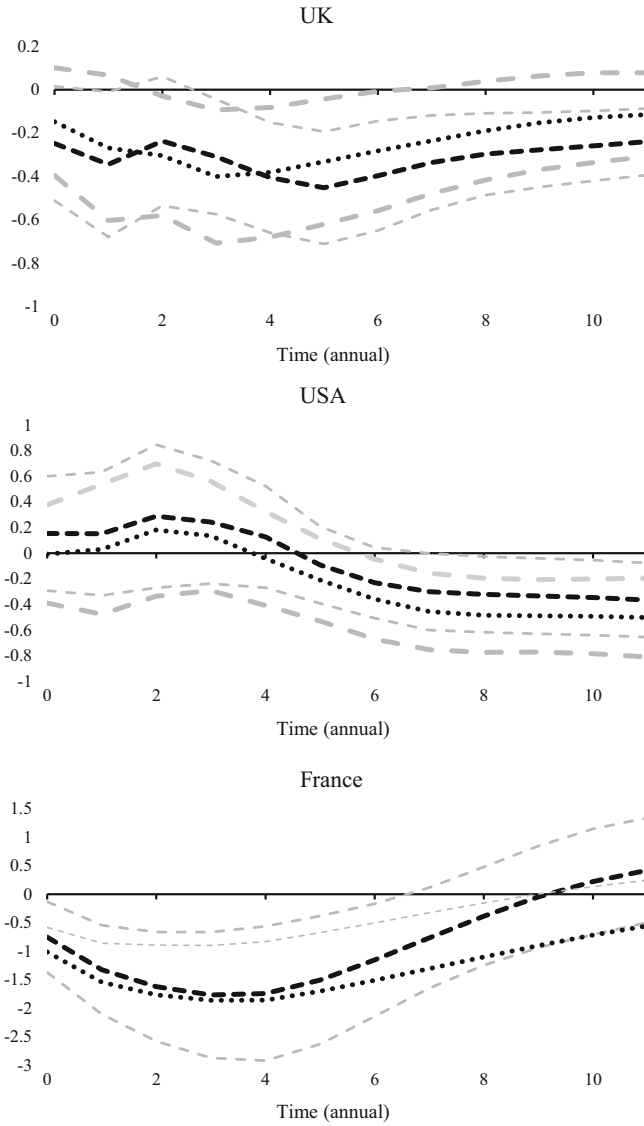


Figure 9. Structural impulse response function: Effects of a 1-% point increase in union density or collective bargaining coverage on top wealth shares in the UK, USA and France with trade globalisation.

*Notes:* Sample period: 1970–2015. Dot black line: structural impulse response function for model with trade globalisation index. Black dot line: the residual-based 95% level bootstrapped confidence intervals for model with trade globalisation. Black dashed: structural impulse response function for baseline model. Grey dotted line: the residual-based 95% level bootstrapped confidence intervals for baseline model. Legend: x axis: years. y axis: %-point change in the top 1% wealth share.

