

TREND INFLATION SHOCKS AND FINANCIAL HETEROGENEITY[☆]

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Abstract

We study the distributional consequences of persistent inflation. Using a trend-cycle decomposition and principal component analysis, we identify trend inflation innovations linked to monetary and corporate tax shocks. Trend inflation redistributes resources through debt revaluation, asset price movements, and income composition. Similar trend shocks generate different distributional outcomes depending on their source. Monetary-driven inflation raises house prices and benefits outright owners and mortgagors. Corporate-tax-driven inflation depresses house prices and primarily protects mortgagors through debt revaluation. Housing tenure is the main dimension of heterogeneity: renters consistently experience weaker consumption outcomes because they lack offsetting gains from asset appreciation or debt erosion.

Keywords: heterogeneous financial positions, trend inflation, trend-cycle decomposition, smooth local projections, redistribution.

JEL Codes: E21, E31, E32, E52.

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1 Introduction

A large literature shows that transitory inflation shocks have important distributional consequences, with heterogeneous effects across households depending on income composition, wealth, age, skill composition and balance-sheet positions (e.g., [Kaplan et al., 2018](#); [Auclert, 2019](#); [Dolado et al., 2021](#)). Most of this evidence, however, concerns transitory fluctuations in inflation. Much less is known about the distributional consequences of persistent inflation.

This distinction matters because persistence shapes the channels through which inflation redistributes resources. Any unexpected inflation revalues nominal assets and liabilities, but persistent inflation has larger and more durable effects: by shifting expectations and long-term interest rates, it moves asset prices and the present value of long-duration positions such as mortgages, reshaping household wealth over longer horizons. Moreover, its consequences are likely to depend on the forces that generate it. Yet despite renewed interest following the recent inflation surge, there is little empirical evidence on how persistent inflation affects different households, or whether these effects vary with its source.

This paper studies the distributional effects of persistent inflation shocks and asks whether they depend on the source of inflation. We decompose PCE inflation into trend and cycle components following [Stock and Watson \(2016\)](#) and focus on innovations to trend inflation. We then trace these innovations to the underlying structural shocks driving them, including persistent monetary shocks ([Uribe, 2022](#); [Mumtaz and Theodoridis, 2023](#)), oil supply shocks ([Baumeister and Hamilton, 2019](#); [Kanzig, 2021](#)), technology news shocks ([Barsky and Sims, 2012](#); [Cascaldi-Garcia and Vukotić, 2022](#)), and personal and corporate income tax shocks ([Romer and Romer, 2010](#); [Mertens and Ravn, 2013](#); [Cloyne et al., 2023](#)). Permanent monetary shocks ([Uribe, 2022](#)) account for about 21 percent of trend inflation movements. For each remaining disturbance, we isolate the component associated with persistent inflation by extracting the variation that comoves with trend

inflation while remaining orthogonal to movements attributable to permanent monetary shocks. Operationally, we recover this component using a principal-component approach (PCA) applied jointly to the non-monetary structural shock and residual trend inflation. Among non-monetary disturbances, corporate tax shocks emerge as the dominant source of persistent, non-monetary trend inflation.

Despite generating similarly persistent increases in inflation, permanent monetary and corporate-tax-driven trend inflation shocks have markedly different macroeconomic effects. Monetary-driven trend inflation resembles a demand disturbance, increasing output and house prices. In contrast, corporate-tax-driven trend inflation behaves like an adverse supply disturbance, depressing output and asset prices while sustaining inflation (Cloyne et al., 2023). These differences are central to understanding the distributional consequences of persistent inflation because they imply very different changes in household balance sheets and sources of income.

We next examine how households respond to these shocks using microdata from the U.S. Consumer Expenditure Survey (CEX). A central finding is that housing tenure is the primary dimension along which the effects of persistent inflation differ across households. Renters experience significantly weaker consumption responses than mortgagors and outright owners following both monetary- and tax-driven trend inflation shocks. Moreover, housing tenure remains the dominant source of heterogeneity even after controlling for age, income, and other household characteristics. These findings suggest that exposure to housing wealth and mortgage debt plays a central role in shaping the distributional consequences of persistent inflation.

To understand these heterogeneous responses, we combine household-level evidence from the CEX with aggregate data on income and balance-sheet positions. Trend inflation redistributes resources through three channels: debt revaluation, asset price movements, and income composition. The relative importance of these channels depends critically on the source of inflation. Monetary-driven trend inflation raises house prices, generating

capital gains for homeowners and debt revaluation gains for mortgagors through the real erosion of nominal debt. By contrast, corporate tax-driven trend inflation shocks depress house prices, leaving mortgagors only partially protected via debt erosion. Outright owners are also relatively insulated because a larger share of their income derives from financial sources that are less affected by trend inflation rather than labor. Renters systematically lose: inflation erodes real labor income, and in the absence of significant assets, liabilities, or financial income, they receive no offsetting valuation gains. These differences help explain why housing tenure emerges as the key determinant of household responses to persistent inflation and why renters consistently fare worse than owners and mortgagors.

Previous works document heterogeneous effects of different macroeconomic shocks. [Cloyne et al. \(2020\)](#) document that mortgagors and, to some extent, renters increase their consumption more strongly in response to transitory expansionary monetary policy shocks. They argue that the interaction between borrowing constraints and different marginal propensities to consume is key to understanding the heterogeneous effects. In contrast, we show that consumption responses to permanent shocks differ substantially and uncover an underlying mechanism driven by wealth and debt dynamics. This mechanism operates importantly through house prices and home equity—channels whose quantitative importance for household consumption is well established in the housing literature, albeit not in the context of trend inflation ([Berger et al., 2018](#); [Beraja et al., 2019](#); [Berger et al., 2021](#)). [Coibion et al. \(2017a\)](#) show that contractionary monetary policy increases consumption and income inequality in the U.S. When examining persistent monetary shocks, they find that reductions in the inflation target increase overall consumption inequality. However, they do not analyze their effects across other household groups (housing tenure, age, etc). Our contribution is to show that shock persistence matters both for aggregate effects and for heterogeneous transmission across household groups.

More broadly, we extend the analysis beyond monetary shocks to a broader set of inflationary shocks and examine several dimensions of household heterogeneity. More recent

work has focused on analyzing the effects of (transitory) inflationary shocks (see, for example, [Broer et al., 2022](#); [Amberg et al., 2022](#); [Ferreira et al., 2026](#); [Del Canto et al., 2025](#)). [Del Canto et al. \(2025\)](#) show that the source of inflation matters for understanding the effects. Our analysis is closely related to theirs, but focusing on persistent shifts in inflation not on transitory ones. We also find that the source of trend inflation fluctuations matters for the transmission channels and the overall effects.

A growing body of work analyzes the effects of shifts in trend inflation and permanent monetary shocks. They consider the redistribution through the Fisher channel and nominal balance sheets ([Doepke and Schneider, 2006](#); [Pallotti, 2022](#)), as well as the interaction between persistent inflation and mortgage debt ([Doepke et al., 2019](#); [Garriga et al., 2017](#)). Other contributions emphasize earnings heterogeneity and labor income channels ([Gornemann et al., 2016](#); [Heathcote et al., 2010](#)). However, the empirical evidence on the effects of these shocks remains scarce. [Uribe \(2022\)](#); [Mumtaz and Theodoridis \(2023\)](#); and [Lukmanova and Rabitsch \(2023\)](#) document that persistent increases in inflation induce a very transitory expansion in economic activity without analyzing the heterogeneous effects across households. Our macro results are consistent with these works. We complement this analysis by focusing on the heterogeneous effects and transmission mechanisms.

Our findings have important implications for the evaluation of inflationary episodes and stabilization policies. The distributional consequences of persistent inflation depend not only on its magnitude but also on the forces that generate it. Similar increases in trend inflation can produce markedly different effects on household consumption, wealth, and balance sheets depending on whether inflation originates from demand- or supply-side disturbances. A robust finding is that renters are systematically more exposed to adverse consumption effects than owners and mortgagors, regardless of the source of inflation. More broadly, our results suggest that understanding the welfare consequences of persistent inflation requires accounting for asset-price movements and income composition in addition to the traditional debt-revaluation channel.

The remainder of the paper proceeds as follows. Section 2 describes the data and identification strategy. Section 3 presents macroeconomic effects. Section 4 analyzes distributional consequences and their sources, and Section 5 concludes.

2 Extracting Trend Inflation Shocks

This section describes the identification strategy for structural trend inflation shocks. Section 2.1 introduces the statistical framework used to recover trend innovations and discusses their properties. Section 2.2 analyzes their relationship with existing structural shocks. Section 2.3 applies principal component analysis to identify the structural drivers of trend inflation.

2.1 A Trend-Cycle Model of Inflation

Trend inflation can be measured through various methodologies. In this analysis, we adopt an estimate based on the univariate unobserved-components stochastic volatility outlier-adjusted (UCSVO) model of [Stock and Watson \(2016\)](#), applied to PCE inflation. This model decomposes quarterly PCE annualized inflation into two distinct components: (i) a permanent stochastic trend component, τ_t , and (ii) a serially uncorrelated transitory component, ϵ_t . The variances of the innovations to both components evolve over time, governed by independent stochastic volatility processes. Additionally, the model accommodates the possibility of heavy-tailed outliers in the temporary component. Consequently, the PCE inflation rate can be expressed as:

$$\pi_t = \tau_t + \epsilon_t$$

where the components are further defined as:

$$\tau_t = \tau_{t-1} + \sigma_{\Delta\tau,t} \eta_{\tau,t}$$

$$\epsilon_t = \sigma_{\epsilon_t} s_t \eta_{\epsilon,t}$$

$$\Delta \ln(\sigma_{\epsilon_t}^2) = \gamma_\epsilon \nu_{\epsilon,t}$$

$$\Delta \ln(\sigma_{\Delta\tau,t}^2) = \gamma_\Delta \nu_{\Delta\tau,t}$$

Here, $(\eta_\epsilon, \eta_\tau, \nu_\epsilon, \nu_{\Delta\tau}) \sim \mathcal{N}(0, I_4)$ represent independent and identically distributed (i.i.d.) innovations, while s_t is an i.i.d. random variable that accounts for outliers in ϵ_t . The innovations to trend inflation, e_t^τ , are represented as:

$$e_t^\tau \equiv \sigma_{\Delta\tau,t} \eta_{\tau,t}$$

We estimate the trend inflation series using U.S. data from 1959:Q1 to 2023:Q4.¹ The left panel of Figure 1 plots annualized headline PCE inflation (black dotted line) alongside the filtered extracted trend inflation series (solid red line). Trend inflation peaks sharply in the mid-1970s, reaching double-digit levels, and again in the early 1980s, though less dramatically. It then declines to around 4% by the mid-1980s and continues to fall, fluctuating near 2% during the Great Moderation. Following the COVID-19 pandemic, trend inflation rises again.

The right panel of Figure 1 displays the estimated trend inflation innovations for the subsample 1984:Q1-2019:Q4, which will be the sample period used in our baseline analysis.² The prominent spikes in the early 1980s coincide with the Great Inflation period. Following

¹Throughout our analysis, we focus on one-sided filtered estimates of the trend. Using the smoothed estimates would incorporate future information and likely make the trend innovations predictable and distort the comparison against structural shocks.

²Due to data availability of the CEX and structural shock series, our baseline sample is shorter than the one we used to identify trend inflation innovations. We opt to use a longer sample for the trend estimation to recover more precise estimates. However, trend innovations are very highly correlated if we use a pre-Covid sample to recover the trend.

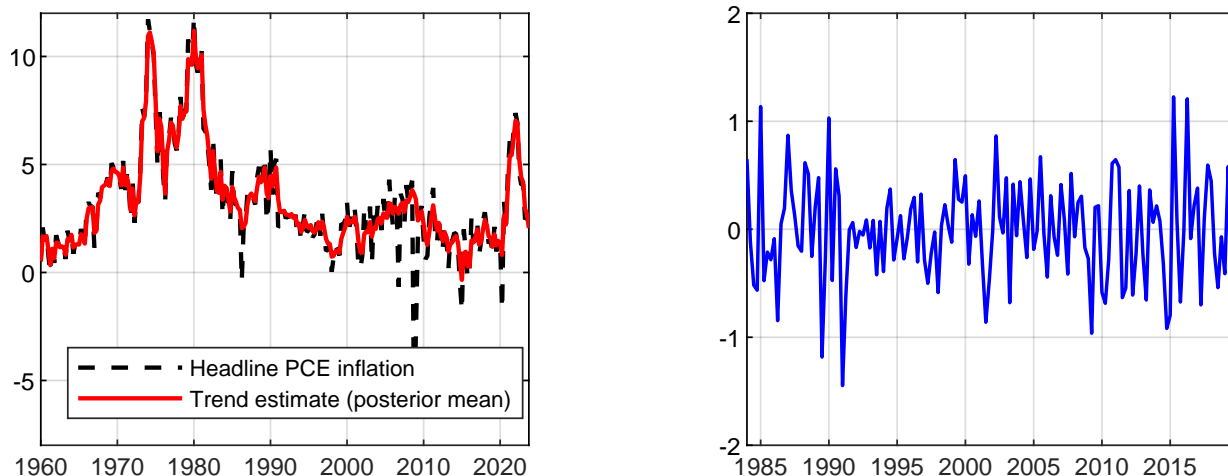


Figure 1 Trend Headline PCE Inflation and Trend Inflation Innovations

Notes: The left panel depicts Headline PCE inflation (change with respect to the previous quarter, annualized) and the filtered trend inflation series estimated using the UCSVO model as [Stock and Watson \(2016\)](#). The right panel depicts the series of filtered trend Inflation innovations estimated for the sample 1984:Q1-2019:Q4. Horizon is in quarters.

this episode, the volatility of innovations declines markedly, before rising again toward the end of the sample.

Alternative approaches to estimating trend inflation yield varying degrees of smoothness, depending critically on model specification and prior assumptions. For example, the model of [Stock and Watson \(2016\)](#), which treats the cyclical component of inflation as independently and identically distributed (i.i.d.), produces a relatively volatile trend that filters out only high-frequency fluctuations. By contrast, allowing for persistence in the cyclical component, as in [Fisher et al. \(2025\)](#), yields a smoother estimated trend. Appendix [A.4](#) reports results based on the [Fisher et al. \(2025\)](#) filter to extract trend shocks (see [Figure A.30](#)) and shows that our main findings are robust to alternative trend-cycle decompositions used to identify the innovations.

2.2 Inflation Innovations and Other Structural Shocks

Trend inflation innovations may reflect shifts in monetary policy or other structural shocks that influence trend inflation but prompt limited or delayed policy responses. To explore

their underlying sources, Figure 2 plots the correlations (solid black lines) between filtered trend inflation innovations and four leads and lags of structural shocks that may potentially drive trend inflation. Statistically significant correlations at the 5% level ($p < 0.05$) are marked with dots. Considering the availability of the CEX data from 1984 and that most of the shocks do not cover post-2019 period, correlations are computed from 1984 up to 2019.

If monetary policy effectively anchors inflation expectations, the identified series can be interpreted either as shocks to the inflation target or as persistent shifts in the stance of monetary policy. Uribe (2022) and Schmitt-Grohé and Uribe (2022) identify permanent monetary shocks in the U.S., while Mumtaz and Theodoridis (2023) focus on inflation target shocks using medium-run restrictions. Notably, Uribe (2022) employs long-run restrictions within a cointegrated system to identify such permanent shocks. The series of permanent monetary shocks identified by Uribe (2022) are significantly and positively correlated with our trend inflation innovations over the sample period. Similarly, the shock series of Mumtaz and Theodoridis (2023) exhibits a statistically significant contemporaneous correlation of 0.21 with the trend inflation innovations.

Figure 2 indicates that trend inflation innovations reflect not only shifts in the inflation target or the monetary policy stance, but also broader structural forces shaping the inflation outlook. These include fiscal policy changes and oil price shocks. For example, trend inflation innovations display positive contemporaneous and lagged correlations with the oil price news shocks identified by Kanzig (2021). Consistent with this interpretation, Degasperi (2023) shows that negative oil supply expectations generate deep and persistent stagflationary effects. By contrast, TFP news measured using patent-based shocks from Cascardi-Garcia and Vukotić (2022) do not appear to be significantly related to trend inflation innovations.

Trend inflation innovations also exhibit a positive, statistically significant, and economically meaningful lagged correlation with corporate tax shocks. Cloyne et al. (2023) provide

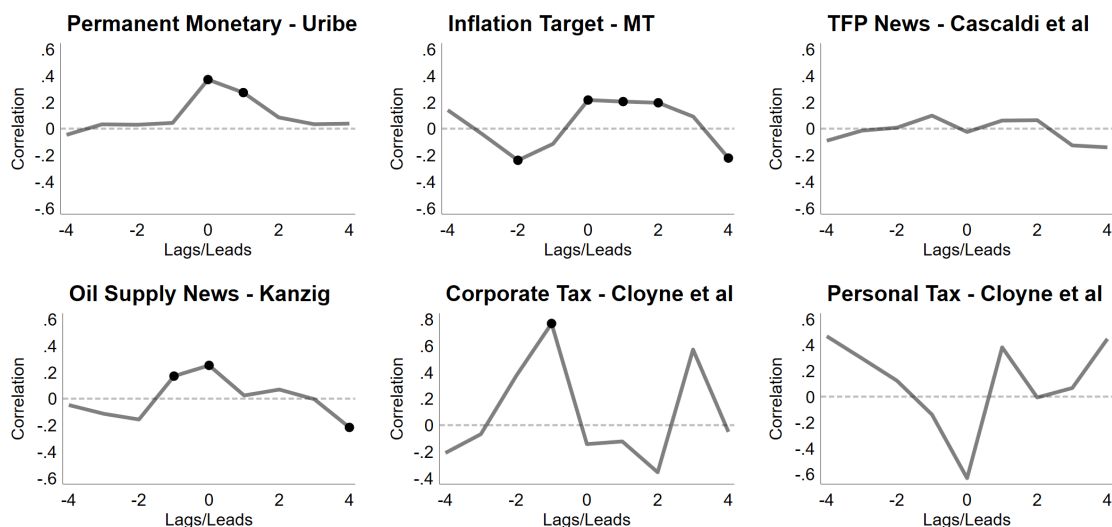


Figure 2 Serial Correlation of Trend Inflation Innovations with Structural Shocks

Notes: Serial correlation between the series of filtered Trend Inflation innovations and monetary, oil and TFP shocks identified by previous works over the sample 1984Q1:2019Q4. Permanent Monetary - Uribe denotes the permanent monetary shocks identified by [Uribe \(2022\)](#). Inflation target shock of [Muntaz and Theodoridis \(2023\)](#). TFP News - Cascaldi denotes the TFP shocks computed by [Cascaldi-Garcia and Vukotić \(2022\)](#). Oil Supply News - Kanzig denotes the series of oil supply news shocks identified by [Kanzig \(2021\)](#). Corporate Income Tax - Cloyne et al. and Personal Income Tax - Cloyne et al. denote the corporate and personal income tax shocks identified by [Mertens and Ravn \(2013\)](#) and updated by [Cloyne et al. \(2023\)](#). Continuous black lines represent the estimated correlation for different lags/leads of the corresponding shock series. The point denotes statistical significance $p < 0.05$.

empirical evidence supporting the inflationary effects of corporate tax changes, which are identified following [Mertens and Ravn \(2013\)](#). The evidence in [Figure 2](#) suggests that the inflationary effects of corporate taxation documented by [Cloyne et al. \(2023\)](#) contain a sizable and persistent trend component. In contrast, trend inflation innovations are negatively correlated with personal income tax shocks identified by the same authors, although this correlation is not statistically significant.

Hence, trend inflation innovations capture a broad set of structural shocks, including shifts in the inflation target, changes in the monetary policy stance, and cost-push disturbances such as oil price news and fiscal policy adjustments. These forces shape long-run inflation expectations. In the next section, we exploit these correlations to disentangle structural components underlying observed movements in trend inflation.

2.3 Decomposing the Structural Drivers of Trend Inflation

Innovations to trend inflation can arise from a variety of structural shocks. As shown in Figure 2, permanent monetary shocks are naturally correlated with trend inflation and account for roughly 21 percent of its fluctuations. Our objective is to identify additional structural forces that contribute to persistent movements in trend inflation beyond those associated with monetary policy.

For each structural shock s_t^z , we seek to isolate the component that is systematically associated with persistent inflationary pressures. Specifically, we define $e_t^{\tau,z}$ as the component of shock s_t^z that generates positive comovement with trend inflation after removing the variation in trend inflation attributable to permanent monetary shocks. Conceptually, we decompose each structural shock as

$$s_t^z = e_t^{\tau,z} + \nu_t^z,$$

where $e_t^{\tau,z}$ denotes the inflationary component of the shock and ν_t^z captures variation unrelated to persistent trend inflation dynamics. Our objective is to recover $e_t^{\tau,z}$. We proceed in two steps.

First, we orthogonalize trend inflation innovations with respect to the permanent monetary shock series identified by Uribe (2022). This yields a measure of trend inflation innovations driven by non-monetary forces, denoted by $(e_t^\tau)^o$. To allow for delayed effects of structural disturbances on trend inflation, we define the cumulative one-quarter-ahead change in orthogonalized trend inflation (c_t^τ) as

$$c_t^\tau = (e_t^\tau)^o + (e_{t+1}^\tau)^o.$$

The use of a one-quarter-ahead horizon is motivated by the serial correlations reported in Figure 2, which suggest that some structural disturbances affect trend inflation with a

delay. At the same time, the short horizon limits contamination from unrelated shocks.

Second, for each non-monetary structural shock s_t^z discussed in the previous section (i.e. TFP news shocks, oil supply news shocks, corporate tax shocks, and personal income tax shocks), we estimate a separate principal component analysis using the bivariate vector

$$X_t^z = \begin{pmatrix} s_t^z \\ c_t^\tau \end{pmatrix}.$$

The first principal component extracts the linear combination of s_t^z and c_t^τ that explains the largest share of their joint variation. Since our objective is to identify the component of each structural shock associated with increases in trend inflation, we extract the factor that loads positively on s_t^z and c_t^τ .³ The resulting series, denoted $e_t^{\tau,z}$, captures the component of structural shock s_t^z that is most closely associated with persistent non-monetary movements in trend inflation. In this sense, identification relies on a sign restriction: among all sources of variation in s_t^z , we retain the component that comoves positively with orthogonalized trend inflation innovations.

A linear projection of trend inflation innovations on a structural shock would recover the average relationship between the two variables across all realizations of the shock. Our objective is different. We seek to isolate the component of the shock that is associated with persistent inflationary pressures. If only a subset of shock realizations generates persistent movements in trend inflation, averaging across all realizations may attenuate the relationship and mask the relevant variation. PCA instead extracts the direction of maximum joint variation between the structural shock and trend inflation innovations. Consequently, it emphasizes the component of the shock that systematically comoves with trend inflation while downweighting variation unrelated to persistent inflation dynamics.

This procedure is closely related in spirit to the use of principal components to identify

³For the case of shocks with negative correlation with trend inflation (personal tax shocks), we extract the factor that loads negatively on the original shock series and positively on c_t^τ .

distinct dimensions of monetary policy shocks in [Gürkaynak et al. \(2005\)](#). The extracted factors are highly robust to alternative definitions of trend inflation changes. The correlation of $e_t^{\tau,z}$ with factors obtained using contemporaneous changes in trend inflation is 0.97, while the corresponding correlations using cumulative horizons of two and three quarters are 0.99 and 0.98, respectively.

We evaluate the extracted factors using two validation exercises. First, we assess their contribution to fluctuations in orthogonalized trend inflation. Second, we estimate their effects on headline PCE inflation. A factor that captures the inflationary component of an underlying structural shock should both explain a meaningful share of trend inflation variation and generate persistent movements in observed inflation.

