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No Taxation Without Reallocation: The Distributional Effects of Tax Changes

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Abstract

This paper quantifies the distributional effects of tax changes in the United States. A functional vector autoregression framework is used to estimate the joint dynamics of tax shocks, the cross-sectional distribution of disposable income, and macroeconomic aggregates. I distinguish between changes in personal and corporate income taxes and investigate the distributional effects on families and business owners. I document that tax changes affect incomes along the distribution unevenly and that the family status and the source of income matters. Tax reductions benefit high incomes and disadvantage lower incomes. Entrepreneurs and families benefit more from tax cuts than individuals without business income and non-families.

JEL classification: C11, C32, E32, E62

Keywords: Income Distribution, Functional Vector Autoregressions, Tax Policy Shocks

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"My friends, history is clear: Lower tax rates mean greater freedom, and whenever we lower the tax rates, our entire nation is better off."

Ronald Reagan, October 3, 1985

1 Introduction

What are the distributional effects of changes in tax policy? Over the last decades, the macroeconomic implications of tax changes have been the focus of empirical research and distributional evidence remains scarce. This is despite the explicit redistributory function of tax policy and prevalent political narratives on who should benefit from changes in tax policy. My paper presents this empirical evidence, quantifying the effect of tax changes on the cross-sectional distribution of disposable income for the US for the 1980 to 2006 period.

The fresh ingredient for my analysis is the functional vector autoregressive (fVAR) model of Chang et al. (2021); it allows me to study the causal effects of tax changes on the cross-sectional distribution of disposable income and macroeconomic variables jointly in a dynamic setup at business cycle frequency. I use micro-level data on after-tax income constructed from the Consumer Expenditure Survey (CEX) to approximate a log density of cross-sectional disposable income for each quarterly observation period. Together with aggregate macroeconomic data on tax revenues, government spending, GDP, non-durable consumption, and disposable income, these approximated log densities enter the fVAR model, which is estimated with Bayesian techniques.

I base the identification on the tax shock measure of Mertens and Ravn (2014), which isolates exogenous variation in tax policy changes from narrative sources accompanying the tax legislation process - a strategy introduced by Romer and Romer (2010). Including all major unanticipated exogenous federal tax liability changes that happened between 1980 and 2006, this measure can be interpreted as approximate changes in the average tax rate in the US. To document, in a similar manner, the heterogeneous effects of different tax types available

to governments along the distribution, in a second step, I employ the personal income and corporate income tax shock measure of Mertens and Ravn (2013) for identification.

The micro-level information of the CEX data allows me to scrutinize prevalent narratives on US tax policy. A systematic study of government documents covering the 1980 to 2006 period reveals that, over the entire sample and independent of the government's political background, three narratives repeatedly emerge: tax changes are directed toward low-income people, are pro-business, and are pro-family. To empirically validate these political statements, I decompose the cross-sectional disposable income distribution according to personal characteristics, discriminating between (i) entrepreneurs and non-entrepreneurs, and (ii) families and non-families.

I document that tax cuts throughout the 1980 to 2006 period generate a significant boost in GDP and aggregate disposable income, but the benefits are spread unevenly across households: they hurt the bottom and center of the distribution and benefit the rich - independent of the tax shock measure. For instance, after a one standard deviation cut in the average tax rate that increases aggregate disposable income on impact by 0.16 % at the median, the 10th percentile experiences a decrease in after-tax income of 0.5 %, while the 90th percentile benefits with an income increase of 0.1 %. Hence, my findings do not lend empirical substance to political rhetoric selling tax changes as targeted toward low-income households. However, they support political claims according to which tax changes foster business and families. I find that entrepreneurs and families benefit more from tax cuts than non-entrepreneurs and non-families.

The fVAR model framework, modeling the interaction between macroeconomic aggregates and cross-sectional level, lends itself particularly well for addressing the crucial question on the distributional impacts of aggregate tax shocks. It quantifies the distributional effects dynamically by taking into account the behavioral changes initiated by the tax intervention. The strength of the method is that it does so, without having to model the underlying micro-level heterogeneity in labor supply or saving decisions (Guvenen, 2011; Guner et al.,

2011), explicitly, as the fVAR model focuses on the response of the distribution as opposed to the individual. In this respect, the empirical evidence of my study complements distributional analysis based on micro-simulation models, as carried out by the Urban-Brookings Tax Policy Center, the Congressional Budget Office, the Joint Committee on Taxation, and the Treasury Department's Office of Tax Analysis, as these simulations usually do not consider the behavioral responses induced by the tax change (Elmendorf et al., 2008; Auerbach et al., 2017).

Modeling the dynamics of the entire distribution compared to modeling the dynamics of pre-selected distributional statistics like the Gini-coefficient, provides a more comprehensive and unambiguous perspective on the distributional effects of tax changes. As Chang et al. (2021) point out, unlike a VAR model that includes quantiles of the cross-sectional distribution that may cross in a forward simulation, the fVAR model is theoretically coherent, ensuring non-negative cross-sectional densities of disposable income that integrate to one.

Related literature While the macroeconomic effects of tax shocks are extensively studied (Blanchard and Perotti, 2002; Mountford and Uhlig, 2009; Romer and Romer, 2010; Barro and Redlick, 2011; Auerbach and Gorodnichenko, 2012; Cloyne, 2013; Mertens and Ravn, 2013; Caldara and Kamps, 2017; Demirel, 2021; Cloyne et al., 2022; Ghassibe and Zanetti, 2022) and over the years a consensus on what is driving the size of the tax multiplier has emerged (Mertens and Ravn, 2014; Ramey, 2019), empirical evidence on the distributional impacts of tax shocks remains sparse. Zidar (2019) quantifies the importance of the distribution of tax changes for their overall impact on economic activity to discriminate between trickle-down vs. bottom-up economics. In a similar vein, Ferrière and Navarro (2022) show how the effects of government spending are shaped by the distribution of taxes. Jackson et al. (2019) identify in a factor-augmented VAR model (FAVAR) exogenous changes in the progressivity of taxes and study their causal effects on various statistics of the distribution of disposable income. Cloyne and Surico (2017) study the role of household debt in the

transmission of tax shocks estimating group-specific VAR models discriminating between households with different debt positions. Misra and Surico (2014), using CEX data, study the heterogeneous consumption response to the 2001 and 2008 US tax rebates in a heterogeneous response model. Mertens and Montiel Olea (2018) derive annual narrative measures of exogenous variation in marginal tax rates for the US and study how counterfactual tax changes for the top 1 % or the bottom 99 % of the income distribution affect economic activity and incomes before taxes. Cloyne et al. (2023) exploit US firm-level data to construct an exogenous measure of federal corporate income tax rate changes and study the distributional effects of tax cuts across groups of firms. In contrast, my study contributes the first comprehensive dynamic analysis on the quantitative effects of exogenous tax changes on the entire distribution of disposable income at business cycle frequency.

My study also connects to the literature that computes the dynamic responses in micro-level behavior, in particular consumption expenditure, following an aggregate tax shock. Johnson et al. (2006) and Parker et al. (2013) are corresponding examples. Unlike these panel studies, which focus on the partial equilibrium effects of tax changes and, without further imputation, cannot provide estimates on general equilibrium dynamics (Wolf, 2021), the fVAR model approach directly takes into account general equilibrium effects, modeling the interaction between macroeconomic aggregates and micro-level data explicitly.

The remainder of this paper is structured as follows. Section 2 summarizes the fVAR model framework and outlines the data, the identification, and the estimation approach. In Section 3, I present the effects of an unanticipated cut in the average tax rate on the cross-sectional distribution of disposable income, while in Section 4, I decompose these effects. I analyze the distributional effects of different tax types, distinguishing between changes in the personal income and the corporate income tax rate and using micro-level information to quantify the distributional consequences of tax cuts on families and business-owners separately. Section 5 concludes.

2 The functional VAR model

The fVAR approach developed by Chang et al. (2021) allows me to study the distributional effects of aggregate tax shocks in a dynamic setup. Unlike traditional VAR models, the fVAR model interacts macroeconomic aggregates with cross-sectional distributions.

The $n_Y \times 1$ vector Y_t collects the macroeconomic variables and $p_t(x)$ denotes the cross-sectional density.[1] In my application, I use a log density defined as $\ell_t(x) = \ln p_t(x)$ and the cross-sectional variable x is disposable income. Y_t and ℓ_t are decomposed into a deterministic component $(Y_*, \ell_*(x))$ and fluctuations around the deterministic component:

$$Y_t = Y_* + \tilde{Y}_t, \quad \ell_t = \ell + \tilde{\ell}_t. \tag{1}$$

It is assumed that the deviations from the deterministic component evolve jointly according to the following linear fVAR law of motion, which can be interpreted as reduced-form fVAR model:

$$\begin{aligned} \tilde{Y}_t &= B_{YY}\tilde{Y}_{t-1} + \boldsymbol{B_{Y\ell}}[\tilde{\ell}_{t-1}] + u_{Y,t} \\ \tilde{\ell}_t(x) &= B_{\ell Y}(x)\tilde{Y}_{t-1} + \boldsymbol{B_{\ell\ell}}[\tilde{\ell}_{t-1}](x) + u_{\ell,t}(x). \end{aligned} \tag{2}$$

$\boldsymbol{B_{Y\ell}}[\tilde{\ell}_{t-1}]$ and $\boldsymbol{B_{\ell\ell}}[\tilde{\ell}_{t-1}](x)$ are integral operators and defined as $\boldsymbol{B_{Y\ell}}[\tilde{\ell}_{t-1}] = \int B_{Y\ell}(\bar{x})\tilde{\ell}_{t-1}(\bar{x})d\bar{x}$ and $\boldsymbol{B_{\ell\ell}}[\tilde{\ell}_{t-1}](x) = \int B_{\ell\ell}(x,\bar{x})\tilde{\ell}_{t-1}(\bar{x})d\bar{x}$. The matrix B_{YY} and the function $B_{\ell Y}(x)$ collect the coefficients. $u_{Y,t}$ is a mean-zero reduced-form error with covariance Ω_{YY} and $u_{\ell,t}(x)$ is a reduced-form error in a Hilbert space with covariance function $\Omega_{\ell\ell}(x,\bar{x})$.

I follow Chang et al. (2021) and estimate a functional state-space model in which the log density $\ell_t(x)$ is the state variable. In this framework, the linear fVAR in Equation (2) constitutes the state-transition equation. For every period $t = 1, ..., T$, I observe the macroeconomic aggregates Y_t as well as a sample of N_t draws x_{it}, $i = 1, ..., N_t$ from the

[1] For better comparability, I follow closely the notation of Chang et al. (2021) for recapitulating the method. Readers interested in further details on the implementation of the fVAR method are referred to the original study.

cross-sectional density $p_t(x)$. The draws for each period t are collected in a vector $X_t = [x_{1t}, ..., x_{Nt}]'$. The draws are assumed to be independently and identically distributed over the cross-section and independent over time. The measurement equation for the cross-sectional data is specified as

$$x_{it} \sim \text{iid } p_t(x) = \frac{\exp\{\ell_t(x)\}}{\int \exp\{\ell_t(x)\}dx}, \quad i = 1, ..., N, \quad t = 1, ..., T \tag{3}$$

and captures the error in estimating log densities from repeated cross-sectional samples. The data as well as the estimation of the log densities and the functional state-space model is outlined in the following.

2.1 Data and identification

I estimate the model for the US for the period 1980Q1 – 2006Q4 using three types of quarterly data: (i) exogenous tax policy changes, (ii) macroeconomic time series, and (iii) cross-sectional data on disposable income. While data on exogenous tax policy changes and macroeconomic outcomes is available for the entire postwar period, quarterly cross-sectional data on disposable income is only available since 1980, thus determining the start of the sample.

Exogenous tax policy changes I use a narrative tax policy shock series to identify the causal effects of tax policy changes, in particular the tax policy instruments of Mertens and Ravn (2014). These instruments build on the work of Romer and Romer (2009, 2010), who classified all major Federal tax liability changes between 1950 to 2006 according to their motivations given by the executive and legislative decisionmakers. Mertens and Ravn (2014) retain those tax changes that were not implemented for reasons related to changes in current or prospective future economic conditions and those that were implemented less than 90 days after becoming law (Mertens and Ravn, 2011). For each of these identified exogenous and unanticipated tax policy changes, a quantitative measure of projected tax revenue change is

constructed from narrative sources and scaled by nominal GDP. Hence, the resulting shock series can be interpreted as approximate changes in the average tax rate.

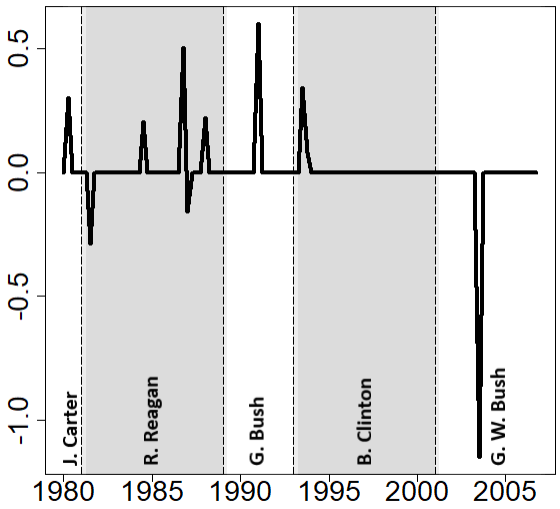


Figure 1: Narrative measure of unanticipated tax shocks of Mertens and Ravn (2014)

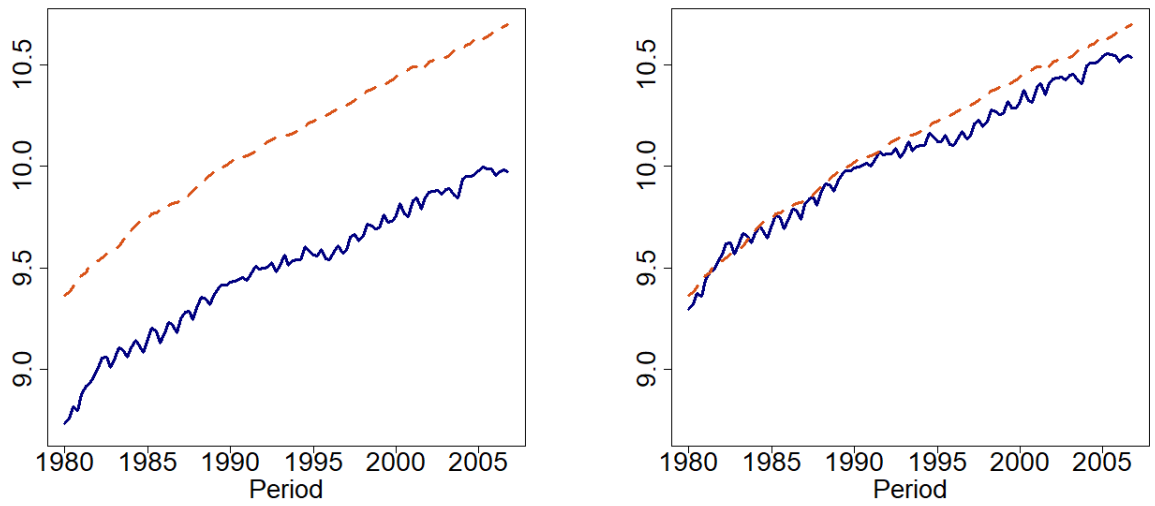
Figure 1 shows the shock instrument. For the 1980Q1 – 2006Q4 period, the series contains ten observations of tax liability changes. One of the changes falls in the presidency of Jimmy Carter, five in Ronald Reagan's presidency, one in the George H.W. Bush presidency, two were legislated under Bill Clinton, and one under George W. Bush. Seven out of the ten changes increased the average tax rate. Tempalski (2006) or Romer and Romer (2009) include a detailed list on the tax bills major provisions.

To identify the structural effects of tax policy changes on macroeconomic and cross-sectional variables, I order the instrument first in the functional VAR model, a strategy pioneered by Kilian (2006) and Ramey (2011), and theoretically discussed in Plagborg-Møller and Wolf (2021).

Macroeconomic data Besides the tax policy shock instrument, I use five macroeconomic time series to estimate the model: (i) tax revenues, (ii) non-durable consumption expenditure, (iii) government spending, (iv) GDP, and (v) disposable income. I construct the

variables from the National Income and Product Accounts (NIPA). All series are converted to per-capita terms and are used in log-levels. Appendix A includes a detailed data description.

Cross-sectional data Cross-sectional data on disposable income is constructed from the CEX conducted by the Bureau of Labor Statistics. I clean the data in the same way and apply the same definitions as in Heathcote et al. (2010). Appendix A summarizes the details. In panel (a) of Figure 2, I plot average log per-capita disposable income obtained from the CEX against log per-capita disposable income obtained from the NIPA tables. CEX disposable income is lower over the whole period, but follows a similar trend. The measurement error between CEX and NIPA income is well-documented in the literature and arises from underreporting in the CEX (Slesnick, 1992; Heathcote et al., 2010; Coeurdacier et al., 2015).



(a) Unscaled CEX series

(b) Scaled CEX series

Figure 2: CEX average log per-capita disposable income (blue, solid) and NIPA log per-capita disposable income (red, dashed)

I follow Chang and Schorfheide (2022) and correct for this underreporting bias by scaling cross-sectional disposable income to the level of the aggregate. Let Y_t^D be NIPA aggregate per-capita disposable income and y_{it}^D cross-sectional per-capita disposable income from CEX.

I calculate the scaling factor as $\frac{1}{T}\sum_{t=1}^{T}\text{median}(y_{it}^{D},...,y_{Nt}^{D})/Y_{t}^{D} \approx 0.57$ and define $y_{it}^{D*} = y_{it}^{D}/(0.57 \cdot Y_{t}^{D})$. Hence, if $y_{it}^{D*} = 1$ the individual's disposable income corresponds to the level of aggregate disposable income per capita. The scaled micro-level series is plotted in panel (b) of Figure 2. To retain zero, or close-to-zero, observations of cross-sectional disposable income, I apply an inverse hyperbolic sine transformation to obtain x_{it}.

2.2 Estimation and implementation

The estimation of the fVAR succeeds in two steps. First, for every quarter t, a log density of cross-sectional disposable income is approximated. Second, the estimated coefficients of the density approximation are stacked with the macroeconomic aggregates into a linear functional state-space model which is estimated using Bayesian techniques. I select the approximation order of the densities and the hyperparameters for the prior distribution based on marginal data densities (MDD).

Density approximation I follow Chang et al. (2021) and approximate the log cross-sectional densities $\ell_t(x)$ by finite-dimensional sieves with K fixed spline basis functions and time-varying coefficients that capture the dynamics:

$$\ell_t(x) \approx \ell_t^{(K)}(x) = \sum_{k=1}^{K} \alpha_{k,t}\zeta_k(x) = [\zeta_1(x), ...\zeta_K(x)] \cdot \begin{bmatrix} \alpha_{1,t} \\ \vdots \\ \alpha_{K,t} \end{bmatrix} = \zeta'(x)\alpha_t. \tag{4}$$

The vector α_t includes the coefficients, while the vector $\zeta(x)$ collects a sequence of basis functions with knots x_k, $k = 1, ..., K-1$. I consider different approximation orders K and place the knots at predetermined percentiles of the empirical distribution of cross-sectional disposable income. Table 1 summarizes the specifications. The sieve coefficients are estimated by maximum likelihood (MLE), compressed to remove potential collinearities and seasonally-adjusted.

Table 1: Knot placement

K	1st	2.5th	5th	10th	15th	25th	35th	50th	65th	75th	85th	90th	95th
4						✓		✓		✓			
6				✓		✓		✓		✓		✓	
8			✓	✓		✓		✓		✓		✓	✓
10	✓	✓	✓	✓		✓		✓		✓		✓	✓
14	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: The cross-sectional observations are pooled across i and t. $T = 108$, $N_{min} = 1353$ (1996Q1), and $N_{max} = 3289$ (2004Q1).

This approximation turns the reduced-form VAR model in Equation (2) to the following representation:

$$\begin{aligned} \tilde{Y}_t &= B_{YY}\tilde{Y}_{t-1} + \boldsymbol{B}^{(K)}_{\boldsymbol{Y\ell}}[\tilde{\ell}^{(K)}_{t-1}] + u_{Y,t} \\ \tilde{\ell}_t^{\,(K)}(x) &= B^{(K)}_{\ell Y}(x)\tilde{Y}_{t-1} + \boldsymbol{B}^{(K)}_{\boldsymbol{\ell\ell}}[\tilde{\ell}^{(K)}_{t-1}](x) + u^{(K)}_{\ell,t}(x). \end{aligned} \tag{5}$$

The coefficient matrix B_{YY} is of dimension $n_Y \times n_Y$, the function $B_{\ell Y}(x)$ is of dimension $K \times n_Y$ and approximated as $B_{\ell Y}(x) \approx B^{(K)}_{\ell Y}(x) = \xi'(x)B_{\ell Y}$. $\xi(x)$ is a second vector of $K \times 1$ basis functions. $\boldsymbol{B}^{(K)}_{\boldsymbol{Y\ell}}[\cdot]$ and $\boldsymbol{B}^{(K)}_{\boldsymbol{\ell\ell}}[\cdot](x)$ are the operators associated with the transition kernels, which are approximated as $B_{Y\ell}(\bar{x}) \approx B^{(K)}_{Y\ell}(\bar{x}) = B_{Y\ell}\xi(\bar{x})$ and $B_{\ell\ell}(x,\bar{x}) \approx B^{(K)}_{\ell\ell}(x,\bar{x}) = \zeta'(x)B_{\ell\ell}\xi(\bar{x})$, and of dimension $n_Y \times K$ and $K \times K$, respectively. The functional innovation $u_{\ell,t}$ is of dimension $K \times 1$ and approximated as $u_{\ell,t} \approx u^{(K)}_{\ell,t} = \zeta'(x)u_{a,t}$.

Functional state-space model estimation Equations (1), (4), and (5) can be combined to the following vector autoregressive system for the macroeconomic aggregates and the estimated sieves coefficients $\hat{\alpha}_t$:

$$\begin{bmatrix} Y_t - Y_* \\ \hat{\alpha}_t \end{bmatrix} = \begin{bmatrix} \Phi_{YY} & \Phi_{Y\alpha} \\ \Phi_{\alpha Y} & \Phi_{\alpha\alpha} \end{bmatrix} \begin{bmatrix} Y_{t-1} - Y_* \\ \hat{\alpha}_{t-1} \end{bmatrix} + \begin{bmatrix} u_{Y,t} \\ u_{a,t} \end{bmatrix} \tag{6}$$

As explained in detail in Chang et al. (2021), the measurement equation in (3) can be linearized to

$$\hat{\alpha}_t(X_t) = \alpha_t + N^{-1/2}\eta_t, \quad \eta_t \sim \mathscr{N}(0, \hat{V}_t). \tag{7}$$

As the measurement error variance $\hat{V}_t$ vanishes for large N, like in my application, the MLE estimates $\hat{\alpha}_t$ enter the system directly. The $\Phi_{..}$'s denote the coefficient matrices. Under the assumption that the innovations are normally distributed, the state transition can be expressed as a multivariate linear regression model:

$$W_t = \Phi_1 W_{t-1} + u_t, \qquad u_t \sim \mathscr{N}(0, \Sigma), \tag{8}$$

where $W_t = [(Y_t - Y_*)', \hat{\alpha}']'$ and $u_t = [u'_{Y,t}, u'_{\alpha t}]'$. In matrix form the state-transition takes the form

$$W = Z\Phi + U. \tag{9}$$

I estimate the model using Bayesian techniques following Chang et al. (2021). I demean the macroeconomic variables, fit them like Mertens and Ravn (2014) on a linear and quadratic trend[2], and include one lag such that $\Phi = \Phi'_1$. The likelihood of the linear state-space model is evaluated with the Kalman filter. The prior distribution is defined as

$$\Sigma \sim IW(\underline{\nu}, \underline{S}), \qquad \phi|\lambda \sim N(0, \underline{P}_\phi^{-1}(\lambda)), \tag{10}$$

where $IW(\cdot)$ stands for the Inverse-Wishart distribution with degrees of freedom $\underline{\nu} = n_Y + K + 5$ and scale matrix $\underline{S}$. For the prior of the coefficients, $\phi = \text{vec}(\Phi)$ and $\underline{P}_\phi(\lambda)$ is the prior precision matrix. It is a function of a vector of hyperparameters $\lambda = [\lambda_1, \lambda_2, \lambda_3]'$ and

[2]The results I report are not sensitive to this deterministic trend assumption.

corresponds to the partitions $W_t' = [(Y_t - Y_*)', \hat{\alpha}_t{}']$. It is given as

$$\underline{P}_\phi(\lambda) = \lambda_1 \begin{bmatrix} (\underline{\Sigma}^{-1})_{YY} \otimes \begin{bmatrix} \hat{D}_Y & 0 \\ 0 & \lambda_2 \hat{D}_\alpha \end{bmatrix} & (\underline{\Sigma}^{-1})_{Y\alpha} \otimes \begin{bmatrix} \sqrt{\lambda_3}\hat{D}_Y & 0 \\ 0 & \sqrt{\lambda_2}\hat{D}_\alpha \end{bmatrix} \\ (\underline{\Sigma}^{-1})_{\alpha Y} \otimes \begin{bmatrix} \sqrt{\lambda_3}\hat{D}_Y & 0 \\ 0 & \sqrt{\lambda_2}\hat{D}_\alpha \end{bmatrix} & (\underline{\Sigma}^{-1})_{\alpha\alpha} \otimes \begin{bmatrix} \lambda_3\hat{D}_Y & 0 \\ 0 & \hat{D}_\alpha \end{bmatrix} \end{bmatrix}. \tag{11}$$

$\hat{D}_Y$ and $\hat{D}_\alpha$ are diagonal matrices of dimension $n_Y \times n_Y$ and $K \times K$, respectively, which are used to rescale the prior variances. I set $\hat{D}_Y$ and $\hat{D}_\alpha$ equal to the corresponding sample variance of W_t'. For $\underline{\Sigma}$, I use the OLS estimate of Σ in Equation (8).