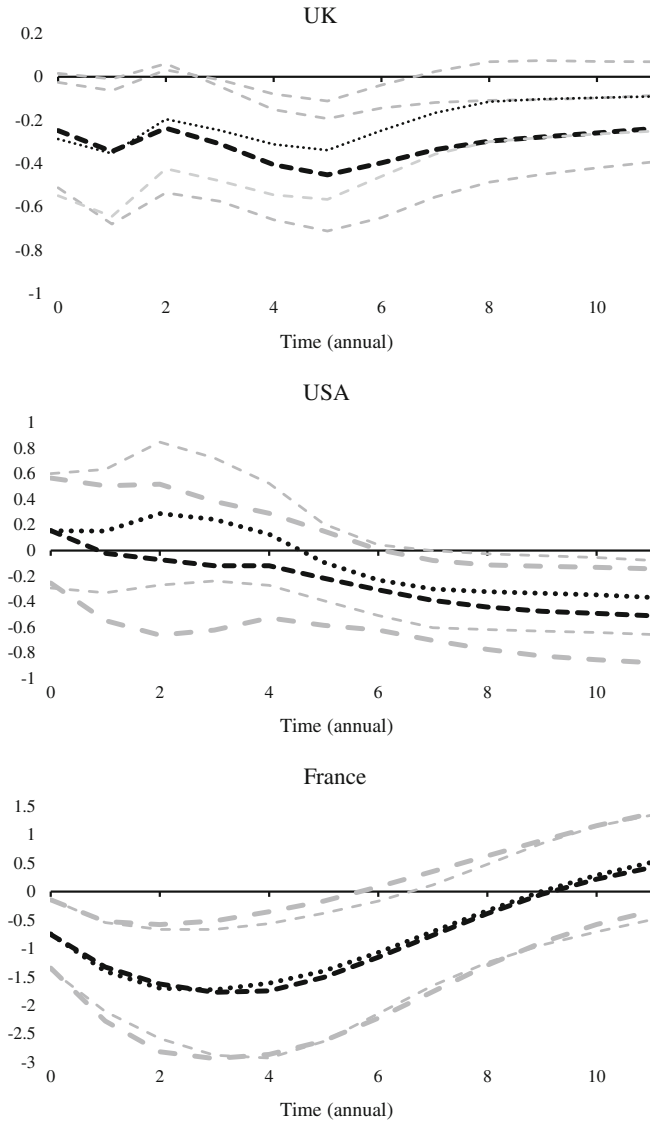


Figure 10. Structural impulse response function: Effects of a 1-% point increase in union density or collective bargaining coverage on top wealth shares in the UK, USA and France with top income tax rate.

Notes: Sample period: 1970–2015. Black dot line: structural impulse response function for model with top income tax rate. Yellow dotted line: the residual-based 95% level bootstrapped confidence intervals for model with top income tax rate. Black dotted line: structural impulse response function for baseline model. Black dashed line: the residual-based 95% level bootstrapped confidence intervals for baseline model. Legend:  $x$  axis: years.  $y$  axis: %-point change in the top 1% wealth share.