Among non-monetary disturbances, corporate tax shocks emerge as an important driver of trend inflation, accounting for roughly two-thirds of the non-monetary persistent inflation movements in quarters with corporate tax shocks. Although oil-driven trend inflation shocks raise inflation expectations on impact and increase PCE inflation for up to ten quarters, their effects are considerably less persistent than those associated with corporate-tax-driven trend inflation shocks or permanent monetary shocks. Consistent with this, the inflationary component of oil supply news plays a much smaller role in explaining trend inflation fluctuations, they account for only about 3 percent of those fluctuations. For this reason, we exclude them from the analysis that follows.⁴

Finally, neither personal income tax shocks nor TFP news shocks generate economically meaningful contributions to trend inflation. Consistent with their weak correlation with trend inflation in [Figure 2](#), the corresponding PCA factors explain only a negligible share of trend inflation fluctuations. We therefore focus on permanent monetary shocks and corporate-tax-driven trend inflation shocks, which emerge as the quantitatively most

⁴Figure [A.4](#) reports the responses of PCE inflation and inflation expectations to oil-driven trend inflation shocks, temporary oil shocks, and the raw oil supply news shocks. The PCA procedure successfully separates the persistent inflationary component of oil news from its transitory component. While temporary oil shocks have no statistically significant effects on either PCE inflation or inflation expectations, oil-driven trend inflation shocks generate persistent increases in both variables.

important sources of persistent inflation.

Figure A.3 in the Appendix compares the raw series of corporate tax shocks with the identified corporate-tax-driven trend inflation shocks. The two series track each other closely, indicating that most corporate tax changes are associated with persistent movements in inflation. There are, however, two notable exceptions. The first is the Omnibus Budget Reconciliation Act of 1990, which raised taxes on a relatively small group of high-income households and improved the long-run fiscal outlook, thereby lowering long-run inflation expectations (Auerbach, 2000). The second is the Jobs and Growth Tax Relief Reconciliation Act of 2003, which was widely perceived as temporary and therefore had little effect on inflation expectations. Appendix A.2.1 provides a detailed discussion of these episodes.

Given these findings, we focus on permanent monetary shocks and corporate-tax-driven trend inflation shocks in the remainder of the paper. These shocks emerge as the primary sources of persistent inflation and together account for roughly 25 percent of contemporaneous trend inflation innovations. This highlights the joint importance of monetary and fiscal forces in shaping long-run inflation dynamics. For brevity, we refer to corporate-tax-driven trend inflation shocks as CT-TI shocks.

3 Macroeconomic Effects

To estimate the macroeconomic effects of trend-inflation-driving structural shocks, we use local projections (LP) (Jordà, 2005). Specifically, we estimate the following specification to obtain impulse response functions (IRFs):

$$y_{t+h} - y_{t-1} = \alpha_h + \beta_h e_t^{\tau,z} + \gamma_h X_{t-1} + u_{t+h} \quad (1)$$

where h denotes the IRF horizon, t is the contemporaneous quarter, y_{t+h} denotes the aggregate variable of interest (GDP, one-year yield, PCE inflation, etc.), $e_t^{\tau,z}$ is either the permanent monetary shock or the corporate-tax-driven trend inflation (CT-TI) shock and X_{t-1} includes first four lags of the first differences of PCE inflation, real GDP per capita, the 10-year U.S. Treasury yield, and the dependent variable y_t . Given the length of our sample period and the fact that most of our data is non-stationary we follow [Jorda and Taylor \(2025\)](#) and estimate the local projections in this long-difference specification instead of a level specification. As our baseline we employ the smooth local projections (SLP) approach by [Barnichon and Brownlees \(2019\)](#) where our coefficient of interest β_h is approximated using a linear B-splines basis function extension ($\beta_h \approx \sum_{k=1}^K b_k B_k(h)$ where $B_k : \mathbb{R} \rightarrow \mathbb{R}$ for $k = 1, \dots, K$ is a set of B-spline basis functions and b_k for $k = 1, \dots, K$ is a set of scalar parameters). Newey-West standard errors are used to correct for serial correlation in the error term u_{t+h} .

Figures 3 and 4 report the impulse response functions of key macroeconomic variables to a permanent monetary shock and to a CT-TI shock, respectively. Both shocks are normalized to generate the same peak increase in headline PCE inflation of 25 bps and are identified over the 1984:Q1 to 2019:Q4 sample period.

A permanent monetary shock generates an immediate and persistent increase in headline PCE inflation, core PCE inflation, and inflation expectations. Both one-year and ten-year rates rise in tandem with observed and expected inflation. Real GDP increases on impact and remains above trend for roughly two years before gradually reverting to its steady state level. Unemployment falls quickly and modestly following the shock and returns to baseline sooner than output. Aggregate consumption increases slightly and is less responsive than investment, which exhibits a stronger and more pronounced expansion.

Relative to permanent monetary shocks, CT-TI shocks generate a more delayed but highly persistent increase in both headline and core PCE inflation. Inflation responds gradually to the shock, consistent with the positive lagged correlation between corporate

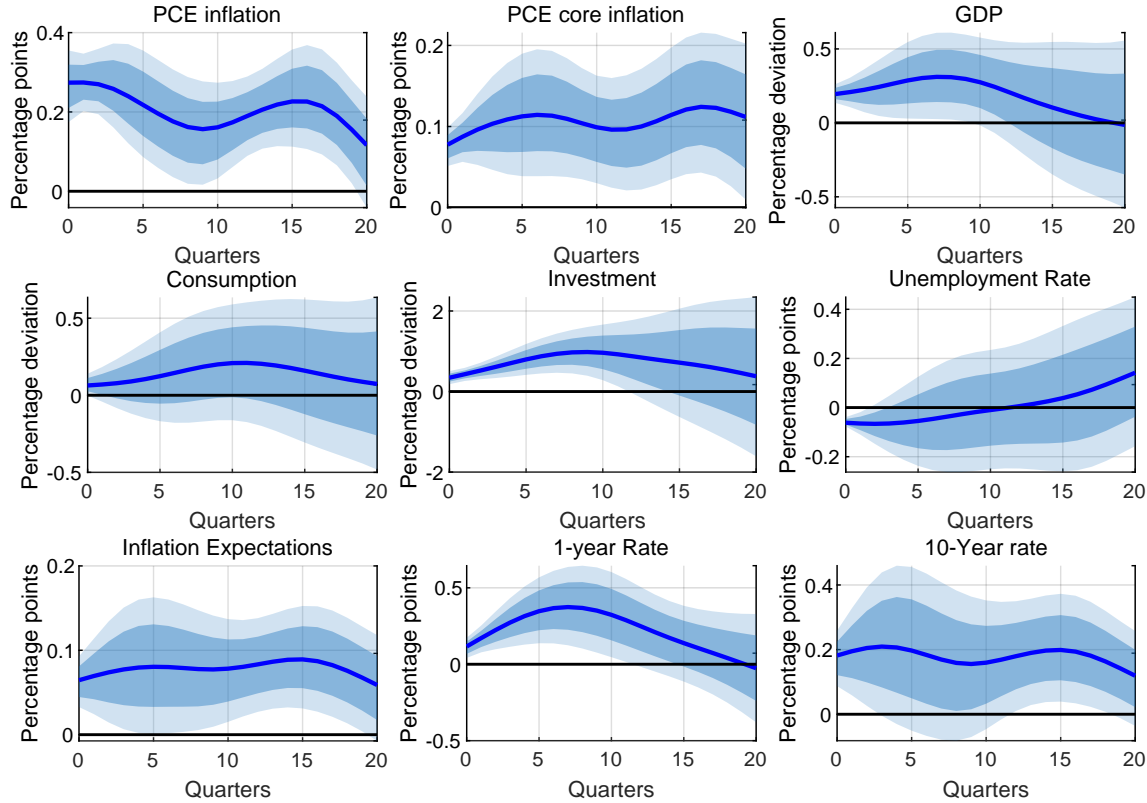


Figure 3 IRFs to Permanent Monetary Shock

Notes: Impulse responses of aggregate macro variables to a permanent monetary shock, estimated based on equation (1) using smooth local projections. Sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Continuous solid lines denote the point estimates. Shaded areas denote 68% and 90% confidence bands based on Newey-West standard errors.

tax shocks and trend inflation innovations documented in Figure 2. Inflation expectations display a similar delayed and persistent rise.

In contrast to permanent monetary shocks, CT-TI shocks have markedly different real effects. Real GDP shows little response for roughly the first ten quarters and then declines significantly thereafter. Consumption and investment follow a similar pattern, pointing to a contractionary effect on real activity at medium horizons. Unemployment mirrors the behavior of output, remaining initially stable before rising as real activity weakens.

The one-year interest rate closely tracks inflation, suggesting an active monetary policy response aimed at containing inflationary pressures. However, this response appears insufficient to fully offset the inflationary impact of the CT-TI shock. Long term yields also rise

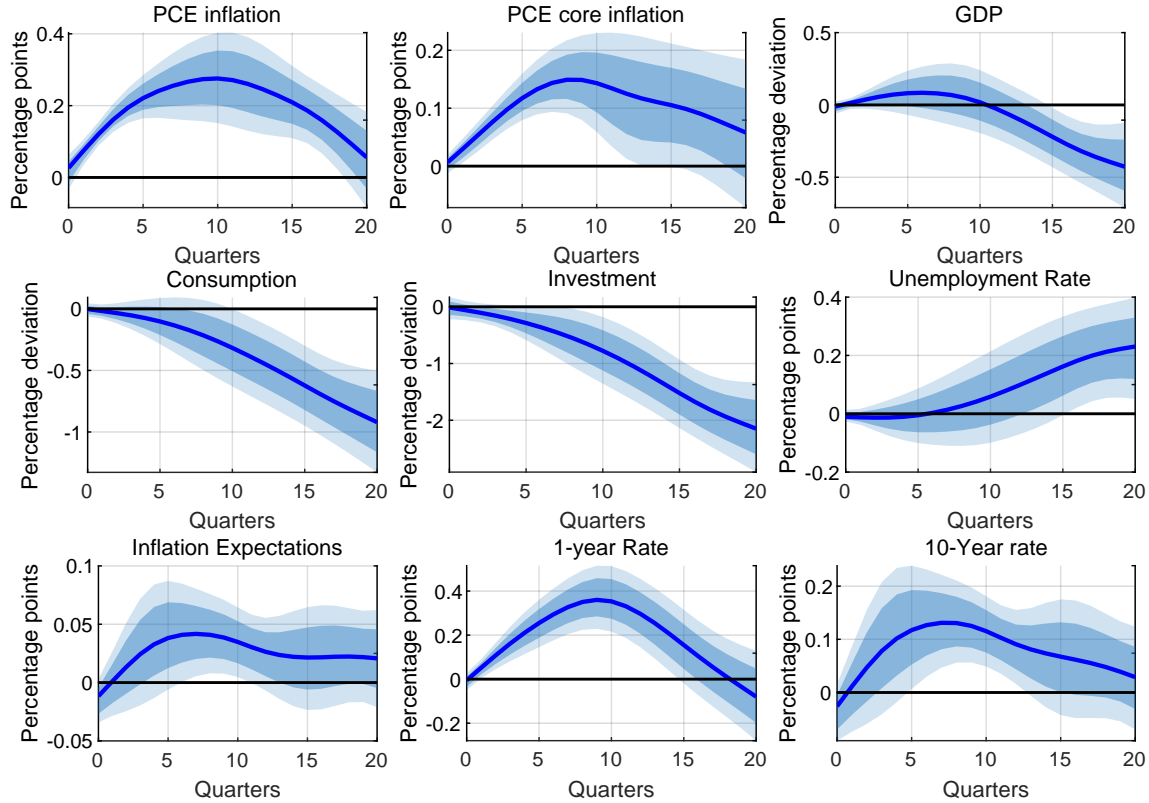


Figure 4 IRFs to Corporate-Tax-Driven Trend Inflation Shock

Notes: Impulse responses of aggregate macro variables to a corporate-tax-driven trend inflation shock, estimated based on equation (1) using smooth local projections. Sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Continuous solid lines denote the point estimates. Shaded areas denote 68% and 90% confidence bands based on Newey-West standard errors.

in line with inflation expectations, reflecting the persistent nature of the shock. Appendix A.2.3 further explores the effects of this shock on markups, real wages, and fiscal deficit.

In the Appendix, we report the macroeconomic responses to the raw corporate tax shocks (see Figure A.9). The responses are broadly similar to those obtained for the corporate-tax-driven trend inflation shock, but two notable differences emerge. First, raw corporate tax shocks do not generate a significant increase in inflation expectations, consistent with Cloyne et al. (2023). Second, they do not raise core PCE inflation at almost any horizon. Appendix A.2.4 further shows that these results are qualitatively similar, although less smooth, when estimated using standard local projections.

Taken together, these results show that although both permanent monetary shocks and

CT-TI shocks contribute to movements in trend inflation, they have markedly different real consequences. Permanent monetary shocks raise inflation while temporarily stimulating real activity, whereas CT-TI shocks generate persistent inflationary pressures alongside a delayed but substantial contraction in output, consumption, and investment. Thus, shocks that move trend inflation are not homogeneous in their macroeconomic effects, underscoring the importance of distinguishing between their underlying structural sources when assessing the real consequences of long-run inflation dynamics.

4 Heterogeneous Effects

While it is well known that inflation impacts all economic agents, it is equally important to recognize that its effects are not uniform across the population. Variations in net borrowing positions, wealth composition, wages, and consumption patterns can lead to differing impacts on individuals. In this section, we explore how structural shocks that shift trend inflation affect different groups of households, focusing in particular on their housing tenure status.

4.1 Econometric Strategy

To estimate the heterogeneous effects of trend inflation, we employ the same framework as in our analysis of macroeconomic aggregates:

$$y_{i,t+h} - y_{i,t-1} = \alpha_{i,h} + \beta_{i,h} e_t^{\tau,z} + \gamma_{i,h} X_{i,t-1} + u_{i,t+h} \quad (2)$$

where again h and t denote the IRF horizon and the contemporaneous quarter, respectively. The index i represents different household groups. The variable $y_{i,t+h}$ is our outcome of interest, with our baseline specification focusing on the log of real consumption per capita by housing tenure group such that $i \in (\text{renter}, \text{mortgagor}, \text{outright owner})$. A

more detailed description of the microdata and variables of interest is provided in the next section. As in equation (1), $e_t^{\tau,z}$ denotes a shock driving trend inflation, where $z \in \{\text{monetary, corporate tax}\}$. The vector $X_{i,t-1}$ includes four lags of the first difference of PCE inflation, real GDP per capita, the U.S. ten-year yield, and the dependent variable $y_{i,t}$. For the CEX consumption expenditure data there is evidence for trends in under-reporting (Heathcote et al. (2010)). Following Cloyne et al. (2020), we account for the trend in under-reporting in two ways. First, we re-scale consumption expenditure for each cohort in the survey data. This is done by applying the ratio of the national statistics series to the corresponding series aggregated from the CEX. Second, we incorporate a group-specific linear time trend to account for low-frequency variation in under-reporting and other characteristics unique to each group. As in the previous section, we employ the SLP approach by Barnichon and Brownlees (2019) and use Newey-West standard errors to control for heteroskedasticity and serial correlation in the error term.

4.2 Data

We utilize data from the Consumer Expenditure Survey (CEX) interview sample conducted by the Bureau of Labor Statistics. This monthly rotating panel is designed to be representative of the US population and covers the period from 1984:Q1 to 2019:Q4.⁵ The CEX provides detailed information on household expenditures across various categories, household income, labor supply, and a rich set of demographic characteristics. Expenditure categories include durable goods, non-durable goods, and services.⁶ All expenditure series are converted into real per capita terms using the CPI and adjusted for family size,

⁵In our baseline analysis we focus on the pre-Covid sample until 2019:Q4 because the series for corporate tax shocks is not available after 2019. However, the responses to the permanent monetary policy shock are consistent over the longer sample including the Covid period (see Appendix, Figure A.20).

⁶Following Coibion et al. (2017b), our measure of non-durable and service consumption encompasses food, beverages, clothing, footwear, gasoline, and other fuels, personal care items, newspapers, tobacco, household operations, utilities, recreational services, financial services, accommodations, telecommunications services, and transportation services. Durable consumption includes items such as leisure goods, furniture, and jewelry.

then aggregated to a quarterly frequency using the interview reference date. To estimate the heterogeneous effects by household group, we create three pseudo cohorts based on household characteristics such as housing tenure, age or net income. Section A.1.2 in the Appendix provides further details on the data and the construction of the variables.

Table 1 presents average real per-capita quarterly expenditures, annual income, and liabilities by housing tenure over the full sample period. Renters have the lowest total consumption, while mortgagors exhibit the highest levels, driven in part by higher durable expenditures. Nondurable goods and services account for the majority of consumption across all groups.

	Renter	Mortgagor	Owner
Total consumption	2986	3819	3633
Durable consumption	313	523	398
Nondurable & service consumption	2674	3303	3223
Total before-tax income (annual)	10026	15699	11541
Total after-tax income (annual)	8665	12774	10175
Gross labor income (annual)	8256	13158	5986
Gross business income (annual)	456	1605	799
Gross financial income (annual)	348	828	2158
Gross other income (annual)	947	714	2570
Total liabilities (only from 1994)	1688	25809	1664
Mortgage liabilities (only from 1994)	410	24159	889
Savings	776	2422	4118
Age of HH head	42	47	63

Table 1 Average Quarterly Expenditures, Income and Liabilities over 1984:2019

Notes: The values in the table are average real per-capita values. The CEX sample goes from 1984:Q1-2019:Q4 (1994:Q1-2019:Q4 for liabilities) and the CEX sample weights are used to compute averages.

Income varies substantially across tenure types: mortgagors have the highest total income, followed by owners and renters. For mortgagors and renters labor income constitutes by far the largest share of their income. Owners instead rely more on other income sources such as financial income and transfers, including social security and pension income. Balance-sheet positions also differ sharply, with mortgagors holding significantly higher liabilities, reflecting mortgage debt, while renters and owners have relatively low debt and

a higher relative role for non-mortgage debt — such as consumer credit — especially for renters.⁷ Savings are highest among owners and lowest among renters. The average age of the household head increases monotonically from renters to mortgagors to owners, consistent with life-cycle patterns in housing tenure, income, and wealth accumulation.

In parts of our analysis, we complement the micro evidence from the CEX with aggregate income and balance sheet information by component from NIPA Table 2.1 and the U.S. Financial Accounts. This allows us to study the response of detailed income and asset/liability components in response to the two shocks for which we have documented substantial heterogeneity across household groups in Table 1.⁸ The Financial Accounts data also allows us to distinguish between overall balance sheet changes and changes due to transactions only which is particularly relevant for assets. We construct a “transaction-only” level by cumulatively summing transaction flows over time. This enables us to identify active balance sheet adjustments in response to the two trend inflation shocks. For example, we can assess whether households increase holdings of financial assets, independently of asset price increases that would mechanically raise the level of financial assets. Similar to the CEX, all data is deflated by CPI and converted into per capita terms based on population size (see details on the series used in the Appendix, Table A.1).

4.3 The Heterogeneous Response of Consumption

We begin by estimating the consumption response of households across the three housing tenure groups: renters, mortgagors and outright owners. Figure 5 illustrates the changes in

⁷Housing tenure status is defined based on the dwelling in which the household resides. As a result, renters and outright owners may occasionally report small mortgage liabilities, for example related to second homes. However, these amounts are negligible compared with the mortgage liabilities held by households classified as mortgagors.

⁸The CEX is primarily designed to collect information on household spending over time. While it includes also some information on income, assets and liabilities the quality of this data — especially by components — is generally lower than the expenditure data. Moreover, these questions are only asked during some interviews, are not available for our full sample period and are subject to more structural breaks. Therefore, we report the results based on this additional CEX data — when available — only as cross-check in the Appendix but focus on the aggregate data in the main part of the paper.

consumption levels for the three groups in response to the permanent monetary and CT-TI shocks. As in Section 3, both shocks are normalized to generate the same peak increase in headline PCE inflation of 25 bps. To streamline exposition, Figure 5 reports confidence bands only for the owner group. For renters and mortgagors, we plot average responses, marking statistical significance with squares and circles, respectively. The consumption responses for each group, together with their confidence bands, are reported in Figure A.16 in the Appendix.

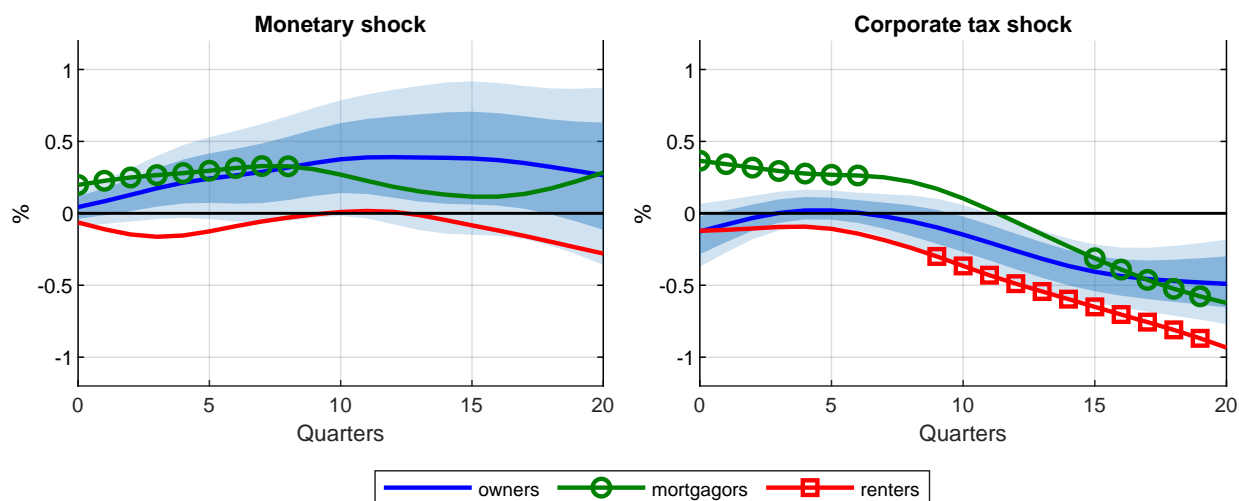


Figure 5 Consumption Response by Housing Tenure Group

Notes: Impulse responses to permanent monetary (left column) and corporate-tax-driven (right column) trend inflation shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate for owners (blue line), 68% (darker) and 90% (lighter) confidence bands based on Newey-West standard errors. Point estimates for mortgagors (green line) and renters (red line). Markers indicate significance at 90% confidence level.

Permanent monetary shocks significantly raise consumption for mortgagors and outright owners, while leaving renters’ consumption broadly unchanged. In contrast, trend inflation shocks associated with corporate tax increases reduce consumption across all household groups in the medium run, although mortgagors experience a significant increase in consumption in the first year after the shock. Figure A.12 in the Appendix reports the relative consumption responses for the two shocks. The figure displays confidence bands for renters relative to owners only; however, since owners and mortgagors exhibit similar outcomes

(mortgagors fare even better in the case of corporate tax shocks) the results clearly indicate that renters are significantly worse off in relative consumption terms following both trend inflation shocks.

The decline in renters' relative consumption is similar when consumption is decomposed into durable and nondurable components (see Appendix Figure A.11). Renters' durable consumption falls significantly following both trend inflation shocks, whereas the increase in consumption among mortgagors is driven primarily by higher nondurable spending. Moreover, using the broader expenditure measure introduced by Coibion et al. (2017b), which includes mortgage interest payments, rent, housing maintenance costs, education, vehicle purchases, and health insurance expenditures, yields very similar conclusions (see Appendix Figures A.14 and A.15).

Cloyne et al. (2020) show that expansionary monetary policy disproportionately benefits households with mortgage debt relative to outright homeowners and renters. The responses reported in Figure 5 indicate that shock persistence plays a crucial role: households with debt also benefit from monetary shocks that raise trend inflation. However, debt alone does not fully explain the distributional effects, as owners' consumption responses are statistically similar to those of mortgagors, while renters experience pronounced relative losses. For corporate tax shocks that raise trend inflation, households with debt benefit more than the other groups, although these gains dissipate over the medium run. Renters, by contrast, emerge as the clear losers from the fiscal contraction that induces trend inflation.⁹ In the next section, we investigate the theoretical mechanisms that can account for these patterns.