The hyperparameter λ_1 scales the overall precision of the prior distribution, λ_2 controls the relative precision of the prior distribution for the coefficients that capture the effect of $\hat{\alpha}_{t-1}$ on $\tilde{Y}_t$, and λ_3 the relative precision of the prior distribution for the coefficients that control the effect of $\tilde{Y}_{t-1}$ on $\hat{a}_t$. Hence, the prior in Equation (11) allows me to regulate the degree of interaction between distributional and aggregate dynamics. As $\lambda_2, \lambda_3 \to \infty$, the posterior distributions of $\Phi_{\alpha Y}$ and $\Phi_{Y\alpha}$ concentrate around the mean of zero, which shuts down spillover effects. Conditional on λ, I use a Gibbs sampler to take draws from the posterior distribution of (ϕ, Σ) following the approach in Carter and Kohn (1994). In total, I generate 11,000 posterior draws, discard the first 1,000 as burn-in, and use every 10th draw for the empirical analysis.

Model selection I compute log MDD's to choose the hyperparameters in λ and the number of knots K used to approximate the cross-sectional densities. I evaluate five different approximation orders ($K \in 4, 6, 8, 10, 14$) and consider for each element in vector λ ten equally-spaced values of $\ln\lambda_j$ on the interval $[-5, 6]$.

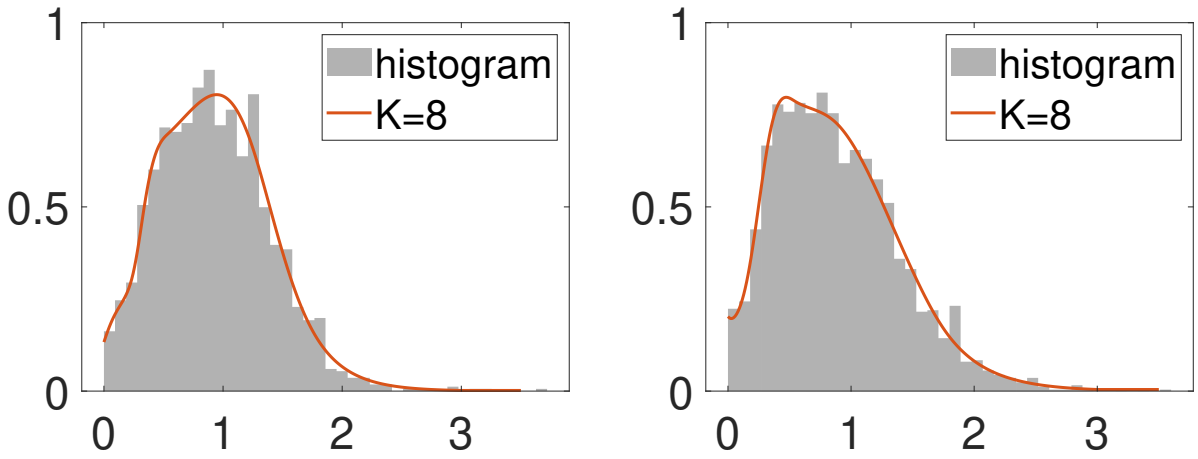
Table 2 summarizes the results. For each K, columns two to four show the estimated optimal λ_j, while column five gives the log MDD differentials with respect to $K = 4$. In all specifications, the optimal values for λ_2 and λ_3 are found to be large which means that

the off-diagonal blocks of the prior precision matrix are shrunk to zero and Granger-causal relationships between the macroeconomic variables and cross-sectional disposable income are missing. The log MDD is maximized for $K = 8$.

Table 2: Log MDD's and hyperparameter estimates

K	$\hat{\lambda}_1$	$\hat{\lambda}_2$	$\hat{\lambda}_3$	MDD differential
4	1.25	95	95	0
6	1.25	95	95	2993
8	**1.25**	**403**	**95**	**3170**
10	1.25	95	95	3067
14	5.3	22	95	2973

Figure 3 shows the fitted densities for $K = 8$ for the start and the end of the sample and compares them against histograms. The distribution of disposable income is right-skewed. The approximated densities capture the form of the histograms and have a smooth surface.



(a) 1980Q1 (b) 2006Q4

Figure 3: Fitted densities of disposable income distribution

Figure 4 presents percentiles of the estimated densities over time and compares them against their sample counterparts. The estimated percentiles move in tandem with the sample percentiles, indicating that the fitted densities capture well the evolution of cross-sectional disposable income over time. The 80th and 90th percentiles exhibit a pronounced

increase in disposable income at the beginning of the 1980s. While this increase is permanent at the 90th percentile, disposable income at the 80th percentile falls below its initial value at the end of the sample. The 10th, 20th, 30th, 40th, and 50th percentile evolve almost in parallel over time. Similar to the 80th percentile, the median and the percentiles below experience a decrease in level over the sample period.

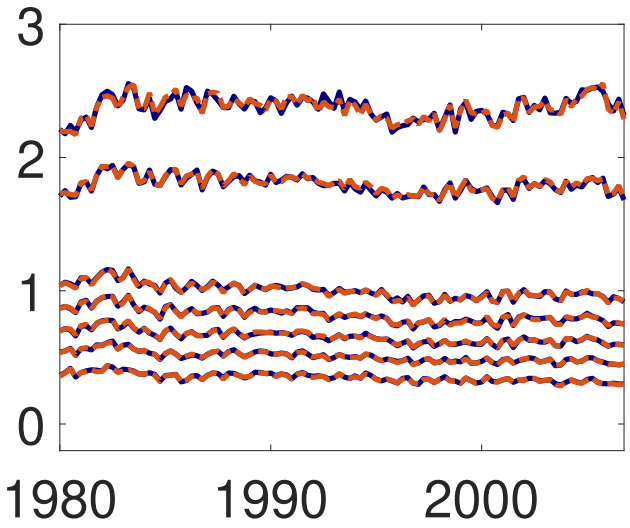


Figure 4: Percentiles (10th, 20th, 30th, 40th, 50th, 80th, and 90th) of disposable income distribution; sample percentiles (red), estimated percentiles (blue)

3 New insights on the effects of tax shocks

While the aggregate effects of tax shocks are well-studied, their distributional consequences are still undetermined. The fVAR allows me to quantify both in a unified framework.

Aggregate responses I first outline the aggregate dynamics. Figure 5 displays the impulse responses of the aggregate variables in the fVAR to a one standard deviation tax cut. The solid lines show the posterior median responses, while the dashed lines represent the corresponding 80-percent credible bands. The system is in steady-state at horizon $h = -1$ and the shock occurs at $h = 0$. The responses of the aggregate variables are qualitatively in line with previous findings in the literature. Tax revenues decrease on impact by 0.5 percent

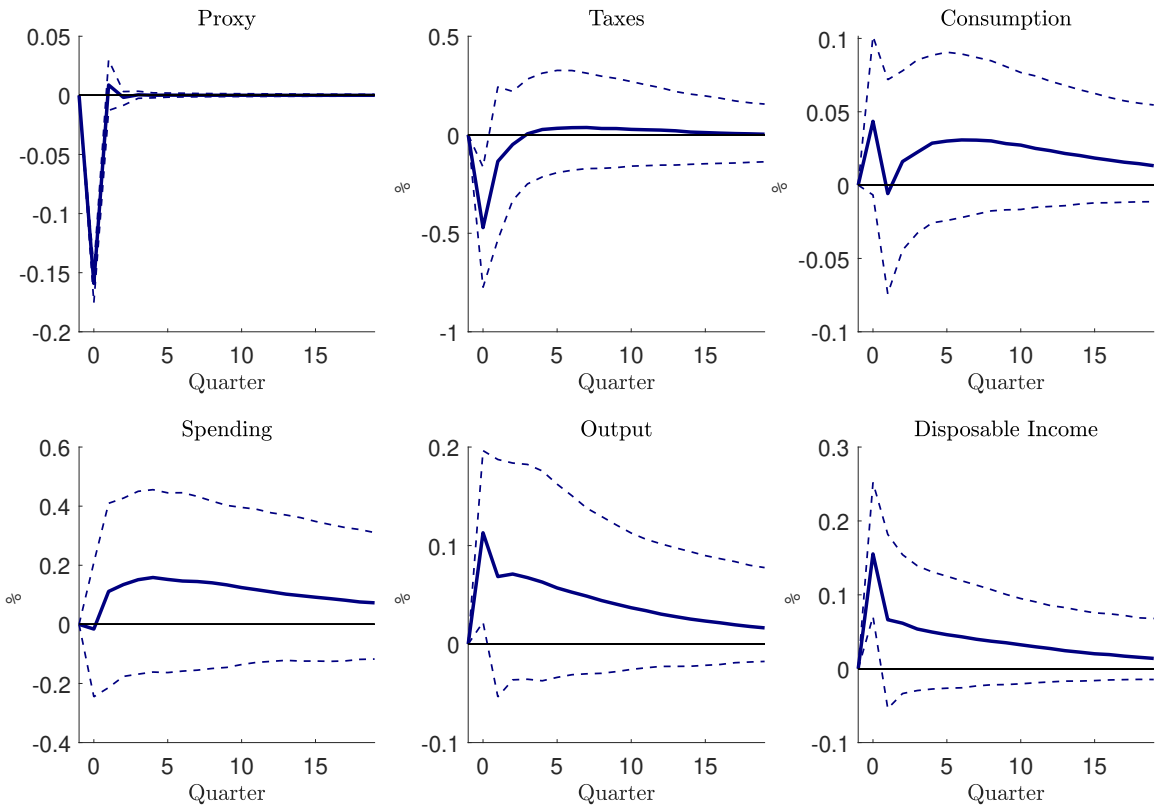


Figure 5: Aggregate responses to a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed). Shock occurs at $h = 0$.

on the median and revert to zero within one year. The tax cut leads to an immediate increase in median consumption expenditure by five basis points and does not have an instantaneous effect on government spending. Output and disposable income show a similar pattern: the two variables rise on impact on the median by 11 and 16 basis points, respectively and stay above zero for four years.

Distributional responses How does the increase in aggregate disposable income change the cross-sectional distribution? Figure 6 shows the response of the disposable income distribution to a one standard deviation tax cut. These results are new to the literature.

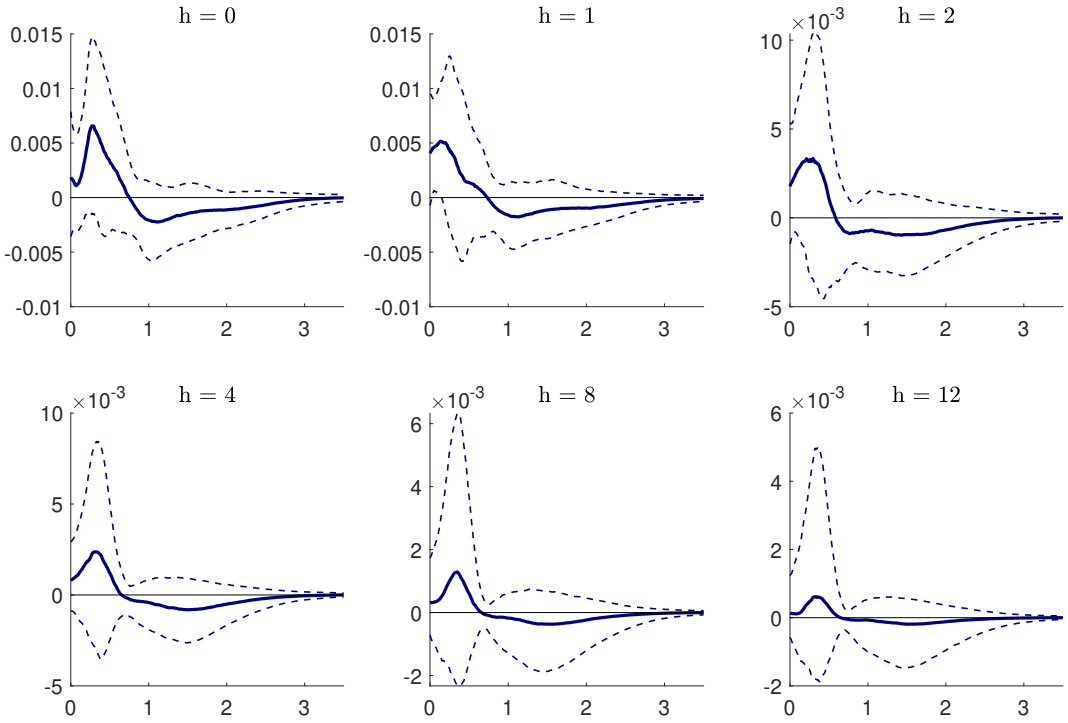


Figure 6: Density responses to a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

The panels display the difference between the steady-state disposable income density and the shocked density for different horizons h. The x-axis shows the level of disposable income and a value of one corresponds to an individual who has aggregate disposable income per capita available. The top-row panel on the left ($h = 0$) depicts the impact response. Because aggregate disposable income increases in response to the tax cut, the probability mass of the

shocked density shifts to the right relative to the steady-state density.

The mass of individuals with less than aggregate disposable income per capita increases over all horizons according to the median response. Most of the probability mass is added between 0 and 0.5. The mass of individuals with disposable income between 0.6 and 2.8 drops, whereas the mass of individuals with disposable income over three is not affected by the tax shock. Except for the first horizon, the 80-percent bands are wide, including both positive and negative values. After 12 quarters the negative density differential for disposable income between 0.6 and 2.8 reverts back to zero, while the positive differential for after-tax income between 0 and 0.6 is more persistent.

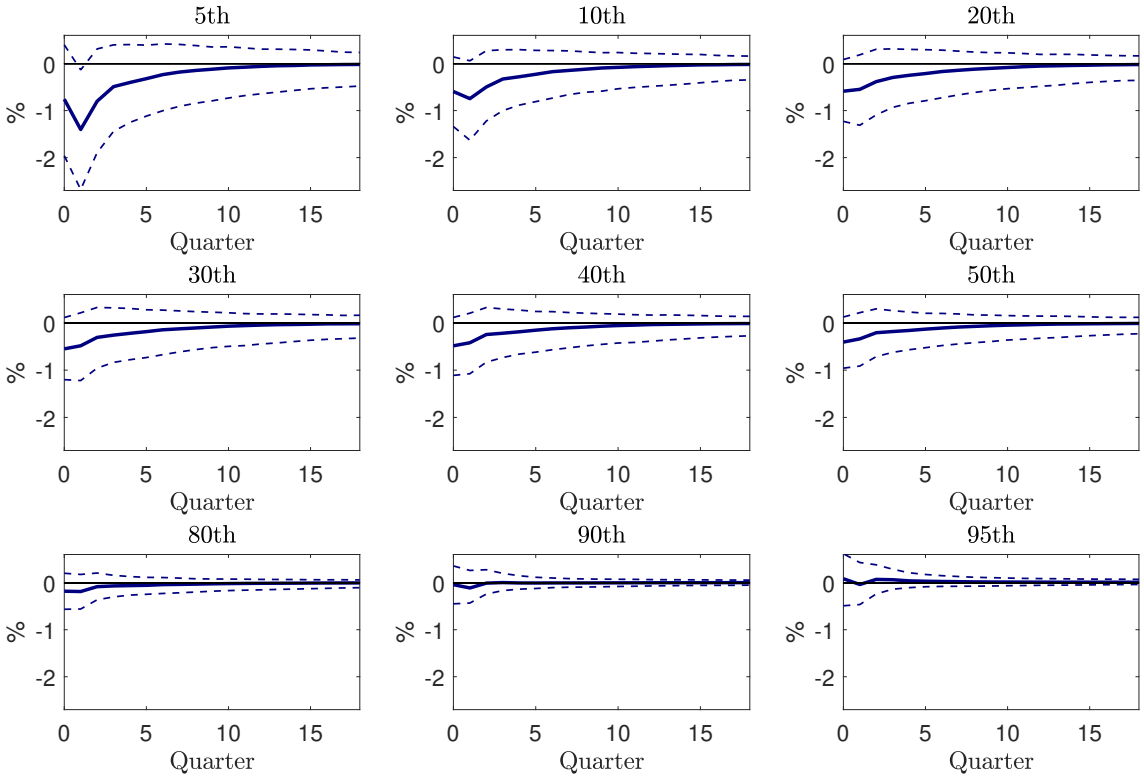


Figure 7: Percentile responses to a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

A major advantage of the fVAR model is that the response of the cross-sectional density can be converted into any distributional statistic. Figure 7 illustrates percentile responses to a one standard deviation tax cut. The percentile responses are computed as percentage changes relative to their steady-state level. All percentiles, except the 95th, shift down rela-

tive to their steady-state position. The tax cut has the largest impact on the 5th percentile, which declines significantly by more than one percent. From the 10th to the 90th percentile the decline becomes smaller and less persistent. Only the 95th percentile experiences a slight and short-lived increase. The finding is consistent with the density response in Figure 6, thus providing evidence that after a tax cut the mass in the left tail of the disposable income distribution is increasing.

The previous results show that tax cuts have heterogeneous distributional effects. In the following, I quantify the effects along the disposable income distribution. I compute the absolute effect of the tax change to shed light on (i) which percentile benefitted and (ii) by how much from the tax cut. The absolute effect of the tax intervention per percentile is defined as

$$\underbrace{\left(\frac{\partial \ell^{**}_{t+h}}{\partial IV_t}/\ell^{ss} - 1\right)\cdot 100}_{\text{Percentage change in level of income at percentile }**} + \underbrace{\frac{\partial Y^{D}_{t+h}}{\partial IV_t}}_{\text{Change in aggregate income}}, \qquad h = 0, 1, ..., H, \tag{12}$$

where $\frac{\partial Y^{D}_{t+h}}{\partial IV_t}$ is the response of aggregate disposable income to the tax shock IV_t, ℓ^{ss} denotes the steady-state density of cross-sectional disposable income and $\frac{\partial \ell^{**}_{t+h}}{\partial IV_t}$ is the disposable income density response at a certain percentile. For instance, $\frac{\partial \ell^{90}_{t+h}}{\partial IV_t}$ is the density response to a tax cut at the 90th percentile. A positive absolute effect for a percentile means that the percentile has benefitted from the increase in aggregate disposable income, while a negative absolute effect states that the respective percentile is worse off after the tax change.

Figure 8 displays the absolute effect of a one standard deviation tax cut on disposable income per percentile computed at the posterior median.[3] The first finding is that the sign of the impact response differs across percentiles. While the percentiles at the bottom and center of the distribution are negatively affected by the tax cut, the immediate benefit becomes positive between the 80th and 90th percentile, growing toward the right tail of the

[3]Appendix B contains the corresponding plot with credible bands.

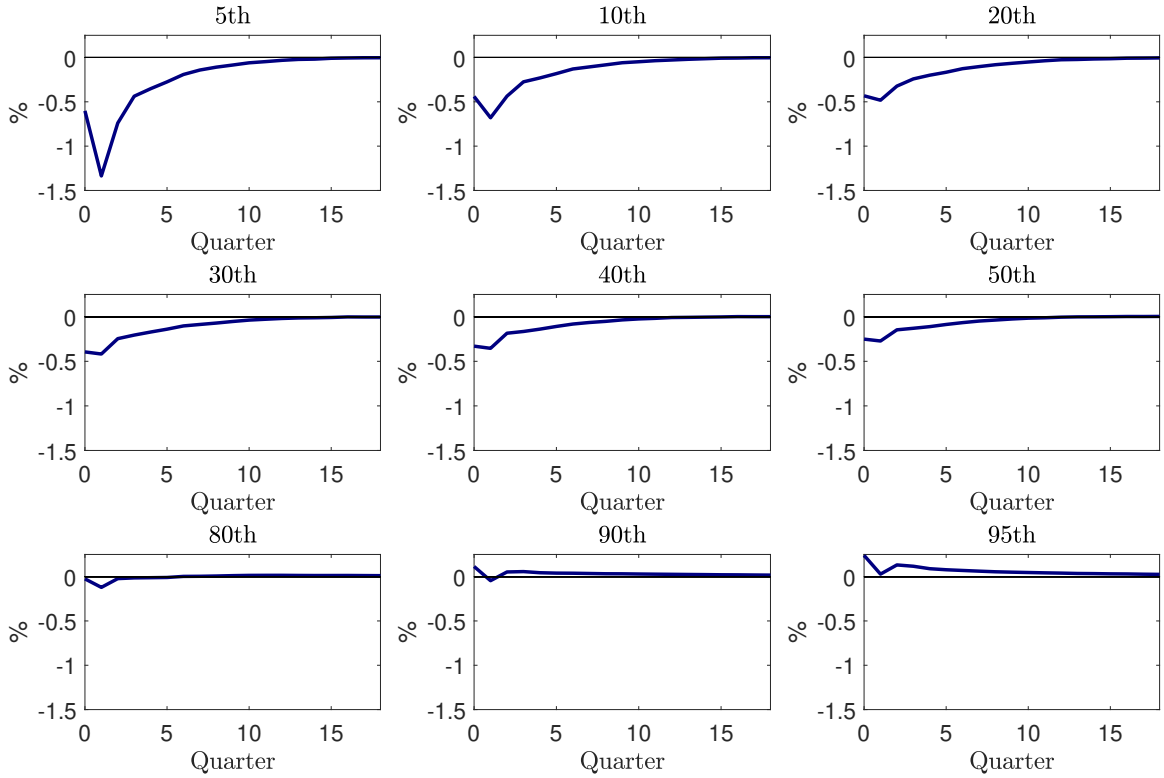


Figure 8: Absolute benefit from a one standard deviation tax cut computed at the median

distribution. Second, the differences in the size of the effect across percentiles are pronounced: whereas disposable income at the 10th percentile declines on impact by 0.44 percent and stays below its initial level for three years, disposable income at the 90th percentile increases upon impact by 0.11 percent and remains positive from the third quarter.

In summary, the average exogenous tax cuts in the US during the 1980 to 2006 period lead to an increase in after-tax income inequality: the probability mass in the left tail of the disposable income distribution increased and the relative position of percentiles shifted down. In terms of economic and statistical relevance, this effect is most pronounced at the bottom of the distribution. Quantifying the absolute effect of tax cuts along the disposable income distribution provides a rationale for the distributional dynamics observed in Figure 6 and 7. At the median estimate only the upper percentiles see their disposable income increased after a tax cut and can benefit from the increase in aggregate disposable income. Individuals in the center and the bottom of the disposable income distribution not only

cannot profit from the increase in aggregate disposable income, but are even made worse off.

Robustness I verified the sensitivity of my results to including variables in the aggregate conditioning set that (i) contain independent information on fiscal policy expectations, and that (ii) control explicitely for labor market effects. In the spirit of Leeper et al. (2012, 2013), I construct an average forward tax rate that is implied by tax exempt municipal bonds and Treasury securities with maturity of one and five years, respectively. For the 1980Q1 to 2006Q4 period, I obtain yield data on AAA-rated municipal bonds from Bloomberg's Municipal Fair Market Bond Index and market yields on constant-maturity-adjusted, noninflation-indexed US Treasury securities from the Federal Reserve's Statistical Release on Selected Interest Rates. In a separate exercise, I control for labor market effects of tax changes. I add sequentially the log of total employment per capita, the log of hours worked, and the log of the labor force relative to population to the set of aggregate variables. To construct the labor market outcomes, I employ the same data sources and definitions as in Mertens and Ravn (2013). Appendix B contains the results.