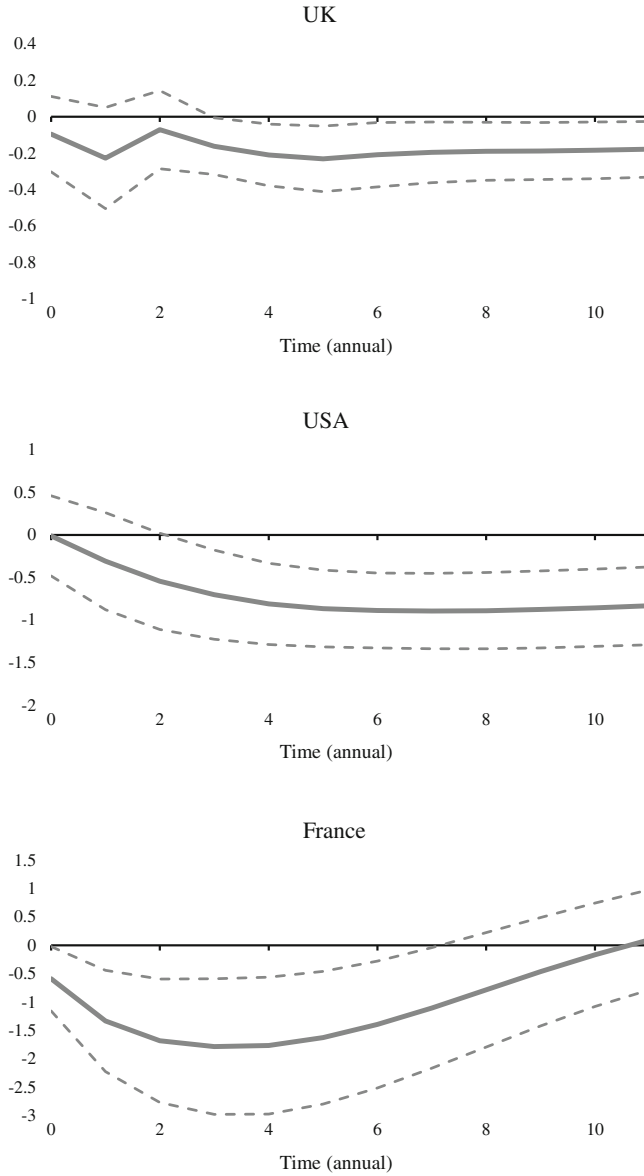


Figure 11. Structural Impulse Response Function: Effects of a 1 Percent Point Increase in Union Density or Collective Bargaining Coverage on Top Wealth Shares in the UK, USA and France 1970–2019.

Notes: Sample period: 1970–2019. Solid black line: structural impulse response function. Blue dotted line: the residual-based 95 percent level bootstrapped confidence intervals. Legend: x axis: years. y axis: percent-point change in the top 1 percent wealth share.



all the specifications. Quantitatively, a positive bargaining shock associated with a 1 percent-point increase in union density in the UK and USA leads to a 0.25 percent-point and 0.36 percent-point decline in top wealth shares after 10 years. A positive shock associated with a 1 percent-point increase in collective bargaining coverage in France leads to a much bigger drop in top wealth shares in the short run (1.8 percent-points after 3 years), although the impact is less persistent and dies out by the 10<sup>th</sup> year. After 11 years, labor's bargaining power explains 32 percent, 8 percent and 32 percent of the variation in top wealth shares in the UK, the USA and France respectively.

The reason why bargaining shocks explain less of the variation in top wealth shares in the USA compared to the UK and France is not because bargaining shocks have a smaller impact in the USA. Using impulse response functions, we demonstrate that a positive shock to labor's bargaining power reduces top 1 percent wealth shares by similar magnitudes across all three countries. The reason why less of the variation is explained by bargaining in the USA is because of a more pronounced variation in the wealth inequality in the USA, as represented by the much steeper increase in the top wealth shares.