⁹The shares of renters, owners, and mortgagors are broadly stable over the sample period (Figure A.1). Still, one concern is that tenure switching may contaminate our results. We address this in two ways. First, we exclude households that change tenure during the four quarters they are observed. Second, we examine the response of tenure shares to the shocks (Appendix, Figure A.13). The response is insignificant in the case of permanent monetary shocks. For inflationary corporate tax increases there is a small increase in the share of renters. If some mortgagors or owners switch to become renters, these are on average households with a higher income and higher consumption expenditures which would increase the average consumption of renters and hence suggests that our estimated response for renters in Figure 5 could be considered an upper bound. The conclusion that renters are relatively worse off remains unchanged.

4.3.1 Robustness

Our analysis delivers clear conclusions regarding the distributional effects of trend inflation shocks across housing tenure groups. Nevertheless, one may question the specific empirical choices underlying our results.

Standard LP. We have already shown that our findings are robust to alternative specifications of the local projection equation (2). Figure A.16 reports results using a standard LP approach and alternative smoothing approaches.

Role of linear trends and rescaling. Following Cloyne et al. (2020), the CEX pseudo-panel incorporates two adjustments designed to address under-reporting: quarterly rescaling of cohort consumption to match NIPA aggregates and the inclusion of group-specific linear trends. Figure A.17 shows that our findings are robust to the inclusion of linear trends. Figure A.12 reports relative consumption responses computed without NIPA rescaling. The qualitative pattern remains unchanged. In particular, renters exhibit systematically weaker consumption responses than owners and mortgagors following both monetary and corporate-tax-driven trend inflation shocks, consistent with our baseline results.

Alternative Trend Estimate. Another objection one might raise regards the trend inflation shock we extract. Given we wish to recover a purely statistical trend we have used as a baseline the model of Stock and Watson (2016) to extract the cyclical and the trend components of inflation. Yet, this approach recovers a trend series that are characterized by high volatility even in low frequency. To ensure that our results are not driven by the way we have extracted the trend shock we proceed by re-estimating the trend using the approach of Fisher et al. (2025). According to their specification inflation follows:

$$\pi_t = \tau_t + \epsilon_t + \sigma_\omega \omega_t$$

τ_t is defined exactly as in the baseline specification (i.e., $\tau_t = \tau_{t-1} + \sigma_{\Delta\tau,t}\eta_{\tau,t}$), but the cyclical components is assumed to have persistence:

$$\epsilon_t = \phi_t\epsilon_{t-1} + \sigma_{\epsilon,t}\eta_{\epsilon,t}$$

Figure [A.30](#) plots the identified trend inflation and shocks under the alternative specification and compares them with the benchmark. The alternative method produces a noticeably smoother trend series, particularly prior to the 1980s. In the post-1980 period, however, the two measures are very similar. Since our sample begins in 1984Q1, the estimated distributional effects of corporate tax shocks that shift trend inflation are unlikely to differ qualitatively across approaches. Appendix Figure [A.32](#) confirms this intuition.

Bias-Correction. Finally, we highlight that our results do not suffer from small sample bias issues as highlighted by [Herbst and Johannsen \(2024\)](#). Applying the bias-corrected estimator suggested by [Herbst and Johannsen \(2024\)](#) yields very similar IRFs (see Figure [A.18](#)). Moreover, these authors point out that Newey-West standard errors are often downward biased in short samples, and recommend to use only heteroscedasticity-robust standard errors. The results using Huber-White standard errors, displayed in Figure [A.19](#), turn out to be very similar to our baseline results.

4.3.2 Alternative Dimensions of Heterogeneity

Inflationary shocks may generate distributional effects that are not solely determined by households' net wealth positions. Other characteristics, such as income, age and skill composition, can shape how permanent changes in inflation affect different household groups. For example, [Del Canto et al. \(2025\)](#), studying temporary oil and monetary policy shocks, find that oil shocks are regressive while temporary monetary policy shocks are progressive, with the asset holding channel, rather than debt exposure, playing a central role in driving

their results.

To assess whether our results are driven by households' financial positions rather than by characteristics correlated with net wealth, such as age or permanent income, we replicate the analysis by grouping households along these alternative dimensions. The results, reported in Appendix Figure A.21, indicate that households' financial positions are central to understanding the distributional effects of trend inflation. Older and middle aged households, which are more likely to be owners or mortgagors, experience larger consumption gains than younger households following permanent monetary shocks. In contrast, both young and middle aged households benefit more from CT-TI shocks in the short- and medium-run than older households. When households are grouped by permanent income, consumption responses do not differ significantly across income groups for either of the trend inflation shocks considered.

To emphasize that housing tenure is the key dimension of heterogeneity, Figure A.22 plots consumption responses by interacting housing tenure with age groups. The figure shows that the results are largely driven by middle aged households. Within this group, renters consistently experience the largest consumption losses following trend inflation shocks, while owners and mortgagors display similar responses. Among older households, with the exception of a short lived consumption gain for mortgagors in the first year following a corporate tax shock, there are no significant differences between owners and mortgagors. Likewise, among younger households, consumption responses do not differ significantly between renters and mortgagors.

Figure A.23 further reports consumption responses by housing tenure interacted with income groups. High income and middle income renters experience the largest consumption declines following trend inflation shocks, irrespective of whether these shocks originate from monetary policy or corporate tax changes. In contrast, low income renters display short run consumption gains. Taken together, these results indicate that the adverse distributional effects of trend inflation are concentrated primarily among renters, particularly higher

income renters. By contrast, middle aged and middle and high income mortgagors emerge as the group that benefits the most from trend inflation. Overall, these findings underscore the central role of housing tenure in shaping household level responses to persistent inflationary shocks, beyond differences in income or age alone.

4.4 Distributional Channels

Inflation can generate distributional effects through several complementary channels. Differences in earnings exposure imply that households can be affected unevenly depending on how wages and labor income respond to inflationary shocks, as emphasized by the earnings heterogeneity channel (Heathcote et al., 2010, Gornemann et al., 2016, Auclert, 2019). Wealth heterogeneity may further amplify these effects through multiple mechanisms. The debt-revaluation channel operates via changes in the real value of nominal assets and liabilities, potentially benefiting borrowers at the expense of lenders (Doepke et al., 2019, Garriga et al., 2021, 2017). Asset holdings may also matter, as households with different portfolios experience distinct valuation and income effects (Erosa and Ventura, 2002, Del Canto et al., 2025, Ferreira et al., 2026). Financial frictions and liquidity constraints can shape consumption responses by limiting households' ability to smooth shocks (Cloyne et al., 2020). Finally, the expenditure channel underscores that inflation has heterogeneous effects across households, depending on the composition of their consumption baskets and their exposure to relative price changes (Cravino et al., 2020, Kanzig, 2021).¹⁰ In the next section, we investigate the mechanisms underlying the distributional patterns observed in the data for households with different housing tenure.

¹⁰Because renters, mortgagors, and some owners consume broadly similar baskets of goods, we are unable to examine this channel separately across these groups in our analysis.

4.4.1 The Debt-Revaluation Channel

As shown in Figures 3 and 4 both trend inflation shocks lead to a persistent increase in inflation and long-run inflation expectations. By construction, this reduces the real value of existing debt and primarily benefits mortgagors who hold the largest value of debt. Owners and renters sometimes have consumer credit but their total liabilities are negligible relative to the liabilities held by mortgagors (see Table 1). The effect of this channel could work both via a direct cash-flow effect by reducing the real mortgage payments paid by mortgagors and via a wealth effect as the real value of debt is eroded and the present value of all future payments falls. While the former will build up over time, the latter can immediately benefit mortgagors as we see in their consumption responses.

Most of the existing research on the distributional effects of trend inflation across different housing tenure groups is theoretical and emphasizes the debt channel as the primary mechanism driving the redistributive effects of trend inflation. [Garriga et al. \(2017\)](#) and [Garriga et al. \(2021\)](#), using two-agent New Keynesian models with long-term debt, show that higher inflation benefits indebted homeowners by reducing the real value of mortgage liabilities. Our results are consistent with this mechanism: homeowners emerge as the primary beneficiaries in terms of relative consumption following both trend inflation shocks considered. However, homeowners without mortgage debt also benefit from permanent monetary shocks that raise trend inflation, indicating that the revaluation channel alone cannot account for the full set of distributional effects.

Similarly, [Doepke et al. \(2019\)](#) show in a life-cycle model with housing that higher expected inflation generates sizable welfare gains for middle-aged, middle-class households with substantial mortgage debt, largely at the expense of wealthy retirees. Our empirical evidence is consistent with the beneficial effects of trend inflation for middle-aged mortgagors. However, in contrast to their model, we find that the households most adversely affected by trend inflation are not wealthy retirees, but rather middle-aged renters as well

as middle- and high-income renters. This divergence suggests that, although the debt-revaluation channel plays an important role, it is not sufficient to fully account for the distributional consequences of trend inflation. In the following analysis, we will analyze additional channels that might be relevant to explain the distributional effects.

4.4.2 Labor Earnings Heterogeneity Channel

The differential consumption responses shown in Figure 5 may reflect heterogeneous effects of trend inflation on labor income or differences in the sensitivity of consumption to income changes (see, e.g., [Guvenen et al., 2017](#)). We find little heterogeneity in labor income responses to permanent monetary shocks, particularly in the short run (Figure A.24 included in the Appendix). Likewise, trend inflation shocks associated with corporate tax increases generate no meaningful differences in labor income responses across housing tenure groups.

Although renters, who hold few assets and liabilities and rely primarily on labor income, may partly reflect these income dynamics in their consumption behavior (Section 4.3), labor income patterns for mortgagors and outright owners do not align with their consumption responses. Hence, heterogeneity in labor earnings cannot account for the observed dispersion in consumption effects.

4.4.3 The Income Composition Channel

As shown in Table 1, mortgagors and owners derive a sizable share of their total income from sources other than labor income. Figure 6 reports the response of total before-tax income to the two shocks. Permanent monetary shocks generate a persistent increase in total real income for owners. For mortgagors and renters, real income declines significantly on impact, when inflation rises, and remains statistically insignificant thereafter.

In response to corporate tax shocks that raise trend inflation, total real income declines for all three groups, but the decline is smaller for owners relative to mortgagors and renters. Across both shocks, owners are relatively better off, while mortgagors and renters display

similar patterns. For renters, the response of total income closely mirrors the response of labor income and consumption, consistent with the fact that they hold few assets or liabilities and therefore rely primarily on income flows to finance consumption.

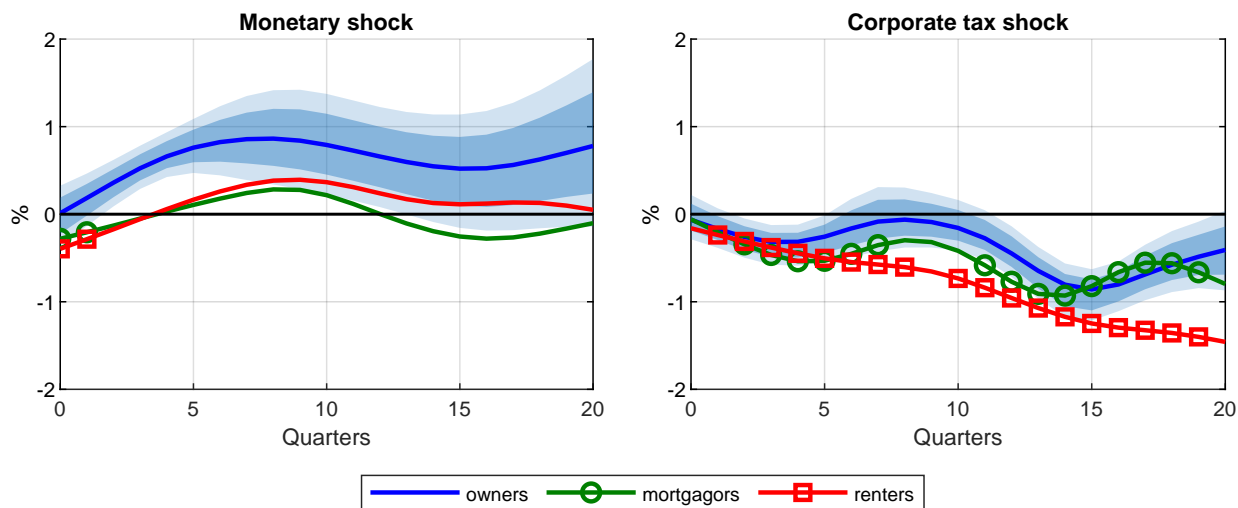


Figure 6 Total Before-Tax Income Response by Housing Tenure Group

Notes: Impulse responses to permanent monetary (left column) and corporate-tax-driven (right column) trend inflation shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate for owners (blue line), 68% (darker) and 90% (lighter) confidence bands based on Newey-West standard errors. Point estimates for mortgagors (green line) and renters (red line). Markers indicate significance at 90% confidence level.

The differential response of total income among owners relative to mortgagors and renters can be attributed to differences in income composition. For mortgagors and renters, more than 80 percent of total income consists of labor earnings (Table 1). By contrast, for owners, labor income accounts for only about 50 percent of total income. They rely more heavily on financial income and other income sources, including Social Security benefits. To better understand the relative income response of owners to both shocks, we examine the aggregate behavior of these different income components.

Figure 7 reports the impulse responses of three key financial income components—(i) rental income, (ii) dividend income, and (iii) interest income—to both the permanent monetary shock and the CT-TI shock (see Appendix A.3.3 for detailed results on all income components). Following a permanent monetary shock, all three financial income compo-

nents increase in real terms, thereby contributing to the positive total income response observed for owners. In response to the CT-TI shock, interest income rises in line with the previously documented increase in interest rates. Rental and dividend income also display positive point estimates, although these responses are not statistically significant. Nevertheless, relative to the labor income component that declines in response to the shock, the relative resilience of financial income helps explain the more muted fall in total income among homeowners.

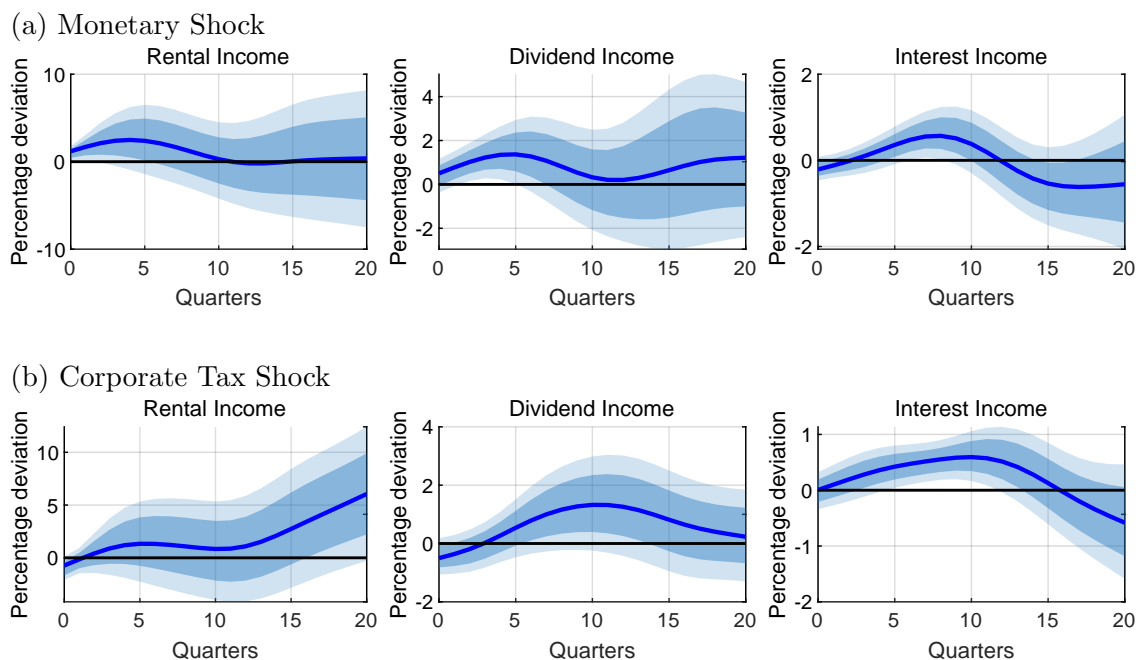


Figure 7 Financial Income Responses

Notes: Impulse responses to permanent monetary (top) and corporate-tax-driven (bottom) trend inflation shocks, estimated based on equation (1) using smooth local projections. Sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Solid lines are point estimates, dark (light) blue shaded areas 68% (90%) confidence bands.

Besides financial income, owners also rely relatively more on transfer income — including in particular social security income for retirees. Importantly, Social Security benefits are partially indexed to inflation. Since 1975, the Social Security Administration has adjusted benefits annually through a Cost-of-Living Adjustment (COLA), based on changes in the Consumer Price Index. As a result, a larger share of owners’ income is directly linked to inflation developments, which partially helps explain the heterogeneous response of total

income across groups. This holds especially for CT-TI shocks which lead to a sustained decline in real labor income while real transfer income declines only very shortly before converging back to zero (see Appendix, Figure A.26).

While the aggregate income series are measured more accurately than the corresponding CEX income components, aggregate data cannot be directly linked to specific housing-tenure groups. To address this concern, we use the CEX as a complementary source and report the responses of business, financial, and other income by housing tenure status in Figure A.27. As highlighted in Table 1, business and financial income is quantitatively relevant primarily for outright owners. This group receives roughly two thirds of total financial and business income, whereas these sources account for only a small fraction of total income for renters and mortgagors (about 5 and 10 percent, respectively). Consistent with this composition, the impulse responses of financial income for owners — reported in Figure A.27 in the Appendix — closely track the aggregate financial income responses measured in NIPA. By contrast, the corresponding responses for mortgagors are considerably more volatile and imprecisely estimated, reflecting both the limited importance of these income sources in their portfolios and the greater measurement error inherent in survey-based data. Overall, the CEX evidence supports the view that financial and business income provide an important channel through which outright owners are insulated from the adverse effects of some trend inflation shocks.

4.4.4 The Wealth Channel

The financial income flows documented above represent one margin through which income composition shapes the distributional effects of trend inflation. However, assets and liabilities also operate through a distinct wealth channel. Changes in asset prices affect the valuation of household balance sheets, and these capital gains or losses can influence consumption through standard wealth effects as well as through changes in collateral values and borrowing capacity. Berger et al. (2018) show that, in standard incomplete-markets

models with realistic features, the marginal propensity to consume out of housing wealth is large, operating through both direct wealth effects and the relaxation of collateral constraints. How much these margins matter, however, depends on the composition of household balance sheets, which differs sharply across our three groups. Renters hold virtually no assets or liabilities. Owners primarily hold assets—most importantly real estate and financial assets—while mortgagors hold both substantial assets and sizable liabilities, especially mortgage debt. These differences imply that valuation effects and borrowing positions may vary significantly across groups.

Figure 8 reports the impulse responses of key balance sheet components in response to the two trend inflation shocks. The first row shows the response of the level of real estate assets, which is the main non-financial asset. The second row shows the response of financial assets. In both cases we distinguish between the overall level (blue) and the change in level only driven by transactions (magenta dashed line). The latter excludes revaluation effects. The third row shows mortgage liabilities and besides the response of real mortgage debt we also show the response of the nominal level to highlight the role of the revaluation channel. Home mortgages are by far the largest component on the liability side. In the appendix we also report the response for consumer credit. The last row shows the response of net lending which is constructed as the cumulative sum of net lending transactions, i.e. the difference between net acquisition of financial assets minus the net increase in liabilities. Figure 9, in turn, reports the responses of property prices, stock prices, and housing rents. Taken together, these figures allow us to decompose overall balance sheet adjustments into price-driven (valuation) and quantity-driven (transaction) components and to assess how these operate differently across the three household groups.

Following a permanent monetary shock, the value of real estate assets rises persistently and significantly in the medium run (Figure 8, first row). This increase is driven primarily by a gradual and sustained rise in property prices (see also Figure 9). Since real estate is the dominant asset class for both owners and mortgagors, this capital gain strengthens

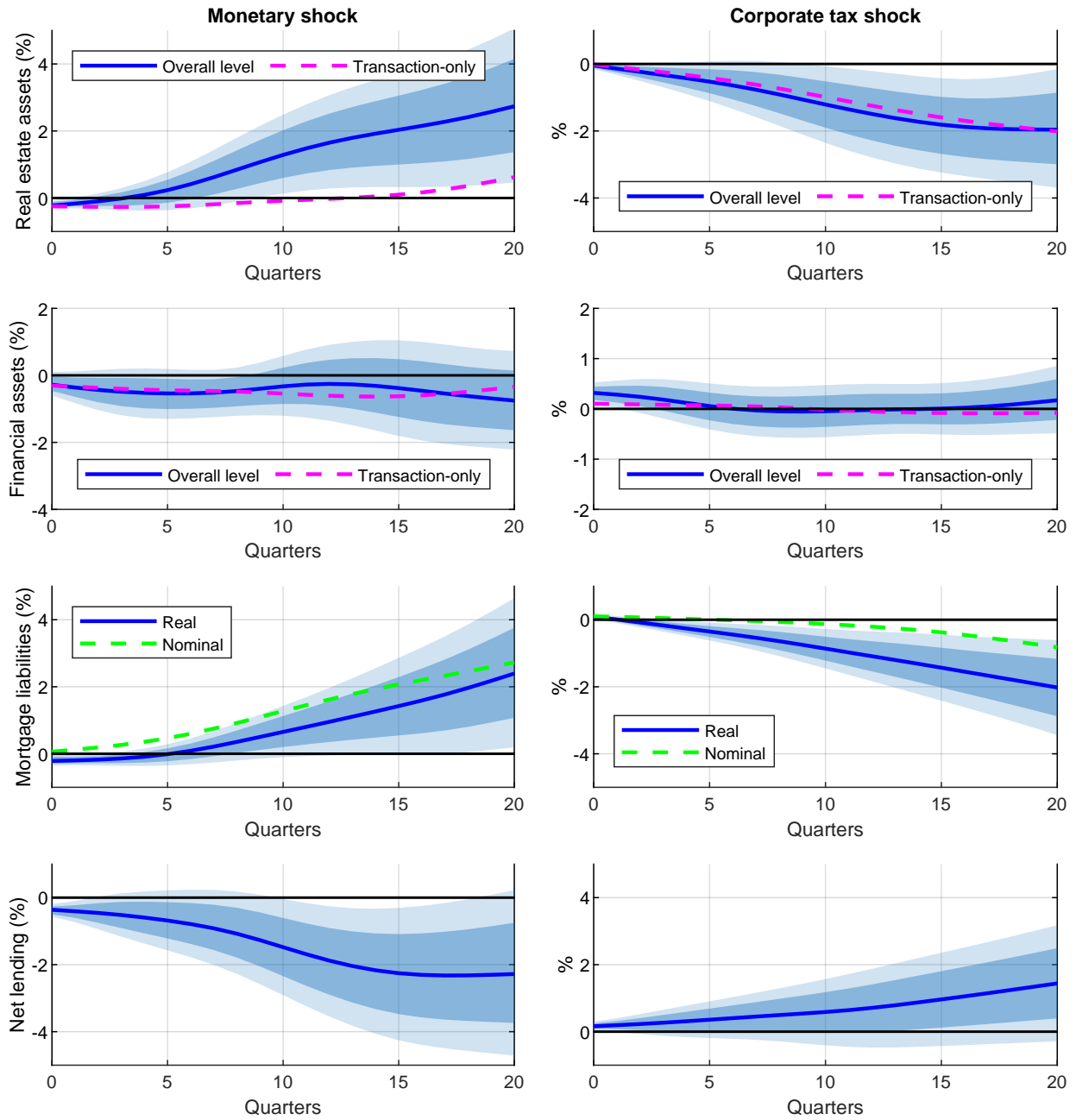


Figure 8 Response of Balance Sheet Variables

Notes: Impulse responses to permanent monetary (left column) and corporate-tax-driven (right column) trend inflation shocks, estimated based on equation (1) using smooth local projections. U.S. Financial Accounts data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Solid lines are point estimates, dark (light) blue shaded areas 68% (90%) confidence bands.

their asset positions, whereas renters—who hold virtually no assets—do not benefit from this channel.

