AEA Papers and Proceedings 2023, 113: 377–381
https://doi.org/10.1257/pandp.20231070

EMPIRICAL ADVANCES IN ADDRESSING POLICY QUESTIONS

Do Tax Increases Tame Inflation?†

By James Cloyne, Joseba Martinez, Haroon Mumtaz, and Paolo Surico*

Inflation is at a four-decade high in many countries. To what extent did recent fiscal stimulus actions contribute to today's current inflationary woes? And could tax increases help lower inflation? Despite intense research on the macroeconomic effects of tax changes on real outcomes, comparatively little evidence exists for prices and inflation.[1] This article asks the question, "Do tax increases tame inflation?" Based on US federal tax changes post–World War II, our answer is "yes" if personal income taxes are increased but "no" if corporate income taxes are increased.

Tax changes can have a range of effects. Raising taxes might lower disposable income; worsen firms' cash flows; and, with credit constraints, lead to lower consumption and investment. Inflation could fall.[2] On the other hand, raising distortionary labor and capital taxes could discourage labor supply and hinder investment incentives. These supply-side channels might lead to increased costs and *higher* prices. Which effect dominates empirically?

*Cloyne: University of California Davis, NBER, and CEPR (email: jcloyne@ucdavis.edu); Martinez: London Business School and CEPR (email: jmartinez@london.edu); Mumtaz: Queen Mary University of London (email: h.mumtaz@qmul.ac.uk); Surico: London Business School and CEPR (email: psurico@london.edu). We would like to thank Sarah Zubairy for inviting us to write and present this paper.

† Go to https://doi.org/10.1257/pandp.20231070 to visit the article page for additional materials and author disclosure statement(s).

[1] Earlier exceptions include Mountford and Uhlig (2009); Mertens and Ravn (2012, 2013); Guajardo, Leigh, and Pescatori (2011); Cloyne (2013); Nguyen, Onnis, and Rossi (2021); and Perotti (2005). Results vary, and most papers focus on headline inflation rates and aggregate tax changes.

[2] In addition, if tax increases raise the expected present value of real primary surpluses, the fiscal theory of the price level suggests that inflation should fall. See, for example, Cochrane (2022) and Bianchi and Melosi (2022).

To examine this question, we analyze a broad range of aggregate and disaggregated price indices. We examine heterogeneity in the effects of tax changes on sectoral consumer, producer, and stock prices, as well as the response of inflation expectations. We use exogenous variation in US federal tax policy changes between 1950 and 2006 identified by Romer and Romer (2010) and decomposed into personal and corporate tax changes by Mertens and Ravn (2013). By combining the identification approach from Mertens and Ravn (2013) with local projections to estimate longer-term impacts, Cloyne et al. (2022) show that corporate tax changes produce highly persistent effects on productivity and GDP via increased R&D and innovation. Personal tax changes generate more transitory effects. In this article, we build on this approach.

First, using 190 subcomponents of the personal consumption expenditure (PCE) deflator, we show that higher average personal income tax rates lower prices across a broad range of sectors but higher average corporate tax rates do not. In fact, higher corporate taxes often lead to persistently *higher* prices. Second, consistent with longer-term productivity effects, the impacts on prices of a corporate tax increase are strongest for durable goods and capital equipment. Personal tax increases have stronger effects on prices of nondurable goods. Third, personal tax increases lower inflation expectations but have noisy and insignificant effects on stock prices. Corporate tax increases persistently lower stock prices, with limited effects on inflation expectations. Overall, personal tax changes seem to affect a broad range of prices through demand channels, while the price effects of corporate tax increases reflect persistent supply-side effects.

I. Approach

We follow the approach in Cloyne et al. (2022), which combines the identification strategy of Romer and Romer (2010) and Mertens

and Ravn (2013) while estimating dynamic effects using local projections. Because tax changes might generate persistent effects on supply conditions, we are interested in both the shorter- and longer-term impacts. Local projections are well suited to this task.[3] In terms of identification, Romer and Romer (2010) measure exogenous variation in US federal tax policy by isolating policy reforms that were not responding to current or prospective economic conditions using narrative evidence on policymakers' motivations. Mertens and Ravn (2013) decompose these data into personal and corporate reforms and use them as proxies for the true shocks to average personal and corporate income tax rates. This approach also provides a convenient way to identify the effects of each tax shock separately while allowing for endogenous feedback to both average tax rates.