How does this relate to the overall aggregate trends in wealth inequality that we see in Figure 1? We argue that the cross-country differences can be explained by the impact of bargaining power on wealth inequality via its impact on income inequality. In the USA, the decline in unionization pushed up income inequality (and therefore wealth inequality), but other factors beyond bargaining power have also contributed to an increase in wealth inequality. In France, on the other hand, workers have become more powerful since the 1980s, as collective bargaining coverage has increased. Despite a rise in differential saving rates, which have been driven by factors other than bargaining power since 1985—the rise in bargaining shocks has prevented income inequality from rising. In other words, without the rise in collective bargaining coverage, France would have seen much higher increases in wealth inequality (and income inequality) than it did. If unionization had not fallen in the USA, wealth inequality may have still risen, but not by as much.

## REFERENCES

- Abowd, J. M. and J. S. Tracy, "Market Structure, Strike Activity, and Union Wage Settlements," *Industrial Relations: A Journal of Economy and Society*, 28, 227–50, 1989. <https://doi.org/10.1111/j.1468-232X.1989.tb00867.x>.
- Acemoglu, D., P. Aghion and G. L. Violante. "Deunionization, Technical Change and Inequality," *Carnegie-Rochester Conference Series on Public Policy*, 55, 229–264, 2001. [https://doi.org/10.1016/S0167-2231\(01\)00058-6](https://doi.org/10.1016/S0167-2231(01)00058-6)
- Acemoglu, D. and D. Autor, "Skills, Tasks and Technologies: Implications for Employment and Earnings," *Handbook of Labor Economics*, Elsevier, North Holland, 1043–171, 2011.
- Acemoglu, D., S. Naidu, P. Restrepo and J. A. Robinson, "Democracy, Redistribution, and Inequality," *Handbook of Income Distribution*, Elsevier, North Holland, 1885–966, 2015. <https://doi.org/10.1016/B978-0-444-59429-7.00022-4>.
- Ahlquist, J. S., "Labor Unions, Political Representation, and Economic Inequality," *Annual Review of Political Science*, 20, 409–32, 2017. <https://doi.org/10.1146/annurev-polisci-051215-023225>.
- Anderson, I., "Ray Forrest, Alan Murie, and Peter Williams, Home Ownership: Differentiation and Fragmentation, Unwin Hyman, London, 1990. 234 pp. paper £12.95," *Journal of Social Policy*, 21, 249–50, 1992. <https://doi.org/10.1017/S0047279400020882>.