Real financial assets, by contrast, decline over the medium term. This decline reflects both the fall in real stock prices (Figure 9) and a reduction in household financial investment: the transaction-only response shows that households invest less in financial assets or liquidate existing positions, which in turn could even free up resources that can support consumption. This margin is primarily relevant for owners, who hold the largest share of financial assets, and to a smaller extent for mortgagors.

Turning to the liability side, the pure revaluation channel would predict a persistent decline in real mortgage debt as higher inflation erodes its nominal value. However, the third row of Figure 8 shows that the decline in real mortgage liabilities is only transient: after falling on impact, real mortgage debt rises over the medium run. A comparison with the response of nominal mortgage liabilities (green dashed line) reveals that the revaluation channel plays some role but the overall increase is driven by households taking out new mortgage debt, consistent with the rise in home values that relaxes collateral constraints and enables mortgagors to draw additional credit on their property.¹¹ Overall, the permanent monetary shock leads to a reduction in net lending, indicating that households borrow more and invest less in financial assets. Since the households who are typically borrowing are mortgagors, this channel benefits them most directly.

Housing rents, meanwhile, do not respond significantly to the shock (Figure 9), so renters receive no offsetting benefit on the expenditure side either. In sum, the consumption gains of mortgagors and owners documented in Section 4.3 can be attributed also to wealth effects and additional borrowing enabled by rising housing wealth, while renters are left without any offsetting asset or liability margin.

The balance sheet dynamics following a CT-TI shock differ markedly from those induced

¹¹This echoes the home-equity-based borrowing channel emphasized by [Beraja et al. \(2019\)](#), in which higher housing wealth relaxes refinancing and collateral constraints and thereby amplifies the response of mortgagor spending.

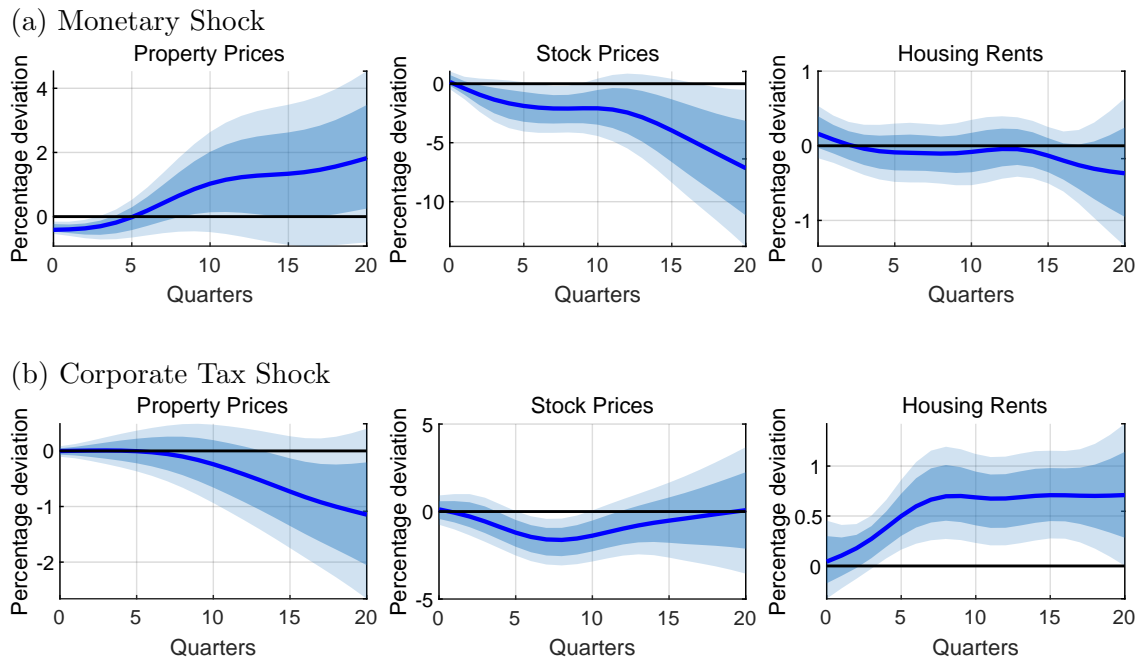


Figure 9 Asset Prices and Housing Rents Responses

Notes: Impulse responses to permanent monetary (top) and corporate-tax-driven (bottom) trend inflation shocks, estimated based on equation (1) using smooth local projections. Sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Solid lines are point estimates, dark (light) blue shaded areas 68% (90%) confidence bands.

by a permanent monetary expansion. Real property prices decline persistently (Figure 9) but in absolute terms they are less affected than for the permanent monetary shock. Consequently, real estate asset values fall persistently but now driven much more by transaction effects. Given that real estate represents the main asset class for both owners and mortgagors, this decline reduces their net wealth and weakens their balance sheet positions.

On the financial asset side, the effects are more muted. Although real equity prices fall, transaction flows of financial assets remain largely unchanged, indicating that households do not actively rebalance their portfolios in response to the shock. At the same time, the level of financial assets exhibits a slight positive response, suggesting the presence of some offsetting valuation effects across different financial instruments. As a result, the financial asset channel does not generate pronounced differences across household groups in response to this shock, in contrast to the strong and heterogeneous effects operating through the real estate channel.

The key distinction between owners and mortgagors emerges on the liability side. Real mortgage liabilities decline. A comparison between real and nominal mortgage liabilities indicates that this reduction is driven both by an erosion of existing nominal debt and lower new borrowing, through both mortgage origination and home equity withdrawal. As collateral values fall, mortgagors face tighter borrowing constraints, which limits their ability to smooth consumption through new credit. Owners, who hold little debt, are exposed almost entirely through the asset side of their balance sheets. Overall, both groups are negatively affected by the decline in real wealth, but the revaluation of outstanding mortgage debt provides mortgagors with a partial cushion that owners do not enjoy. Housing rents, by contrast, rise steadily over time (Figure 9), which increases housing costs for renters and reinforces the adverse distributional effects documented in Section 4.3. Through this channel, the CT-TI shock is unambiguously detrimental for renters, who face both lower income and higher expenditure with no offsetting wealth or borrowing margins.

In summary, the asset holdings channel generates sharply different distributional effects depending on the source of trend inflation. For permanent monetary shocks, rising property prices benefit both owners and mortgagors through wealth effects on real estate. Mortgagors gain an additional margin through relaxed collateral constraints that enable new borrowing. For CT-TI shocks, the decline in property values reduces wealth for both groups, and the only source of partial relief for mortgagors is the revaluation of their outstanding nominal debt. The common thread across both shocks is that renters, who hold virtually no assets or liabilities, have no wealth or borrowing margin to draw on.

With respect to assets and liabilities, the CEX provides a useful but necessarily imperfect complement to the aggregate balance-sheet data. We therefore discuss these results only briefly and report the corresponding figures in the Appendix. Despite the limitations of the survey data, the estimated responses are broadly consistent with the balance-sheet mechanisms emphasized in the main text.

Constructing consistent asset measures from the CEX is challenging because several

key variables are either incomplete or subject to structural breaks.¹² The most consistent measure available over the full sample is a series for financial assets based on reported holdings of savings accounts, stocks, and related instruments. Since renters hold virtually no financial assets, while mortgagors hold substantially fewer than outright homeowners, aggregate financial asset dynamics should lie between the responses of mortgagors and owners, and closer to the latter. Consistent with this prediction, the estimated responses in Figure A.28 broadly mirror the asset-price dynamics reported in Figure 8, although the CEX measures are naturally noisier than the corresponding Financial Accounts aggregates. Mortgage liabilities are available only from 1994 onward. Figure A.29 shows that mortgage debt rises modestly following a permanent monetary shock, consistent with the aggregate evidence in Figure 8, albeit with a smaller estimated magnitude.

Taken together with the evidence on income composition, the results on assets and liabilities make clear that housing tenure is the pivotal state variable in the transmission of trend inflation: it governs not only households' net nominal positions, but also their exposure to asset price movements and their ability to leverage collateral, thereby fundamentally shaping the distributional impact of inflation shocks.

5 Conclusions

Inflation has markedly unequal effects, shaped by households' income, wealth, and liability positions. While much of the existing literature focuses on the distributional consequences of transitory inflation shocks, our analysis emphasizes the role of persistent trend inflation arising from monetary and fiscal policy changes.

Trend inflation redistributes resources through multiple channels. Debtors benefit from debt revaluation, but asset price dynamics are equally important. Expansionary monetary

¹²Property values are not available for the full sample and appear to be missing in 2007. Information on other asset categories is collected through survey questions that were redesigned several times, introducing discontinuities in the series.

shocks that raise trend inflation increase house prices, benefiting homeowners. In contrast, corporate tax shocks that shift trend inflation resemble adverse supply disturbances, lowering house prices and generating gains primarily for mortgagors through reduced real debt burdens.

These findings carry important policy implications. Although permanent monetary shocks may stimulate short-run activity, their longer-run effects exacerbate economic inequality. Corporate tax-driven trend inflation, meanwhile, generates persistent inflation and output losses while disproportionately harming renters.

Our results underscore the need for theoretical frameworks that jointly account for debt positions and asset revaluation. While existing models study inflation targeting and redistribution, important gaps remain. Further research is needed to quantify these channels and inform policy design aimed at mitigating inflation-induced inequality.

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A Appendix

The Online Appendix presents the data description and additional empirical analysis such as robustness checks that we have left out of the main draft of the paper for economy of space.

A.1 Data Appendix

A.1.1 Macroeconomic Variables

Table [A.1](#) displays the sources for each of the macroeconomics variables included in the local projection specifications.

Variable	Definition	Transformation	Source	FRED Code
PCE Inflation	Personal Consumption Expenditures: Chain-Type Price Index, seasonally adjusted	Annualized quarterly growth rate	FRED	PCEPI
Core PCE Inflation	PCE excluding Food and Energy: Chain-Type Price Index, seasonally adjusted	Annualized quarterly growth rate	FRED	PCEPILFE
GDP (per capita)	Real Gross Domestic Product per capita, seasonally adjusted	Level series	FRED	A939RX0Q048SBEA
Investment	Real Gross Fixed Capital Formation for United States	Divided by population	FRED	NFIRSAXDCUSQ
Private Consumption	Real Personal Consumption Expenditures per capita, SA	Level series	FRED	A794RX0Q048SBEA
1-Year Rate	1-Year Treasury Constant Maturity Rate	Level (%)	FRED	DGS1
10-Year Rate	10-Year Treasury Constant Maturity Rate	Level (%)	FRED	DGS10
House Prices	Median sales price of houses sold in the U.S.	Deflated by PCE; annualized quarterly % change	FRED	MSPUS
Unemployment Rate	Share of unemployed in the labor force	Quarterly average of monthly values	FRED	UNRATE
Inflation Expectations	10-year expected inflation	Level (%).	Cleveland Fed	—
Property Prices	Real residential property prices	Deflated by quarterly avg. CPI (CPIAUCSL)	FRED	QUSR628BIS
Stock Prices	S&P500 real price index, quarterly avg.	Deflated by quarterly avg. CPI (CPIAUCSL)	FRED	SP500
Rental Income	Rental income of persons with capital consumption adjustment	Deflated by quarterly avg. CPI (CPIAUCSL)	FRED	RENTIN
Dividend Income	Personal dividend income	Deflated by quarterly avg. CPI (CPIAUCSL)	FRED	B703RC1Q027SBEA
Interest Income	Personal interest income	Deflated by quarterly avg. CPI (CPIAUCSL)	FRED	A064RC1Q027SBEA
Real estate (levels)	Households and Nonprofit Organizations; Real Estate at Market Value, Market Value Levels	Deflated by quarterly avg. CPI (CPIAUCSL)	FRED	HNOREMV
Real estate (transactions)	Households and Nonprofit Organizations; Real Estate at Market Value, Transactions	Cumulative sum, deflated by quarterly avg. CPI (CPIAUCSL)	FRED	BOGZ1FA155035005Q
Financial assets (levels)	Households and Nonprofit Organizations; Total Financial Assets, Level	Deflated by quarterly avg. CPI (CPIAUCSL)	FRED	TFAABSHNO
Fin. assets (transactions)	Households and Nonprofit Organizations; Total Financial Assets, Transactions	Cumulative sum, deflated by quarterly avg. CPI (CPIAUCSL)	FRED	HNOTFSQ027S
Mortgage liabilities	Households and Nonprofit Organizations; One-to-Four-Family Residential Mortgages; Liability, Level	Deflated by quarterly avg. CPI (CPIAUCSL)	FRED	HMLBSHNO
Net lending	Households and Nonprofit Organizations; Net Lending (+) or Borrowing (-) (Financial Account), Transactions	Cumulative sum, deflated by quarterly avg. CPI (CPIAUCSL)	FRED	HNOLAFQ027S

Table A.1 Macroeconomic Series: Source and Transformations

A.1.2 Consumer Expenditure Survey

We use the Consumer Expenditure Survey (interview section) from 1984-2022.¹³ The files from 1984-1995 are obtained from the Inter-university Consortium for Political and Social Research (ICPSR) at the University of Michigan, and the files starting from 1996 from the website of the Bureau of Labor Statistics (BLS).

The CEX is a monthly rotating panel, where households are selected to be representative of the US population. Each household is interviewed once per quarter, for at most five consecutive quarters, although the first interview is used for pre-sampling purposes and is not available for analysis. While expenditure is reported at the household level, demographics are reported for individuals. These include age, income, labor supply, family size, and year of birth of the head of household.

In each interview, the reference period for expenditures covers the three months prior to the interview month. Income and most labor supply questions are only asked during the second and fifth interview and the reference period covers the twelve months prior to the interview month. Information on assets and liabilities is only collected in the fifth interview.

Our data preparation procedure broadly follows [Coibion et al. \(2017b\)](#). All expenditure data is aggregated up from the disaggregated MTAB files and income and demographic data is derived from the MEMB and FMLY files. Starting from the raw data files the following steps are carried out:

1. All expenditure data is aggregated up from the disaggregated MTAB files. We aggregate the monthly UCC expenditures by household and generate expenditure aggregates for the different categories such as food following the BLS documentation.
2. We correct for breaks in the expenditure variables. In particular, between 1982 and

¹³It is possible to find CEX data back to 1980:Q1 but there are several changes in methodology in the first years and issues regarding data quality.

1987 food at home is adjusted following Aguiar and Bils (2015).

3. We deflate all series using the Consumer Price Index (CPI).
4. Then, we convert the expenditure data into a quarterly time series using the reference date of the interview. We merge the expenditure data with the income and demographic data from the MEMB and FMLY files by household and interview date.
5. We define consumption and income variables following [Coibion et al. \(2017b\)](#):
 - Non-durable goods and services: food, alcohol, tobacco, clothing and footwear, household utilities, fuel, personal care, public transport, household services and non-durable household goods, leisure services and goods (e.g. entertainment services, reading)
 - Durable goods: durable leisure goods (e.g. entertainment equipment) and durable household goods (e.g. furniture and electrical appliances).¹⁴
 - Broader expenditure measure: we also follow [Coibion et al. \(2017b\)](#) and define a broader expenditure measure which includes non-durable goods, services and durable goods consumption and in addition mortgage interest rate payments, rental payments, maintenance/housing costs, education expenditures, vehicle purchase and related costs and health insurance expenditures.
 - Labor-related earnings and total before-tax and total disposable income: Labor-related earnings only include wages and salaries and hence do not include all household income components. For example it does not include income from farm and non-farm business, self-employment and financial income. Total before-tax income includes all these income components and also social security benefits and pensions. Then, total net (disposable) income is calculated as gross income - (taxes - rebates/refunds). Following [Coibion et al. \(2017b\)](#) we impute missing

¹⁴This definition of durable consumption does not include large purchases such as car or house purchases.

income following the BLS methodology and compute taxes using the NBER TAXSIM calculator. From 2013 the BLS directly reports taxes based on the TAXSIM model. For the impulse response function estimation we assign income to the corresponding reference month(s) and also fill up the missing months between the first and the last interview during which the income question is not asked based on the income information from the last interview that refers to the prior 12 months. This yields income values over the same reference period as for consumption expenditures.

- Business, financial and other income are constructed in line with the previous bullet point. Business income includes farm and non-farm business income. Financial income includes dividend and interest income, rental income, private pension income, etc. and other income includes social security benefits such as public/state pensions, unemployment benefits, veteran payments, and child support.
6. Household variables are transformed into real-per capita values using family size
 7. We construct a pseudo-panel based on three household characteristics:
 - Housing tenure status: renter, mortgagor and owner. Households who switch housing tenure status during the four quarters they are interview are dropped from the sample but these are very few.
 - Age of household head: <33rd (young), 34th-66th (middle-aged) and >66th (old) percentile of age distribution.
 - “Permanent” income: Mincerian-type regression based on total disposable income and <33rd (low), 34th-66th (middle) and >66th (high) as thresholds.
 8. We use the household weights provided within the survey and normalize these so that they sum up to 1 within each housing group and quarter. Then, we apply these

normalized weights to the household level variables to construct cohort-level series.

9. In order to deal with under-reporting trends in consumption over time and following Cloyne et al. (2020), the cohort-level series for total, non-durable and services, and durable expenditures are adjusted each quarter using the ratio of aggregate national accounts to aggregated household data (NIPA/CEX). Moreover, cohort-specific time trends are added to capture cohort-specific low frequency trends.

Figure A.1 shows the distribution of housing tenure shares over time and Figure A.2 the age and income distribution by housing tenure status.

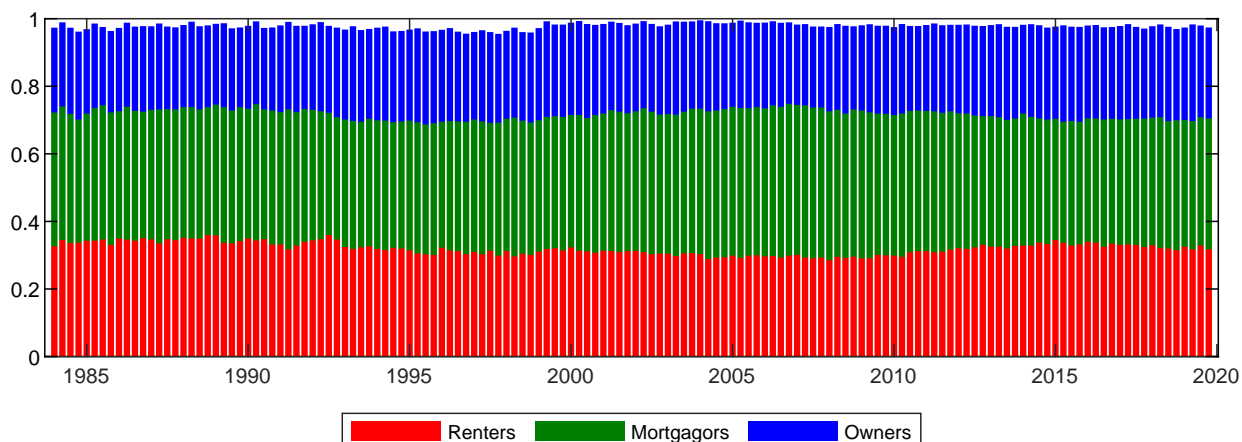


Figure A.1 Distribution of Housing Tenure Status

Notes: CEX data over sample from 1984:Q1-2019:Q4. Households who are classified in different housing tenure status or who switch housing tenure status over the period of 4 interviews are excluded (see residual white area).

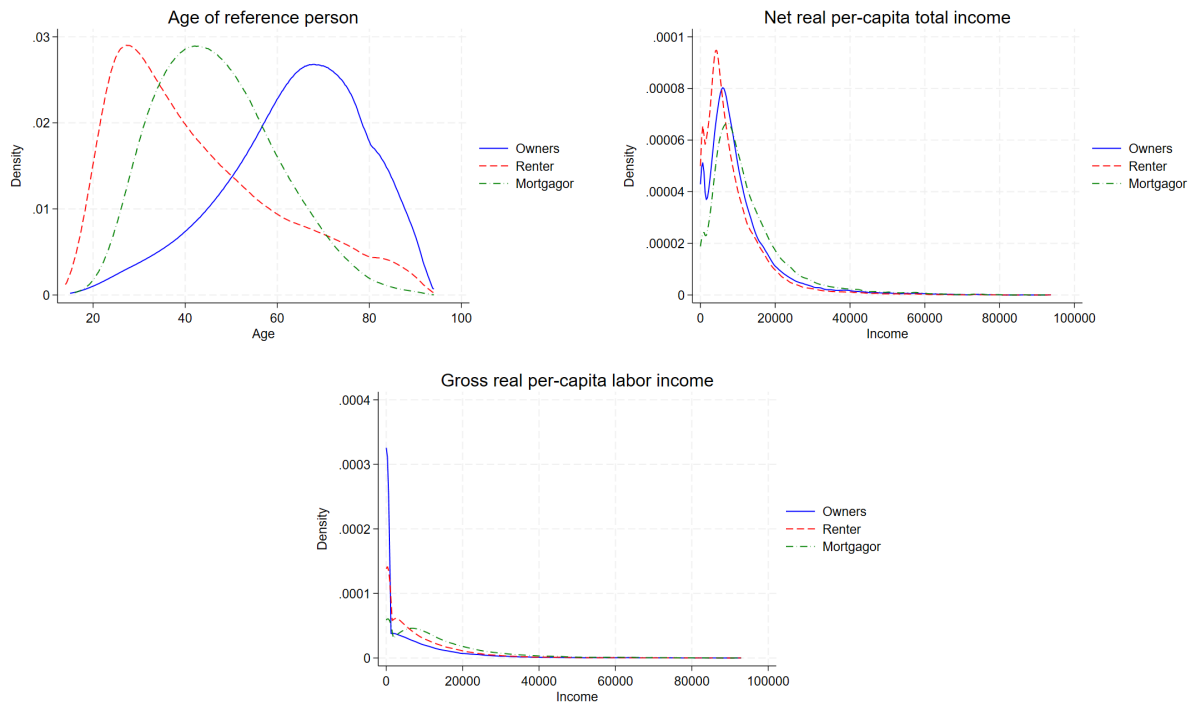


Figure A.2 Demographic Characteristics Across Household Tenure Groups: Age, Total Net Income and Gross Labor Income.

Notes: CEX data over sample from 1984:Q1-2019:Q4.

A.2 Additional Macroeconomic Results

A.2.1 Descriptive Statistics Shock Series

Figure A.3 displays the series of structural shocks used in the analysis. Most of the corporate tax shock events in our sample have a persistent effect on inflation. The only exceptions are 1991:Q1 and 2003:Q2. In 1991:Q1, the permanent component of the corporate tax shock is negative even though the shock itself is positive. This episode corresponds to the implementation of the Omnibus Budget Reconciliation Act of 1990, effective in January 1991. As noted by Auerbach (2000), the Omnibus Budget Reconciliation Act raised marginal tax rates only for a small group at the top of the income distribution. Consistent with this, the reform increased the tax burden on high-income households while improving the fiscal outlook. The data suggest that this was associated with lower long-run inflation expectations, implying negative trend inflation innovations in 1991:Q1. In Section A.2.5 we show that aggregate responses are robust to excluding this event from the shock series.

The second episode corresponds to the Jobs and Growth Tax Relief Reconciliation Act of 2003. This legislation aimed to stimulate the post recession economy by sharply reducing taxes on corporate income, dividends, and capital gains, leading to one of the lowest levels of corporate tax revenue in modern U.S. history. However, our methodology indicates that it did not have a permanent effect on inflation. The early 2000s are characterized by a monetary dominant regime, in which fiscal expansions were perceived as temporary and did not alter inflation expectations. Consistent with this interpretation, we classify this episode as having no permanent effect on trend inflation.

Figure A.9 reports the macroeconomic responses to raw corporate tax shocks. The impulse responses closely resemble those in Figure 4, indicating that CT-IT shocks are the primary drivers of tax change dynamics.