We estimate a sequence of local projections for each horizon h:

$$(1)\quad \mathbf{Y}_{t+h} = c^{(h)} + \sum_{j=1}^{P} \mathbf{B}_j^{(h+1)} \mathbf{Y}_{t-j} + \mathbf{u}_{t+h}^{h}.$$

$\mathbf{Y}$ is a vector of variables of interest, including GDP, prices, and the tax rates.[4] For $h = 0$, this structure is equivalent to the vector autoregression setup in Mertens and Ravn (2013). The identification problem is that the reduced-form residuals are combinations of unobserved structural disturbances. In other words, $\mathbf{u}_t = \mathbf{A}\mathbf{e}_t$, where $\mathbf{e}_t$ is the vector of "structural" shocks and not all elements of the matrix $\mathbf{A}$ are identified. The relevant elements of $\mathbf{A}$ can, however, be identified using the narrative exogenous tax reforms as instruments. As shown by Jordà (2005), the impulse response function (IRF) at horizon h can be computed as $\hat{\mathbf{B}}_1^h \mathbf{A}_i$, where $\mathbf{A}_i$ refers to the relevant component pertaining to tax shock i and $\hat{\mathbf{B}}_1^h$ is estimated for each h using the local projection specification above. Following Cloyne et al. (2022), we use Bayesian methods for estimation.[5]

When considering a limited number of outcome variables for prices, we add each price index of interest (in logs) to $\mathbf{Y}$ one at a time. To study the 190 subcategories of the PCE deflator, we extend the specification above to a factor model approach. $\mathbf{Y}$ then contains four factors from the large set of PCE components. For this specification, the observation equation that links the factors to the disaggregated PCE data, $\mathbf{x}$, is

$$(2)\quad \mathbf{x}_t = c + b\tau + \Lambda \mathbf{F}_t + \xi_t,$$

where c is an intercept, τ is a time trend, $\mathbf{F}_t$ are the $R = 4$ nonstationary factors, Λ is a matrix of factor loadings, and ξ_t are idiosyncratic components that are allowed to be $I(1)$ or $I(0)$.[6] The response of $\mathbf{F}_t$ is estimated using the augmented equation (1), which can be substituted in equation (2) to produce IRFs of all variables in $\mathbf{x}_t$.[7]

II. Do Tax Increases Tame Inflation?

We start by examining the short- and longer-term implications of tax increases for consumer prices. We estimate the factor-augmented local projection specification outlined above and plot the response of the headline PCE deflator as well as 190 subcomponents. These data are available from 1960 to 2006, which we take from Baumeister, Liu, and Mumtaz (2013).

Figure 1 shows the results. Each panel reports the percentage response of prices to a 1 pp increase in the average personal income tax rate or the average corporate income tax rate.[8] The central red line is the response of the (log) aggregate PCE deflator. Each gray line refers to one of the 190 subsectors. The online Appendix shows the red line with the associated error bands.

Figure 1 shows that personal tax increases are broadly disinflationary, with the vast majority of

[3] See, for example, Jordà, Singh, and Taylor (2020).

[4] $\mathbf{Y}$ includes the main variables from Mertens and Ravn (2013): the average corporate income tax rate, the average personal income tax rate, the two tax bases, real GDP, real government spending, and real federal debt. As in Cloyne et al. (2022), we also add a principal component from a large quarterly US macro and financial dataset to guard against information insufficiency.

[5] We use flat priors, $P = 4$, standard errors are adjusted for heteroskedastity, and our "lag-augmented" specification addresses potential serial correlation in the residuals (Montiel Olea and Plagborg-Møller 2021).

[6] The factors are estimated using the nonstationary factor model of Barigozzi, Lippi, and Luciani (2021). $R = 4$ based on the Bai and Ng (2002) criteria.

[7] Aikman, Bush, and Taylor (2018) use a factor-augmented LP, although in a different context.

[8] The tax rates themselves increase by 1 pp and then return to 0 after around four to five years.