Additionally, I compare my distributional estimates identified by narrative approaches with traditional tax shock identification schemes that impose short run restrictions in structural VARs. In particular, I adopt the strategy pioneered by Blanchard and Perotti (2002) as implemented by Caldara and Kamps (2017) and assume that taxes and government spending can systematically respond, within a quarter, only to changes in output. The aggregate and distributional effects resulting from this alternative shock identification are presented in Appendix B. A tax cut identified with short run restrictions increases GDP and aggregate disposable income. Compared to the narrative identification, the positive aggregate stimulus is smaller - a finding already established in Mertens and Ravn (2014) and Caldara and Kamps (2017). Consequently, the distributional effects on cross-sectional disposable income are smaller relative to the narrative identification. However, the two identification schemes agree in finding that inequality in disposable income rises in the short and medium term

following a tax cut. While the narrative approach attributes the 5th percentile the biggest relative decline, the Blanchard-Perotti approach finds the most sizeable downward shifts of percentiles in the center of the distribution. For all distributional estimates identified by the Blanchard-Perotti approach the credible bands are wide and the sign of the response is ambiguous.

4 Decomposing the effects

While the baseline results in Section 3 focus on the distributional effects of the average exogenous tax rate changes implemented between 1980 and 2006, in this section I provide evidence on the distributional effects of different tax types. I follow Mertens and Ravn (2013) and decompose the average tax rate changes into personal and corporate income tax changes separately. Moreover, I use additional microlevel information to split the disposable income distribution according to different personal characteristics. In particular, I differentiate between disposable income from (i) entrepreneurs and non-entrepreneurs, and (ii) families and non-families.

4.1 Nature of the change in tax code

To investigate the distributional effects of different tax types, I employ the narrative personal income and corporate income tax shock series derived in Mertens and Ravn (2013). Personal income tax liability changes mainly include marginal rate adjustments and tax deductions and credits. Corporate income tax liability changes incorporate mostly adjustments in depreciation allowances and investment tax credits. Across the 1980 to 2006 sample, Mertens and Ravn (2013) identify seven personal income and six corporate income tax changes.

To estimate the structural effects of personal and corporate income tax shock series, I include the two proxy variables in the vector of aggregate macroeconomic variables Y_t and use sign and covariance restrictions to identify the two shocks separately. Instead of tax

revenues, like in the baseline specification outlined in Section 2.1, I include as Mertens and Ravn (2013) the average personal and corporate income tax rates, respectively.[4]

Table 3: Identifying restrictions

	Personal income tax shock	Corporate income tax shock
	Covariance restrictions	
	$\mathrm{E}(IV_t^{PI}, \epsilon_t^{PI}) \geq 0$	$\mathrm{E}(IV_t^{CI}, \epsilon_t^{CI}) \geq 0$
	$\mathrm{E}(IV_t^{PI}, \epsilon_t^{PI}) \geq \mathrm{E}(IV_t^{PI}, \epsilon_t^{CI})$	$\mathrm{E}(IV_t^{CI}, \epsilon_t^{CI}) \geq \mathrm{E}(IV_t^{CI}, \epsilon_t^{PI})$
Variable	Sign restrictions	
Personal income tax rate	≤ 0	$\bullet$
Corporate income tax rate	$\bullet$	≤ 0

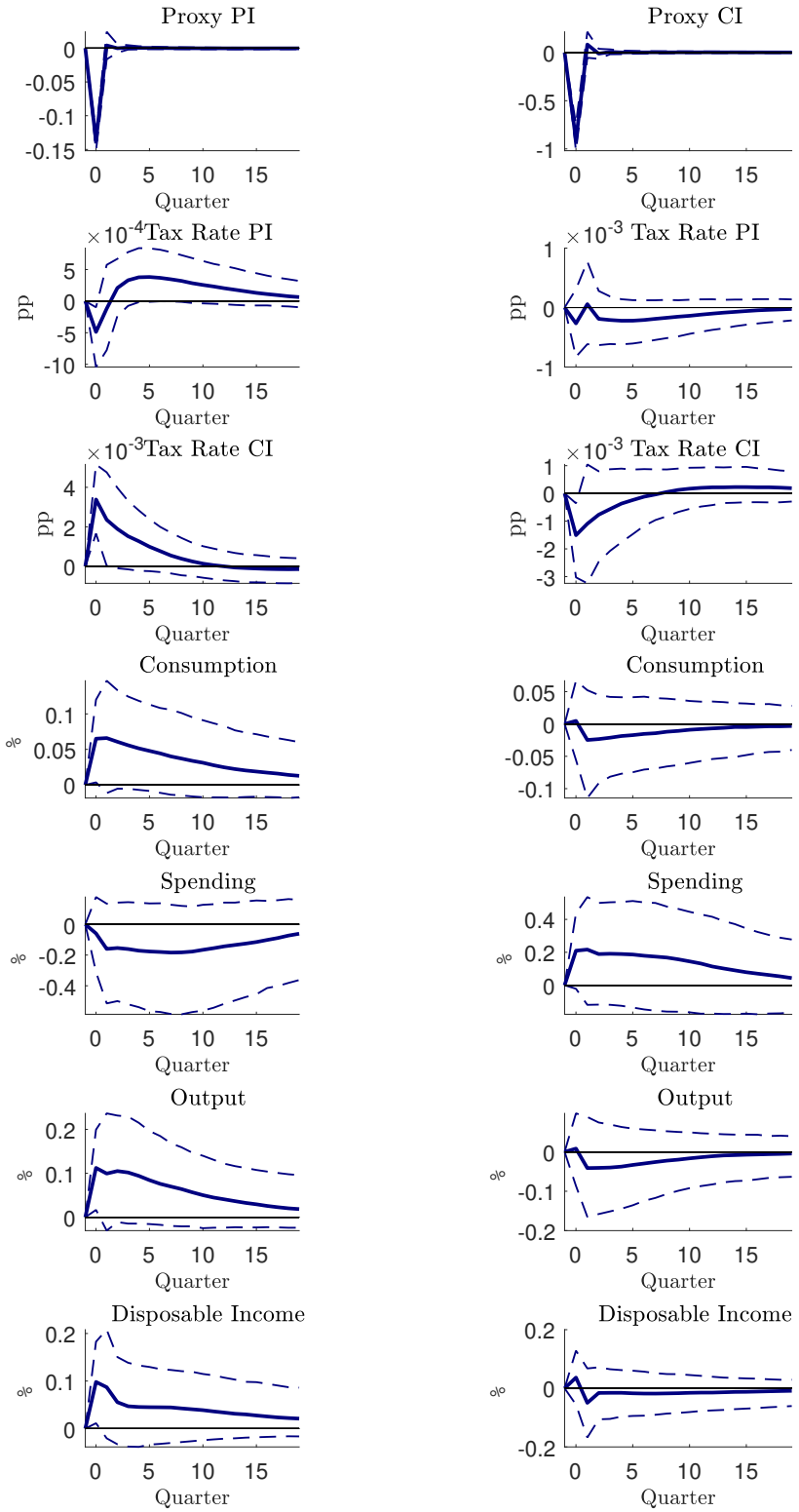
Notes: Covariance restrictions and restrictions on the contemporaneous responses of variables to shocks. ≤ 0 and $\bullet$ denote the respective sign restrictions and unrestricted responses. PI and CI stands for personal income and corporate income, respectively.

Table 3 summarizes the identifying restrictions I use to separate the tax changes. Additional identifying restrictions become necessary because the personal and corporate income proxy series exhibit positive correlation (Mertens and Ravn, 2013). I follow Giacomini et al. (2022), by employing the same sign and covariance restrictions to decompose average tax changes into personal and corporate income tax changes. IV_t^{PI} and IV_t^{CI} denote the personal income and corporate income proxy variable and ϵ_t^{PI} and ϵ_t^{CI} represent the corresponding structural shock. It is assumed that each proxy variable is positively correlated with its associated structural shock and that each proxy variable is stronger correlated with its own structural shock than with the structural shock associated with the other proxy variable. Moreover, it is assumed that the response of each tax rate to its own structural shock following a tax cut is nonpositive.

Figure 9 shows the identified impulse responses to the aggregate variables.[5] The left

[4]Appendix A outlines their construction.

[5]To enhance visibility, the response of the proxy variable associated with the unconsidered structural shock (left panel: CI; right panel: PI) is not displayed. My findings are in line with the respective responses



(a) Personal income tax shock

(b) Corporate income tax shock

Figure 9: Aggregate responses to a one standard deviation personal (left panel) and corporate income (right panel) tax cut; median (blue, solid), 80-percent credible interval (blue, dashed). Shock occurs at $h = 0$. PI and CI stands for personal income and corporate income, respectively.

panel displays the responses to a one standard deviation personal income tax cut and the right panel illustrates the corporate income tax cut responses. Except for the only on impact positive output response following a corporate income tax cut, the findings are qualitatively in line with what was found in earlier and longer-spanning samples in the literature. By construction, the impact response of the tax rates associated with the structural shock of interest satisfy the sign restrictions. The personal income tax rate (left panel) and the corporate income tax rate (right panel) both decline. While a personal income tax cut decreases government spending by at most 20 basis points, a corporate income tax cut elicits a positive response of circa 20 basis points on impact at the median. Following a personal income tax cut, consumption and output increase over a period of five years, whereas a corporate income tax cut only produces on impact a slight positive response in consumption and output that is not precisely estimated. Both the personal and the corporate income tax cuts increase disposable income on impact: in the left panel disposable income rises on impact by 10 basis points and stays above its initial level for 20 quarters. Corporate income tax cuts lead to a less strong increase in aggregate disposable income. After an initial increase of 4 basis points, the response becomes negative, reverting back to zero after five years.

The distributional effects of a personal and corporate income tax cut are contrasted in Figure 10, which shows the absolute effect of each tax intervention on percentiles of cross-sectional disposable income computed at the median.[6] The plot makes obvious that personal and corporate income tax changes impact disposable income along the distribution similarly. While the corporate income tax shock induces hump-shaped responses, the responses following a personal income tax shock show a more monotonic and less persistent pattern. Two results emerge. First, the regressive pattern documented in the analysis of average tax shock effects in Section 3 persists. Only the upper percentiles of the disposable income distribution benefit from the tax intervention. Hence, with respect to corporate income tax cuts,

presented in Giacomini et al. (2022) and are available on request.

[6] Appendix B shows the corresponding density differential and percentile plots.

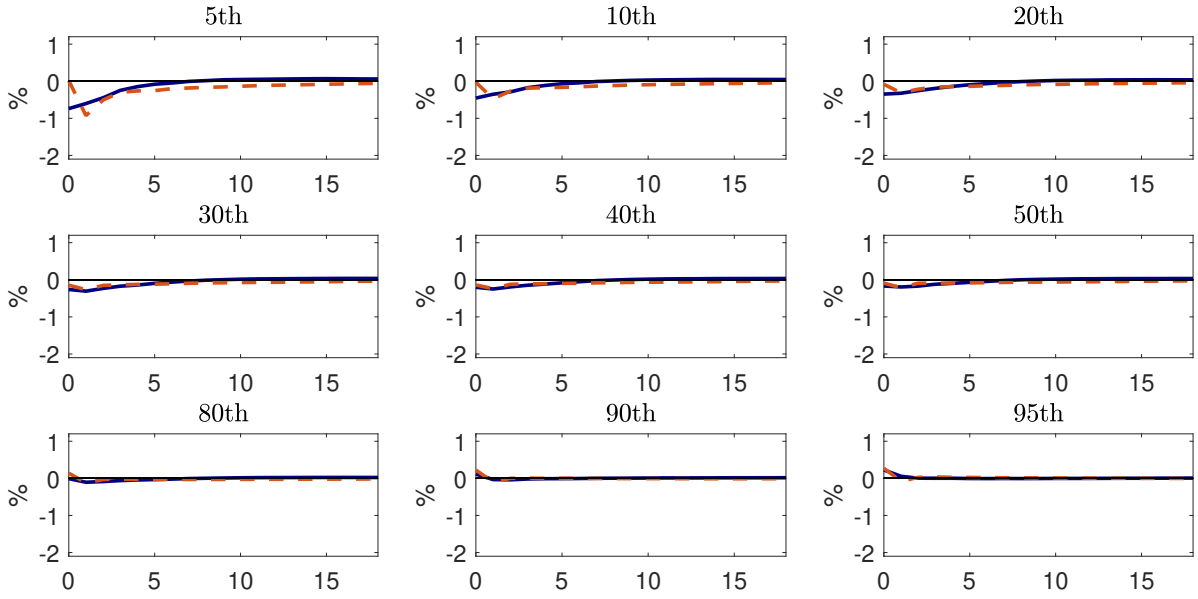


Figure 10: Absolute benefit from a one standard deviation tax cut computed at the median; personal income tax cut (blue, solid), corporate income tax cut (red, dashed).

my results complement the findings in Dobridge et al. (2021) and Ohrn (Forthcoming) who provide evidence that corporate tax changes mostly benefit the rich. Second, individuals are hurt by tax cuts up to the median percentile. Only after two years they benefit from personal income tax cuts. The effect of corporate income tax cuts remains negative over the whole period of five years.

4.2 Personal characteristics

To investigate the heterogenous distributional effects of personal and corporate income tax cuts further, I partition the disposable income distribution according to personal characteristics. To learn which groups governments target when implementing their tax policy changes, I revert to the anecdotal evidence accompanying the tax policy process in the US. In particular, I study presidential speeches, the US Budget Reports, and the Economic Reports of the President.[7] Over the entire sample, and, independent of the government's political back-

[7]Presidential speeches are retrieved from "The American Presidency Project", accessible via `https://www.presidency.ucsb.edu/`. The Budget of the United States Government contains the Budget Message of the President, information on the President's priorities, budget overviews organized by agency, and summary tables for every fiscal year. It can be accessed via `https://fraser.stlouisfed.org/title/`

ground, three narratives repeatedly emerge: tax changes (i) are directed toward low-income people, (ii) are pro-business, and (iii) pro-family. For instance, George W. Bush stated, on May 28, 2003, on the occasion of signing the Jobs and Growth Tax Relief Reconciliation Act:[8]

> "We are helping workers who need more take-home pay. We're helping small-business owners looking to grow and to create more new jobs. We're helping families with children who will receive immediate relief."

To assess these narratives empirically, I distinguish between disposable income (i) of entrepreneurs versus non-entrepreneurs, and (ii) families versus non-families. Entrepreneurs are defined as households with business income $\neq 0$. Families are defined as having at least one person below the age of 18 in their household. Appendix A provides all details.

Entrepreneurs Figure 11 compares the steady-state densities for entrepreneurs and non-entrepreneurs. The x-axis indicates the level of after-tax income. Both distributions are right-skewed and exhibit a similar shape. The mode of the disposable income distribution of entrepreneurs is shifted to the right.

The absolute benefits from a corporate income tax cut on disposable income of entrepreneurs and non-entrepreneurs computed at the median are depicted in Figure 12.[9] Not surprisingly, entrepreneurs benefit more strongly than non-entrepreneurs from corporate income tax cuts. Again, a robust finding in this exercise is the regressive nature of the tax cut. While the lower percentiles hardly benefit from the increase in aggregate disposable income, disposable income for entrepreneurs at the top of the distribution increases considerably - on impact more than 1 percent at the 90th percentile. Further, households without business

budget-united-states-government-54?browse=1920s. The Economic Report of the President is an annual report written by the Chairman of the Council of Economic Advisers. It can be accessed via https://fraser.stlouisfed.org/title/economic-report-president-45?browse=1940s.

[8] Appendix C provides a collection of further relevant examples from the narrative sources.

[9] The absolute benefits of a personal income tax cut on entrepreneurs and non-entrepreneurs are presented in Appendix B. Across all percentiles, entrepreneurs benefit more from the personal income tax cut than non-entrepreneurs.

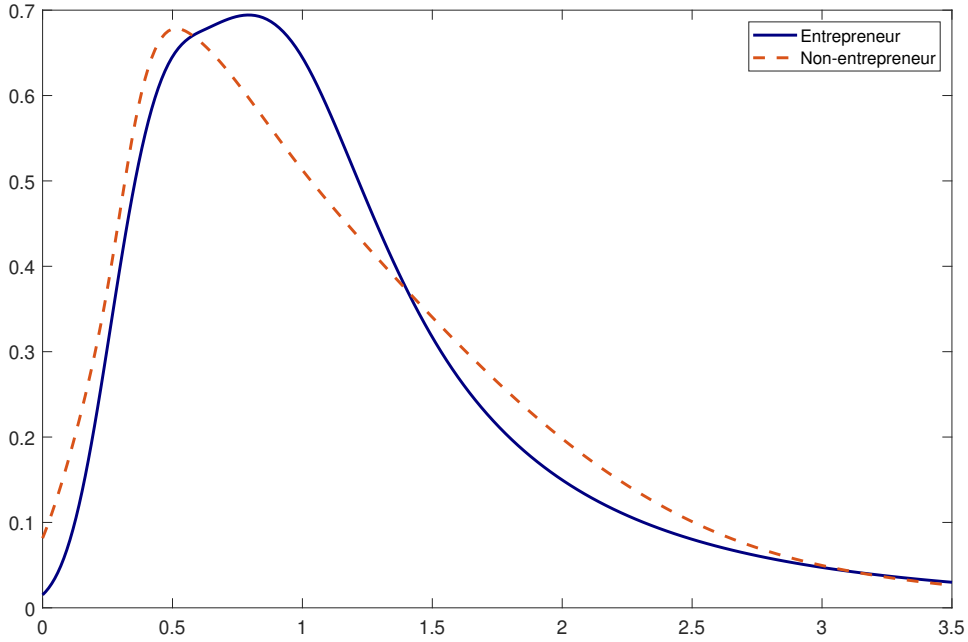


Figure 11: Steady-state density of disposable income of entrepreneurs (blue, solid) and non-entrepreneurs (red, dashed) income.

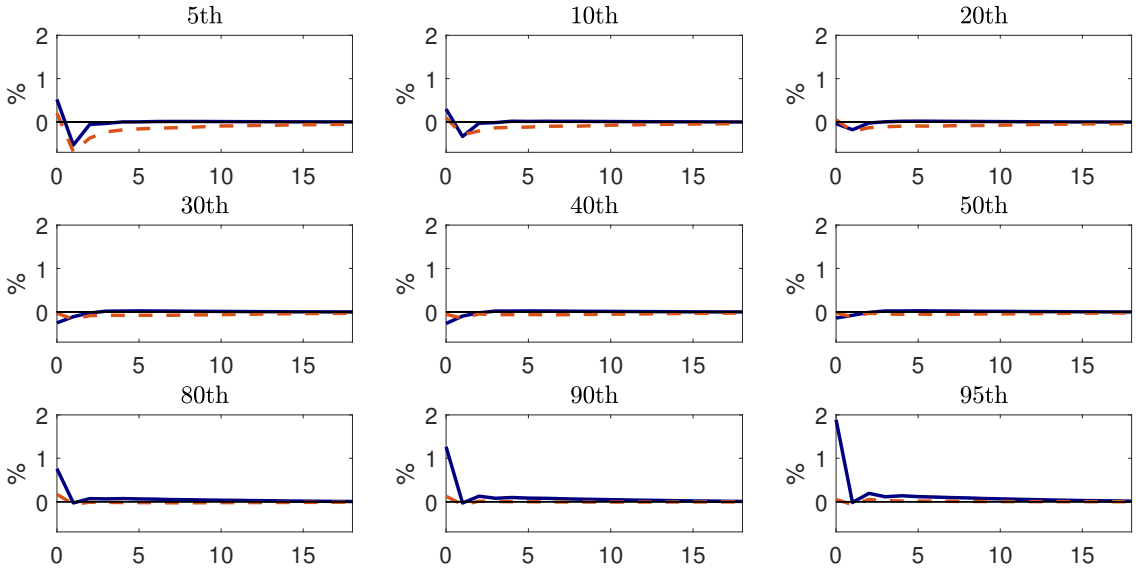


Figure 12: Absolute benefit from a one standard deviation corporate income tax cut computed at the median; entrepreneurs (blue, solid), non-entrepreneurs income (red, dashed).

income register changes in disposable income. Non-entrepreneurs at the bottom and center of the distribution are made worse off by the tax cut, while the 80th percentile benefits the most. As non-entrepreneurs are not directly affected by the cut in corporate income taxes, their change in income has to be related indirectly to the entrepreneurs' change in income.

In summary, decomposing the distributional effects of tax cuts for entrepreneurs and non-entrepreneurs separately lends evidence to the political narrative: the findings suggest that US tax policy between 1980 and 2006 was directed toward entrepreneurs and pro-business oriented.

Families Figure 13 shows the steady-state densities for families and non-families. Both distributions are right-skewed. The mode of the disposable income distribution of families lies at 0.7, while the disposable income distribution of non-families peaks at an income level of 0.5.

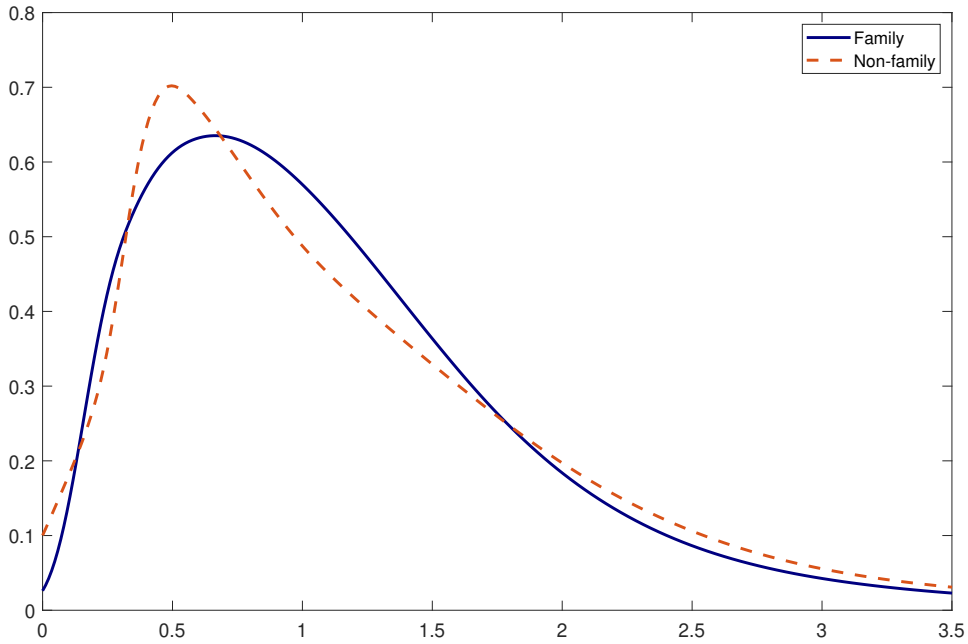


Figure 13: Steady-state density of disposable income partitioned into disposable income from families (blue, solid) and non-families (red, dashed).

The absolute benefits of a personal income tax cut on families and non-families computed

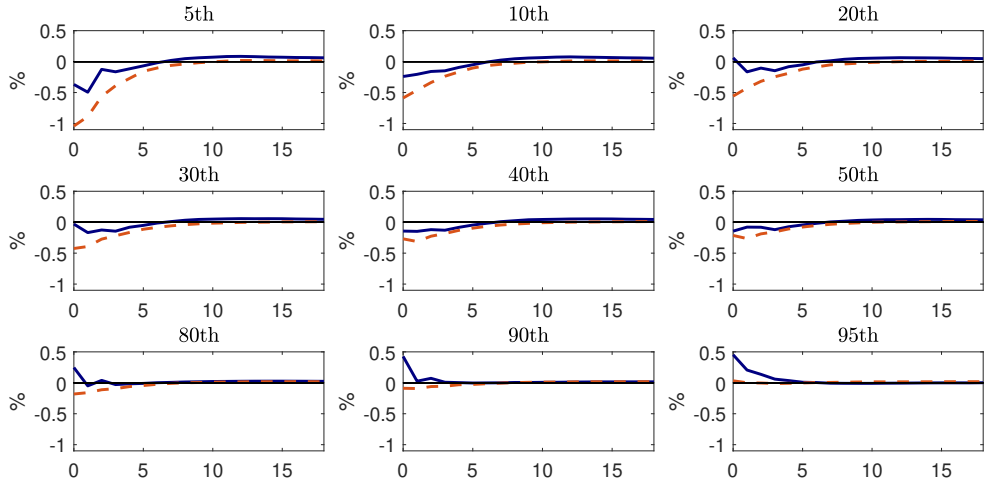


Figure 14: Absolute benefit from a one standard deviation personal income tax cut computed at the median; income of families (blue, solid), income of non-families (red, dashed).

at the median are presented in Figure 14.[10] Two findings stand out. First, families benefit more from personal income tax cuts than non-families. This results holds throughout the entire distribution. While, for families, the tax cut already results in increases in disposable income at the bottom of the distribution, non-families do not register income gains and, except for the very top of the distribution, are even made worse off. Second, controlling for family status does not remove the regressive effects associated with the tax cut. For both families and non-families, the lower percentiles benefit less from the change in aggregate disposable income than the upper percentiles. In summary, this decomposition suggests that US tax policy indeed fostered families.