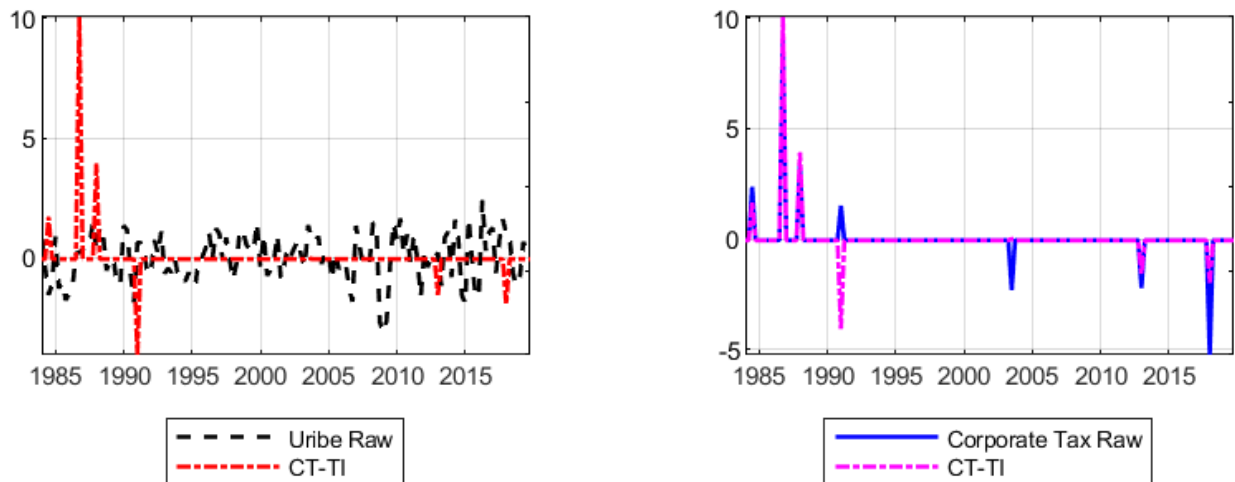


Figure A.3 Raw Series and Trend Inflation Driven by Monetary and Corporate Tax Shocks

Notes: The left panel depicts the raw series of permanent monetary shocks as identified by Uribe (2022) and the corporate-tax-driven trend inflation (CT-TI) shocks. The right panel displays the raw series of corporate tax shocks identified by Cloyne et al. (2023) together with the corporate tax shock that drives trend inflation. The innovations are identified using the strategy described in Section 2.3. All the series are standardized only for this figure. Horizon is in quarters.

A.2.2 Decomposition Based on PCA

In this section we assess the power of the proposed identification strategy to recover structural shocks that affect trend inflation. As an example, we focus on an oil supply news shock that induces a shift in trend inflation and one that does not. We use exactly the same identification strategy for the oil supply news shock series computed by Kanzig (2021). Figure A.4 displays the response of headline PCE inflation and inflation expectations to the three versions of the oil supply news shock: the raw one (left-panel), the one that induces a positive comovement with cumulative trend inflation (oil-supply-news-driven-trend inflation shocks - middle panel) and the component that does not induce a positive comovement with cumulative trend inflation (right panel). Oil-supply-news-driven-trend inflation shocks induce a more persistent increase in headline PCE inflation and also an immediate increase in long-run inflation expectations. These effects are stronger than those in response to an oil supply news shock. The component of the oil supply shock that does not induce comovement with trend inflation has no significant effect on either headline inflation

or inflation expectations.

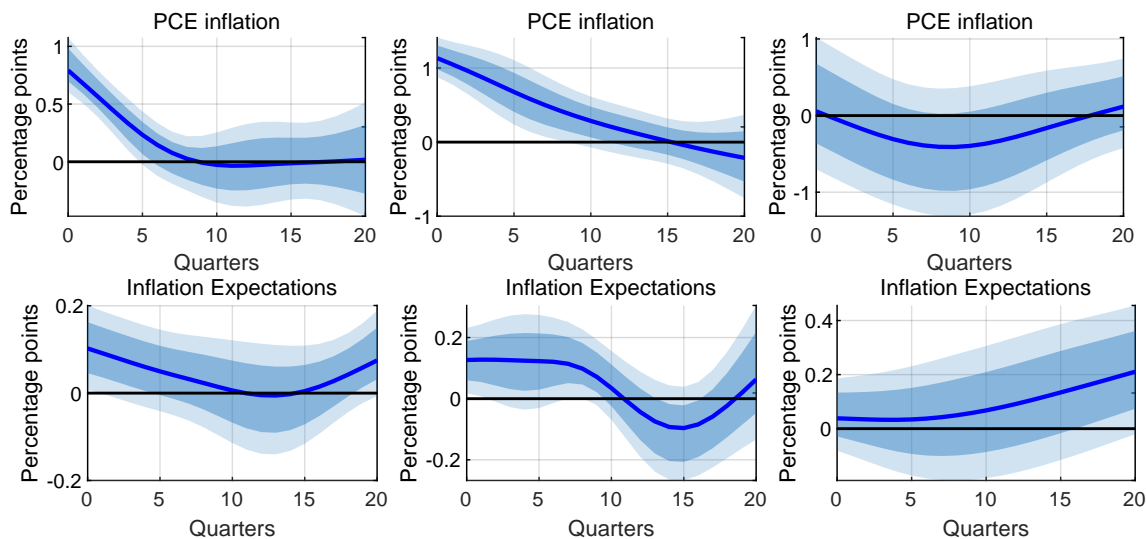


Figure A.4 IRFs to Oil Supply News Shocks

Notes: Impulse responses of aggregate macro variables to an oil supply news shock (left panel), an oil supply news shock that comoves with trend inflation (middle panel), and an oil supply news shock that does not increase trend inflation (right panel) estimated based on equation (1) using smooth local projections. Sample from 1984:Q1-2019:Q4. Continuous solid lines denote the point estimates. Shaded areas denote 68% and 90% confidence bands based on Newey-West standard errors.

A.2.3 Additional IRFs Permanent Corporate Tax Shocks

In this section we complement the main results in response to a permanent corporate tax shock presented in Figure 4. This analysis helps us to characterize the transmission of this shock which is important for characterizing the heterogeneous effects of the shock. First, we look into the response of fiscal surplus to GDP, markups, and wages to understand the direct effect of this shock.¹⁵ Figure A.5 displays the IRFs of these variables to the permanent corporate tax shock. The increase in corporate taxes does not affect the fiscal surplus significantly. The shock induces a temporary fall of firms’ mark-ups on impact and a delayed decline in real wages, which can be linked to the fall in aggregate investment.

¹⁵We compute a measure of markups using the inverse of the labor share (FRED series PRS85006173). Fiscal surplus is defined based on Federal Government Budget Surplus or Deficit (series M318501Q027NBEA from FRED) to current GDP. Real wage is defined as the quarterly average of the monthly Average Hourly Earnings of All Employees, Total Private (FRED series CES0500000003) deflated by the Consumer Price Index.

This decline in mark-ups is consistent with the decrease in stock prices (see Figure 9). The delayed decline in wages is consistent with the decline in Compensation of Employees presented in Figure A.26. Thus, this shock directly affects firms' mark-ups and investment decisions, which are reflected immediately in asset prices, without a direct effect on fiscal surplus.

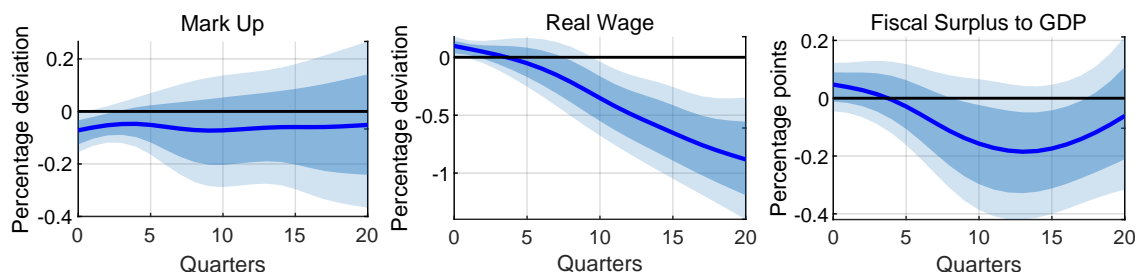


Figure A.5 IRFs to Corporate-Tax-Driven Trend Inflation Shocks - Additional Variables

Notes: Impulse responses of aggregate macro variables to a corporate-tax-driven trend inflation shock, estimated based on equation (1) using smooth local projections. Sample from 1984:Q1-2019:Q4 excluding the event of 1991:Q1. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Continuous solid lines denote the point estimates. Shaded areas denote 68% and 90% confidence bands based on Newey-West standard errors.

A.2.4 Responses with Local Projections

Our baseline results are estimated using Smooth Local Projection (Barnichon and Brownlees, 2019). In this section we estimate the impulse responses to the two shocks but using local projections, keeping the same controls as in our baseline specification. Figures A.6 and A.7 display the responses to the permanent monetary shock and the corporate-tax-driven trend inflation (CT-TI) shocks, respectively. Responses are comparable to the baseline ones.

A.2.5 IRFs Excluding Fiscal Event of 1991:1

Figure A.8 displays the IRFs to a corporate-tax-driven trend inflation shock excluding the 1991:Q1 episode, where the permanent component is negative and the raw series of shocks is positive. Results are almost the same without including this event.

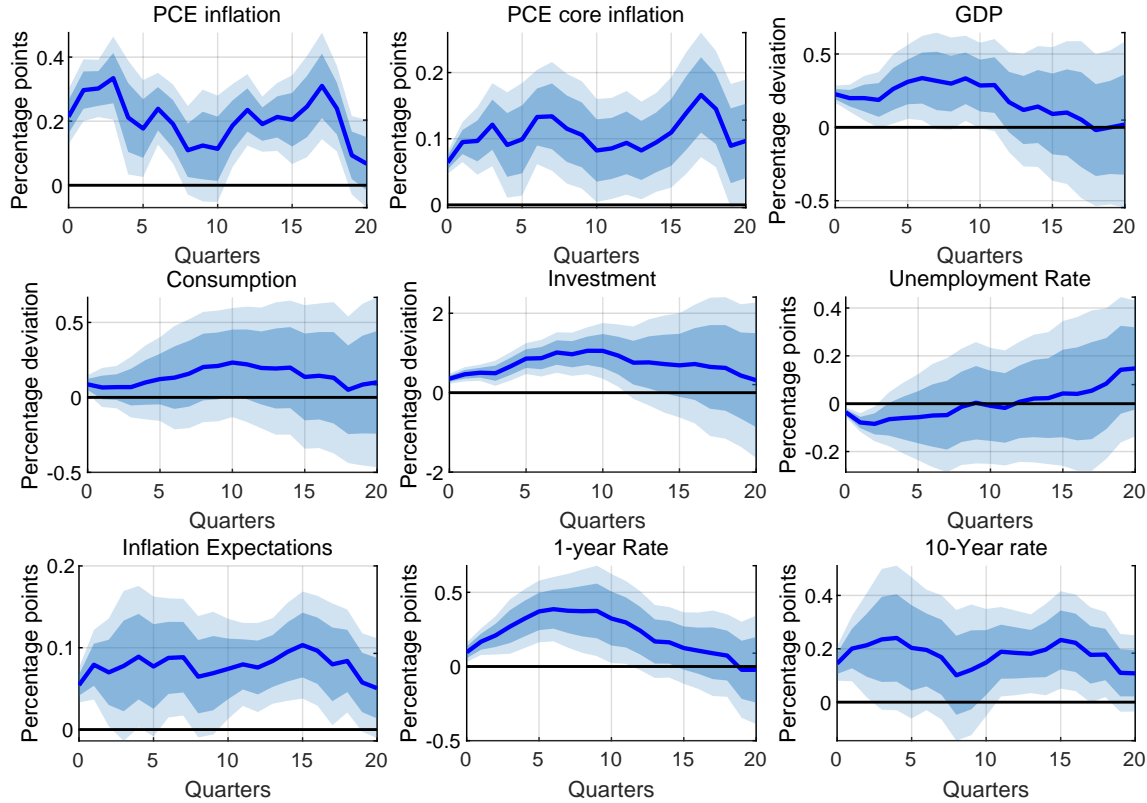


Figure A.6 IRFs to Permanent Monetary Shocks - Local Projections

Notes: Impulse responses of aggregate macro variables to a permanent monetary shock, estimated based on equation (1) using standard local projections. Sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Continuous solid lines denote the point estimates. Shaded areas denote 68% and 90% confidence bands based on Newey-West standard errors.

A.2.6 Raw Series of Structural Shocks

In this section we present the estimated IRFs using the raw series of corporate tax shocks, identified by Cloyne et al. (2023). In this case we do not apply the decomposition of the structural shocks based on Principal Component, as we do in the baseline analysis. Figure A.9 displays the estimated impulse responses. The raw series of structural shocks, which include components that affect the trend inflation and the cyclical inflation, induce less persistent effects on headline inflation and slightly different effects relative to the permanent component of the shock presented in Figure 4. Figure A.10 shows the consumption responses by housing tenure group to the raw corporate tax shocks. Overall, there is slightly less evidence of heterogeneity in consumption responses compared to the CT-TI

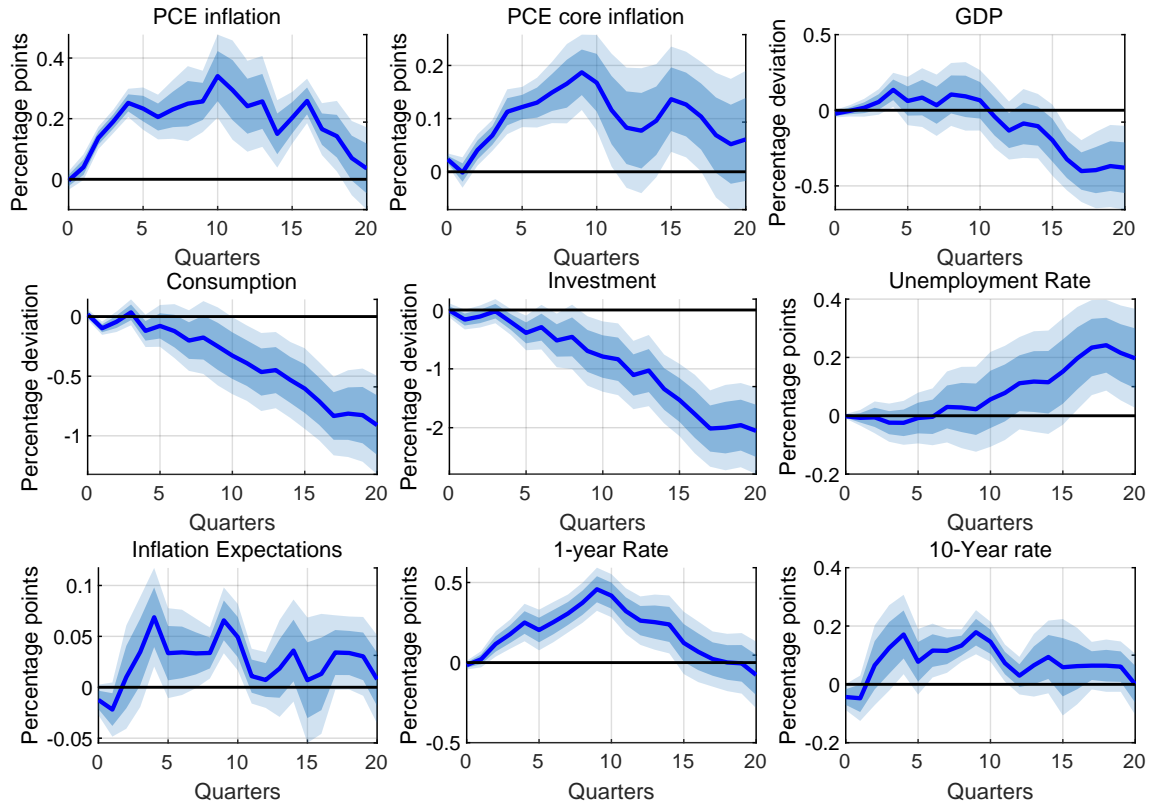


Figure A.7 IRFs to Corporate-Tax-Driven Trend Inflation Shocks - Local Projections

Notes: Impulse responses of aggregate macro variables to a corporate-tax-driven trend inflation shock, estimated based on equation (1) using standard local projections. Sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Continuous solid lines denote the point estimates. Shaded areas denote 68% and 90% confidence bands based on Newey-West standard errors.

shock shown in Figure 5. However, given that the corporate tax shocks are predominantly classified as shocks that have persistent effects on inflation the differences between the raw corporate tax shocks and the CT-TI shocks are small.

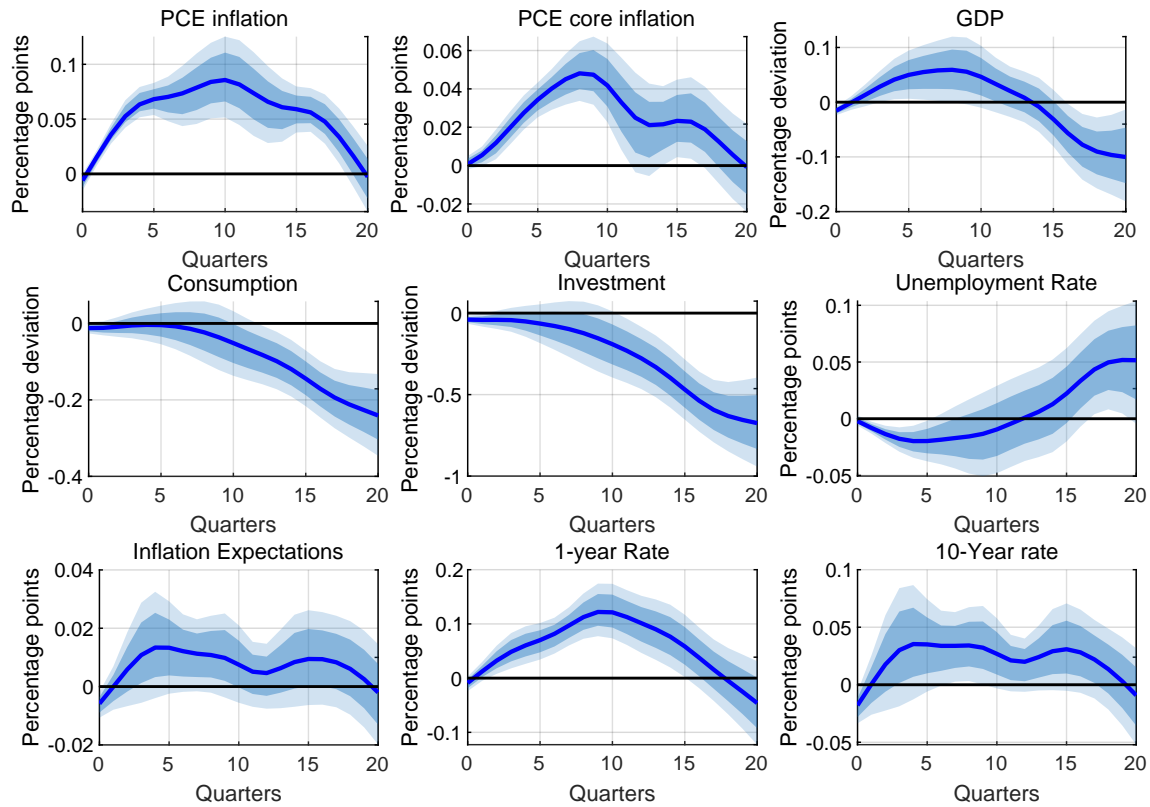


Figure A.8 IRFs to Corporate-Tax-Driven Trend Inflation Shocks - Without 1991:Q1 Episode

Notes: Impulse responses of aggregate macro variables to a corporate-tax-driven trend inflation shock, estimated based on equation (1) using smooth local projections. Sample from 1984:Q1-2019:Q4 excluding the event of 1991:Q1. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Continuous solid lines denote the point estimates. Shaded areas denote 68% and 90% confidence bands based on Newey-West standard errors.

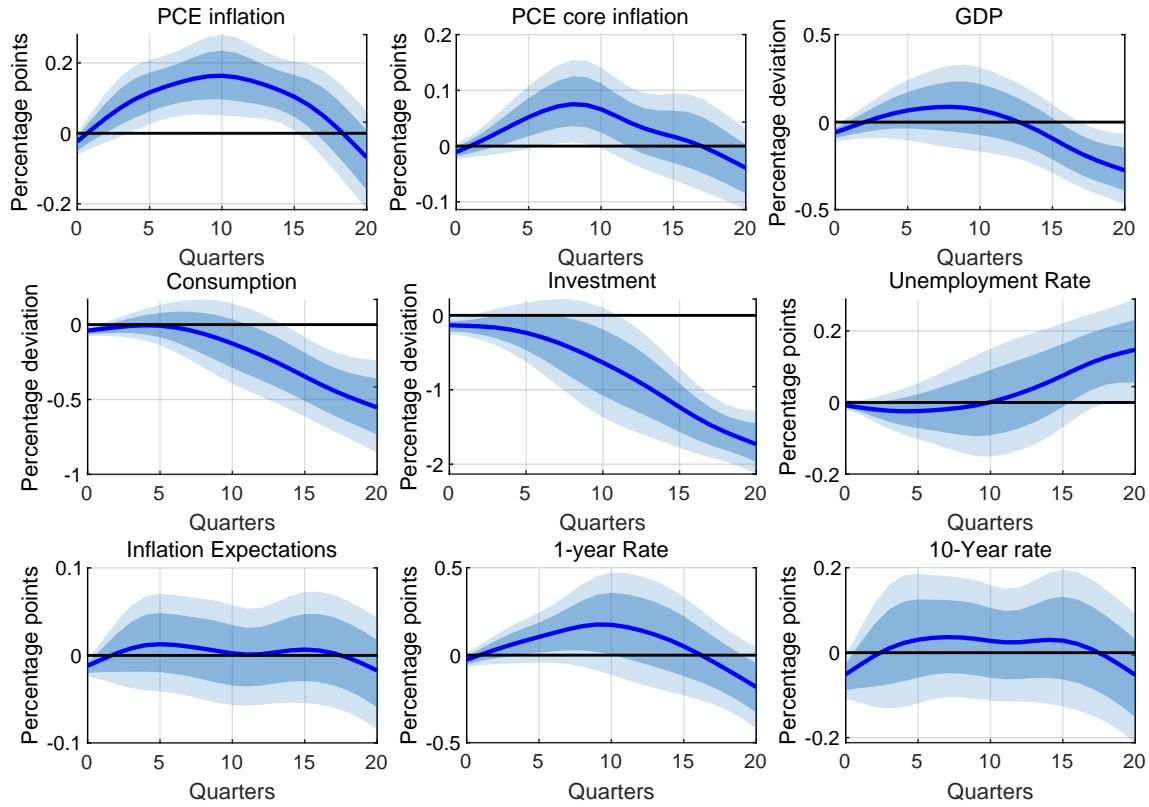


Figure A.9 IRFs to Raw Corporate Tax Shock

Notes: Impulse responses of aggregate macro variables to raw corporate tax shock, estimated based on equation (1) using smooth local projections. Sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Continuous solid lines denote the point estimates. Shaded areas denote 68% and 90% confidence bands based on Newey-West standard errors.