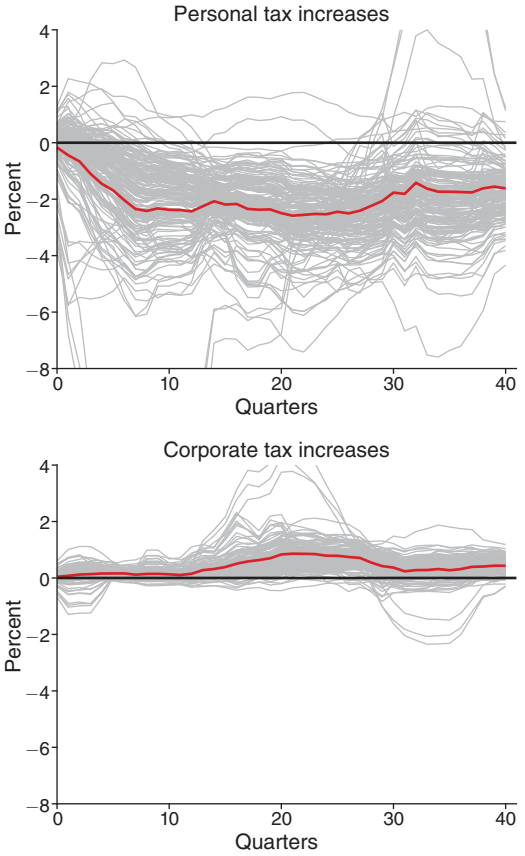

FIGURE 1. RESPONSE OF CONSUMER PRICES

Notes: Percentage response of the PCE deflator (red) and 190 subcomponents (grey lines). Estimation uses factor-augmented local projections as discussed in the text. The sample period is 1960–2006. The top panel shows the effect of a 1 pp increase in the average personal income tax rate. The bottom panel shows the effects of a 1 pp increase in the average corporate income tax rate.

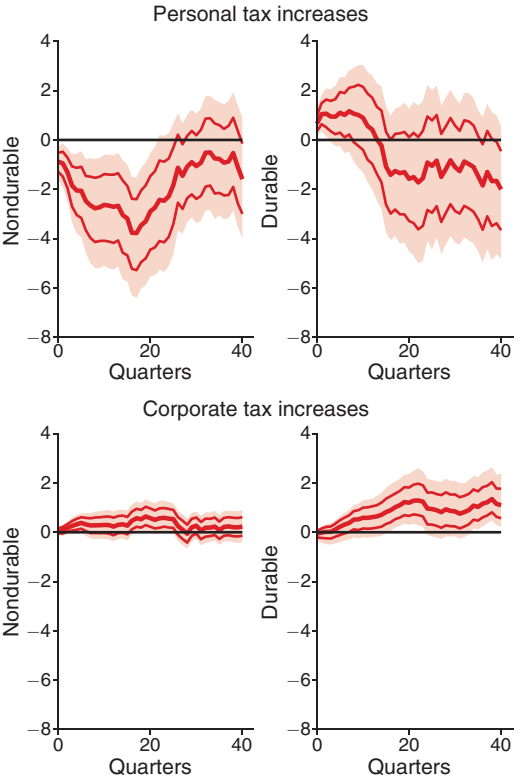

FIGURE 2. CONSUMER PRICES BY SECTOR

Notes: Percentage response of PCE price indices for durable and nondurable goods prices. IRFs are estimated using the baseline local projection specification discussed in the text. The sample period is 1950–2006. Top panel: effect of a 1 pp increase in the average personal income tax rate. Bottom panel: effects of a 1 pp increase in the average corporate income tax rate. Red areas denote 68 percent and 90 percent credible sets.

sectors seeing prices fall over time. Some of the most volatile responses are for food and energy. Given the shape of the IRF, inflation falls in the short term. On the other hand, corporate tax increases do not lower prices. The effect on prices and inflation is limited in the short term but tends to become positive in the medium term. There is some evidence of a short-term fall in prices for a limited number of products—for example, fresh foods.