- Arundel, R. and J. Doling, "The end of mass homeownership? Changes in labour markets and housing tenure opportunities across Europe," *Journal of Housing and the Built Environment*, 32, 649–72, 2017. <https://doi.org/10.1007/s10901-017-9551-8>.
- Autor, D., L. Katz and M. Kearney, "Trends in U.S. Wage Inequality: Revising the Revisionists," *The Review of Economics and Statistics*, 90, 300–23, 2008.
- Autor, D. H., "Why Are There Still So Many Jobs? The History and Future of Workplace Automation," *Journal of Economic Perspectives*, 29, 3–30, 2015.
- Bassanini, A. and T. Manfredi, "Capital's grabbing hand? A cross-industry analysis of the decline of the labor share in OECD countries," *Eurasian Business Review*, 4, 3–30, 2014. <https://doi.org/10.1007/s40821-014-0004-y>.
- Beaudry, P., P. Feve, A. Guay and F. Portier, "When is Nonfundamentalness in SVARs a Real Problem?" *Review of Economic Dynamics*, 34, 221–43, 2019.
- Bebchuk, L. A. and J. M. Fried, "Executive Compensation as an Agency Problem," *Journal of Economic Perspectives*, 17, 71–92, 2003. <https://doi.org/10.1257/089533003769204362>.
- Becker, B. E. and C. A. Olson, "The Impact of Strikes on Shareholder Equity," *ILR Review*, 39, 425–38, 1986. <https://doi.org/10.1177/001979398603900309>.
- Bengtsson, E., "Do unions redistribute income from capital to labour? Union density and wage shares since 1960," *Industrial Relations Journal*, 45, 389–408, 2014. <https://doi.org/10.1111/irj.12065>.
- Berman, E., J. Bound and Z. Griliches, "Changes in the Demand for Skilled Labor within U. S. Manufacturing: Evidence from the Annual Survey of Manufactures," *The Quarterly Journal of Economics*, 109, 367–97, 1994. <https://doi.org/10.2307/2118467>.
- Bivens, J. and L. Mishel, "The Pay of Corporate Executives and Financial Professionals as Evidence of Rents in Top 1 Percent Incomes," *Journal of Economic Perspectives*, 27, 57–78, 2013. <https://doi.org/10.1257/jep.27.3.57>.
- Blanchard, O. and L. F. Katz, "What We Know and Do Not Know about the Natural Rate of Unemployment," *Journal of Economic Perspectives*, 11, 51–72, 1997. <https://doi.org/10.1257/jep.11.1.5>.
- Blanchet, T. and C. Martinez-Toledan, *Wealth Inequality Dynamics in Europe and the United States: Understanding the Determinants*. Working Paper, 2022.
- Boserup, S. H., W. Kopczuk and C. T. Kreiner, "The Role of Bequests in Shaping Wealth Inequality: Evidence from Danish Wealth Records," *American Economic Review*, 106, 656–61, 2016. <https://doi.org/10.1257/aer.p20161036>.
- Camilli, A., *Labor Market Institutions and Homeownership (SSRN Scholarly Paper No. ID 3606667)*, Social Science Research Network, Rochester, NY, 2020.
- Davidson, W. N., D. L. Worrell and S. H. Garrison, "Effect of Strike Activity on Firm Value," *Academy of Management Journal*, 31, 387–94, 1988. <https://doi.org/10.2307/256554>.
- De Nardi, M. and G. Fella, "Saving and wealth inequality," *Review of Economic Dynamics*, 26, 280–300, 2017. <https://doi.org/10.1016/j.red.2017.06.002>.
- De Nardi, M. and F. Yang, "Wealth inequality, family background, and estate taxation," *Journal of Monetary Economics*, "Inequality, Institutions, and Redistribution" held at the Stern School of Business, New York University, April 24–25, 2015, 77, 130–45, 2016. <https://doi.org/10.1016/j.jmoneco.2015.10.005>.
- Diebold, F. X. and K. Yilmaz, "Measuring Financial Asset Return and Volatility Spillovers, with Application to Global Equity Markets\*," *The Economic Journal*, 119, 158–71, 2009. <https://doi.org/10.1111/j.1468-0297.2008.02208.x>.
- DiNardo, J., K. Hallock and J.-S. Pischke, *Unions and Managerial Pay (No. w6318)*, National Bureau of Economic Research, Cambridge, MA, 1997. <https://doi.org/10.3386/w6318>.
- Dinardo, J. and K. F. Hallock, "When Unions 'Mattered': The Impact of Strikes on Financial Markets, 1925–1937," *ILR Review*, 55, 219–33, 2002. <https://doi.org/10.2307/2696206>.
- DiNardo, J. and D. S. Lee, "Economic Impacts of New Unionization on Private Sector Employers: 1984–2001\*," *The Quarterly Journal of Economics*, 119, 1383–441, 2004. <https://doi.org/10.1162/0033553042476189>.
- Dynan, K. E., J. Skinner and S. P. Zeldes, "Do the Rich Save More?" *Journal of Political Economy*, 112, 397–444, 2004. <https://doi.org/10.1086/381475>.
- Ebbinghaus, B. and J. Visser, *Trade Unions in Western Europe Since 1945, The Societies of Europe*, Palgrave Macmillan, London, XXI, 80, 2000. <https://doi.org/10.1007/978-1-349-65511-3>
- Ederer, S. and M. Rehm, "Will wealth become more concentrated in Europe? Evidence from a calibrated Post-Keynesian model," *Cambridge Journal of Economics*, 44, 55–72, 2020. <https://doi.org/10.1093/cje/bez014>.
- Farber, H. S., D. Herbst, I. Kuziemko and S. Naidu, "Unions and Inequality over the Twentieth Century: New Evidence from Survey Data\*," *The Quarterly Journal of Economics*, 136, 1325–85, 2021. <https://doi.org/10.1093/cje/qjab012>.
- Ferreiro, J., "Decentralized versus centralized collective bargaining: is the collective bargaining structure in Spain efficient?" *Journal of Post Keynesian Economics*, 26, 35, 2004.