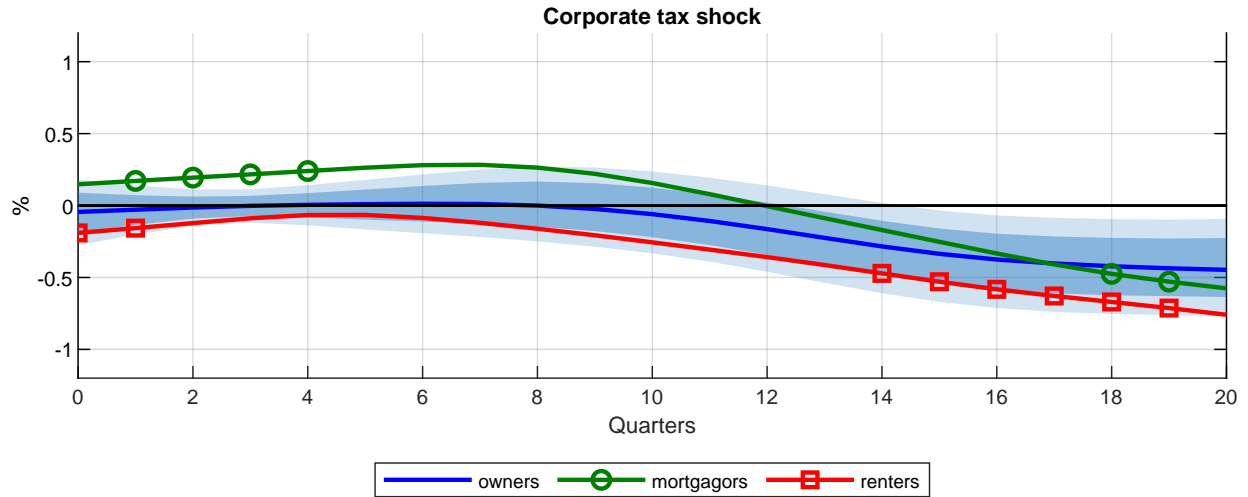


Figure A.10 Consumption Response by Housing Tenure Group to Raw Corporate Tax Shock

Notes: Impulse responses to raw corporate tax shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate for owners (blue line), 68% (darker) and 90% (lighter) confidence bands based on Newey-West standard errors. Point estimates for mortgagors (green line) and renters (red line). Markers indicate significance at 90% confidence level.

A.3 Additional Heterogeneous Results

In this section we present additional results on the heterogeneous effects of trend inflation shocks and the distributional channels.

A.3.1 Consumption Responses to Trend Inflation-Driving Shocks

This section shows additional details and robustness to the main results on the heterogeneous consumption responses to the two trend inflation shocks. Figure A.11 shows the disaggregated consumption responses for durable and nondurable and services consumption. Figure A.12 shows the relative consumption responses by housing tenure group and highlights that in response to both shocks renters lose in relative terms and these effects are statistically significant. Figure A.13 illustrates that household tenure shares respond little to the two shocks. Figures A.14 and A.15 show the heterogeneous consumption responses for the broader expenditure measure following Coibion et al. (2017b) and demonstrate a very similar pattern of heterogeneity in responses as for the consumption responses in our baseline analysis.

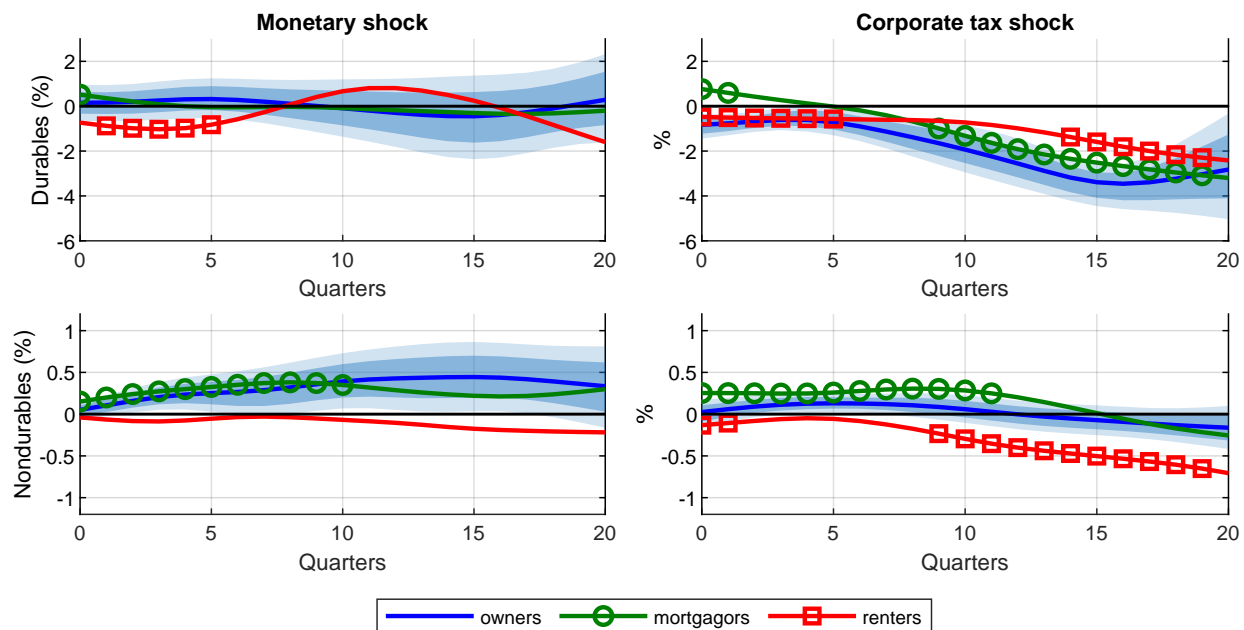


Figure A.11 Disaggregated Durable and Nondurable Consumption Response by Housing Tenure

Notes: Impulse responses to permanent monetary (left column) and corporate-tax-driven (right column) trend inflation shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate for owners (blue line), 68% (darker) and 90% (lighter) confidence bands based on Newey-West standard errors. Point estimates for mortgagors (green line) and renters (red line). Markers indicate significance at 90% confidence level.

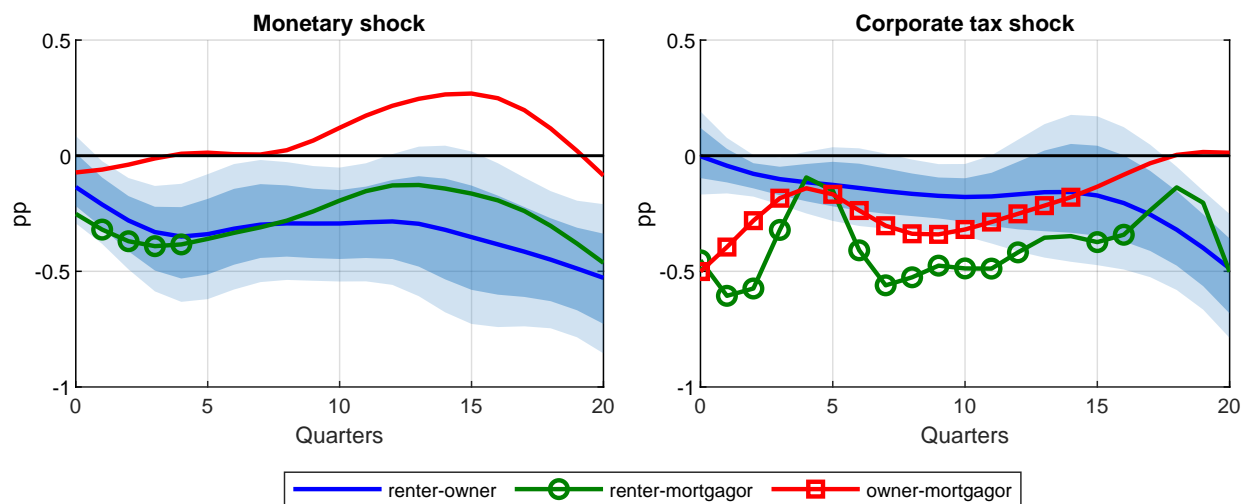


Figure A.12 Relative Consumption Response by Housing Tenure Group

Notes: Impulse responses to permanent monetary (left column) and corporate-tax-driven (right column) trend inflation shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Solid lines are point estimates, dark (light) blue shaded areas 68% (90%) confidence bands and markers show significance at 90% level.

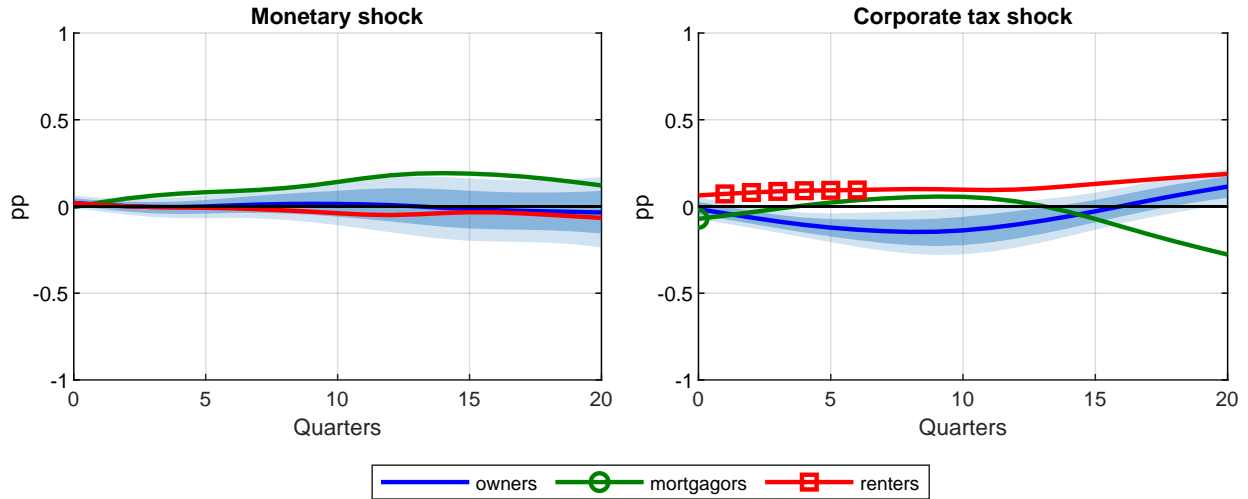


Figure A.13 Response of Housing Tenure Shares

Notes: Impulse responses to permanent monetary (left column) and corporate-tax-driven (right column) trend inflation shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate for owners (blue line), 68% (darker) and 90% (lighter) confidence bands based on Newey-West standard errors. Point estimates for mortgagors (green line) and renters (red line). Markers indicate significance at 90% confidence level.

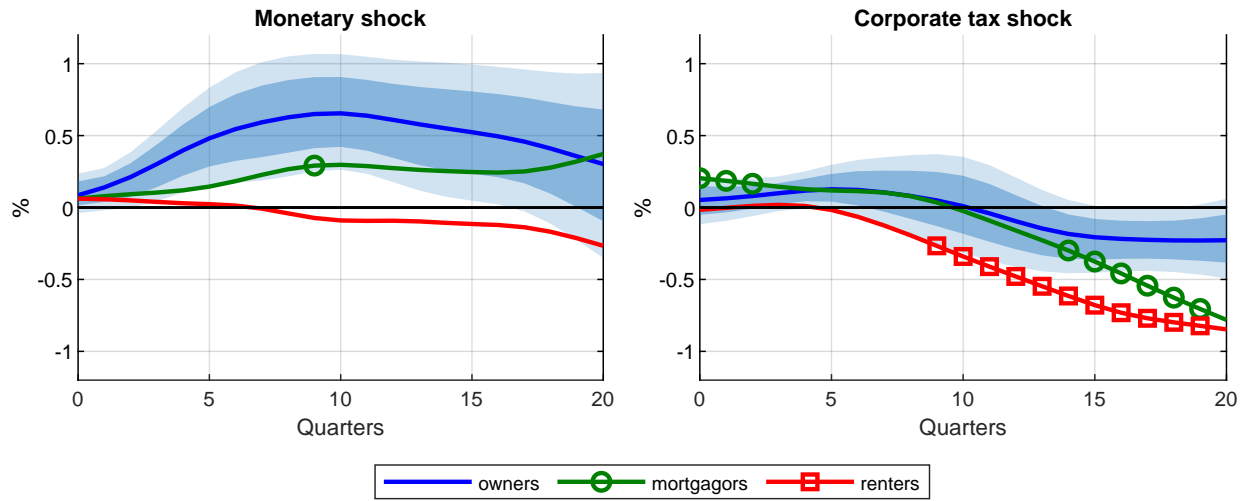


Figure A.14 Broad Expenditure Response by Housing Tenure Group

Notes: Impulse responses to permanent monetary (left column) and corporate-tax-driven (right column) trend inflation shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate for owners (blue line), 68% (darker) and 90% (lighter) confidence bands based on Newey-West standard errors. Point estimates for mortgagors (green line) and renters (red line). Markers indicate significance at 90% confidence level.

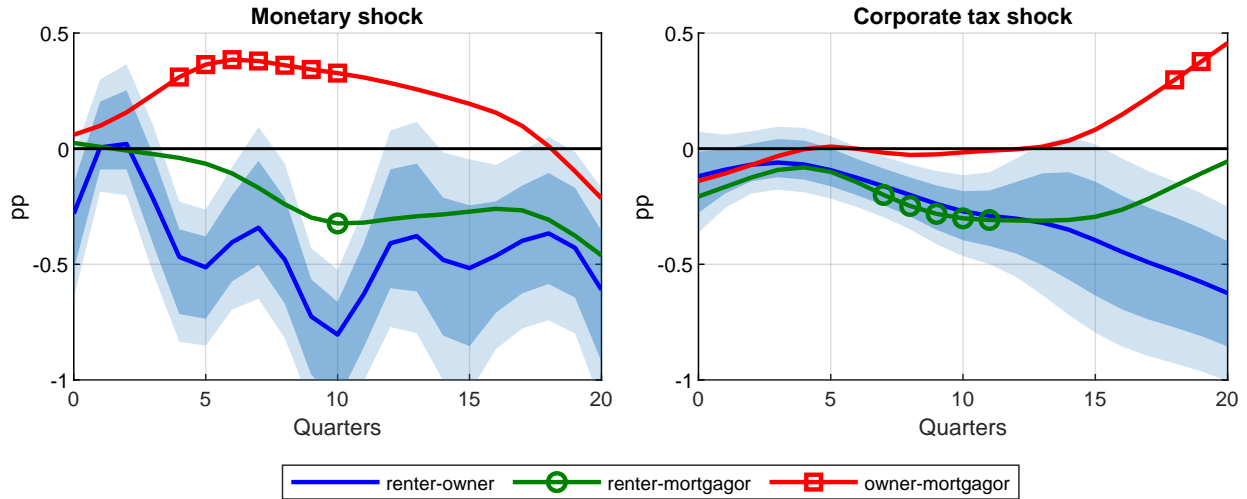


Figure A.15 Relative Broad Expenditure Response by Housing Tenure Group

Notes: Impulse responses to permanent monetary (left column) and corporate-tax-driven (right column) trend inflation shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Solid lines are point estimates, dark (light) blue shaded areas 68% (90%) confidence bands and markers show significance at 90% level.

Figures A.16-A.19 provide robustness on the baseline consumption results and show the role of the smoothed local projections approach relative to standard local projections or simple MA-smoothing, the role of the linear trend included in the baseline specification, the role of small-sample local projections bias as demonstrated by [Herbst and Johannsen \(2024\)](#) and the role of Newey-West vs Huber-White standard errors, respectively.

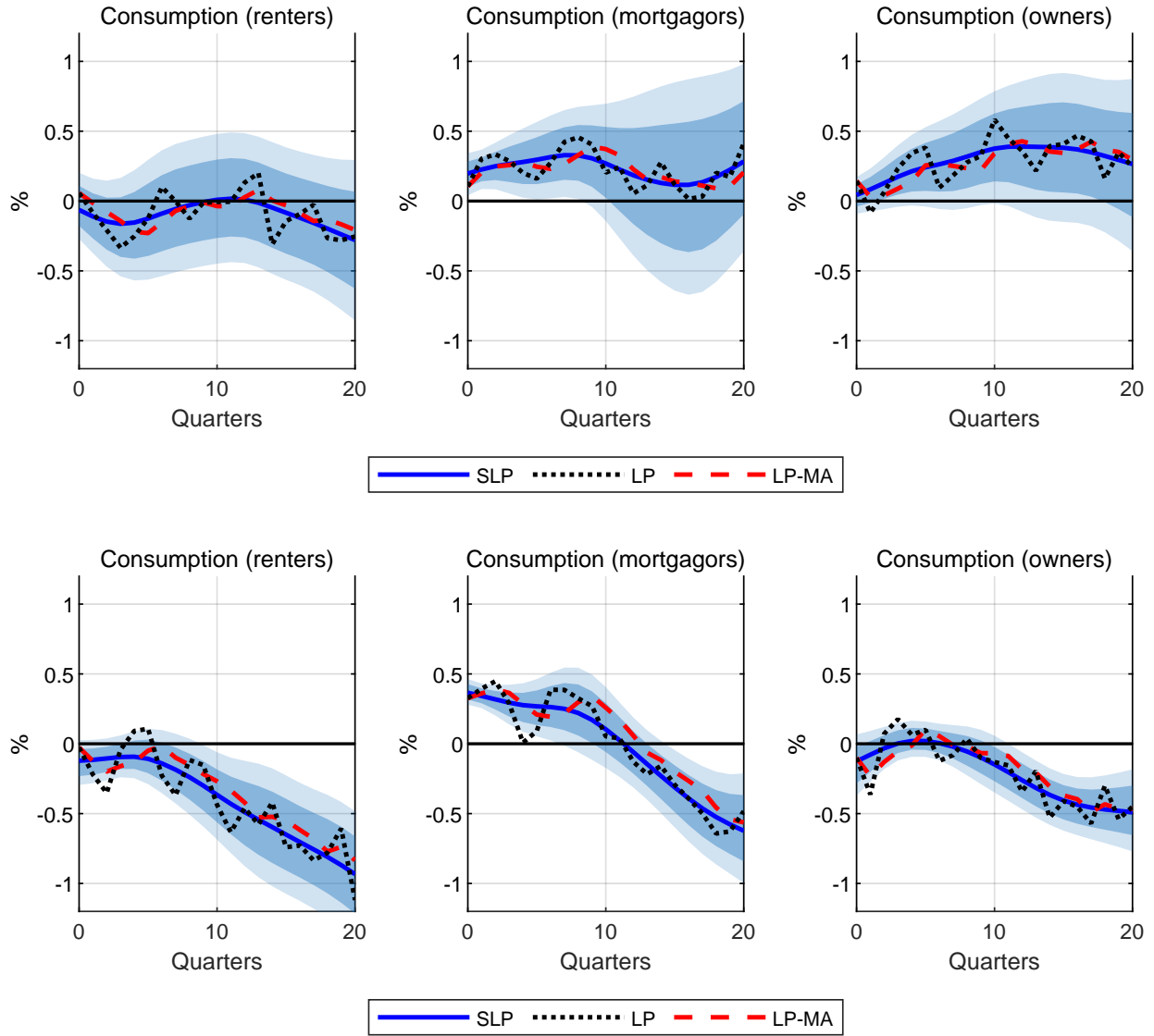


Figure A.16 Sensitivity of Consumption Response to Smoothing of Impulse Responses

Notes: Impulse responses to permanent monetary shock (top) and corporate-tax-driven trend inflation shock (bottom), estimated based on equation (2). CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate using smooth local projections (blue line), 68% (darker band) and 90% (lighter band) confidence bands based on Newey-West standard errors. Point estimate using standard local projections (black dotted line) and smoothed point estimate from standard local projections using 3-quarter backward looking moving average (red dashed line).

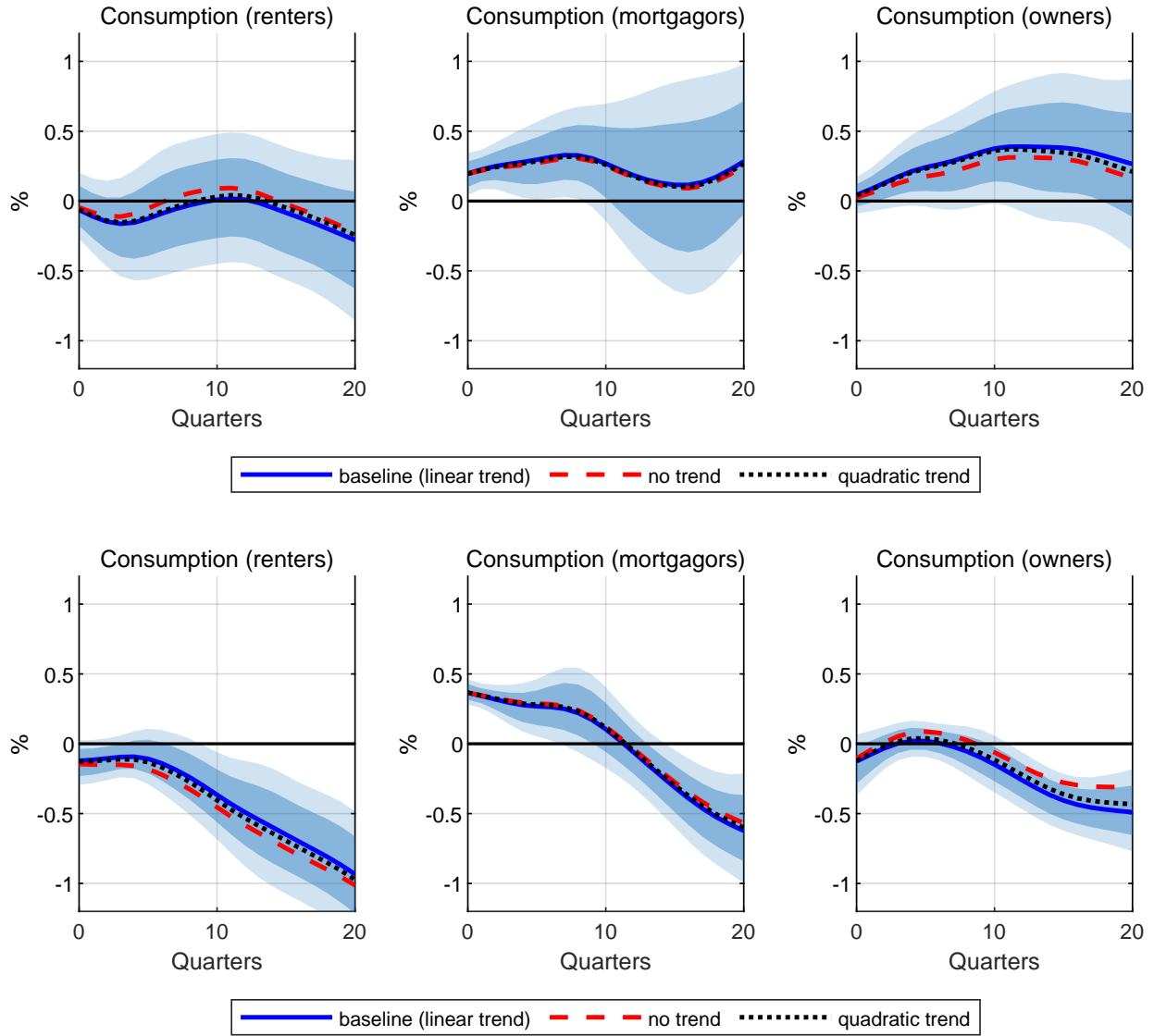


Figure A.17 Robustness of Consumption Response with Respect to Linear Trend

Notes: Impulse responses to permanent monetary shock (top) and corporate-tax-driven trend inflation shock (bottom), estimated based on equation (2). CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate based on specification with linear trend (blue line), 68% (darker band) and 90% (lighter band) confidence bands based on Newey-West standard errors. Point estimate based on specification without trend (red dashed line) and with quadratic trend (black dotted line).