5 Conclusion

How tax changes affect the distribution of income is a long-standing question in macroeconomics. In this paper, I provide the first comprehensive empirical analysis and estimate a fVAR model that interacts macroeconomic aggregates and the cross-sectional distribution of disposable income on US data for the 1980 to 2006 period. This setup allows me to quantify

[10]The absolute benefits of a corporate income tax cut on families and non-families are presented in Appendix B.

the distributional effects of aggregate tax shocks.

My findings provide evidence that the average tax cut in this period boosted GDP and aggregate disposable income, but the benefits are spread unevenly across households: it hurt households at the bottom and center of the distribution of disposable income and benefitted the rich. This regressive pattern is also confirmed in a more granular analysis in which I distinguish between personal and corporate income tax cuts. Decomposing the cross-sectional disposable income distribution according to personal characteristics allows me to verify prevalent narratives surrounding US tax policy legislation. While my findings do not support political statements that US tax policy benefitted low-income households, they lend empirical substance to narratives describing US tax legislation as pro-family and pro-business.

Although my analysis is silent on the long-term relationship between rising US income inequality and the contribution of tax policy, the results show that the analyzed tax changes have not shrunk the gap. I leave for future work the linking of the response of the distribution of disposable income to micro-level consumption expenditure and identifying the individuals in the distributions according to their micro-level characteristics.

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Appendix A Data description

In this appendix, I outline how I construct the aggregate and cross-sectional variables.

Aggregate variables

Unless otherwise noted, the data is retrieved from the NIPA Tables published by the Bureau of Economic Analysis (BEA). All time series in nominal values are converted to real values by dividing them by the GDP deflator. To obtain per capita values, I divide the variables by the civilian non-institutional population of 16 years and older provided by Francis and Ramey (2009) ('civnipop16'). All variables are seasonally adjusted.

Average corporate income tax rate: The average corporate income tax rate is the variable 'ACITR' from the replication files of Mertens and Ravn (2013) and defined as federal taxes on corporate income excluding Federal Reserve banks divided by corporate profits.

Average personal income tax rate: The average personal income tax rate is the variable 'APITR' from Mertens and Ravn (2013) and defined as the sum of federal personal current taxes and federal contributions for government social insurance divided by the personal income tax base. The personal income tax base is defined as personal income less government transfers plus contributions for government social insurance.

Corporate income tax changes proxy variable: The narrative corporate income tax shock series from Section 4 is the variable 'm_CI' from the replication files of Mertens and Ravn (2013).

Disposable Income: Aggregate disposable income per capita is given by the logarithm of disposable personal income divided by population. The data on disposable personal income is retrieved from the FRED database of the Federal Reserve Bank of St. Louis (variable code: DSPI) and originates from the BEA (BEA account code: A067RC).

GDP deflator: The GDP deflator is the implicit price deflator for GDP (table 1.1.9, line 1) (index, 2012 = 100) divided by 100.

Government spending: Government spending per capita is the logarithm of the sum of federal consumption expenditures (table 3.9.5, line 10) and federal gross investment (table 3.9.5, line 11) divided by population.

Non-durable consumption expenditure: Non-durable consumption expenditure per capita is defined as the logarithm of the sum of non-durable goods (table 1.1.5, line 5) and services (table 1.1.5, line 6) divided by population.

Output: Output per capita is defined as the logarithm of GDP (table 1.1.5, line 1) divided by population.

Personal income tax changes proxy variable: The narrative personal income tax shock series from Section 4 is the variable 'm_PI' from the replication files of Mertens and Ravn (2013).

Tax revenue: Tax revenue per capita is the logarithm of the sum of federal current tax receipts (table 3.2, line 2), and contributions for government social insurance (table 3.2, line 10) minus corporate income taxes (table 3.2, line 8) divided by population.

Total tax changes proxy variable: The proxy variable used in Section 3 is the variable 'Tax Narrative' in the replication files of Mertens and Ravn (2014).

Cross-sectional disposable income

I use income data from the Family Characteristics and Income (FAMILY) files of the CEX. The CEX is a rotating panel of households selected to be representative of the US population and is conducted by the Census Bureau for the Bureau of Labor Statistics. The CEX provides detailed information on consumption expenditures and income of each consumer unit (CU), which corresponds to households or families who are living at the same address. The survey

additionally includes detailed demographic information about all CU members. Each CU stays in the sample for a maximum of four consecutive periods before it is dropped. Although the CEX started in 1960, continuous data is only available since the first quarter of 1980, which is the beginning of my sample.

I take disposable income from the dataset provided by Heathcote et al. (2010), in particular the variable 'tian' from the file 'cex_a.dta'. Disposable income is defined as the sum of wages, salaries, business income (farm and non-farm) earned by each member, financial income (interest, dividends and rent), private transfers (including private pensions, alimony and child support), public transfers (including social security, unemployment compensation, welfare and food stamps) minus total taxes paid (including federal, state, local and social security contribution).

In Section 4.2, I partition total disposable income into disposable income from (i) entrepreneurs and non-entrepreneurs and (ii) families and non-families. I use an indicator variable to partition total disposable income into disposable income of CUs with different characteristics. I define a CU as "entrepreneur"-CU if its business income $\neq 0$. Over the sample 1980 – 2006, the share of CU with business income is 9 % relative to 91 % without business income. A CU is counted toward the "family"-category if at least one individual below the age of 18 lives in the CU. This definition applies to 64 % of the CUs, as opposed to 36 % who are counted as "non-family".

Appendix B Additional results

Additional results Section 3

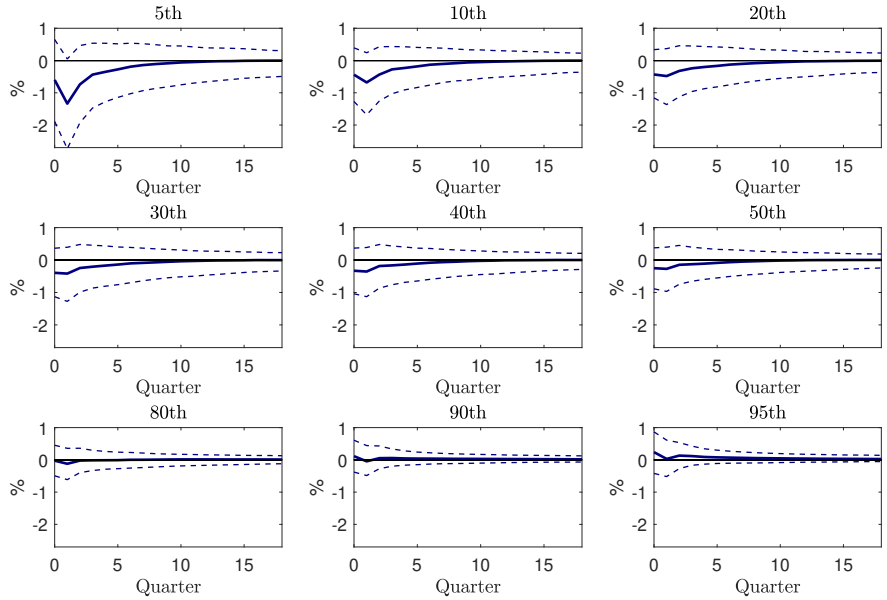

Figure 15: Absolute benefit from a one standard deviation total tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

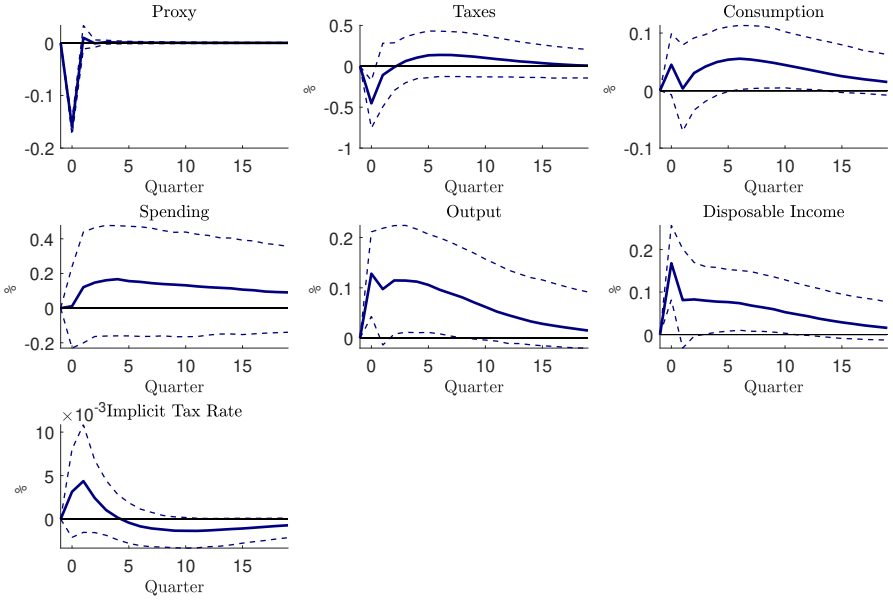

Figure 16: fVAR model with forward tax rate: Aggregate responses to a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed). Shock occurs at $h = 0$.

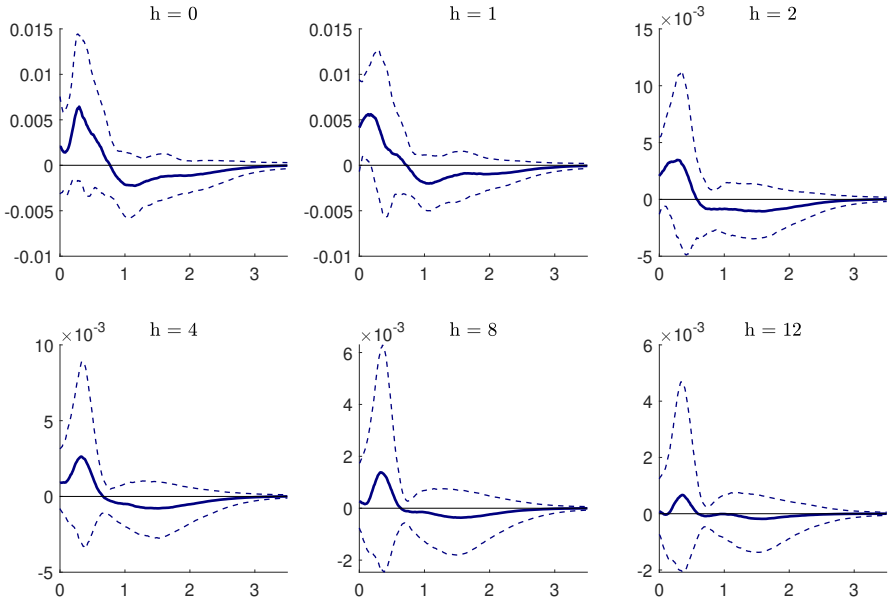

Figure 17: fVAR model with forward tax rate: Density responses to a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

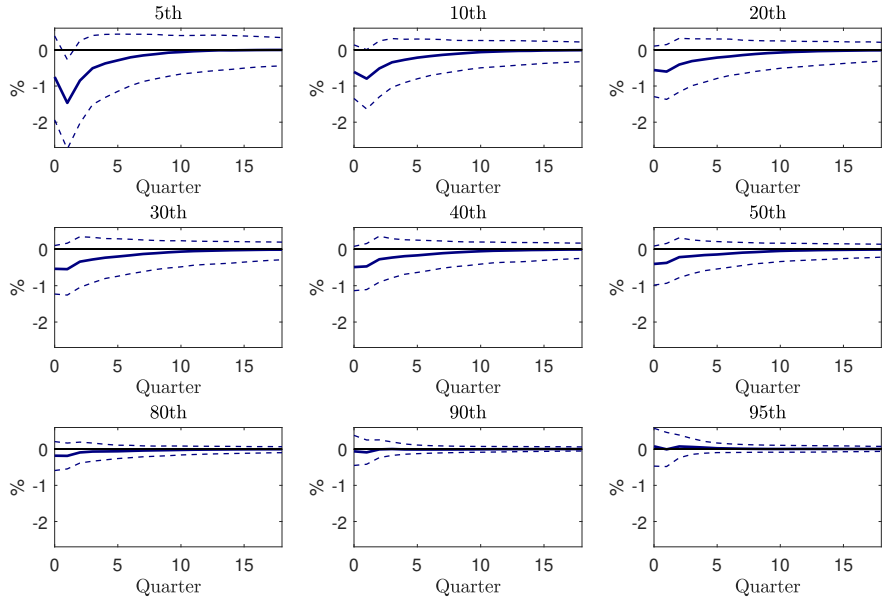

Figure 18: fVAR model with forward tax rate: Percentile responses to a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

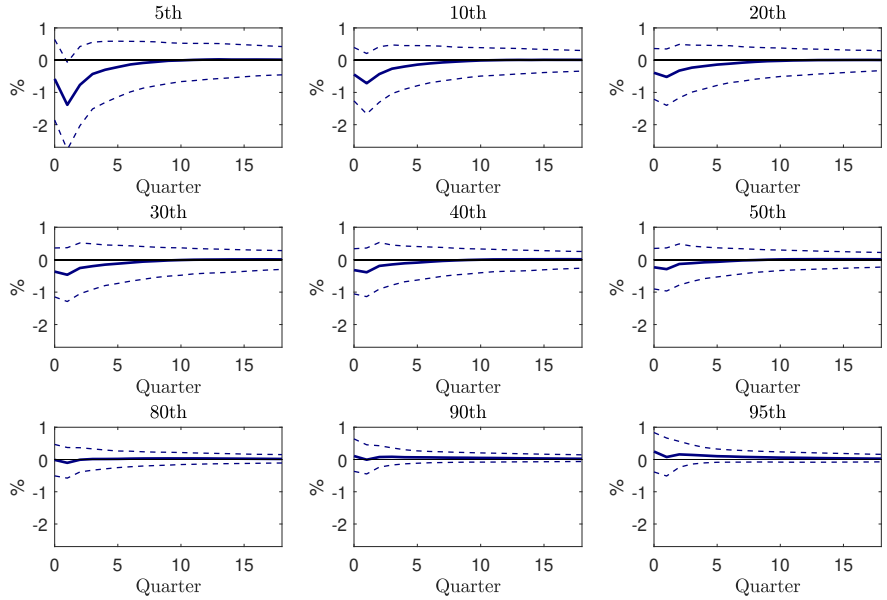

Figure 19: fVAR model with forward tax rate: Absolute benefit from a one standard deviation total tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

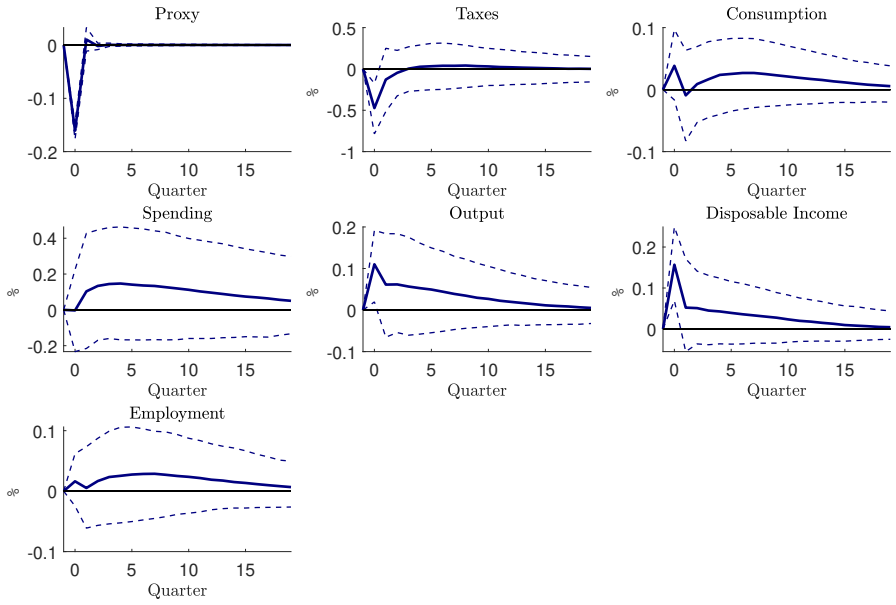

Figure 20: fVAR model with total employment: Aggregate responses to a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed). Shock occurs at $h = 0$.

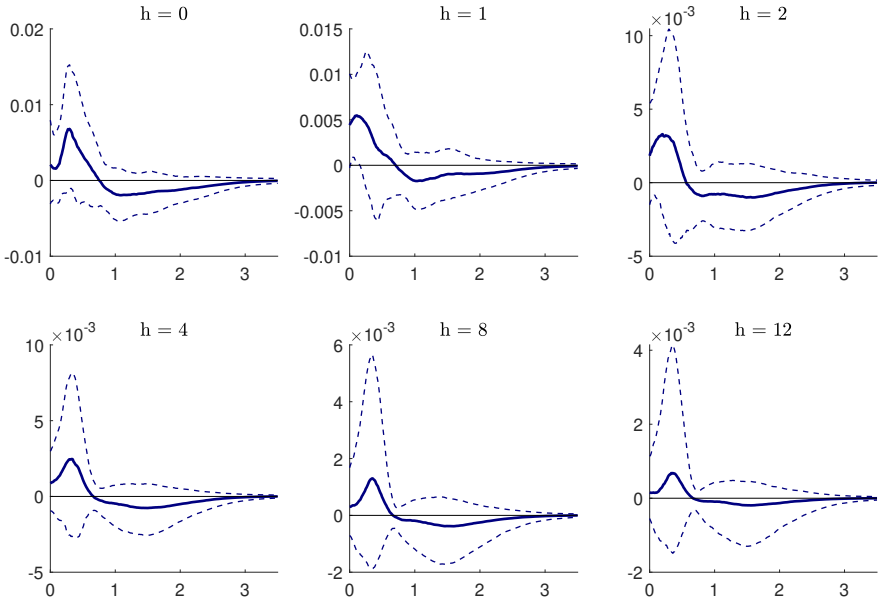

Figure 21: fVAR model with total employment: Density responses to a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

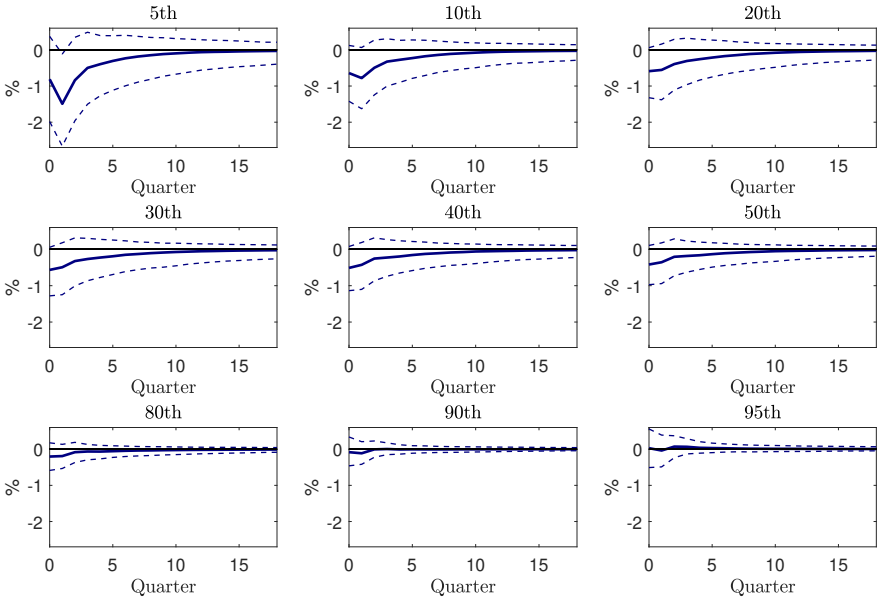

Figure 22: fVAR model with total employment: Percentile responses to a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

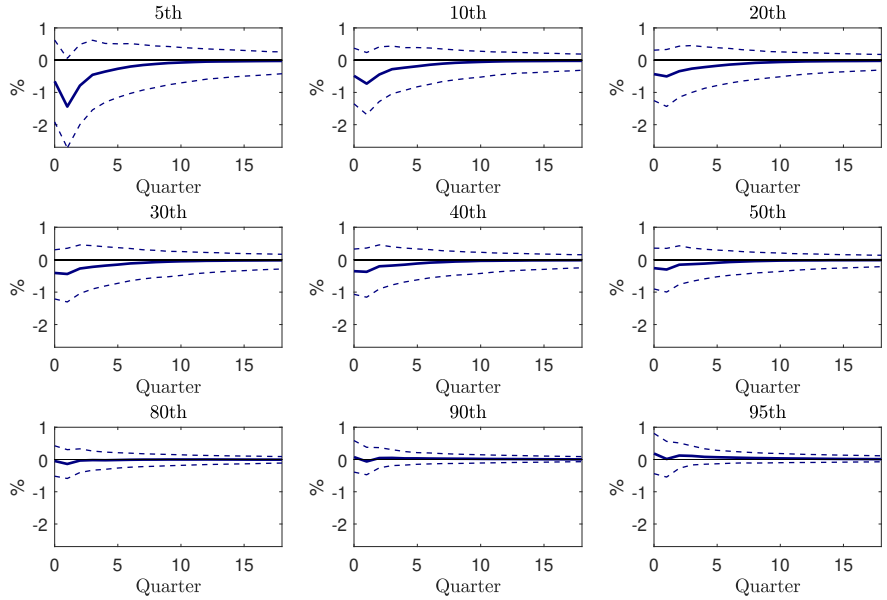

Figure 23: fVAR model with total employment: Absolute benefit from a one standard deviation total tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

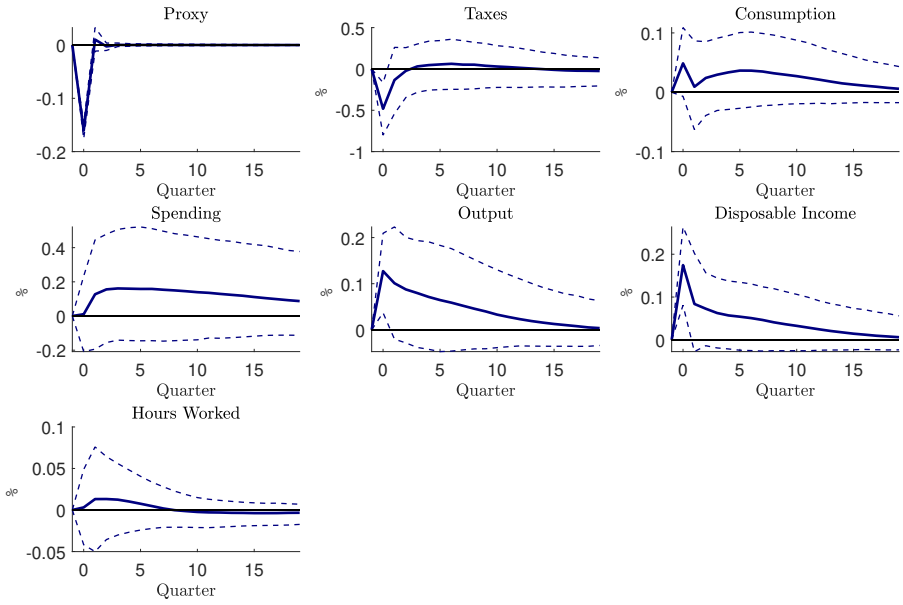

Figure 24: fVAR model with hours worked: Aggregate responses to a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed). Shock occurs at $h = 0$.