- Fessler, P. and M. Schürz, *Private wealth across European countries: the role of income, inheritance and the welfare state* (Working Paper Series No. 1847), European Central Bank, Frankfurt am Main, Germany, 2015.
- Fichtenbaum, R., “The Impact of Unions on Labor’s Share of Income: A Time-Series Analysis,” *Review of Political Economy*, 21, 567–88, 2009. <https://doi.org/10.1080/09538250903214859>.
- Forni, M. and L. Gambetti, “Sufficient information in structural VARs,” *Journal of Monetary Economics*, 66, 124–36, 2014.
- Forni, M., Gambetti, L. and L. Sala, 2018. Fundamentalness, Granger Causality and Aggregation (No. 139), Center for Economic Research (RECent), Center for Economic Research (RECent). University of Modena and Reggio E., Dept. of Economics “Marco Biagi.”
- Forni, M., L. Gambetti and L. Sala, “Structural VARs and noninvertible macroeconomic models,” *Journal of Applied Econometrics*, 34, 221–46, 2019. <https://doi.org/10.1002/jae.2665>.
- Forni, M. and M. Lippi, *Aggregation and the Microfoundations of Dynamic Macroeconomics (OUP Catalogue)*, Oxford University Press, Oxford, UK, 1997.
- Freeman, R. B. and J. L. Medoff, “What Do Unions Do?” *ILR Review*, 38, 244–63, 1985. <https://doi.org/10.1177/001979398503800207>.
- Frydman, C. and D. Jenter, “CEO Compensation,” *Annual Review of Financial Economics*, 2, 75–102, 2010. <https://doi.org/10.1146/annurev-financial-120209-133958>.
- Furceri, D., P. Loungani and A. Zdzienicka, “The effects of monetary policy shocks on inequality,” *Journal of International Money and Finance*, 85, 168–86, 2018. <https://doi.org/10.1016/j.jimonfin.2017.11.004>.
- Goldin, C. and L. Katz, *The Race between Education and Technology: The Evolution of U.S. Educational Wage Differentials, 1890 to 2005 (No. w12984)*, National Bureau of Economic Research, Cambridge, MA, 2007. <https://doi.org/10.3386/w12984>.
- Gomez, R. and K. Tzioumis, 2006. What do unions do to executive compensation? [WWW Document]. URL <http://cep.lse.ac.uk> (accessed 11.30.21).
- Goos, M., A. Manning and A. Salomons, “Explaining Job Polarization: Routine-Biased Technological Change and Offshoring,” *American Economic Review*, 104, 2509–26, 2014. <https://doi.org/10.1257/aer.104.8.2509>.
- Guschanski, A. and Ö. Onaran, “The decline in the wage share: falling bargaining power of labour or technological progress? Industry-level evidence from the OECD,” *Socio-Economic Review*, 20, 2021. <https://doi.org/10.1093/ser/mwaa031>.
- Gygli, S., F. Haelg, N. Potrafke and J.-E. Sturm, “The KOF Globalisation Index—revisited,” *Review of International Organizations*, 14, 543–74, 2019. <https://doi.org/10.1007/s11558-019-09344-2>.
- Hancké, B., “The missing link. Labour unions, central banks and monetary integration in Europe<sup>1</sup>,” *Transfer: European review of labour and research*, 19, 89–101, 2013. <https://doi.org/10.1177/1024258912469347>.
- Heimberger, P., “Does economic globalisation affect income inequality? A meta-analysis,” *The World Economy*, 43, 2960–82, 2020. <https://doi.org/10.1111/twec.13007>.
- Henly, S. E. and A. L. Wolman, “Housing and the Great Recession: A VAR Accounting Exercise,” *FRB Richmond Economic Quarterly*, 97, 22, 2005.
- Hubmer, J., P. Krusell and A. A. Smith, Jr., “Sources of US Wealth Inequality: Past, Present, and Future,” *NBER Chapters*, National Bureau of Economic Research, Inc, Chicago, IL, 391–455, 2020.
- Jacobs, E., “Everywhere and Nowhere: Politics in Capital in the Twenty-First Century,” *After Piketty*, Harvard University Press, Cambridge, MA, 512–40, 2018. <https://doi.org/10.4159/9780674978195-022>.
- Jaumotte, F., S. Lall and C. Papageorgiou, “Rising Income Inequality: Technology, or Trade and Financial Globalization?” *IMF economic review*, 61, 271–309, 2013. <https://doi.org/10.1057/imfer.2013.7>.
- Jensen, C. S., “Trade Unionism: Differences and Similarities—a Comparative View on Europe, USA and Asia,” *Journal of Industrial Relations*, 48, 59–81, 2006. <https://doi.org/10.1177/0022185606059314>.
- Jensen, M. C. and K. J. Murphy, “Performance Pay and Top-Management Incentives,” *Journal of Political Economy*, 98, 225–64, 1990.
- Jordà, Ó., K. Knoll, D. Kuvshinov, M. Schularick and A. M. Taylor, “The Rate of Return on Everything, 1870–2015\*,” *The Quarterly Journal of Economics*, 134, 1225–98, 2019. <https://doi.org/10.1093/qj/e/qj2012>.
- Kilian, L. and H. Lütkepohl, *Structural Vector Autoregressive Analysis*, Cambridge University Press, Cambridge, 2017.
- Klößner, S. and S. Wagner, “Exploring All Var Orderings for Calculating Spillovers? Yes, We Can!—A Note on Diebold and Yilmaz (2009),” *Journal of Applied Economics*, 29, 172–9, 2014. <https://doi.org/10.1002/jae.2366>.