Figure 2 examines the broad nondurable and durable subcategories of PCE prices. These broader categories are available from the Bureau of Economic Analysis from 1950 to 2006, and we use the baseline specification in equation (1). The effect of an increase in personal taxes is stronger for nondurable goods prices. On the other hand, neither set of prices falls in response to corporate tax increases. A persistent positive effect on prices is also much more pronounced for durable goods. In the online Appendix, we show similar results using subcomponents of the producer price index. Corporate tax increases also lead to a persistent increase in the price of capital equipment.

Taken together, the results in Figures 1 and 2 are consistent with the notion that demand

effects might be driving the fall in prices following a personal income tax hike, but persistent supply effects might be pushing up prices following an increase in corporate taxes.[9] Cloyne et al. (2022) show that corporate tax changes can generate very persistent movements in productivity through changes in R&D and innovation activities. To the extent that these activities more directly influence durable goods and capital equipment, the heterogeneity discussed above also points in this direction.

To provide further evidence in favor of this hypothesis, Figure 3 examines the response of inflation expectations and real stock prices. The Livingston Survey contains inflation expectations of professional economists back to 1950. For real stock prices, we use the S&P 500 index deflated by the consumer price index.[10]

To the extent that corporate tax increases are expected to hinder productivity, expected inflation may not decline, and stock prices might be negatively affected. The stock market response might be persistent if it takes time for the productivity effects to become fully apparent. These effects can be seen in the second row of Figure 3. In the online Appendix, we also examine heterogeneity in the response of stock prices using Fama-French industry-level data. The fall in stock prices is particularly clear for the high-tech and health industries, sectors that are likely to have a high R&D intensity. Personal income tax increases have a clear negative effect on inflation expectations but noisy and insignificant effects on stock prices.

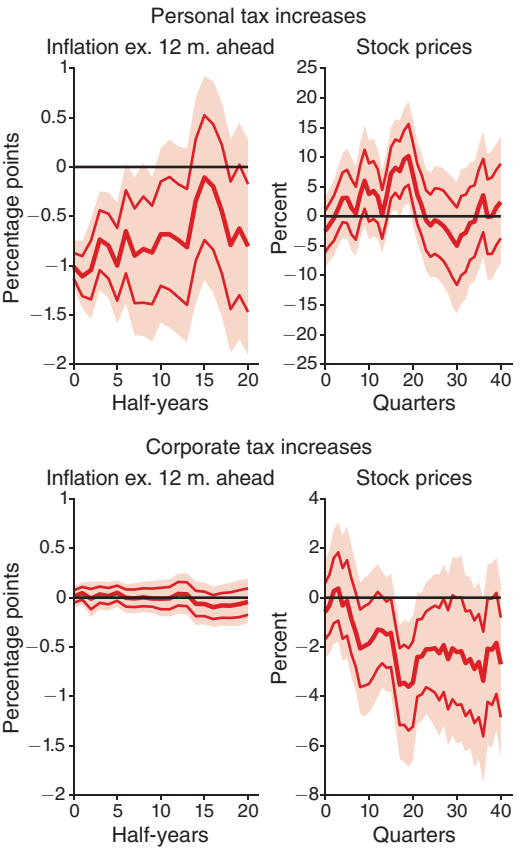

FIGURE 3. EXPECTATIONS AND STOCK PRICES

Notes: Response of 12-month ahead inflation expectations (pp) from the Livingston Survey and the (real) S&P 500 index (percent). Estimation uses the baseline specification. Livingston Survey data are biannual. Sample period: 1950–2006. Top panel: effects of a 1 pp increase in the average personal income tax rate. Bottom panel: effects of a 1 pp increase in the average corporate income tax rate. Red areas denote 68 percent and 90 percent credible sets.

III. Discussion

We have shown that personal tax increases lead to relatively fast reductions in prices for a broad range of goods and services, especially for nondurable goods. Corporate tax increases, however, have a limited effect on prices and inflation in the short run and actually push up prices over the longer term. These inflationary forces are stronger for durable goods. A persistent rise in prices is also consistent with persistently lower productivity, falling stock prices, and a limited movement in inflation expectations. This suggests that supply-side factors are at work for corporate tax changes. For personal tax changes, a Keynesian story would work via the Phillips curve, where higher taxes would lower aggregate demand for goods and services, leading to lower prices. To the extent that a tax increase generates an increase in the present value of expected future real primary

[9] These broad conclusions based on disaggregated sectoral prices, stock prices, and inflation expectations (discussed in Figure 3) over the longer term also echo Mertens and Ravn (2013), who examine the short-term effects on headline inflation only.