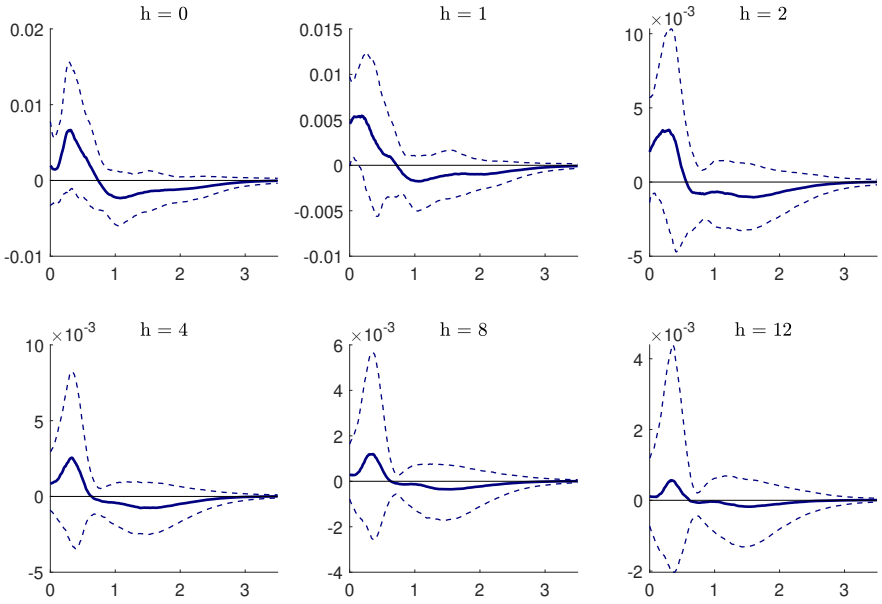

Figure 25: fVAR model with hours worked: Density responses to a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

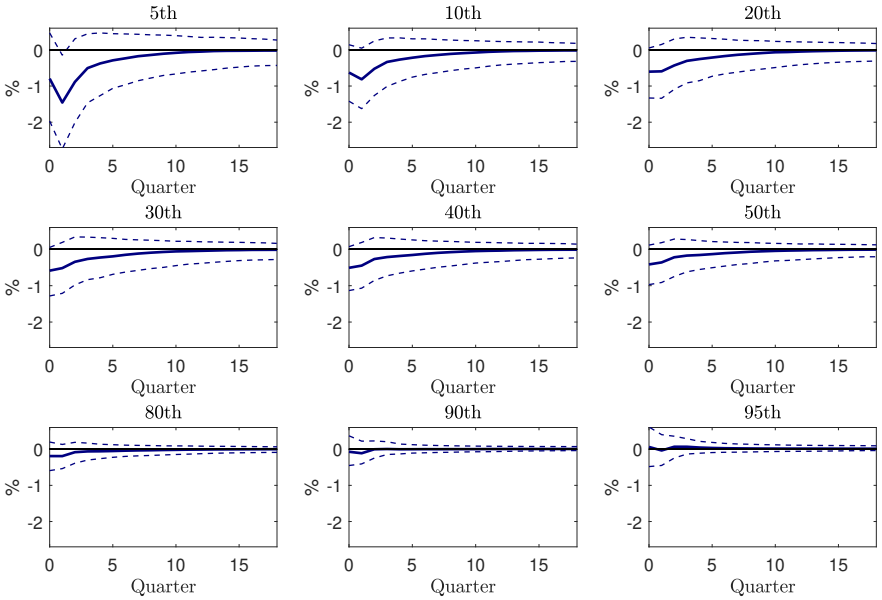

Figure 26: fVAR model with hours worked: Percentile responses to a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

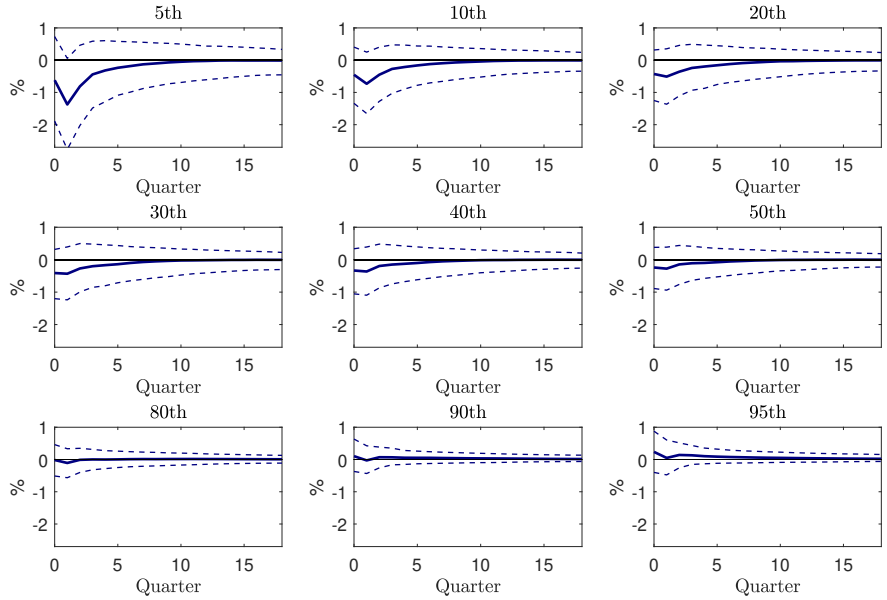

Figure 27: fVAR model with hours worked: Absolute benefit from a one standard deviation total tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

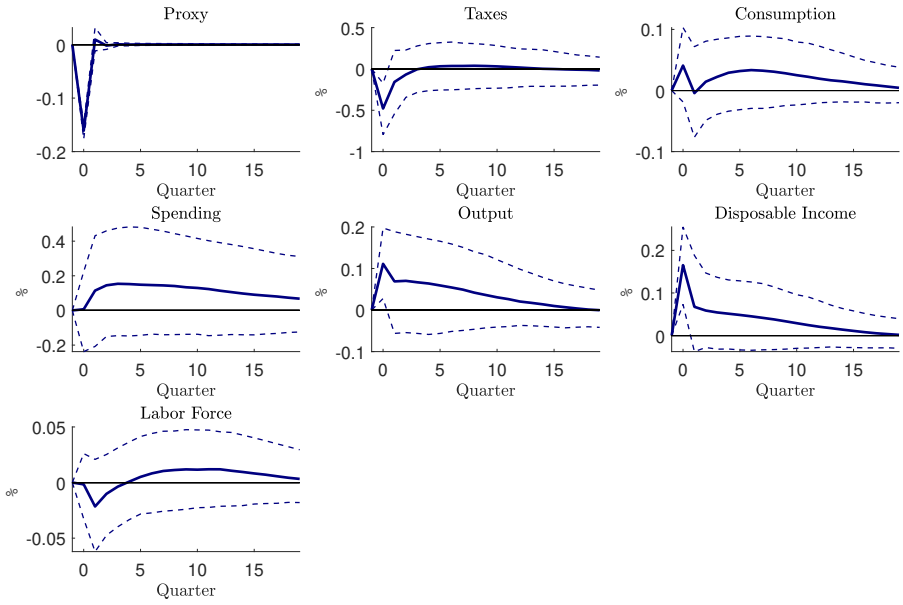

Figure 28: fVAR model with labor force: Aggregate responses to a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed). Shock occurs at $h = 0$.

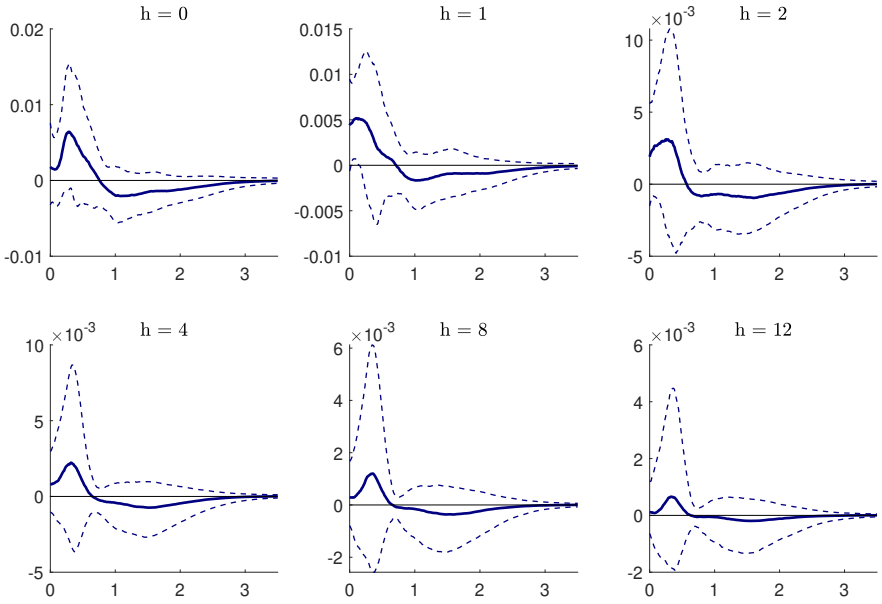

Figure 29: fVAR model with labor force: Density responses to a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

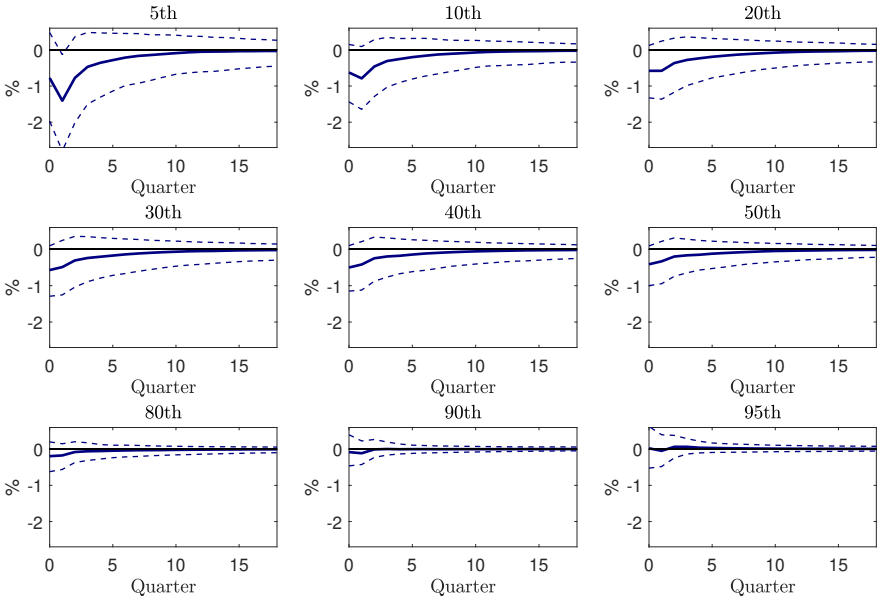

Figure 30: fVAR model with labor force: Percentile responses to a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

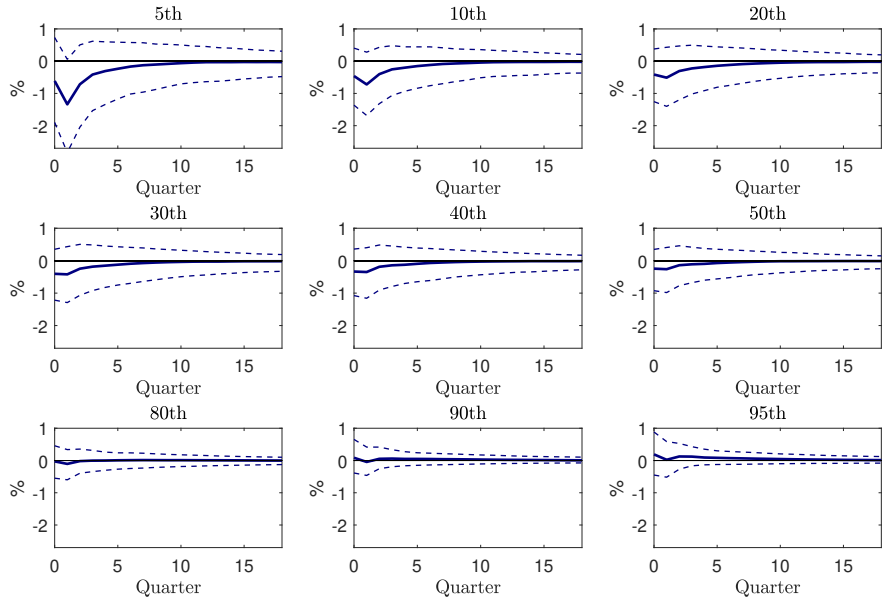

Figure 31: fVAR model with labor force: Absolute benefit from a one standard deviation total tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

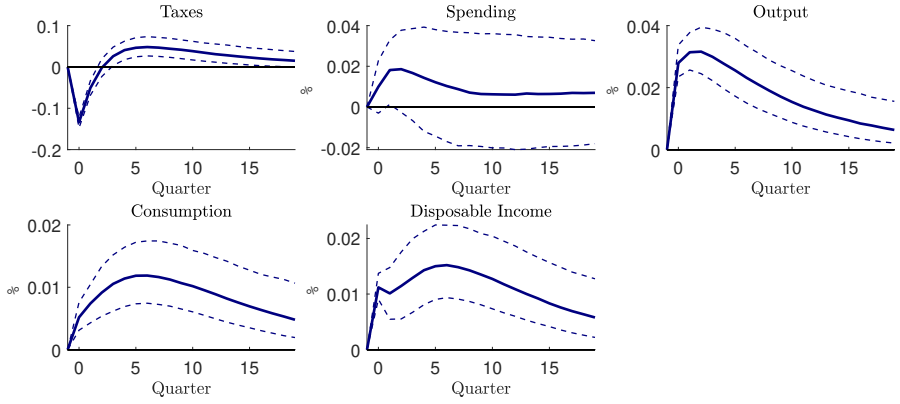

Figure 32: fVAR model identified by the Blanchard-Perotti approach: Aggregate responses to a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed). Shock occurs at $h = 0$.

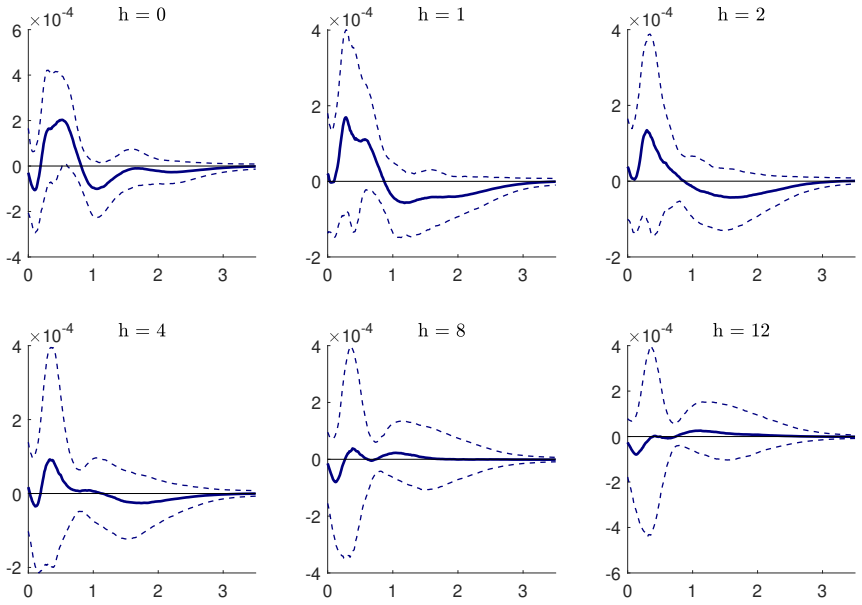

Figure 33: fVAR model identified by the Blanchard-Perotti approach: Density responses to a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

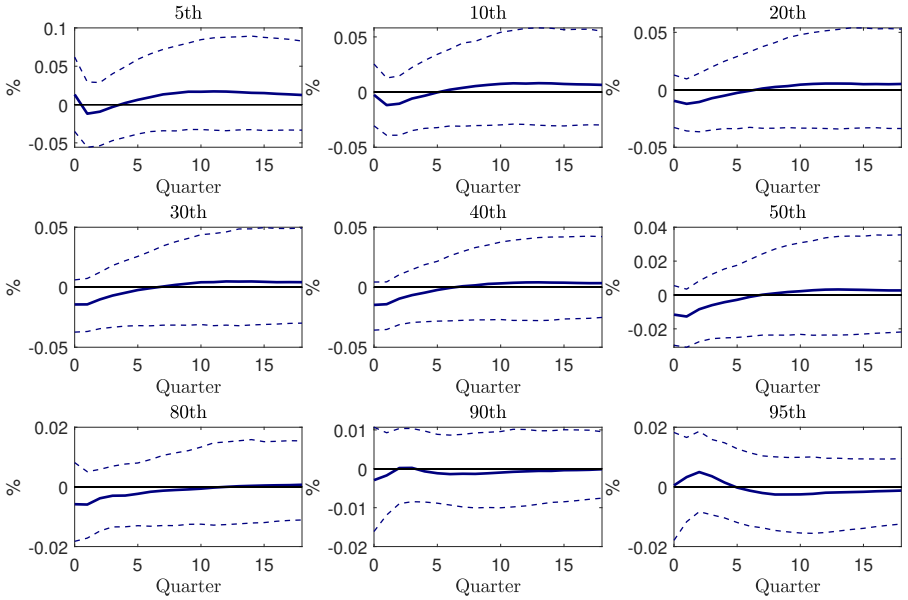

Figure 34: fVAR model identified by the Blanchard-Perotti approach: Percentile responses to a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

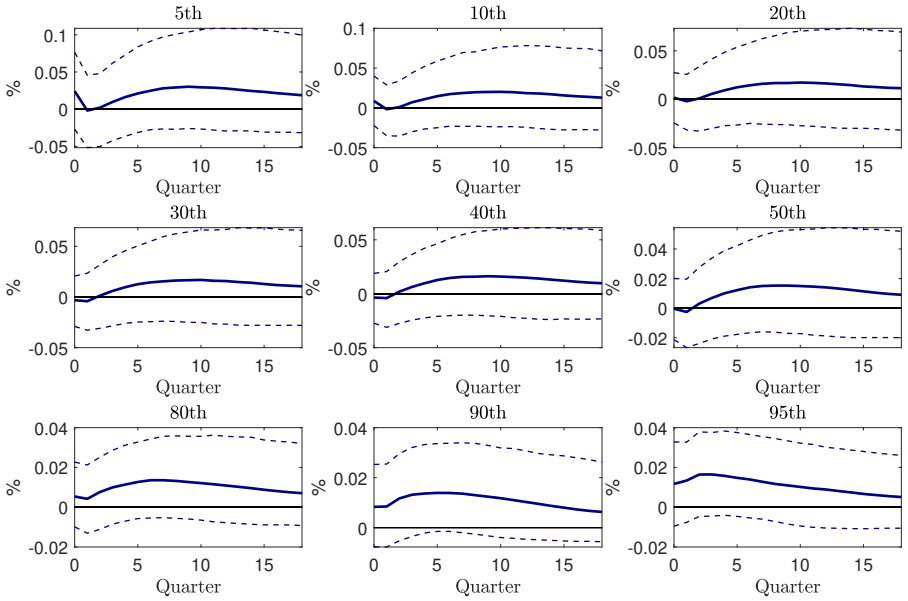

Figure 35: fVAR model identified by the Blanchard-Perotti approach: Absolute benefit from a one standard deviation tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

Additional results Section 4.1

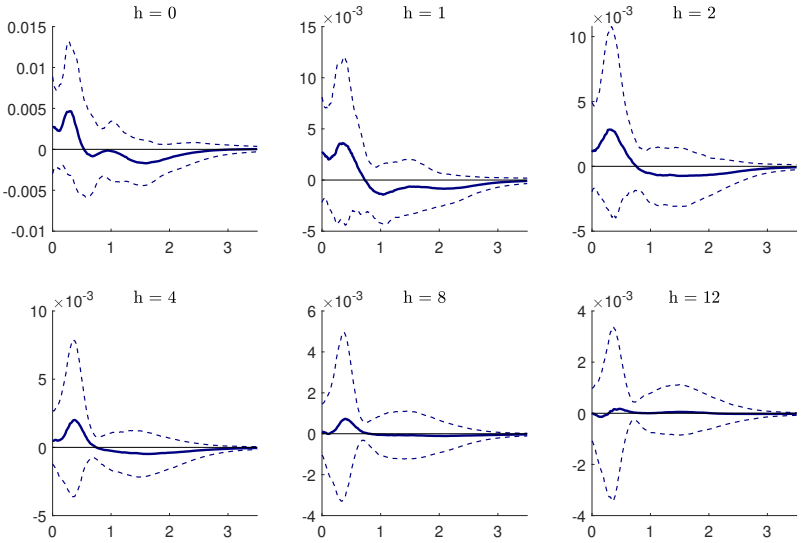

Figure 36: Density responses to a one standard deviation personal income tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

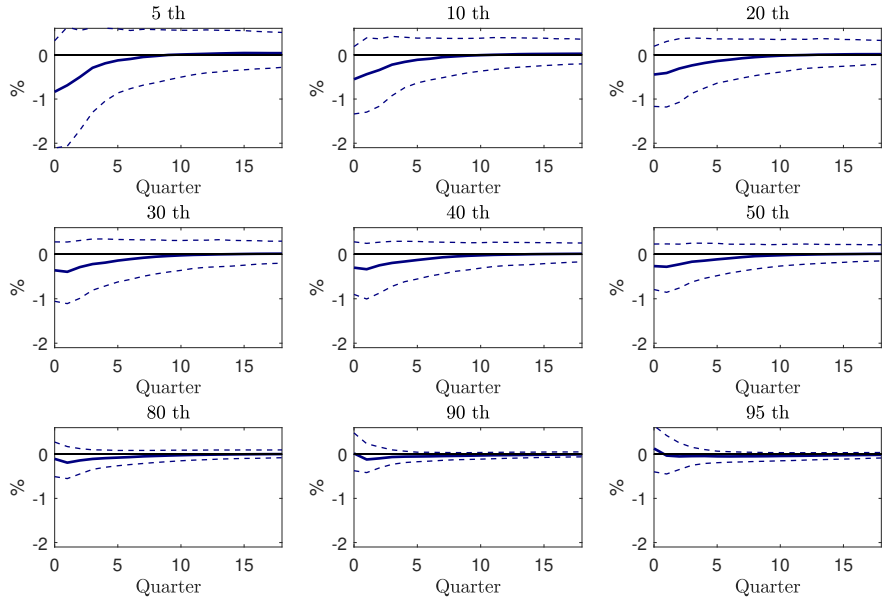

Figure 37: Percentile responses to a one standard deviation personal income tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

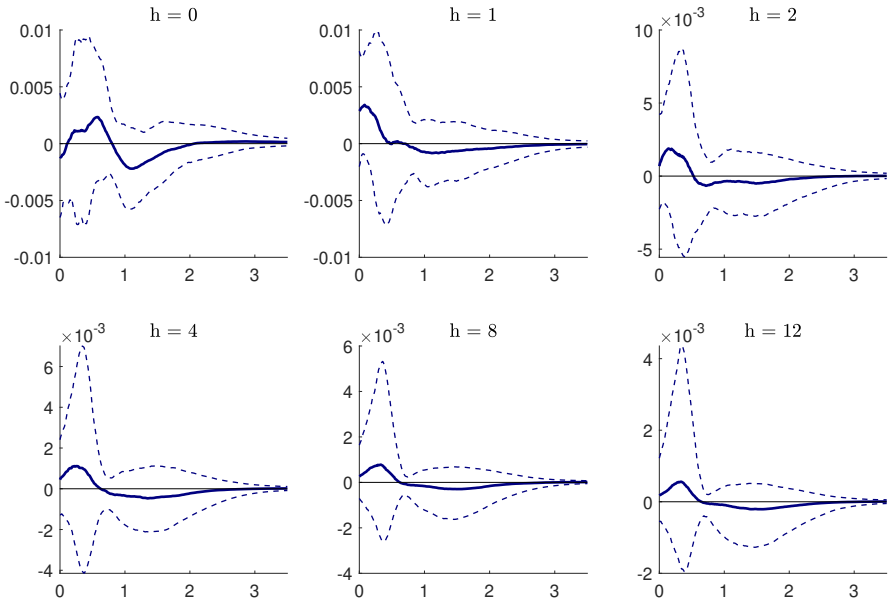

Figure 38: Density responses to a one standard deviation corporate income tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

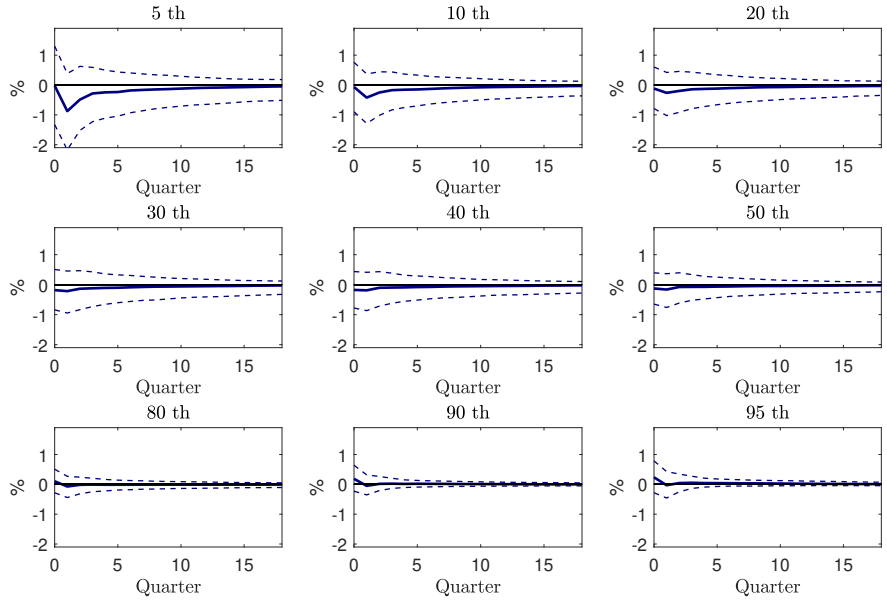

Figure 39: Percentile responses to a one standard deviation corporate income tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