- Kramer, J. K. and G. M. Vasconcellos, "The Economic Effect of Strikes on the Shareholders of Non-struck Competitors," *ILR Review*, 49, 213–22, 1996. <https://doi.org/10.1177/001979399604900202>.
- Kristal, T., "Good Times, Bad Times: Postwar Labor's Share of National Income in Capitalist Democracies," *American Sociological Review*, 75, 729–63, 2010.
- Kristal, T., "The Capitalist Machine: Computerization, Workers' Power, and the Decline in Labor's Share within U.S. Industries," *American Sociological Review*, 78, 361–89, 2013. <https://doi.org/10.1177/0003122413481351>.
- Kuhn, M., M. Schularick and U. I. Steins, "Income and Wealth Inequality in America, 1949–2016," *Journal of Political Economy*, 128, 3469–519, 2020. <https://doi.org/10.1086/708815>.
- Kuhnen, C. M. and J. H. Zwiebel, Executive Pay, Hidden Compensation and Managerial Entrenchment, Rock Center For Corporate Governance Working Paper No. 16, 1-56 2008. <https://doi.org/10.2139/ssrn.972622>.
- Lalonde, R. J., G. Marschke and K. Troske, "Using Longitudinal Data on Establishments to Analyze the Effects of Union Organizing Campaigns in the United States," *Annales d'Economie et de Statistique*, 41/42, 155–185, 1996. <https://doi.org/10.2307/20066467>.
- Lee, D. S. and A. Mas, "Long-Run Impacts of Unions on Firms: New Evidence from Financial Markets, 1961–1999 \*," *The Quarterly Journal of Economics*, 127, 333–78, 2012. <https://doi.org/10.1093/qje/qjr058>.
- Leeper, E. M., T. B. Walker and S.-C. S. Yang, "Fiscal foresight and information flows," *Econometrica*, 81, 1115–45, 2013.
- Levy, F. S. and P. Temin, *Inequality and Institutions in 20th Century America (SSRN Scholarly Paper No. ID 984330)*, Social Science Research Network, Rochester, NY, 2007. <https://doi.org/10.2139/ssrn.984330>.
- Lieberknecht, P. and P. Vermeulen, 2018. Inequality and relative saving rates at the top 42.
- McCall, L. and C. Percheski, "Income Inequality: New Trends and Research Directions," *Annual Review of Sociology*, 36, 329–47, 2010. <https://doi.org/10.1146/annurev.soc.012809.102541>.
- Mian, A., Straub, L., Sufi, A. and C. Booth, 2020. The Saving Glut of the Rich 69.
- Naidu, S., "5. A Political Economy Take on W/Y," *After Piketty*, Harvard University Press, Cambridge, MA, 99–125, 2018. <https://doi.org/10.4159/9780674978195-006>.
- Nelson, M., B. Amoako-Adu and B. Smith, "Impact of labor strikes on equity values: Canadian evidence," *Journal of Economics and Business*, 46, 153–65, 1994. [https://doi.org/10.1016/0148-6195\(94\)90009-4](https://doi.org/10.1016/0148-6195(94)90009-4).
- Onaran, Ö., C. Oyvatt and E. Fotopoulou, *The effects of gender inequality, wages, wealth concentration and fiscal policy on macroeconomic performance (Working Paper)*, University of Greenwich Business School, London, 2019.
- Palley, T., "Wealth and wealth distribution in the neo-Kaleckian growth model," *Journal of Post Keynesian Economics*, 34, 453–74, 2012.