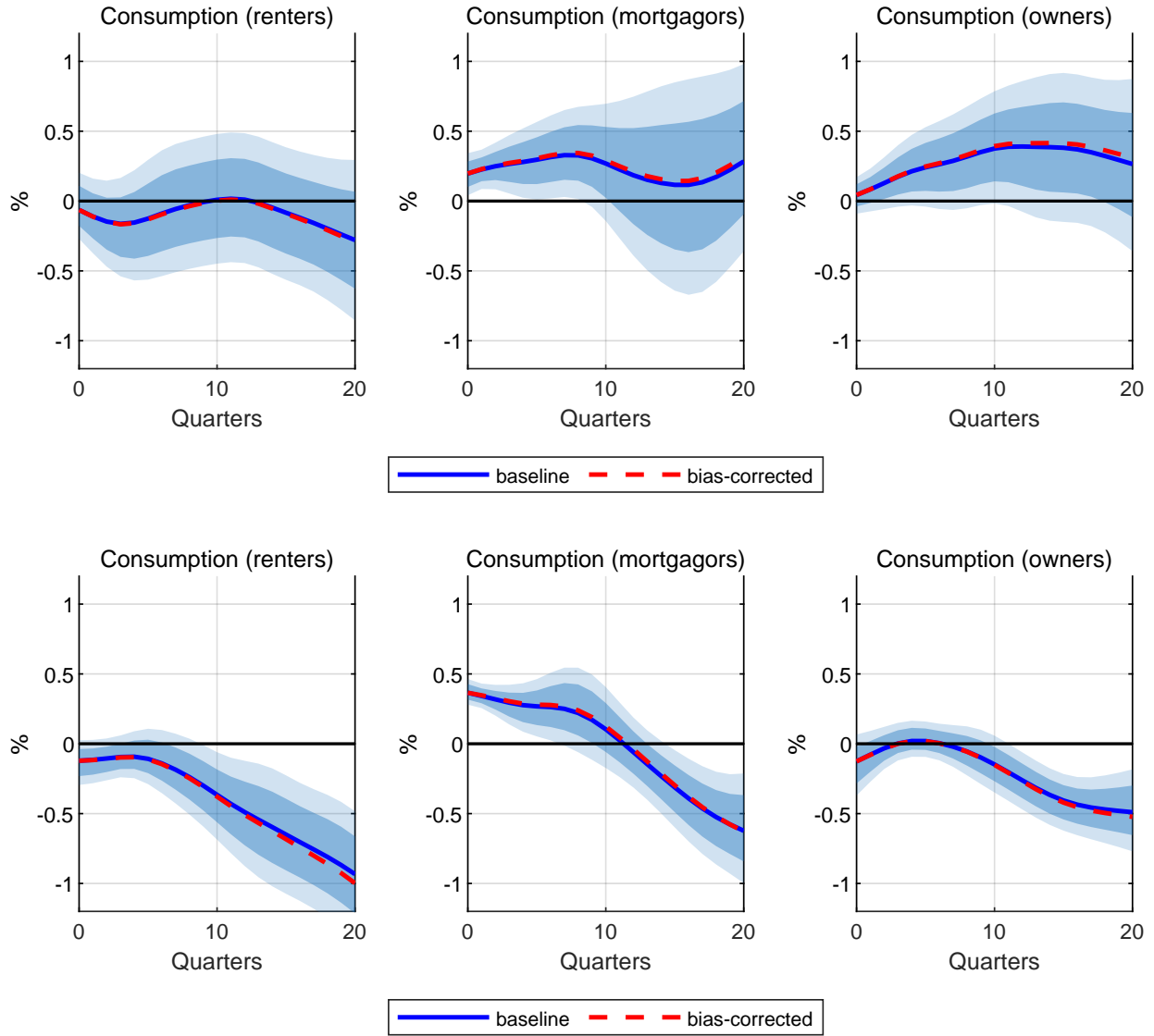


Figure A.18 Consumption Response Including Bias-Corrected Estimator

Notes: Impulse responses to permanent monetary (left column) and corporate-tax-driven (right column) trend inflation shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimates (blue line), 68% (darker band) and 90% (lighter band) confidence bands based on Newey-West standard errors. Point estimate using bias-corrected estimator by [Herbst and Johannsen \(2024\)](#) (red dashed line).

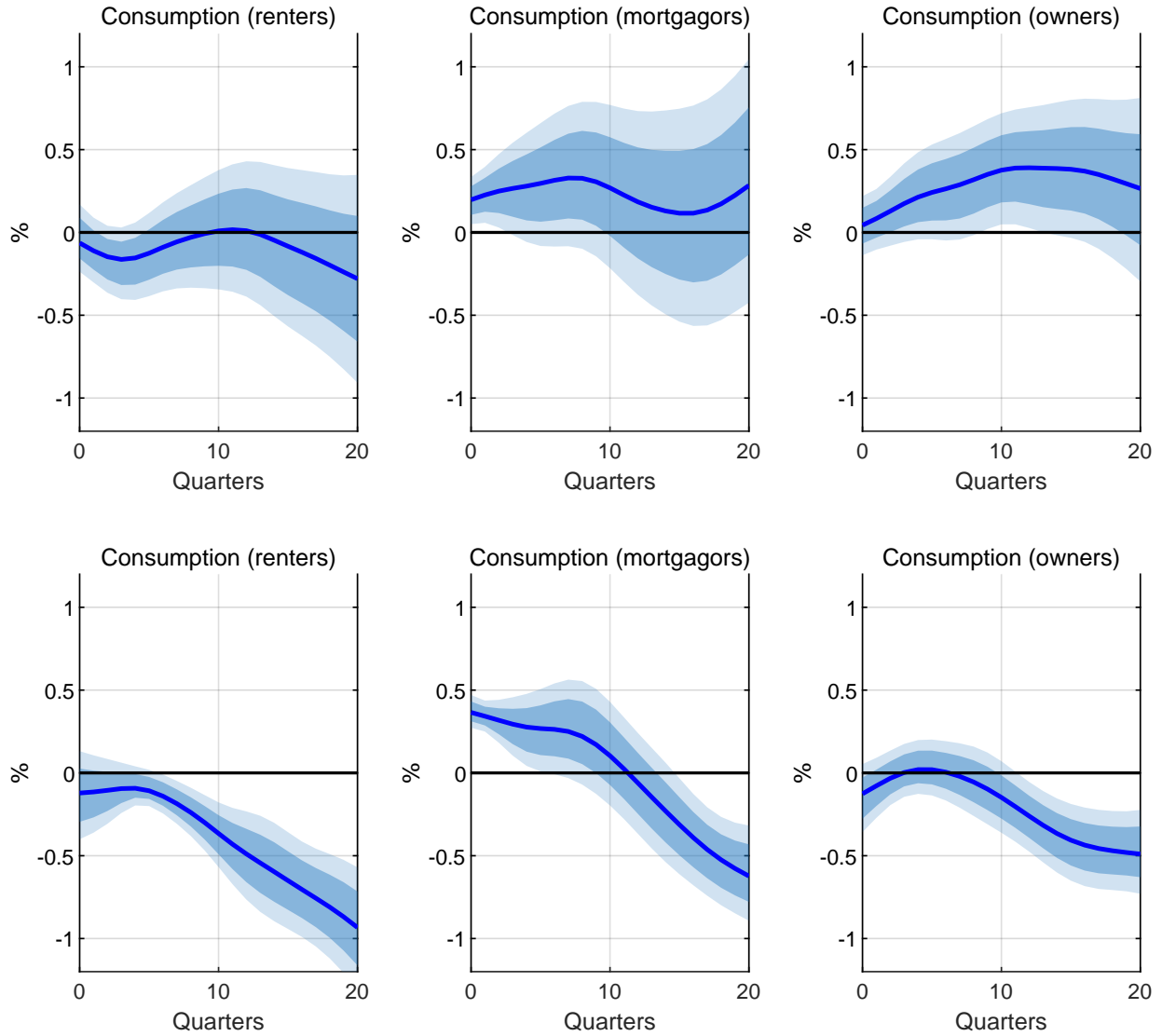


Figure A.19 Consumption Response with Huber-White Standard Errors

Notes: Impulse responses to permanent monetary (left column) and corporate-tax-driven (right column) trend inflation shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate (blue line), 68% (darker band) and 90% (lighter band) confidence bands based on Huber-White standard errors.

Figure A.20 shows the response to the permanent monetary shock by Uribe (2022) extended until 2022:Q4. While the dynamics of the responses is slightly different from the pre-Covid sample, there is also heterogeneity in line with our baseline results. Consumption by renters is relatively worse affected than consumption by homeowners.

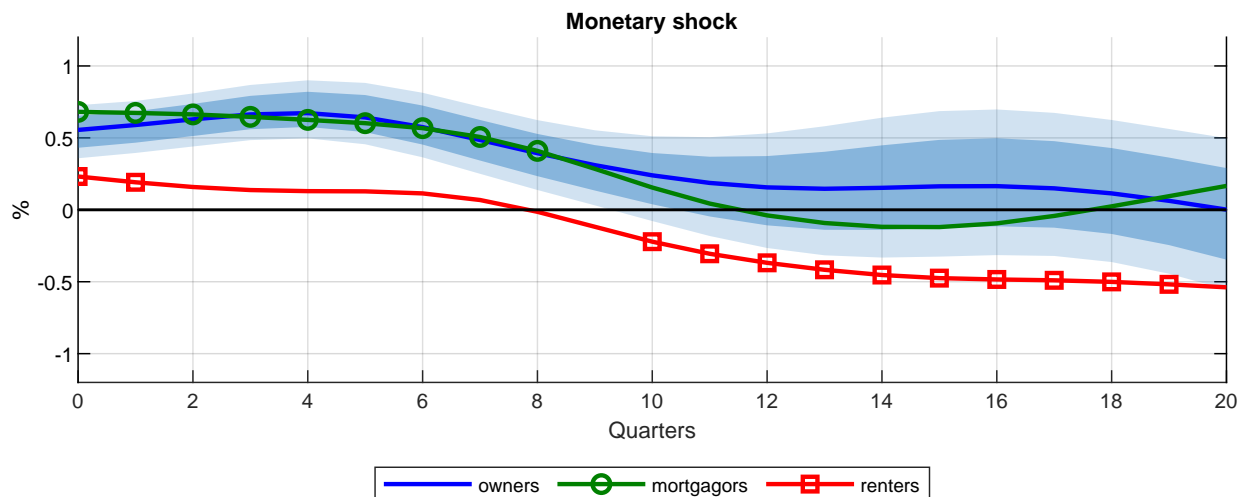


Figure A.20 Consumption Response by Housing Tenure Group to Permanent Monetary Shock (including Covid)

Notes: Impulse responses to permanent monetary trend inflation shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2022:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate for owners (blue line), 68% (darker) and 90% (lighter) confidence bands based on Newey-West standard errors. Point estimates for mortgagors (green line) and renters (red line). Markers indicate significance at 90% confidence level.

A.3.2 Other Dimensions of Heterogeneity

This section shows the impulse response functions of consumption in response to the two trend inflation shocks when grouping households by two alternative heterogeneity dimensions: age and permanent income. Figure A.21 illustrates that there is some evidence for heterogeneous effects by age (top row) but little evidence for heterogeneity by permanent income (bottom row).

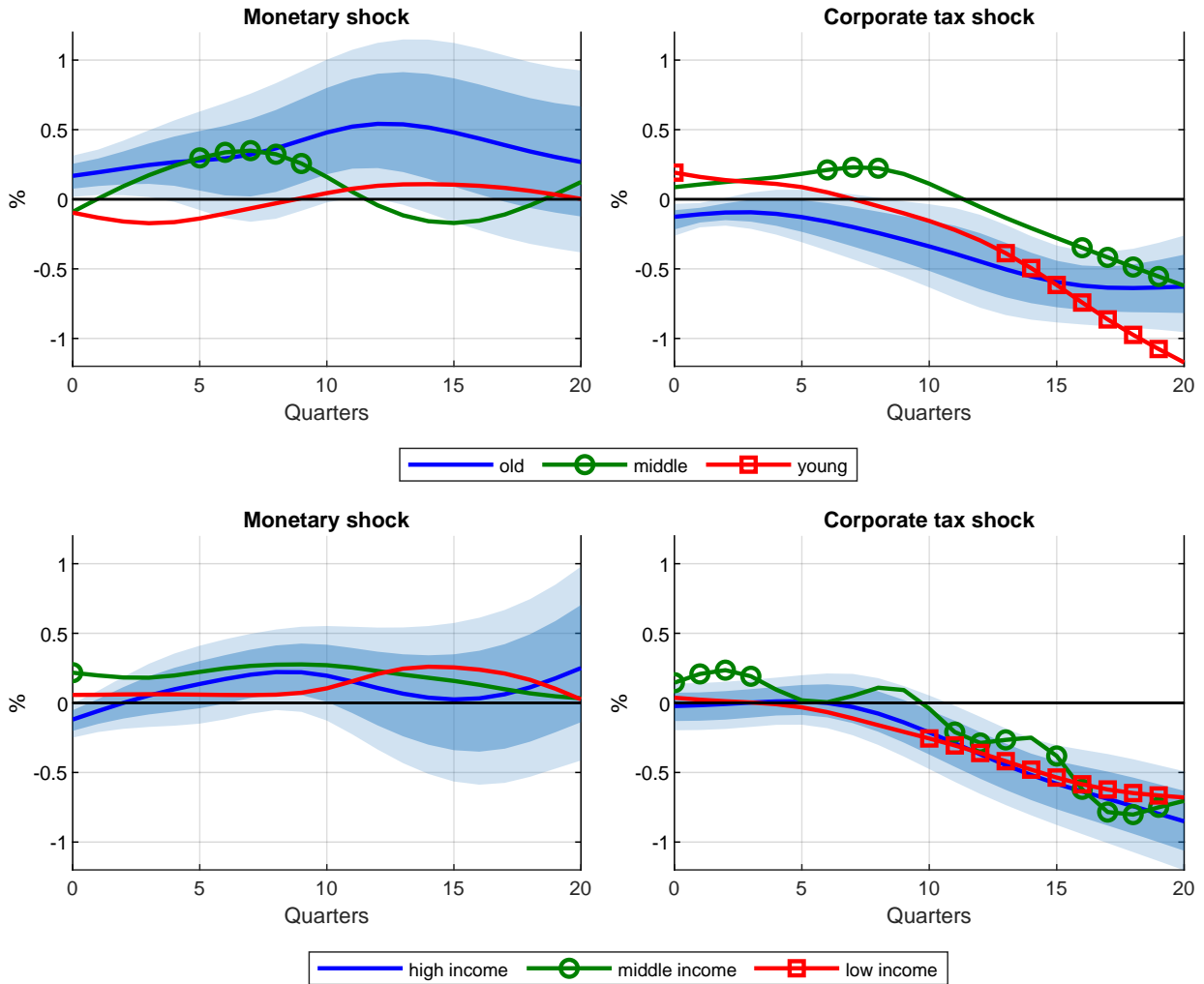


Figure A.21 Consumption Response by Age (top) and Permanent Income (bottom)

Notes: Impulse responses to permanent monetary (left column) and corporate-tax-driven (right column) trend inflation shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate for owners (blue line), 68% (darker) and 90% (lighter) confidence bands based on Newey-West standard errors. Point estimates for mortgagors (green line) and renters (red line). Markers indicate significance at 90% confidence level.

Figures A.22 and A.23 go more into detail and estimate the consumption responses by age or permanent income and housing tenure subgroups. Overall, the results indicate that also within age and permanent income groups there is heterogeneity by housing tenure status and hence highlight housing tenure as the central dimension of heterogeneity.

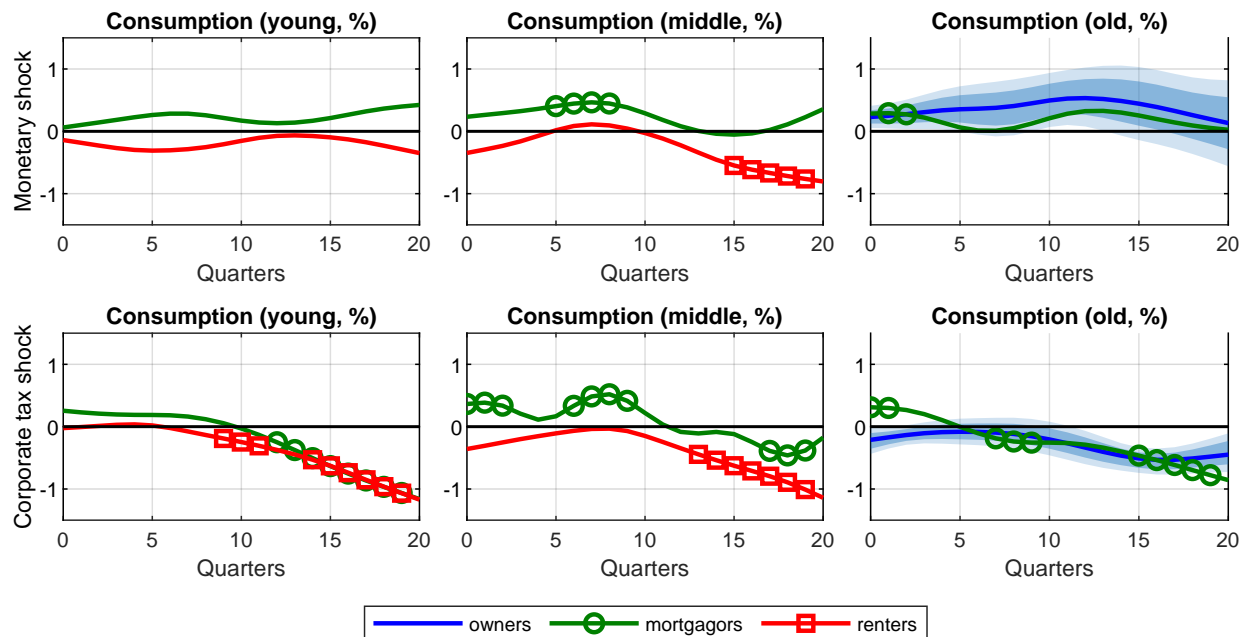


Figure A.22 Consumption Response for Age and Housing Tenure Subgroups

Notes: Impulse responses to permanent monetary (top) and corporate-tax-driven (bottom) trend inflation shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate for owners (blue line), 68% (darker) and 90% (lighter) confidence bands based on Newey-West standard errors. Point estimates for mortgagors (green line) and renters (red line). Markers indicate significance at 90% confidence level.

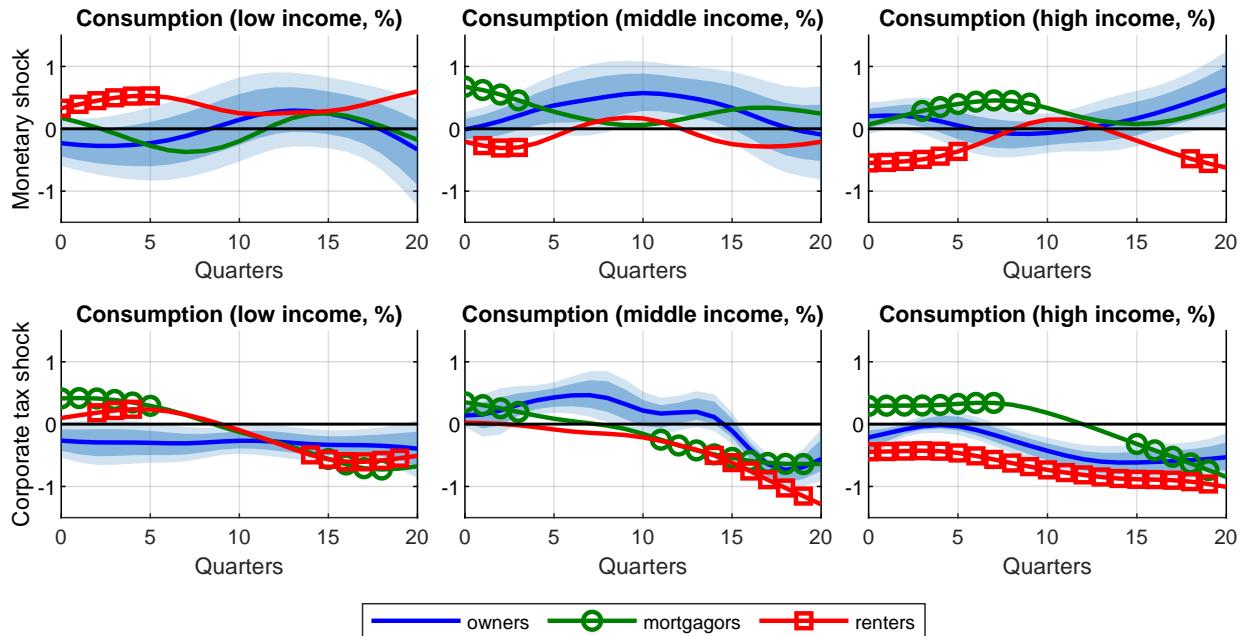


Figure A.23 Consumption Response for Permanent Income and Housing Tenure Subgroups

Notes: Impulse responses to permanent monetary (top) and corporate-tax-driven (bottom) trend inflation shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate for owners (blue line), 68% (darker) and 90% (lighter) confidence bands based on Newey-West standard errors. Point estimates for mortgagors (green line) and renters (red line). Markers indicate significance at 90% confidence level.

A.3.3 Additional Results on Distributional Channels

Figure A.24 shows the response of labor income by housing tenure group to the two trend inflation shocks. For the permanent monetary shock there is little evidence of heterogeneity, especially in the short-run. For the CT-TI shock labor income declines more for owners than for mortgagors and renters. Figure A.25 shows the responses of after-tax income which is similar to the response of before-tax income albeit with larger confidence bands.

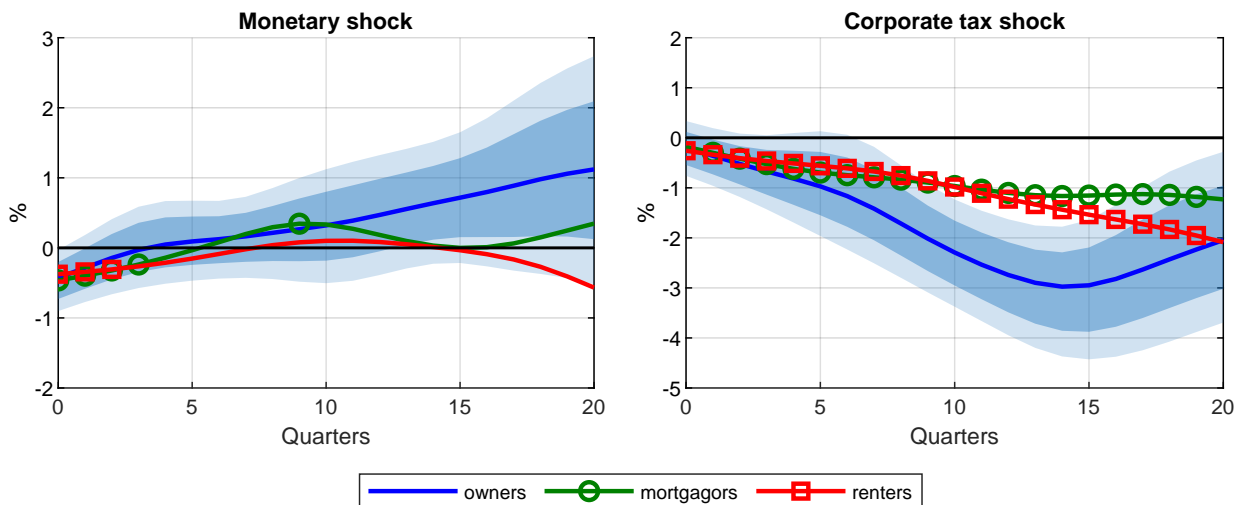


Figure A.24 Gross Labor Income Response

Notes: Impulse responses to permanent monetary (left column) and corporate-tax-driven (right column) trend inflation shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate for owners (blue line), 68% (darker) and 90% (lighter) confidence bands based on Newey-West standard errors. Point estimates for mortgagors (green line) and renters (red line). Markers indicate significance at 90% confidence level.

Figure A.26 displays the IRFs of other types of income to the permanent monetary shock and to a corporate trend-inflation driving shock, complementing Figure 7 presented in the paper. We consider the following series from the Financial Accounts: Compensation to Employees (COE), Income Receipt on Assets (W210RC1Q027SBEA), and Personal Current Transfer Receipts (A577RC1Q027SBEA). In all the cases, we divide by total population and deflate the series using CPI.