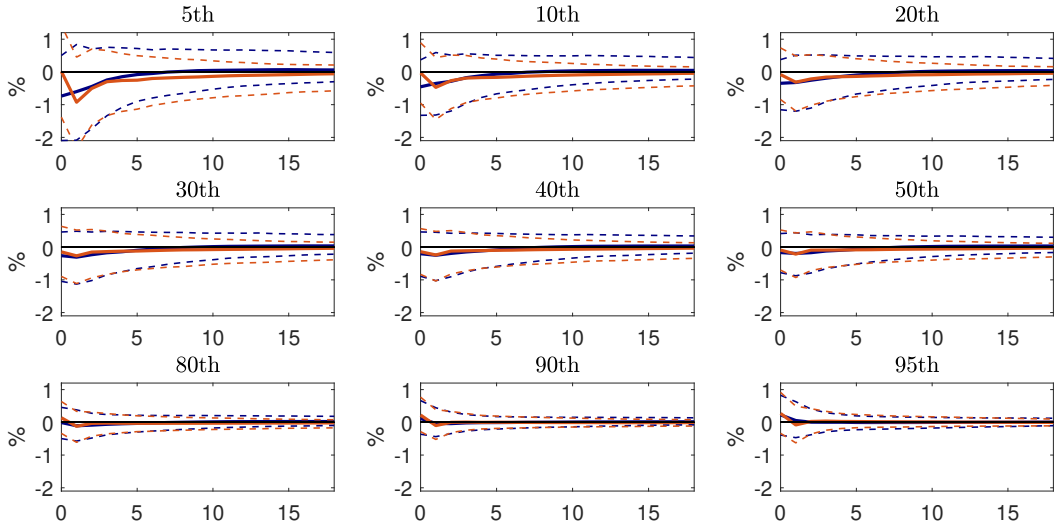

Figure 40: Absolute benefit from a one standard deviation tax cut; personal income tax cut (blue), corporate income tax cut (red), median (solid), 80-percent credible interval (dashed)

Additional results Section 4.2

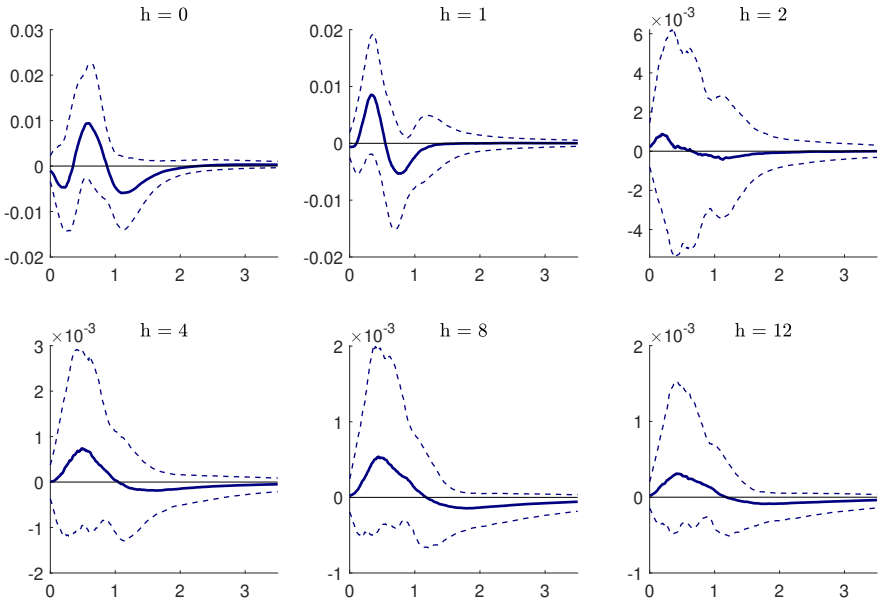

Figure 41: Density response to a one standard deviation personal income tax cut of entrepreneurs; median (blue, solid), 80-percent credible interval (blue, dashed)

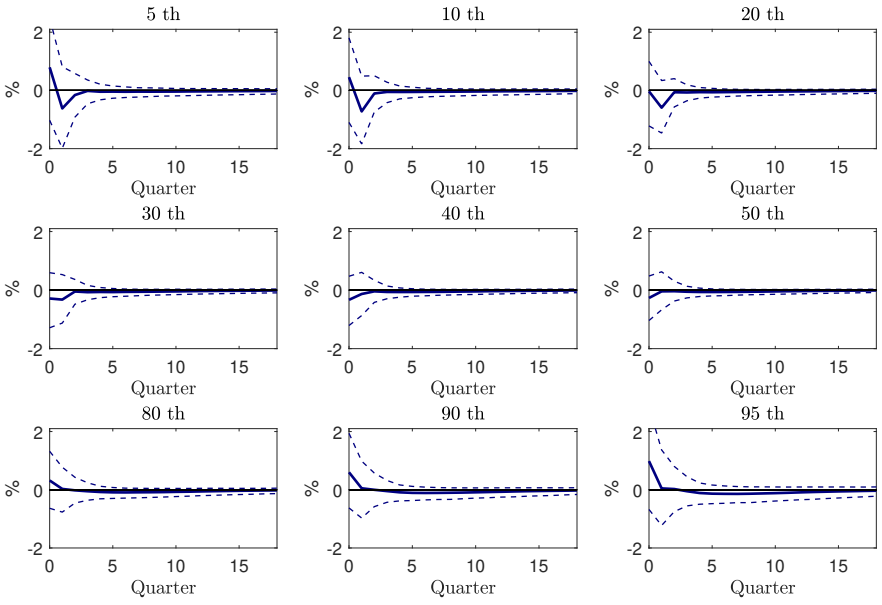

Figure 42: Percentile responses of entrepreneurs to a one standard deviation personal income tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

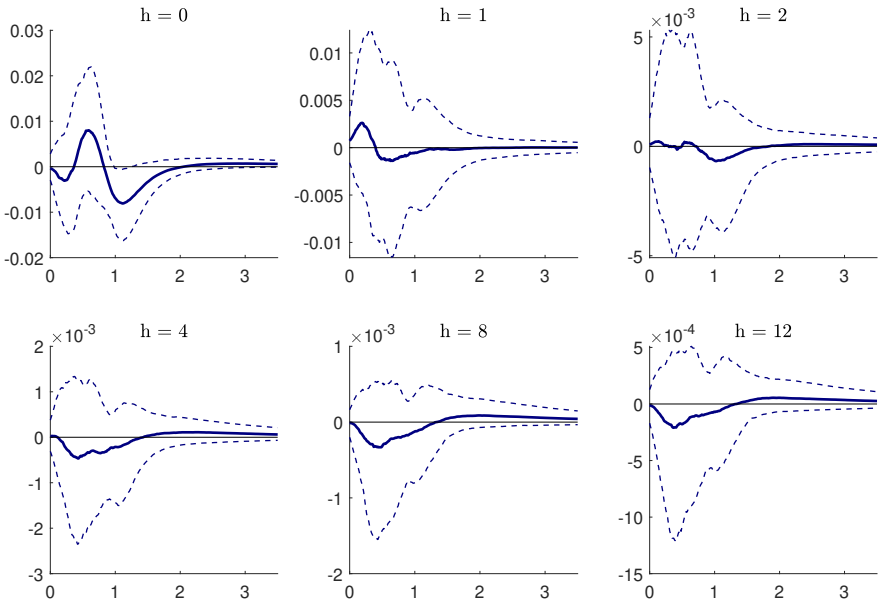

Figure 43: Density responses to a one standard deviation corporate income tax cut of entrepreneurs; median (blue, solid), 80-percent credible interval (blue, dashed)

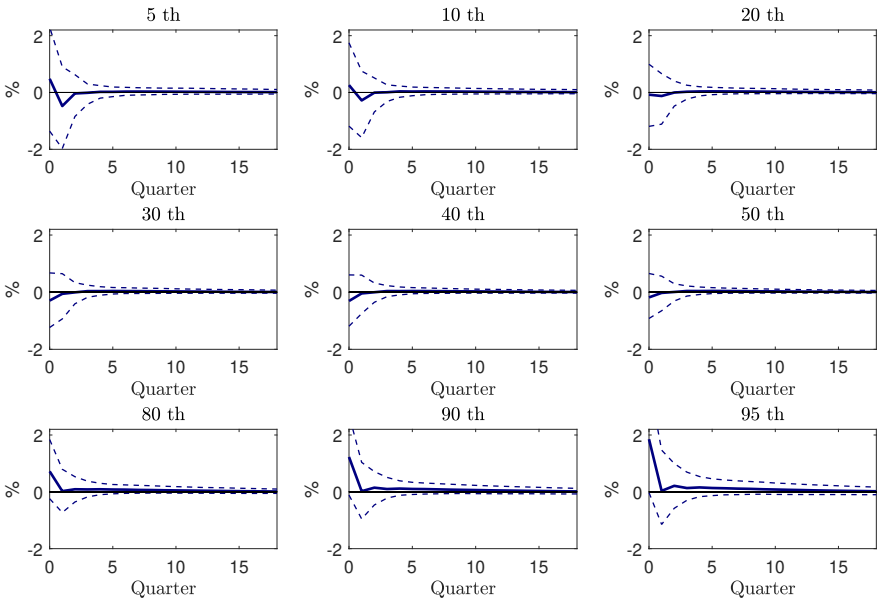

Figure 44: Percentile responses of entrepreneurs to a one standard deviation corporate income tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

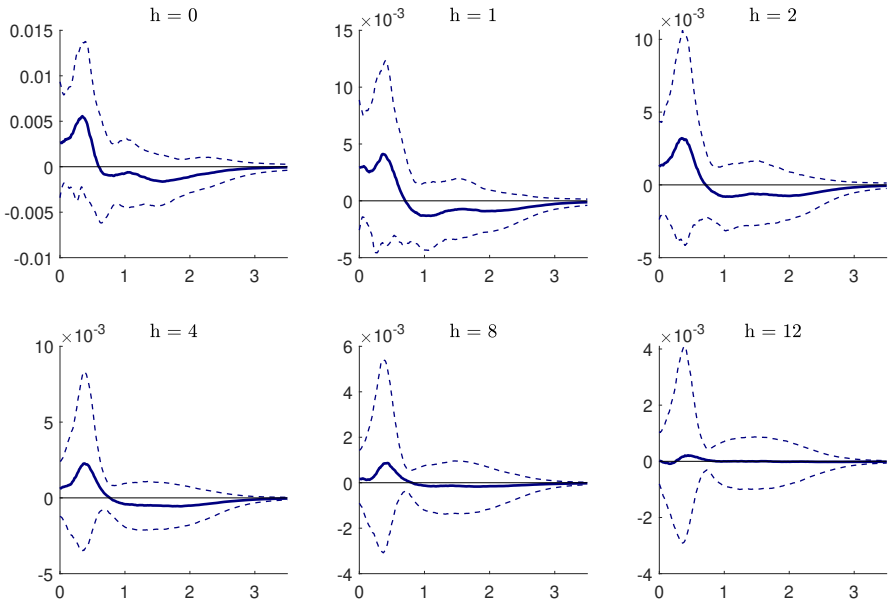

Figure 45: Density responses to a one standard deviation personal income tax cut of non-entrepreneurs; median (blue, solid), 80-percent credible interval (blue, dashed)

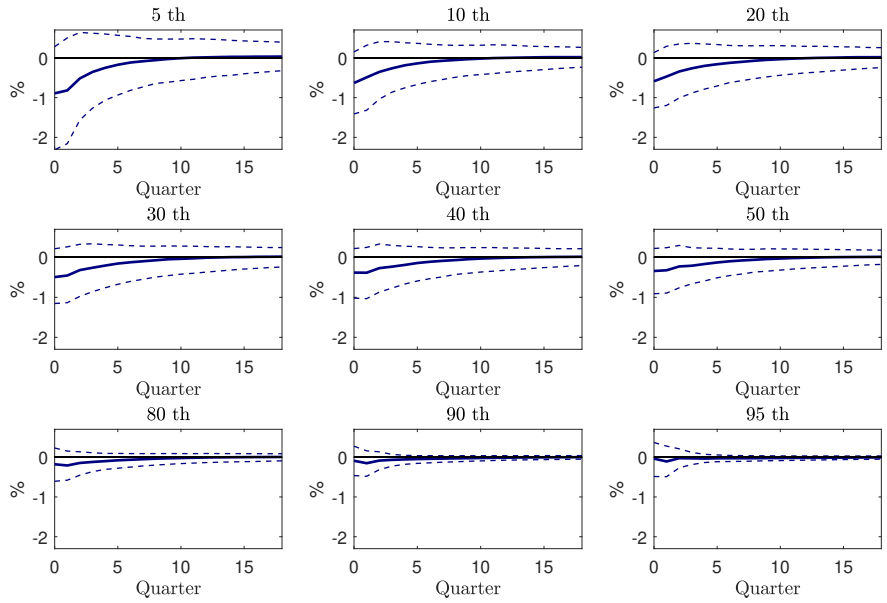

Figure 46: Percentile responses of non-entrepreneurs to a one standard deviation personal income tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

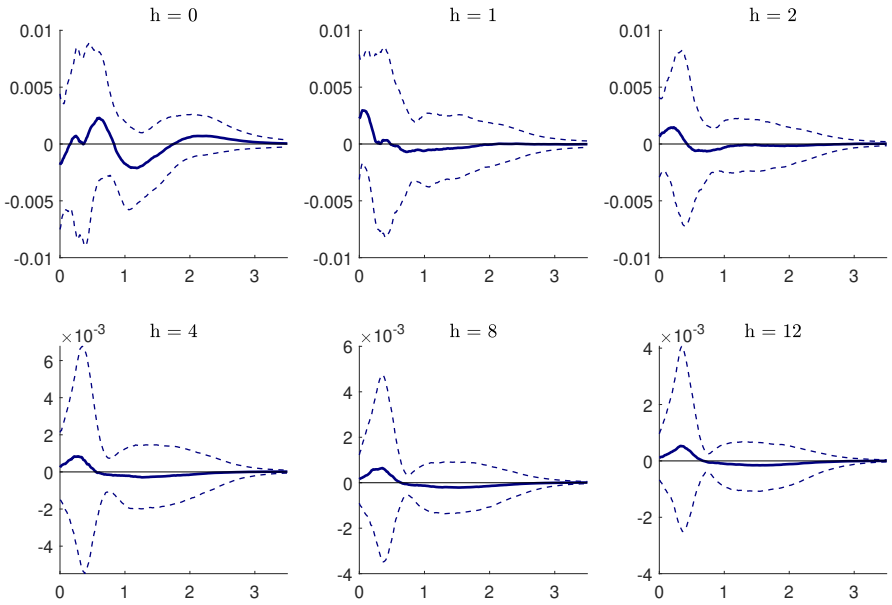

Figure 47: Density responses to a one standard deviation corporate income tax cut of non-entrepreneurs; median (blue, solid), 80-percent credible interval (blue, dashed)

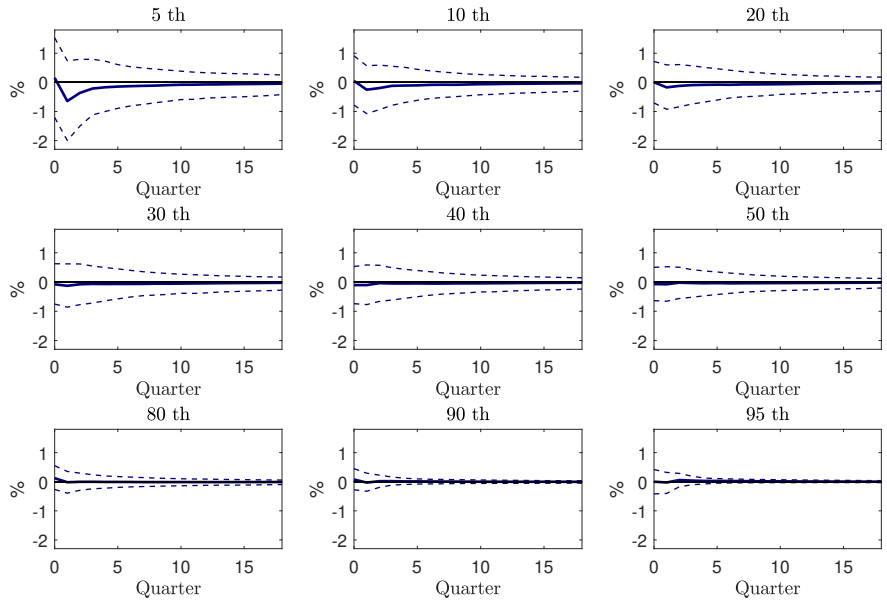

Figure 48: Percentile responses of non-entrepreneurs to a one standard deviation corporate income tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

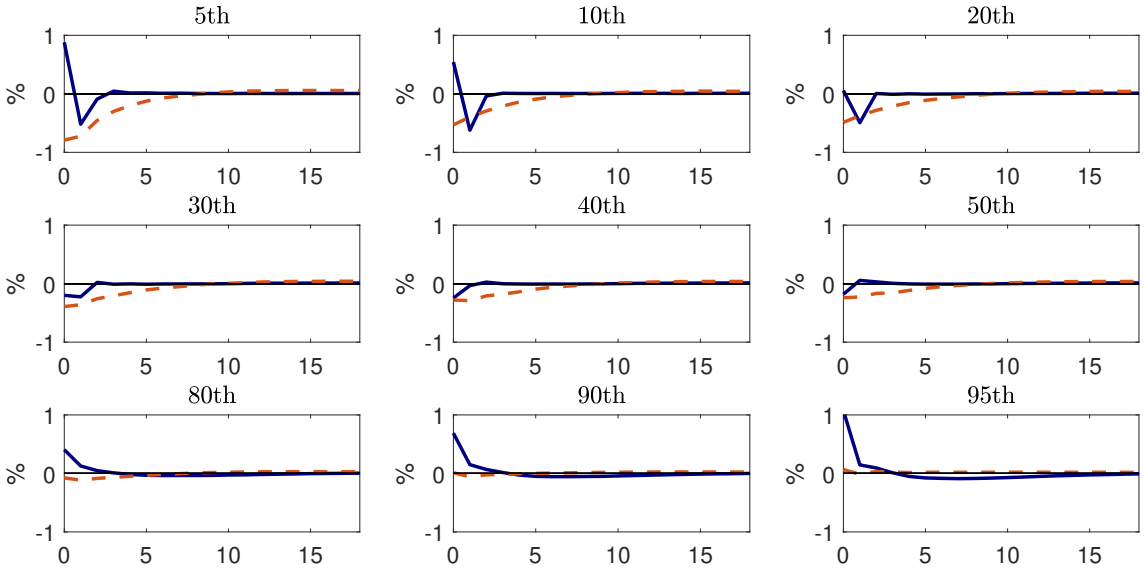

Figure 49: Absolute benefit from a one standard deviation personal income tax cut computed at the median; entrepreneurs (blue, solid), non-entrepreneurs (red, dashed).

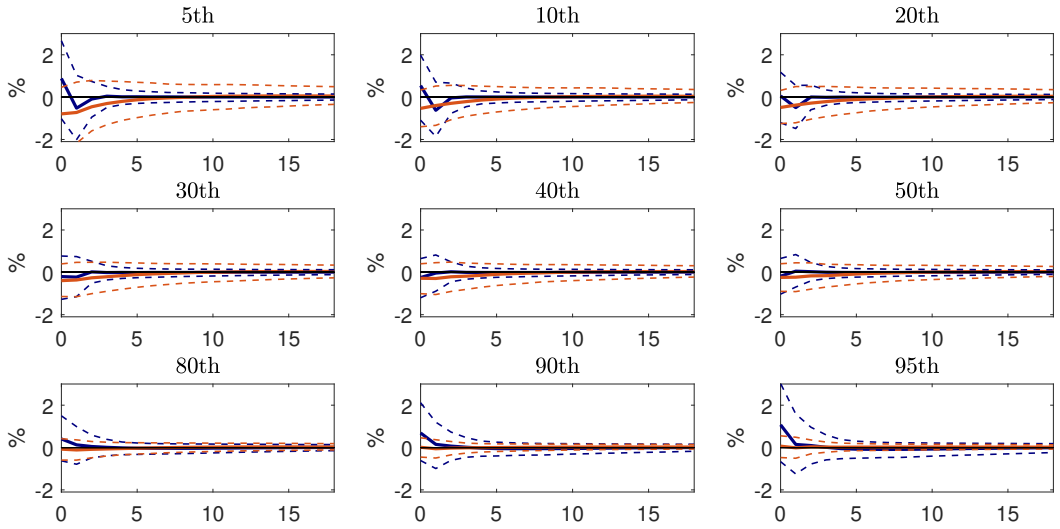

Figure 50: Absolute benefit from a one standard deviation personal income tax cut; entrepreneurs (blue), non-entrepreneurs (red), median (solid), 80-percent credible interval (dashed)

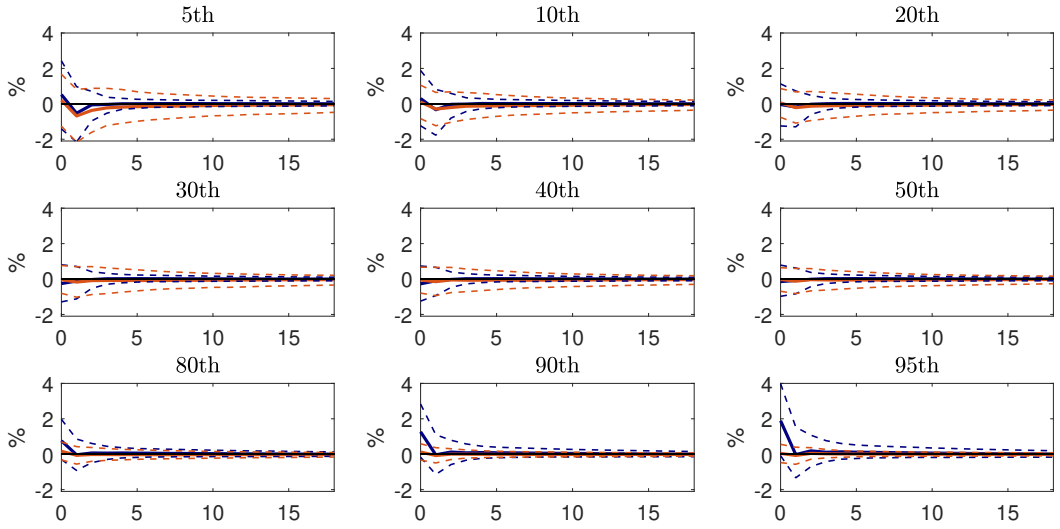

Figure 51: Absolute benefit from a one standard deviation corporate income tax cut; entrepreneurs (blue), non-entrepreneurs income (red), median (solid), 80-percent credible interval (dashed)

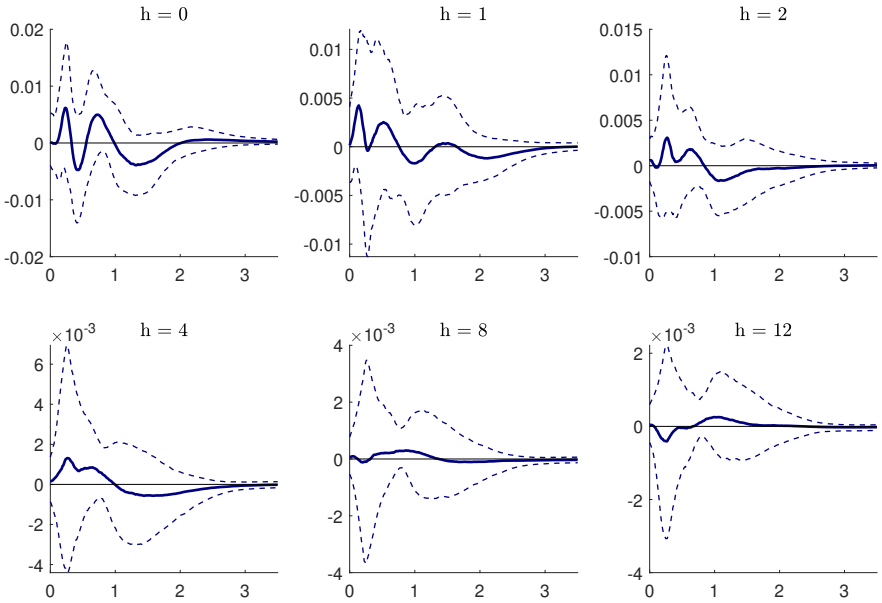

Figure 52: Density responses of income of families to a one standard deviation personal income tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