- Piketty, T., *Capital in the Twenty-First Century* 0 edition, Harvard University Press, Cambridge MA, 2014.
- Piketty, T., E. Saez and S. Stantcheva, "Optimal Taxation of Top Labor Incomes: A Tale of Three Elasticities," *American Economic Journal: Economic Policy*, 6, 230–71, 2014. <https://doi.org/10.1257/pol.6.1.230>.
- Rodrik, D., "Has Globalization Gone Too Far?" *Challenge*, 41, 81–94, 1998. <https://doi.org/10.1080/05775132.1998.11472025>.
- Rosenfeld, J., *What Unions No Longer Do*, 1st ed., Harvard University Press, Cambridge, MA, London, 2014.
- Ruback, R. S. and M. B. Zimmerman, "Unionization and Profitability: Evidence from the Capital Market," *Journal of Political Economy*, 92, 1134–57, 1984. <https://doi.org/10.1086/261278>.
- Saez, E. and G. Zucman, "Wealth Inequality in the United States since 1913: Evidence from Capitalized Income Tax Data," *The Quarterly Journal of Economics*, 131, 519–78, 2016. <https://doi.org/10.1093/qje/qjw004>.
- Scruggs, L. and P. Lange, "Where Have All the Members Gone? Globalization, Institutions, and Union Density," *The Journal of Politics*, 64, 126–53, 2002.
- Sjöberg, O., "Corporate Governance and Earnings Inequality in the OECD Countries 1979–2000," *European Sociological Review*, 25, 519–33, 2009. <https://doi.org/10.1093/esr/jcn069>.
- Stockhammer, E., "Determinants of the Wage Share: A Panel Analysis of Advanced and Developing Economies," *British Journal of Industrial Relations*, 55, 3–33, 2017. <https://doi.org/10.1111/bjir.12165>.
- Stockhammer, E., O. Onaran and S. Ederer, "Functional income distribution and aggregate demand in the Euro area," *Cambridge Journal of Economics*, 33, 139–59, 2009.
- Taylor, L., O. Omer and A. Rezai, *Wealth Concentration, Income Distribution, and Alternatives for the USA (SSRN Scholarly Paper No. ID 2667880)*, Social Science Research Network, Rochester, NY, 2015. <https://doi.org/10.2139/ssrn.2667880>.

- Visser, J., "The rise and fall of industrial unionism," *Transfer: European Review of Labour and Research*, 18, 129–41, 2012. <https://doi.org/10.1177/1024258912439160>.
- Volscho, T. W. and N. J. Kelly, "The Rise of the Super-Rich: Power Resources, Taxes, Financial Markets, and the Dynamics of the Top 1 Percent, 1949 to 2008," *American Sociological Review*, 77, 679–99, 2012. <https://doi.org/10.1177/0003122412458508>.
- Western, B. and J. Rosenfeld, "Unions, Norms, and the Rise in U.S.," *Wage Inequality. American Sociological Review*, 76, 513–37, 2011. <https://doi.org/10.1177/0003122411414817>.

## SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article at the publisher's web site:

**Table A1** Data: The components of the top 1% wealth share

**Table A2** Data: The determinants of the top 1% wealth share

**Table A3** Data for sufficient information tests

**Table A4** Sufficient information test of labor bargaining shock: F-test  $p$  values

**Table A5** Postestimation tests