As additional evidence, Figure A.27 reports the responses for additional income components by housing tenure groups based on the CEX data. To have a sufficient number of

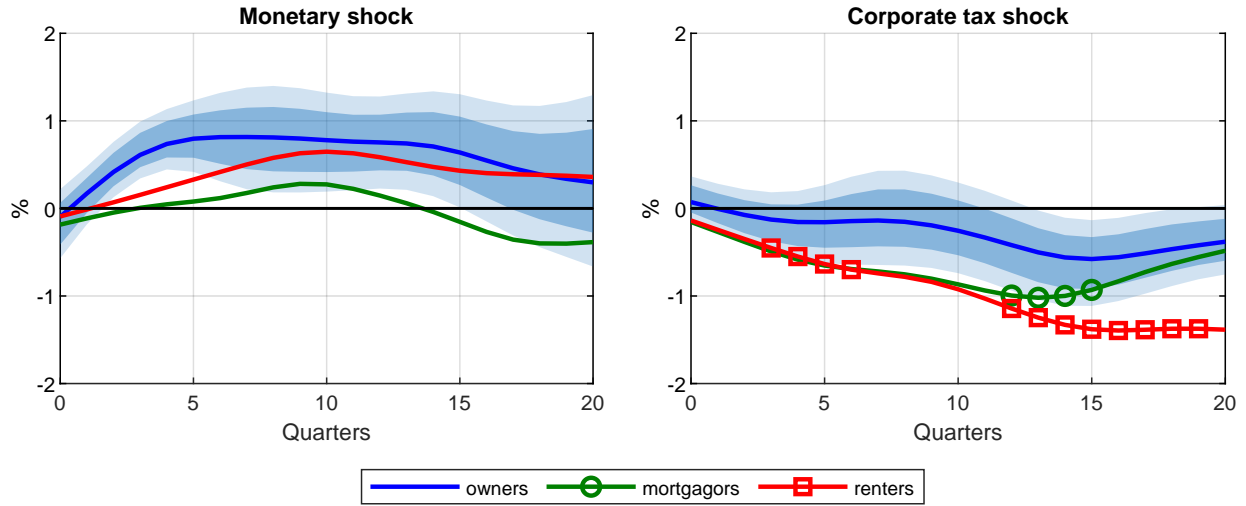


Figure A.25 Total After-Tax Income Response

Notes: Impulse responses to permanent monetary (left column) and corporate-tax-driven (right column) trend inflation shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate for owners (blue line), 68% (darker) and 90% (lighter) confidence bands based on Newey-West standard errors. Point estimates for mortgagors (green line) and renters (red line). Markers indicate significance at 90% confidence level.

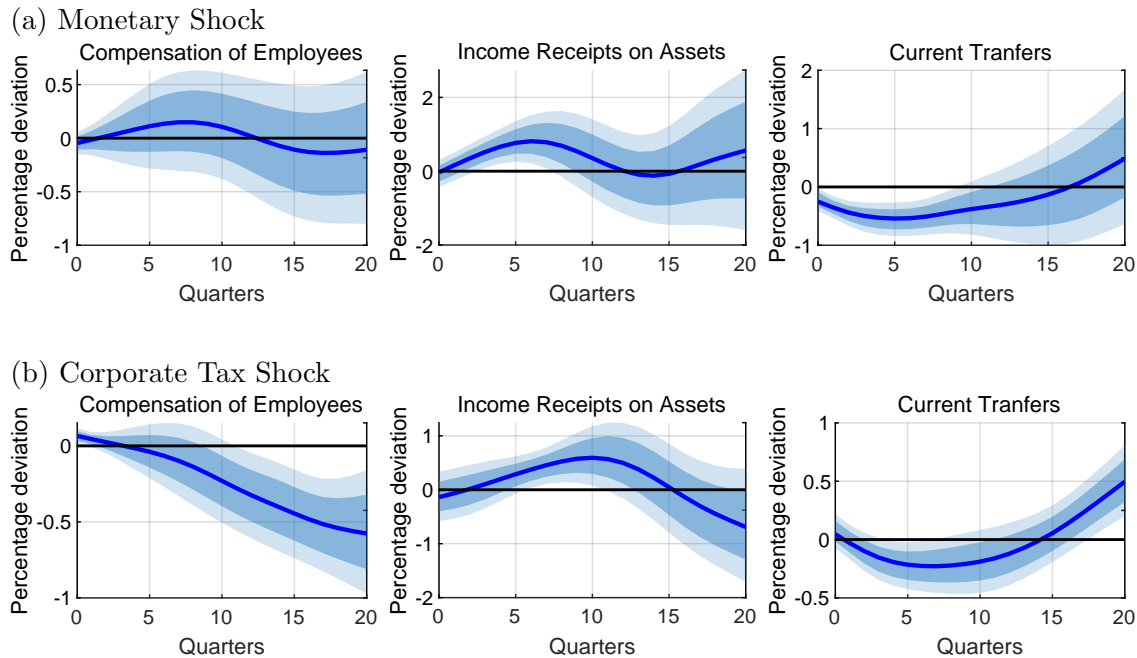


Figure A.26 Aggregate Income Component Responses - Additional Results

Notes: Impulse responses to permanent monetary (top) and corporate-tax-driven (bottom) trend inflation shocks, estimated based on equation (1) using smooth local projections. Sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Solid lines are point estimates, dark (light) blue shaded areas 68% (90%) confidence bands.

observations, we only report income responses if they make up at least 5% of total before-tax income. The response of financial income – which is primarily an income source for owners — is in line with the response of income receipts on assets from NIPA shown in Figure A.26. Similarly, the response of business and other income of owners is relatively better than the response of labor income hence contributing to the relative total income gains of owners.

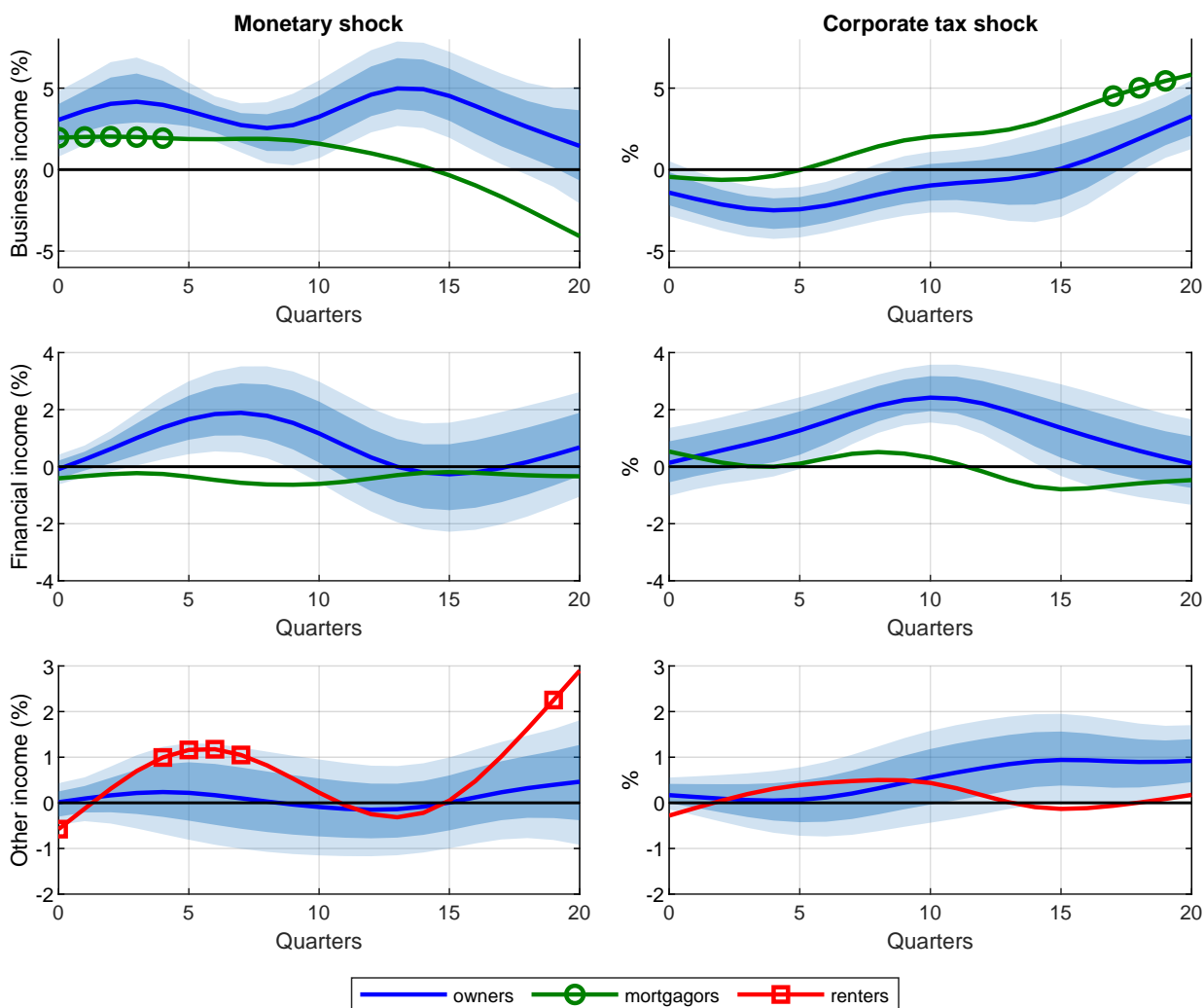


Figure A.27 Other Income Responses by Housing Tenure Group

Notes: Impulse responses to permanent monetary (left column) and corporate-tax-driven (right column) trend inflation shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate for owners (blue line), 68% (darker) and 90% (lighter) confidence bands based on Newey-West standard errors. Point estimates for mortgagors (green line) and renters (red line). Markers indicate significance at 90% confidence level.

Figure A.28 shows the response of financial assets/savings by housing tenure group based on the CEX data. The responses are consistent with the aggregate response of financial assets based on the Financial Accounts data shown in Figure 8 and document that owners gain in relative terms to mortgagors and renters.

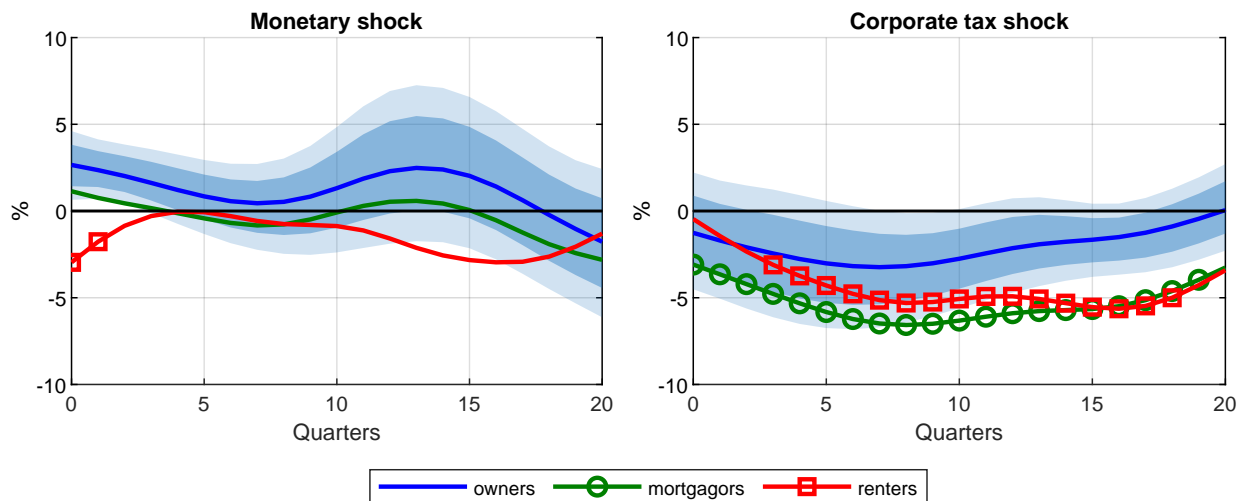


Figure A.28 Financial assets/savings Responses by Housing Tenure Group

Notes: Impulse responses to permanent monetary (left column) and corporate-tax-driven (right column) trend inflation shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate for owners (blue line), 68% (darker) and 90% (lighter) confidence bands based on Newey-West standard errors. Point estimates for mortgagors (green line) and renters (red line). Markers indicate significance at 90% confidence level.

Figure A.29 shows the response of mortgage liabilities by mortgagors based on the CEX data. Since the liabilities data in the CEX is only available from 1994 and there are too few corporate tax shocks after 1994 focus on the permanent monetary shock. The response largely overlaps with the aggregate response based on the Financial Accounts data in terms of confidence bands, but the point estimate at the end of the IRF horizon is smaller than with the Financial Accounts data.

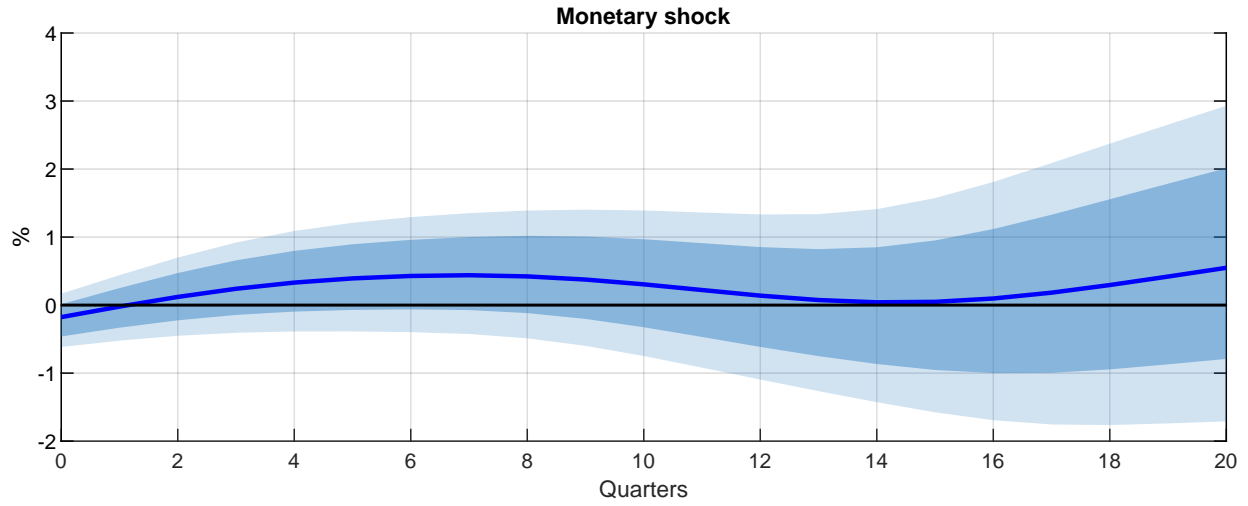


Figure A.29 Mortgage Liabilities Responses by Mortgagors

Notes: Impulse responses to permanent monetary shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1994:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate for owners (blue line), 68% (darker) and 90% (lighter) confidence bands based on Newey-West standard errors. Point estimates for mortgagors (green line) and renters (red line). Markers indicate significance at 90% confidence level.

A.4 Alternative Measure of Trend Inflation

This subsection examines the robustness of our results to the approach used to estimate trend inflation. Introducing persistence into the cyclical component, following Fisher et al. (2025), results in a smoother trend, as illustrated in Figure A.30. Here we demonstrate that our findings on the heterogeneous effects of trend inflation shocks are robust to alternative trend-cycle decompositions used to extract the innovations. Figure A.31 displays the IRFs to a corporate-tax-driven trend inflation shock using the trend identified by Fisher et al. (2025). Figure A.32 shows that our results on the unequal effects of corporate-tax-driven trend inflation shocks are robust to the use of the alternative trend-cycle decomposition for recovering the trend inflation innovations.

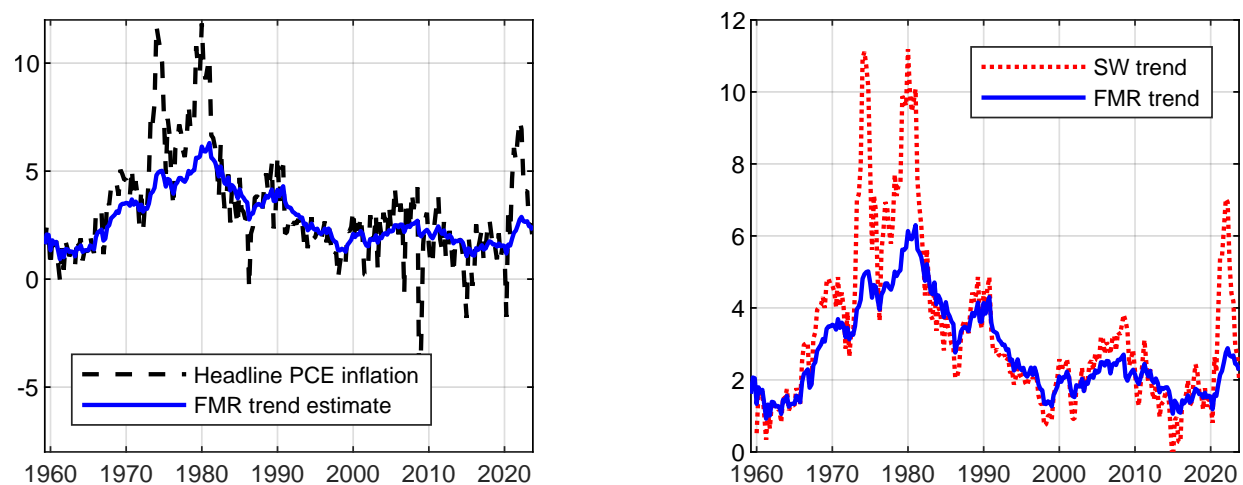


Figure A.30 Estimated Trend Inflation Following Fisher et al. (2025)

Notes: The left panel depicts Headline PCE inflation (change with respect to the previous quarter, annualized) and the filtered trend inflation estimate (posterior mean) computed using the model by Fisher et al. (2025). The right panel depicts the series of filtered trend inflation in comparison with the baseline series computed using the UCSVO model by Stock and Watson (2016).

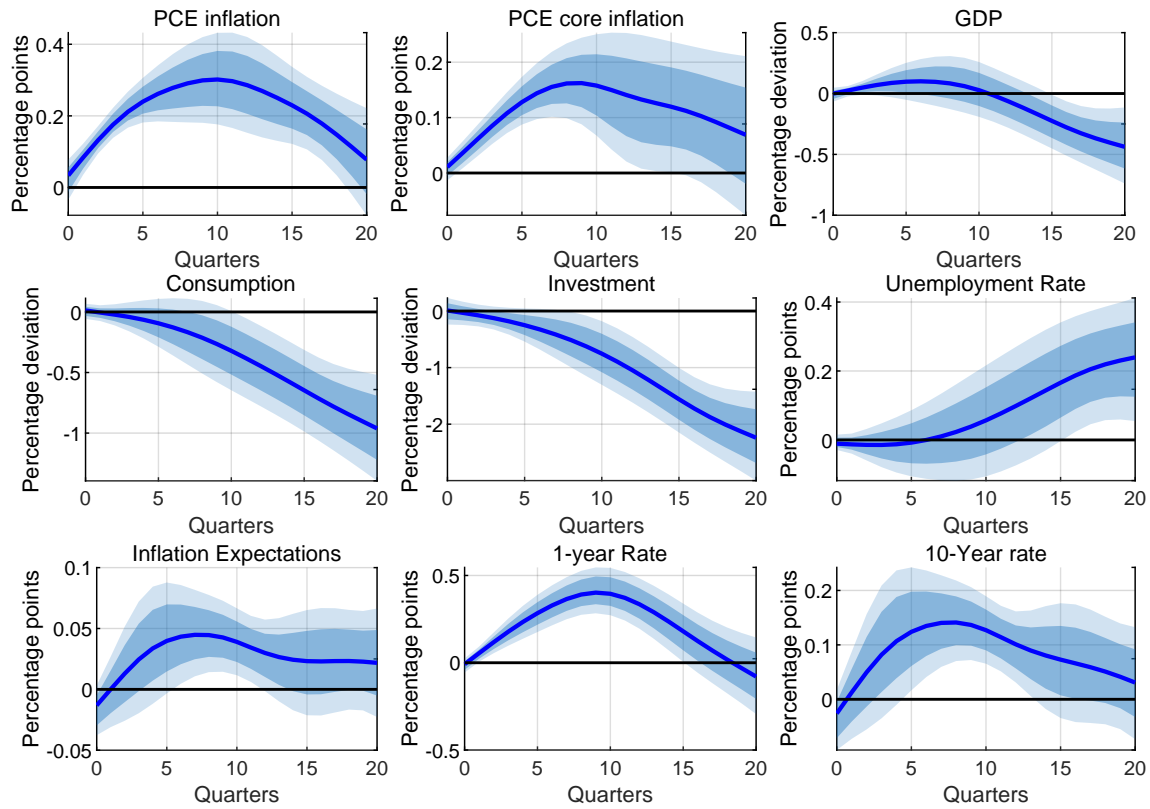


Figure A.31 IRFs to Corporate-Tax-Driven Trend Inflation Shock - Identification Using Fisher et al. (2025) Trend

Notes: Impulse responses of aggregate macro variables to a corporate-tax-driven trend inflation shock, estimated based on equation (1) using smooth local projections. Sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Continuous solid lines denote the point estimates. Shaded areas denote 68% and 90% confidence bands based on Newey-West standard errors.

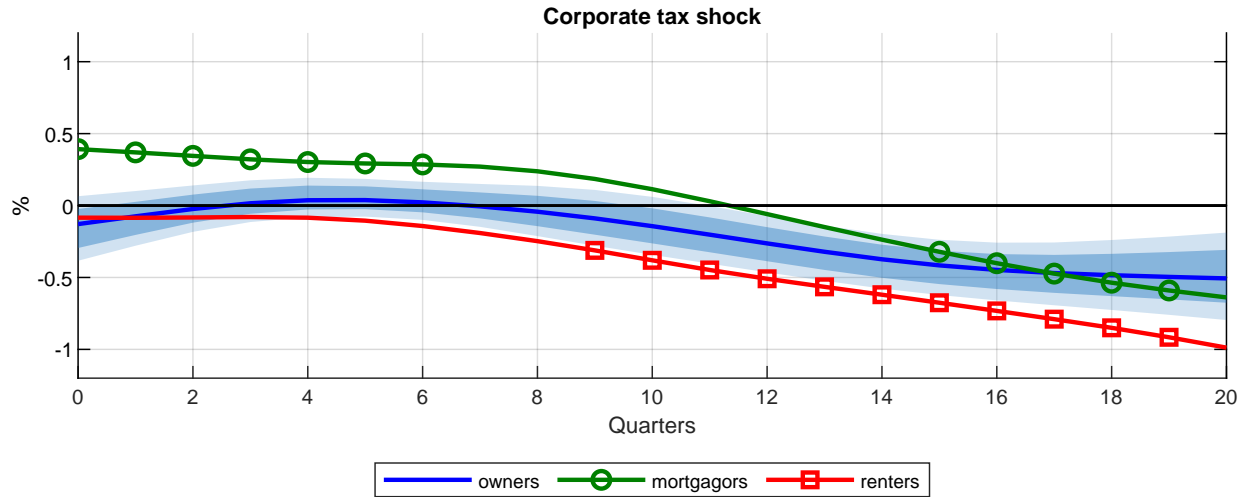


Figure A.32 Consumption Response by Housing Tenure Group to Corporate-Tax-Driven Trend Inflation Shock Identified Using Fisher et al. (2025) Trend

Notes: Impulse responses to corporate-tax-driven trend inflation shocks, estimated based on equation (2) using smooth local projections. CEX data over sample from 1984:Q1-2019:Q4. Effects normalized to generate a peak increase in headline PCE inflation of 25 bps. Point estimate for owners (blue line), 68% (darker) and 90% (lighter) confidence bands based on Newey-West standard errors. Point estimates for mortgagors (green line) and renters (red line). Markers indicate significance at 90% confidence level.