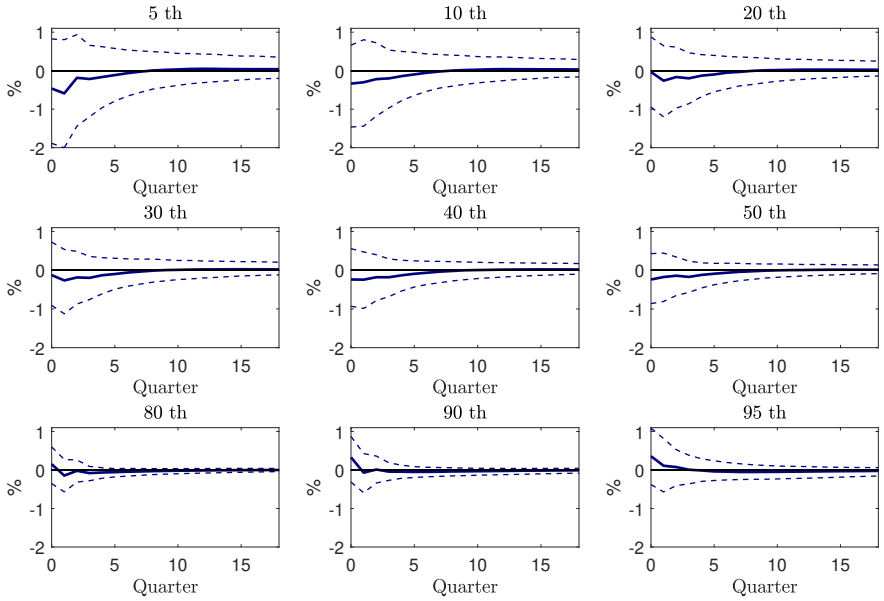

Figure 53: Percentile responses of income of families to a one standard deviation personal income tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

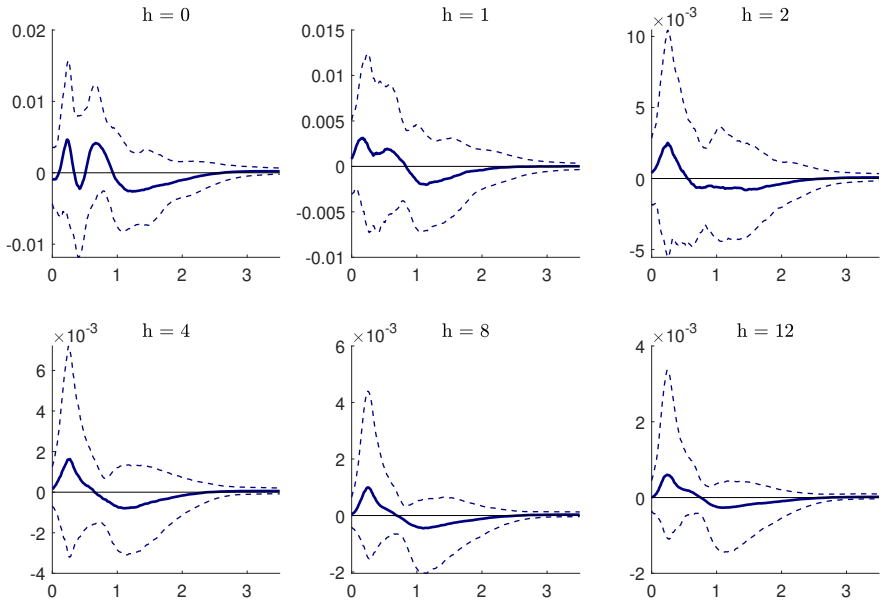

Figure 54: Density responses of income of families to a one standard deviation corporate income tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

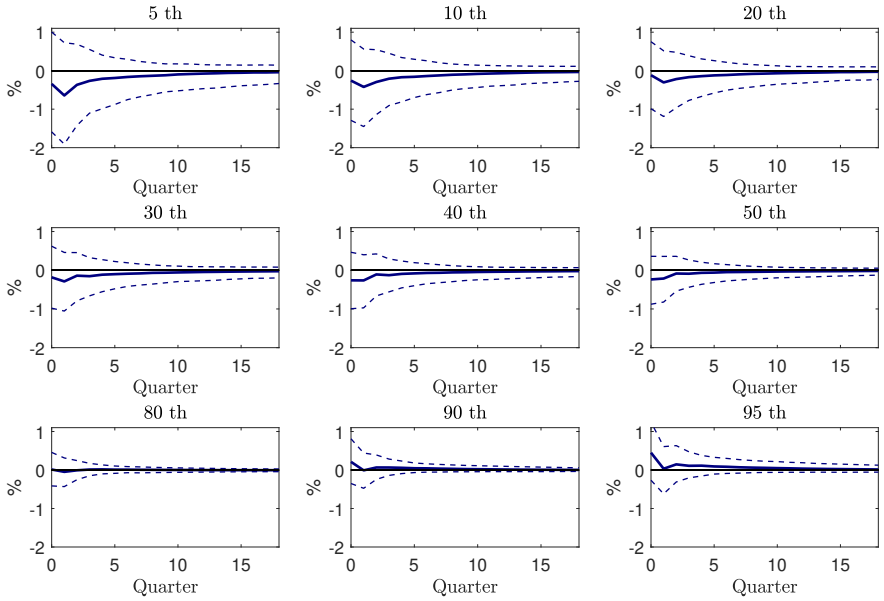

Figure 55: Percentile responses of income of families to a one standard deviation corporate income tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

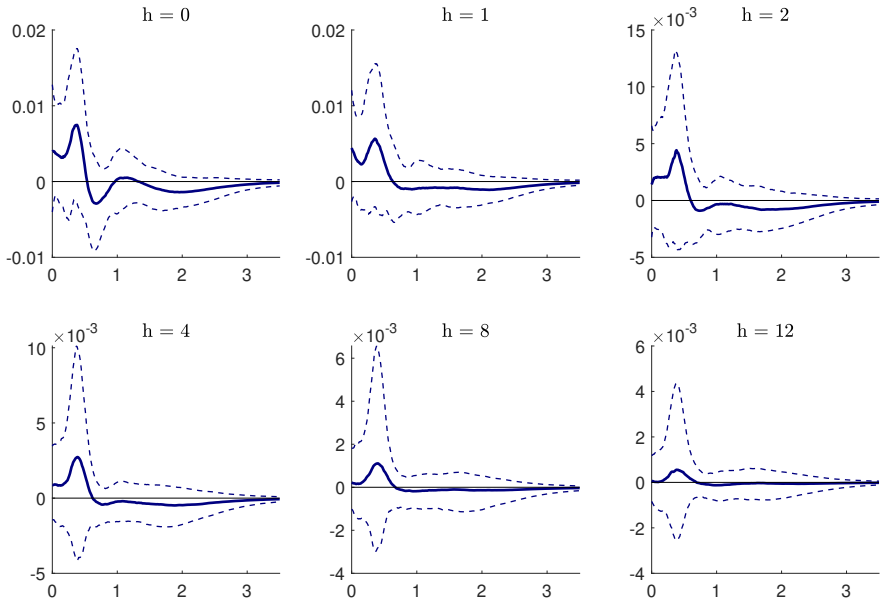

Figure 56: Density responses of income of non-families to a one standard deviation personal income tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

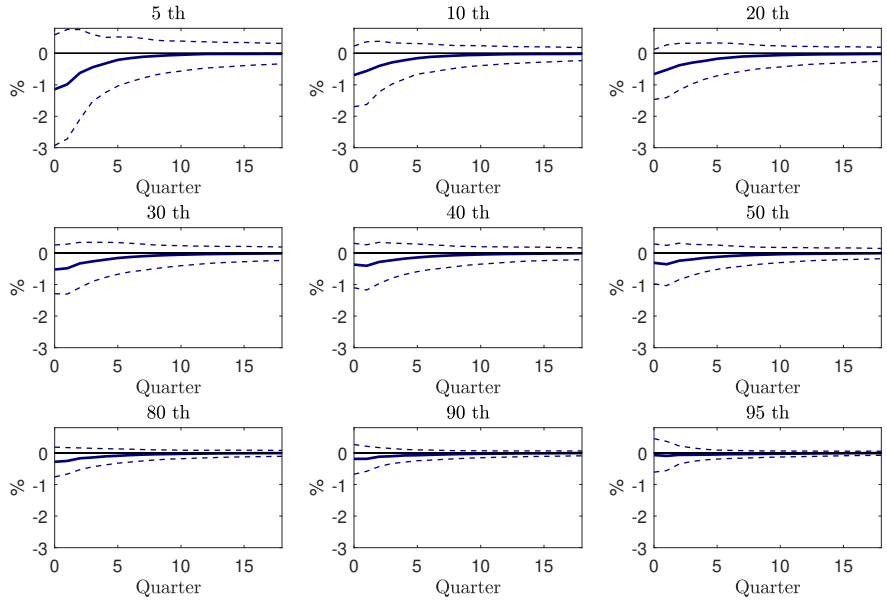

Figure 57: Percentile responses of income of non-families to a one standard deviation personal income tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

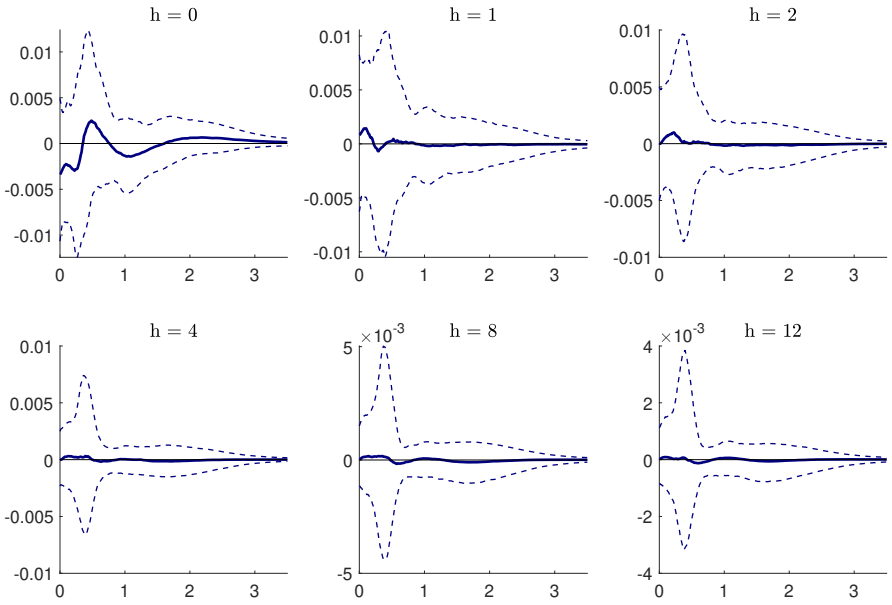

Figure 58: Density responses of income of non-families to a one standard deviation corporate income tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

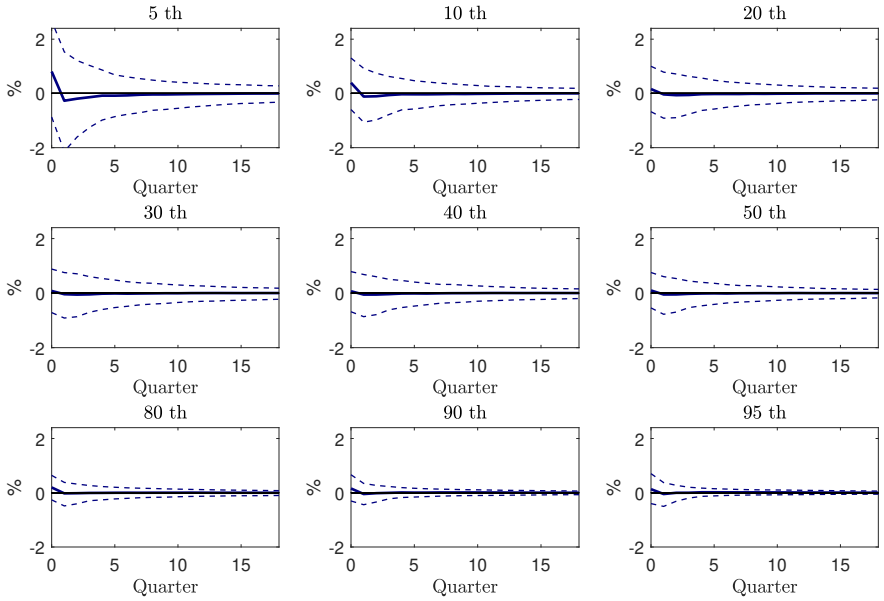

Figure 59: Percentile responses of income of non-families to a one standard deviation corporate income tax cut; median (blue, solid), 80-percent credible interval (blue, dashed)

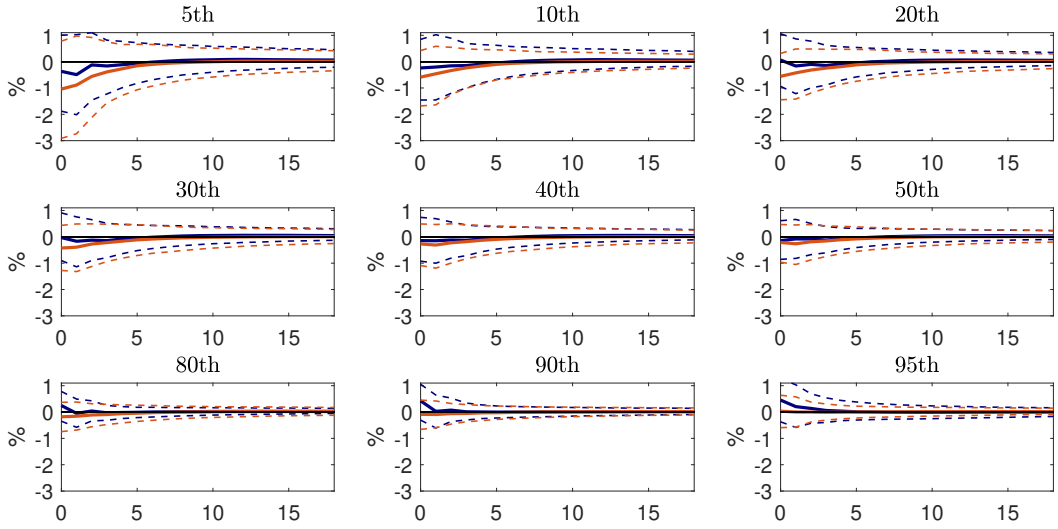

Figure 60: Absolute benefit from a one standard deviation personal income tax cut; income of families (blue), income of non-families (red), median (solid), 80-percent credible interval (dashed)

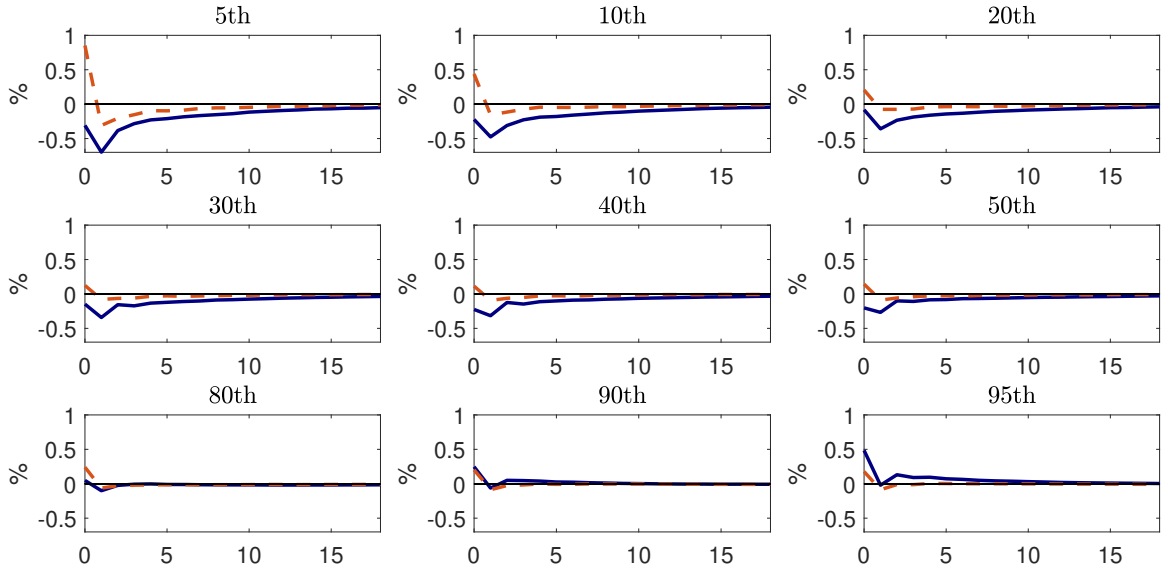

Figure 61: Absolute benefit from a one standard deviation corporate income tax cut computed at the median; income of families (blue, solid), income of non-families (red, dashed).

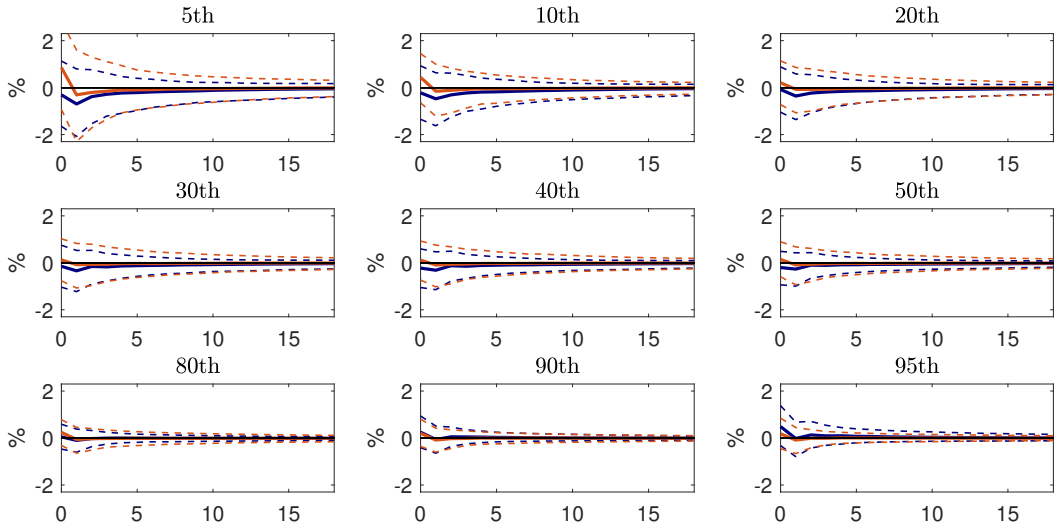

Figure 62: Absolute benefit from a one standard deviation corporate income tax cut; income of families (blue), income of non-families (red), median (solid), 80-percent credible interval (dashed)

Appendix C Tax policy narratives

This appendix collects anecdotal evidence on governmental statements accompanying the tax legislation process in the US. In particular, I study presidential speeches, the US Budget Reports, and the Economic Reports of the President. From these sources three narratives repeatedly emerge: tax changes (i) are directed toward low-income people, (ii) are pro-business, and (iii) pro-family. All sources were accessed last on September 28, 2022.

- **December 20, 1977, Jimmy Carter, Social Security Amendments of 1977 Remarks at the Bill Signing Ceremony:** This legislation is wise. It's been evolved after very careful and long preparation. It focuses the increased tax burdens, which were absolutely mandatory, in a way that is of least burden to the families of this Nation who are most in need of a sound income. The level of payments were raised for those who are wealthier in our country where they can most easily afford increased payments. In the past they've avoided the rate being applied to their much higher income than the average working family. https://www.presidency.ucsb.edu/documents/social-security-amendments-1977-remarks-the-bill-signing-ceremony

- **January 28, 1980, under Jimmy Carter, US Budget Fiscal Year 1981 (p. 61) on the Crude Oil Windfall Profit Tax Act of 1980:** Higher OPEC prices and the phased decontrol of domestic oil prices will result in high profits for domestic oil producers. Fairness requires that some of these windfall profits be returned to the Nation as a whole, to be used for public purposes including the reduction of oil imports, conservation of energy, and mitigation of the impact of higher energy prices on low-income Americans. The President, therefore, proposed a windfall profit tax to become effective January 1, 1980. https://fraser.stlouisfed.org/title/budget-united-states-government-54/fiscal-year-1981-19035

- **April 02, 1980, under Jimmy Carter on the Crude Oil Windfall Profit Tax**

Act of 1980: When I proposed this tax I indicated that the revenues should be used for three basic purposes: one, to assist low-income households in bearing the burden of rapidly increasing energy costs; secondly, to improve the transit systems of our country, including not only rail but also buses and subways, and even the sharing of rides in other rubber-tired vehicles; and third, the development of alternative supplies of energy. https://www.presidency.ucsb.edu/documents/crude-oil-windfall-profit-tax-act-1980-remarks-signing-hr-3919-into-law

- **January 15, 1981, under Jimmy Carter, Annual Report of the Secretary of the Treasury on the State of the Finances 1980 (p. 43) on the Crude Oil Windfall Profit Tax Act of 1980:** As part of the act, increased personal and business tax subsidies are provided for conservation investments and the production of fuels from renewable and exotic sources. In addition the act contained three income tax provisions: A $200 exclusion for interest and dividends ($400 for married couples), repeal of carryover basis, and changes to last-in, first-out (LIFO) accounting rules. https://fraser.stlouisfed.org/title/annual-report-secretary-treasury-state-finances-194/annual-report-secretary-treasury-state-finances-fiscal-year-1980-5626

- **January 17 1981, under Jimmy Carter, Economic Report of the President 1981 (p. 166):** To shift additional national resources into investment, a larger than-usual share of the funds available for tax reduction will have to be devoted to investment incentives. But some other forms of tax relief are both feasible and desirable. The President's program[11] proposes three principal areas of such relief. First, individuals and employers would receive an income tax credit sufficient to offset the rise in social security taxes which took place at the start of the year. This type of tax cut was chosen because it not only would reduce tax burdens but also lower business costs

[11]Refers to The Economic Revitalization Program

and thus help modestly with our inflation problem. Second, for workers who face a growing social security tax burden but earn too little to pay income taxes, the program would expand the earned income tax credit. This would more than offset the increase in social security taxes for our lowest-paid workers. Third, the program proposes a phased reduction in the tax burden on two-earner families by reducing the so-called "marriage penalty" that taxes married couples with roughly equal incomes at rates higher than unmarried couples with the same incomes. https://fraser.stlouisfed.org/title/economic-report-president-45/1981-8152

- **February 8, 1982, under Ronald Reagan, US Budget Fiscal Year 1983 (M6/p. 11) on the Economic Recovery Tax Act of 1981:** The Economic Recovery Tax Act of 1981 is the largest, most comprehensive, and most constructive tax bill ever adopted. [...] • The penalty tax rate on investment income has been eliminated. By dropping the top rate from 70 to 50%, the attractiveness of tax shelters will be reduced and the incentives for productive investment in stocks, bonds, new business ventures, and other financial assets will be increased. Our Nation's capital will again flow to the growth of business and jobs rather than to the vendors of protection from punitive taxation. • Marginal tax rates have been significantly lowered for the first time in two decades. The 23% across-the-board rate reduction will mean $183 billion in lower taxes for individuals over the first 3 years. The financial reward for savings, work effort, and new production will stop diminishing and start rising once again. [...] • The confiscatory taxing of estates and inheritances has been halted as well. By raising the exemption to $600,000, by lowering the rate to 50%, and by removing the limits on the marital deduction, 99.7% of all estates will eventually be exempt from estate taxation. Hard-working American farmers, small businessmen, investors, and workers can once again be confident that the sweat, sacrifices, and accumulations of a lifetime will belong to their heirs rather than their Government. https://fraser.stlouisfed.org/title/budget-

united-states-government-54/fiscal-year-1983-19037

- **February 10, 1982, under Ronald Reagan, Economic Report of the President 1982 (p. 7) on the Economic Recovery Tax Act of 1981:** To spur further business investment and productivity growth, the new tax law provides faster write-offs for capital investment and a restructured investment tax credit. Research and development expenditures are encouraged with a new tax credit. Small business tax rates have been reduced. https://fraser.stlouisfed.org/title/economic-report-president-45/1982-8153

- **February 2, 1983, under Ronald Reagan, Economic Report of the President 1983 (p. 139) on the Economic Recovery Tax Act of 1981:** To the extent that the accelerated cost recovery system in the Economic Recovery Tax Act of 1981 reduced the tax on earnings of depreciable property, it raised the real interest rate that business borrowers are willing to pay. In addition, large budget deficits in many countries have lowered national saving rates, tending to lead to higher real interest rates worldwide. https://fraser.stlouisfed.org/title/economic-report-president-45/1983-8154

- **February 1984, under Ronald Reagan, Economic Report of the President 1984 (p. 6) on the Economic Recovery Tax Act of 1981:** The Economic Recovery Tax Act of 1981 went beyond reducing tax rates to establish important reforms in the structure of the tax system. For businesses, the Accelerated Cost Recovery System increased the after-tax profitability of investments in plant and equipment. The sharp fall in inflation has also increased after-tax profit ability. As a result, investment in business equipment has recently been quite strong despite the high real interest rates. https://fraser.stlouisfed.org/title/economic-report-president-45/1984-8155