[10] The Livingston Survey is biannual. Given the more limited sample, we therefore only include taxes, GDP, and inflation expectations in **Y**. For stock prices, the results are also very similar using the nominal index.

surpluses, the fiscal theory of the price level also predicts lower inflation. Overall, demand-side stories therefore seem more consistent with the results for personal tax increases above.

Will tax increases always reduce inflation? The answer is no. In the United States post–World War II, we find that personal tax hikes reduce prices and inflation, but corporate tax hikes do not. Corporate tax increases may also generate higher prices for many years.

REFERENCES

Aikman, David, Oliver Bush, and Alan M. Taylor. 2018. "Monetary versus Macroprudential Policies: Causal Impacts of Interest Rates and Credit Controls in the Era of the UK Radcliffe Report." NBER Working Paper 22380.

Bai, Jushan, and Serena Ng. 2002. "Determining the Number of Factors in Approximate Factor Models." *Econometrica* 70 (1): 191–221.

Barigozzi, Matteo, Marco Lippi, and Matteo Luciani. 2021. "Large-Dimensional Dynamic Factor Models: Estimation of Impulse–Response Functions with *I*(1) Cointegrated Factors." *Journal of Econometrics* 221 (2): 455–82.

Baumeister, Christiane, Philip Liu, and Haroon Mumtaz. 2013. "Changes in the Effects of Monetary Policy on Disaggregate Price Dynamics." *Journal of Economic Dynamics and Control* 37 (3): 543–60.

Bianchi, Francesco, and Leonardo Melosi. 2022. "Inflation as a Fiscal Limit." Federal Reserve Bank of Chicago Working Paper 2022-37.

Cloyne, James, Joseba Martinez, Haroon Mumtaz, and Paolo Surico. 2022. "Short-Term Tax Cuts, Long-Term Stimulus." NBER Working Paper 30246.

▶ **Cloyne, James S.** 2013. "Discretionary Tax Changes and the Macroeconomy: New Narrative Evidence from the United Kingdom." *American Economic Review* 103 (4): 1507–28.

▶ **Cochrane, John H.** 2022. "Fiscal Histories." *Journal of Economic Perspectives* 36 (4): 125–46.

Guajardo, Jamie, Daniel Leigh, and Andrea Pescatori. 2011. "Expansionary Austerity: New International Evidence." IMF Working Paper WP/11/158.

▶ **Jordà, Òscar.** 2005. "Estimation and Inference of Impulse Responses by Local Projections." *American Economic Review* 95 (1): 161–82.

Jordà, Òscar, Sanjay R. Singh, and Alan M. Taylor. 2020. "The Long-Run Effects of Monetary Policy." NBER Working Paper 26666.

▶ **Mertens, Karel, and Morten O. Ravn.** 2012. "Empirical Evidence on the Aggregate Effects of Anticipated and Unanticipated US Tax Policy Shocks." *American Economic Journal: Economic Policy* 4 (2): 145–81.

▶ **Mertens, Karel, and Morten O. Ravn.** 2013. "The Dynamic Effects of Personal and Corporate Income Tax Changes in the United States." *American Economic Review* 103 (4): 1212–47.

Montiel Olea, José Luis, and Mikkel Plagborg-Møller. 2021. "Local Projection Inference Is Simpler and More Robust than You Think." *Econometrica* 89 (4): 1789–823.

Mountford, Andrew, and Harald Uhlig. 2009. "What Are the Effects of Fiscal Policy Shocks?" *Journal of Applied Econometrics* 24 (6): 960–92.

▶ **Nguyen, Anh D.M., Luisanna Onnis, and Raffaele Rossi.** 2021. "The Macroeconomic Effects of Income and Consumption Tax Changes." *American Economic Journal: Economic Policy* 13 (2): 439–66.

Perotti, Roberto. 2005. "Estimating the Effects of Fiscal Policy in OECD Countries." CEPR Discussion Paper 4842.

▶ **Romer, Christina D., and David H. Romer.** 2010. "The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks." *American Economic Review* 100 (3): 763–801.