- **October 22, 1986, Ronald Reagan, Remarks on Signing the Tax Reform Act**

of 1986: And what about fairness for families? It's in our families that America's most important work gets done: raising our next generation. But over the last 40 years, as inflation has shrunk the personal exemption, families with children have had to shoulder more and more of the tax burden. With inflation and bracket-creep also eroding incomes, many spouses who would rather stay home with their children have been forced to go looking for jobs. And what of America's promise of hope and opportunity, that with hard work even the poorest among us can gain the security and happiness that is the due of all Americans? You can't put a price tag on the American dream. That dream is the heart and soul of America; it's the promise that keeps our nation forever good and generous, a model and hope to the world. For all these reasons, this tax bill is less a freedom—or a reform, I should say, than a revolution. Millions of working poor will be dropped from the tax rolls altogether, and families will get a long-overdue break with lower rates and an almost doubled personal exemption. We're going to make it economical to raise children again. Flatter rates will mean more reward for that extra effort, and vanishing loopholes and a minimum tax will mean that everybody and every corporation pay their fair share. And that's why I'm certain that the bill I'm signing today is not only an historic overhaul of our tax code and a sweeping victory for fairness, it's also the best antipoverty bill, the best profamily measure, and the best job-creation program ever to come out of the Congress of the United States. `https://www.presidency.ucsb.edu/documents/remarks-signing-the-tax-reform-act-1986`

- **January 29, 1987, under Ronald Reagan, Economic Report of the President 1987 (p. 21) on the Tax Reform Act of 1986:** This Act improves overall incentives for economic activity and reduces disparities in rates of taxation on different forms of economic activity. In the long run, after the transition problems of some sectors are resolved, this Act is estimated to increase net national product by approximately 2 percent. Evaluated at current levels of national income and product,

this implies approximately a $600 gain in the annual income of the average American family, without any loss of Federal revenue. https://fraser.stlouisfed.org/title/economic-report-president-45/1987-8158

- **March 30, 1987, under Ronald Reagan, Annual Report of the Board of Trustees of the Federal Old Age and Survivors Insurance Trust Fund 1987 (p. 11) on the Tax Reform Act of 1986:** Other features of the Tax Reform Act, such as the elimination or restriction of several deductions and exemptions, will tend to raise contribution income as would possible favorable impacts on earnings and hours worked. Numerous other changes affecting business income and expenses for tax purposes may also affect Social Security contributions, especially from self-employed persons. https://www.ssa.gov/oact/TR/historical/1987TR.pdf

- **January 10, January 1989, under Ronald Reagan, Economic Report of the President 1989 (pp. 7–8) on the Tax Reform Act of 1986:** The Tax Reform Act of 1986 improved efficiency by eliminating many tax preferences that distort private decision-making. By reducing tax rates and tax loopholes, we have encouraged people to make money the old-fashioned way—by producing goods and services that people want, not by finding new ways to avoid taxes. The tax reforms have increased equity as well, as an estimated 4 million low-income individuals and families have been removed from the income tax rolls by 1988. https://fraser.stlouisfed.org/title/economic-report-president-45/1989-8160

- **January 10, 1989, under Ronald Reagan, Economic Report of the President 1989 (p. 63) on the Tax Reform Act of 1986:** The Tax Reform Act of 1986 did much to even effective tax rates between equipment and structures. However, tax reform raised effective corporate tax rates on business investment and removed the preferential treatment of business capital gains while retaining much of the advantage of investment in housing and consumer durables. https://fraser.stlouisfed.

org/title/economic-report-president-45/1989-8160

- **January 10, 1989, under Ronald Reagan, Economic Report of the President 1989 (p. 86) on the Economic Recovery Tax Act of 1981:** The act significantly reduced the average burden of taxation for American families compared with what it would have been without a change in the tax law. https://fraser.stlouisfed.org/title/economic-report-president-45/1989-8160

- **January 10, 1989, under Ronald Reagan, Economic Report of the President 1989 (p. 87) on the The Economic Recovery Tax Act of 1981:** The provision to allow expensing of up to $5,000 worth of equipment in 1982 and 1983 is likely to have increased the return to all types of small business investment. https://fraser.stlouisfed.org/title/economic-report-president-45/1989-8160

- **January 10, 1989, under Ronald Reagan, Economic Report of the President 1989 (p. 88) on the Tax Reform Act of 1986:** The Tax Reform Act of 1986 also resulted in a somewhat higher effective marginal tax rate on capital income because it changed depreciation rules, the tax treatment of long-term capital gains, and repealed the investment tax credit. However, more uniform tax rates on alternative types of investments also resulted from a change in depreciation rules designed to improve the allocation of investment. Phasing out tax preferences such as the deduction of nonmortgage consumer interest on personal income tax returns was designed to change the allocation of private spending away from consumer durables toward business investment. https://fraser.stlouisfed.org/title/economic-report-president-45/1989-8160

- **February 6, 1992, under George Bush, Economic Report of the President 1992 (pp. 132–133) on the Tax Reform Act of 1986:** The earned income tax credit (EITC) was expanded, and along with increased personal exemptions and standard deductions, exempted more than 4 million low-income taxpayers from hav-

ing to pay Federal income taxes https://fraser.stlouisfed.org/title/economic-report-president-45/1992-8163

- **February 6, 1992, under George Bush, Economic Report of the President 1992 (p. 133) on the Omnibus Budget Reconciliation Act of 1990:** The Omnibus Budget Reconciliation Act of 1990 installed a variety of tax policy changes, in addition to the spending and deficit limitations discussed in last year's Economic Report of the President. The EITC was expanded, with supplemental credits added for families with young children and for health care expenses. Statutory marginal tax rates for the highest levels of income were equalized at 31 percent. A phase-out of personal exemptions, limitations on itemized deductions, and new excise taxes levied on furs, jewelry, and expensive cars effectively raised taxes for the affluent. https://fraser.stlouisfed.org/title/economic-report-president-45/1992-8163

- **February 6, 1992, under George Bush, Economic Report of the President 1992 (pp. 138–139):** By any of a variety of measures, the income tax and Social Security reforms beginning in the late 1970s have not significantly changed the redistributional effect of the tax system. The Individual Income Tax- Tax Chart 4-7 shows estimates from the Department of the Treasury of average Federal individual income tax rates for hypothetical four-member families with the median, half the median, and double the median income level, as reported by the Bureau of the Census. Median income for 1991 was estimated on the assumption that the real level of median income would not change from its 1990 level. Families are assumed to have only wage and salary income earned by one person. Comparisons made for the same type of family over time help to isolate the effect of changes in the tax system from changes in the sources and distribution of income and in demographics. The chart shows that the Federal individual income tax is progressive in each of the years because the average tax rate rises with income. In 1991, for example,

the average estimated income tax rate rises from 5.1 for families with half the median income to 15.1 for families with twice the median income. The average Federal income tax rate has fallen since 1980 for all three groups. The percentage change in average tax rates between 1980 and 1991 was virtually the same at all three relative income levels. https://fraser.stlouisfed.org/title/economic-report-president-45/1992-8163

- **February 6, 1992, under George Bush, Economic Report of the President 1992 (pp. 140–141):** CBO estimates in Table 4-4 indicate that the share of all Federal taxes paid by the highest income groups has increased since 1977, while the share paid by middle and lower income families has fallen. Thus, data developed separately by the Treasury Department and the Congressional Budget Office indicate that the Federal individual income tax and the overall Federal tax system redistribute income from high-income households to low-income households and thus are progressive. The degree of progressivity of, and the amount of redistribution within, the tax system has not changed significantly since the mid-1970s. https://fraser.stlouisfed.org/title/economic-report-president-45/1992-8163

- **February 7, 1994, under Bill Clinton, US Budget Fiscal Year 1995 (p. 4) on the Omnibus Budget Reconciliation Act of 1993:** In addition to budget discipline, we made dramatic changes that restored fairness to the tax code. We made the distribution of the income tax burden far more equitable by raising income tax rates on only the richest 1.2 percent of our people—couples with income over $180,000—and by substantially increasing the Earned Income Tax Credit for 15 million low-income working families. Thus, nearly 99 percent of taxpayers will find out this year that their income tax rates have not been increased. https://fraser.stlouisfed.org/title/budget-united-states-government-54/fiscal-year-1995-19045

- **February 7, 1994, under Bill Clinton, US Budget Fiscal Year 1995 (p. 56) on the Omnibus Budget Reconciliation Act of 1993:** In addition to these and some smaller tax increases, OBRA-93 also contained a number of tax incentives. Expansion of the earned income tax credit (EITC) is one of the most important anti-poverty actions in recent history; when fully phased in, the increased EITC plus food stamps will lift from poverty families with children where at least one parent works full time. The EITC expansion is also a major step toward welfare reform - by making work pay. • Small businesses received important tax incentives. The expensing allowance for investment, especially important for small business, was substantially increased. A targeted capital gains provision for new small businesses was enacted. The deduction for health insurance premiums of the self-employed was extended. • Extension of the credit for research and experimentation encourages technological advancement. Alternative minimum tax relief was provided for business investment depreciation. • Empowerment Zones were enacted for the first time, to help in the renewal of targeted urban and rural areas. The low-income housing credit, mortgage revenue bonds, and small-issue industrial development bonds were made permanent. `https://fraser.stlouisfed.org/title/budget-united-states-government-54/fiscal-year-1995-19045`

- **February 7, 1994, under Bill Clinton, US Budget Fiscal Year 1995 (p. 58) on the Omnibus Budget Reconciliation Act of 1993:** Fairness in OBRA-93. OBRA-93 achieved the Administration's objective of placing the heaviest tax burden on those most able to carry it, while lightening the load on those least able to pay. As a result, the tax system is more progressive than at any time since 1977, according to the Congressional Budget Office (CBO). OBRA-93 provisions affecting taxes are outlined above. The distributional impact of these and other provisions is shown in Table 2-1. Whether measured by the change in average taxes, the share of total new taxes raised, or the change in effective tax rates, the message is the same: The tax

system has been made fairer. • At the top of the income distribution, families with $200,000 or more in annual income (1.3 percent of all families) will pay on average about $23,500 in additional taxes per family, according to CBO estimates. In total, they will pay 80 percent of the taxes raised by OBRA-93 ($33 billion out of $41 billion). The effective tax rate for the average family in this upper income bracket is likely to increase from about 28 percent to almost 33 percent. • Families with $100,000 to $200,000 in income (5.2 percent of all families) will pay on average about $650 more in taxes, raising their effective tax rates by one-half of one percentage point. In aggregate, they will pay about $3.6 billion more in taxes. Thus, families with incomes over $100,000 will shoulder about 90 percent of the taxes raised by OBRA-93. • Families with $30,000 to $100,000 in annual income will pay only slightly more in taxes, ranging on average from $50 for families at the low end of this range, to $312 for those nearer the top. The effective tax rates for families in this range will be increased by only a few tenths of a percentage point. • Families with incomes below $30,000 will have their tax payments lowered on aver-age $41 to $86 per year for a total decrease of $3.3 billion—due largely to the historic increase in the earned income tax credit. The effective tax rates for families with incomes below $20,000 will be lowered by about one-half to one percentage point. In other words, those at the low end of the income distribution will be better off because of OBRA-93. (See Chart 2-1.) Low and middle-income families are still protected by inflation indexing of the income tax rate brackets. `https://fraser.stlouisfed.org/title/budget-united-states-government-54/fiscal-year-1995-19045`

- **February 14, 1994, under Bill Clinton, Economic Report of the President 1994 (p. 34) on the Omnibus Budget Reconciliation Act of 1993:** Finally, OBRA93 increased the top corporate tax rate and closed a variety of business tax loopholes, but also enhanced or created several tax incentives for investment. The net effect of these increases and decreases in business taxes should yield about $8

billion in revenue by fiscal 1998. https://fraser.stlouisfed.org/title/economic-report-president-45/1994-8093

- **February 1, 1995, under Bill Clinton, US Budget Fiscal Year 1996 (p. 34) on the Omnibus Budget Reconciliation Act of 1993:** OBRA also included tax incentives to make the tax system fairer. It expanded the EITC—which, as discussed in Chapter 1, guarantees that any family with children and at least one parent who works full time eventually will rise above the poverty line. Today, the tax system is more progressive than at any time in 18 years. https://fraser.stlouisfed.org/title/budget-united-states-government-54/fiscal-year-1996-19046

- **February 13, 1995, under Bill Clinton, Economic Report of the President 1995 (p. 22) on the Omnibus Budget Reconciliation Act of 1993:** The Administration's first response to the dwindling income prospects of many working Americans took the form of a substantial expansion of the earned income tax credit (EITC). The EITC expansion, included in the Omnibus Budget Reconciliation Act of 1993 (OBRA93), increased the after-tax incomes of over 15 million American workers and their families. The EITC is a refundable tax credit that provides a bonus to eligible low-income workers—a bonus that can amount to over $3,000 a year for a family with two children. Through the EITC these workers may realize after-tax incomes well in excess of their wages. https://fraser.stlouisfed.org/title/economic-report-president-45/1995-8094

- **August 5, 1997, Bill Clinton, Statement on Signing the Balanced Budget Act of 1997:** These bills will balance the budget in a way that honors our values, invests in our people, and cuts taxes for middle-class families. They are a victory for all parents who want a good education for their children and for all families working to build a secure future. This package is the best investment we can make in

America's future, and it prepares our Nation for the 21st century. [...] First, it strengthens our families by extending health insurance coverage to up to 5 million children. By investing $24 billion, we will be able to provide quality medical care for these children—everything from regular check-ups to major surgery. I want every child in America to grow up healthy and strong, and this investment takes a major step toward that goal. I am also pleased that the Congress agreed to pay for this investment in our Nation's children in part with a 15-cents-a-pack tax increase on cigarettes. https://www.presidency.ucsb.edu/documents/statement-signing-the-balanced-budget-act-1997

- **May 16, 2001, under George W. Bush, Statement Of Administration Policy - (House) - (Rep. Thomas (R) California):** By reducing marginal tax rates, this bill would reduce the penalty on work, savings, and investment, begin the process of providing much needed immediate tax relief to the American people, and lay a foundation for further long-term economic growth. No one should be forced to pay more than a third of what they earn in taxes. In fact, 77 percent of the tax relief associated with cutting the top rate in H.R. 1836 would go to small business owners and entrepreneurs - the engines of growth in our economy. https://www.presidency.ucsb.edu/documents/statement-administration-policy-hr-1836-economic-growth-and-tax-relief-reconciliation-act

- **June 07, 2001, George W. Bush, Remarks on Signing the Economic Growth and Tax Relief Reconciliation Act of 2001:** Some months ago, in my speech to the joint session of Congress, I had the honor of introducing Steven Ramos to the Nation. Steven is the network administrator for a school district. His wife, Josefina, teaches at a charter school. They have a little girl named Lianna, and they're trying to save for Lianna's college education. High taxes made saving difficult. Last year

they paid nearly $8,000 in Federal income taxes. Well, today we're beginning to make life for the Ramos' a lot easier. Today we start to return some of the Ramos' money and not only their money but the money of everybody who paid taxes in the United States of America. [...] With us today are 15 of the many families I met as I toured our country making the case for tax relief—hard-working Americans. I was able to talk about their stories and their struggles and their hopes, which made the case for tax relief much stronger than my words could possible convey. [...] Tax relief is an achievement for families struggling to enter the middle class. For hard-working lower income families, we have cut the bottom rate of Federal income tax from 15 percent to 10 percent. We doubled the per-child tax credit to $1,000 and made it refundable. Tax relief is compassionate, and it is now on the way. Tax relief is an achievement for middle class families squeezed by high energy prices and credit card debt. Most families can look forward to a $600 tax rebate before they have to pay the September backto-school bills. And in the years ahead, taxpayers can look forward to steadily declining income tax rates. Tax relief is an achievement for families that want the Government tax policy to be fair and not penalize them for making good choices, good choices such as marriage and raising a family. So we cut the marriage penalty. Tax relief makes the code more fair for small businesses and farmers and individuals by eliminating the death tax. Over the long haul, tax relief will encourage work and innovation. It will allow American workers to save more on their pension plan or individual retirement accounts. Tax relief expands individual freedom. The money we return, or don't take in the first place, can be saved for a child's education, spent on family needs, invested in a home or in a business or a mutual fund or used to reduce personal debt. [...] This tax relief plan is principled. We cut taxes for every income-tax payer. We target nobody in; we target nobody out. And tax relief is now on the way.
`https://www.presidency.ucsb.edu/documents/remarks-signing-the-economic-growth-and-tax-relief-reconciliation-act-2001`

- **February 5, 2002, under George W. Bush, Economic Report of the President 2002 (p. 45) on the Economic Growth and Tax Relief Reconciliation Act of 2001:** In short, the President delivered important tax relief in 2001, providing a solid foundation for renewed growth in consumer spending once confidence rebounds, and for an improved investment climate for businesses. The boost in aggregate demand should help provide a foundation for economy-wide recovery in 2002. https://fraser.stlouisfed.org/title/economic-report-president-45/2002-8101

- **February 15, 2002, under George W. Bush, Council of Economic Advisers' Report on the Economic Growth and Tax Relief Reconciliation Act of 2001:** In 2010 the estate tax will be eliminated. Small businesses have benefited from the lowering of individual income tax rates for owners of flow-through business entities such as sole proprietorships and partnerships. In 1998 there were close to 24 million flow-through businesses in the United States, including 17.1 million sole proprietors, 2.1 million farm proprietorships, 1.9 million partnerships, and 2.6 million S corporations. By 2006, when the tax cut will be fully phased in, the Treasury Department estimates that over 20 million tax filers with income from flow-through entities will receive a tax reduction. Finally, the President's tax cut strengthened families and has reduced the burden of financing education. https://www.presidency.ucsb.edu/documents/council-economic-advisers-report

- **May 9, 2003, under George W. Bush, STATEMENT OF ADMINISTRATION POLICY, (House), (Rep. Thomas (R) California and 52 sponsors), Statement of Administration Policy: H.R. 2 - Growth and Jobs Tax Act of 2003:** H.R. 2 accelerates the reductions in individual income tax rates that were enacted in the Economic Growth and Tax Relief Reconciliation Act of 2001 but that are not scheduled to take effect for some years. The legislation similarly accelerates the 2001 Act's increase in the child credit and its reduction of

the marriage penalty. The legislation also increases small business expensing and significantly reduces the double taxation of dividends. This bill is a strong and positive step forward that will help the economy create new jobs today while permanently raising the wages and living standards of American workers now and in the future. https://www.presidency.ucsb.edu/documents/statement-administration-policy-hr-2-growth-and-jobs-tax-act-2003

- **May 28, 2003, George W. Bush, Remarks on Signing the Jobs and Growth Tax Relief Reconciliation Act of 2003:** We are helping workers who need more take-home pay. We're helping seniors who rely on dividends. We're helping small-business owners looking to grow and to create more new jobs. We're helping families with children who will receive immediate relief. By ensuring that Americans have more to spend, to save, and to invest, this legislation is adding fuel to an economic recovery. We have taken aggressive action to strengthen the foundation of our economy so that every American who wants to work will be able to find a job. [. . .] The Jobs and Growth Act reduces Federal income taxes across the board. And today the Internal Revenue Service will post new withholding tax tables so that employers can begin leaving more money in the paychecks of American workers, starting next month. The Jobs and Growth Act increases the per-child tax credit from $600 to $1,000. So today I'm directing the Department of Treasury to issue checks of up to $400 per child to 25 million eligible families. And those checks will begin arriving in July. This combination of income-tax rate reductions, a higher child credit, and a reduction in the marriage penalty will make a difference for families in every part of this country. A family of four with a total income of $75,000 will receive a 19-percent reduction in Federal income taxes, saving $1,122 per year, per family. A family of four with an income of $40,000 will see their income taxes drop from $1,178 to $45, a 96-percent tax cut. And under this new law, 3 million individuals and families will have their Federal income-tax liability completely eliminated. Altogether, 34 million

families with children, including 6 million single moms, will receive an average tax cut of $1,549 per year. Tax relief matters a lot to the average citizen here in America. This tax bill will make it easier for moms and dads to save for their children's education, and that's vitally important for the future of this country. The benefits of the Jobs and Growth Act will also go to investors. The top capital gains tax rate will be reduced by 25 percent, which will encourage more investment and risk taking, and that will help in job creation. The bill also allows for dividend income to be taxed at a lower rate. This will encourage more companies to pay dividends, which in itself will not only be good for investors but will be a corporate reform measure. It's hard to pay dividends unless you've actually got cashflow. The days when people could say, "Invest with me because the sky's the limit," will be changed by dividend policy. It's hard to promote the sky being the limit and pay dividends unless you're actually profitable and have cashflow. Getting—reducing the tax rate on dividends will also increase the wealth effect around America and will help our markets. And the good news is, a lot of senior citizens rely on dividend income to meet their daily needs, and under this legislation, 12 million seniors will receive an average tax reduction of $1,401. We're delivering substantial tax relief to small-business owners and entrepreneurs. Most small-business owners are Subchapter S—own Subchapter S corporations or sole proprietorships or limited partnerships, so the small business pays taxes at the individual tax rate. By cutting individual tax rates and by delivering other incentives for investment in new equipment, 23 million small-business owners will receive an average tax cut of $2,209. https://www.presidency.ucsb.edu/documents/remarks-signing-the-jobs-and-growth-tax-relief-reconciliation-act-2003

- **July 24, 2003, under George W. Bush, Fact Sheet: President Visits Philadelphia to Discuss Economy and Child Tax Credit, Background: Jobs and Growth Tax Relief Reconciliation Act of 2003:** On May 28, 2003, President Bush signed the Jobs and Growth Tax Relief Reconciliation Act of 2003, an enormous

victory for American workers, American families, American investors, and American entrepreneurs and small businesses. This law will enable the American people and small businesses to keep more of their own money. The more money families and small businesses have to save and invest, the more likely it is that people looking for work will find a job. https://www.presidency.ucsb.edu/documents/fact-sheet-president-visits-philadelphia-discuss-economy-and-child-tax-credit

- **January 30, 2004, under George W. Bush, Economic Report of the President 2004 (pp. 44–45) on the Jobs and Growth Tax Relief Reconciliation Act of 2003 and other tax cuts:** The tax cuts provided further stimulus by increasing incentives for business investment. Some of these incentives came in the form of bonus depreciation for business investment, an expansion in the amount of expensing of investment available for small businesses. [...] The 2003 tax cut (JGTRRA)[12] raised the bonus depreciation to 50 percent of the price of new equipment and extended the period of eligibility so that investments made by the end of 2004 would be covered. It also increased the cap on small-business expensing from $25,000 to $100,000 per year through 2005, effectively lowering the cost of investment for small businesses. These tax changes lowered firms' cost of capital and likely provided support for investment at a crucial time. The tax cuts also reduced the cost of capital and increased incentives for business investment by lowering tax rates on personal capital income. The 2001 tax cut (EGTRRA)[13] phased out the estate tax and reduced marginal tax rates on all forms of income. These steps lowered the tax burden on capital income received from corporations and also on income received through sole proprietorships, partnerships, and S corporations (corporations for which income is taxed through individual tax returns). [...] According to one study, the cut in

[12]Refers to the Job Creation and Worker Assistance Act
[13]Refers to the Economic Growth and Tax Relief Reconciliation Act

taxes on capital income in the 2003 tax package (JGTRRA) reduced the marginal effective total tax rate on income from corporate investment by 2 to 4 percentage points. Lower taxes on dividends and capital gains also move the tax system toward a more equal treatment of debt and equity, of dividends and capital gains, and of corporate and noncorporate capital. This move increases economic efficiency because it promotes the allocation of capital based on business fundamentals rather than a desire for tax avoidance. https://fraser.stlouisfed.org/title/economic-report-president-45/2004-8103

- **February 2, 2004, under George W. Bush, US Budget Fiscal Year 2005 (p. 33) on the Jobs and Growth Tax Relief Reconciliation Act of 2003:** Enabling Families and Businesses to Plan for the Future with Confidence. America's families and businesses need certainty to plan effectively for the future. And while the future holds many uncertainties, Government policies should not needlessly add to them. Right now, key elements of the tax relief passed by the Congress and signed into law by President Bush—including the increase in the child tax credit, the marriage penalty relief, and the increased incentives for small business investing—will expire in a few years. For example, a married couple with two children and an annual income of $40,000 would face a $922 tax increase in 2005 if the provisions of the Jobs and Growth Act are not made permanent. This family needs to know today that it will have that $922 in 2005 for its own needs, not the Government's. President Bush urges the Congress to make these vital tax reductions permanent. https://fraser.stlouisfed.org/title/budget-united-states-government-54/fiscal-year-2005-19051

- **February 2, 2004, under George W. Bush, US Budget Fiscal Year 2005 (p. 333) on the Jobs and Growth Tax Relief Reconciliation Act of 2003:** The Jobs and Growth Tax Relief Reconciliation Act of 2003 provided major bene-

fits for small business: • Small business owners receive 79 percent—about $9.7 billion—of the tax relief from accelerating (from2006 to 2003) the reduction in the top income tax bracket to 35 percent. • The amount of investment eligible for expensing quadruples—to $100,000—beginning in 2003 for firms with investments less than $400,000. This provides a large tax saving and investment incentive, and also reduces record-keeping burdens. https://fraser.stlouisfed.org/title/budget-united-states-government-54/fiscal-year-2005-19051