Tax News in Good and Bad Times

Sandeep Kumar Rangaraju* Ana María Herrera†

Abstract

We investigate whether the effect of tax news depends on the state of the economy. Using U.S. quarterly data, we show that news about future tax cuts are more contractionary during recessions. This nonlinearity is mainly due to the response of durable consumption and, especially, nonresidential investment.

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1 Introduction

Does the effect of tax news on aggregate economic activity depend on the state of the economy? Recent studies indicate that anticipated tax cuts have a short-run contractionary effect. If economic agents foresee future tax cuts –a very likely situation given implementation lags– they adjust their behavior accordingly, postponing investment and consumption to the time when the tax cut is realized (see e.g. Yang (2005), Yang (2007a), Leeper, Walker, and Yang (2013), Kueng (2018) and Mertens and Ravn (2012), and Herrera and Rangaraju (2019)). However, agents' response to foresight might depend on the state of the economy. If this is the case, does foresight hinder the ability of tax cuts to stimulate the economy during recessions?[1]

We define good(low-unemployment)/bad (high-unemployment) times as periods when the unemployment rate is below/above the median unemployment rate for the 1956Q1-2007Q4 sample (5.6%). The solid line in Figure 1 illustrates the real GDP growth, the shaded areas denote periods when the unemployment rate exceeds 5.6%, and the vertical lines indicate tax events intended to stimulate the economy or fight recessions.[2] The Revenue Act of 1964, the Revenue Act of 1971, the

*Department of Economics, Goddard School of Business & Economics, Weber State University, Ogden 84408-3801; phone: (801) 626-6094; e-mail: srangaraju@weber.edu

†Department of Economics, Gatton College of Business and Economics, University of Kentucky, Lexington 40206-0034; phone: (859) 257-1119; e-mail:amherrera@uky.edu

[1]Hussain and Malik (2016), Arin *et al.* (2015), and Demirel (2021), among others, find evidence of state-dependence in the effect of unanticipated tax changes.

[2]Details regarding countercyclical tax laws, enactment dates and provisions during were obtained from the Library of Congress, Yang (2007b), and Romer and Romer (2010).

Tax Reduction Act of 1975, the Tax Reform Act of 1976, and the Tax Reduction and Simplification Act of 1977 were mainly aimed to promote economic growth (Romer and Romer, 2010; Yang, 2007b). There were no countercyclical tax policy changes in the 1990's. However, the phased in tax cuts of the Economic Growth and Tax Relief Reconciliation Act of 2001 and the Job Growth and Tax Relief Reconciliation Act of 2003 were intended to stimulate the economy following the 2001 recession. While Figure 1 illustrates how real GDP predominantly increased after a tax cuts was implemented, it does not allow us to infer the role of foresight.

To isolate the effect of news regarding changes in future taxes we use the implicit tax rate, defined as the yield spread between the one-year tax exempt municipal bond and the one-year taxable Treasury bond (see Kueng (2018), Leeper *et al.* (2013), and Herrera and Rangaraju (2019)), which we plot in Figure 2. Shaded in grey are periods when the unemployment rate exceeds 5.6%. Decreases in the implicit tax rate largely coincide with expectations of future tax cuts. However, because the use of unconventional monetary policy during the Great Recession resulted in close to zero T-bill rates and large swings in the implicit tax rate,[3] we opt to estimate the benchmark specifications on quarterly data spanning 1956:I-2007:IV. That is, we exclude the Great Recession, a period where even AAA-rated municipal bonds might have experienced higher default risks.

Our estimation results show that the effect of tax news on real GDP is state-dependent with the contractionary effect being statistically significant during high-unemployment states (bad times), and insignificant in low-unemployment states (good times). In bad times, agents delay durable consumption and, especially, nonresidential investment. In good times, the decline in consumption and investment is less persistent, and hence, does not lead to a contraction in real GDP. Our results indicate that foresight regarding future tax cuts can hinder countercyclical tax policies during periods of high unemployment, while having a minor impact over expansions.

2 Empirical Methodology

As in Auerbach and Gorodnichenko (2013) and Ramey and Zubairy (2018), we estimate the impulse responses via local projections (Jordà, 2005). We begin by estimating a linear model given by:

$$z_{t+h} = \alpha_t + \Phi_h(L)w_t + \gamma_h C_t + \beta_h \tau_t + \epsilon_{t+h} \tag{1}$$

where α_t denotes the deterministic terms (i.e., constant, linear and quadratic trend)[4], z_t is the outcome of interest (e.g., GDP), and w_t contains the control variables. The latter consist of lags of the log of real per-capita net tax revenues (t_t), the log of real per-capita government spending (g_t), the log of real per-capita GDP (y_t), the Federal Funds Rate (ff_t), and the the implicit tax rate (τ_t^I). $\Phi_h(L)$ is a lag polynomial of order 4. We also control for contemporaneous values of $C_t = \begin{bmatrix} t_t & g_t & y_t & ff_t \end{bmatrix}'$. The estimated coefficients β_h give the impulse response of z_{t+h} at horizon h to

[3] See Figure B.1 in the online appendix

[4] Under this specification the deterministic term in (1) is $\alpha_t = \begin{bmatrix} \alpha_0 & \alpha_1 & \alpha_2 \end{bmatrix} \begin{bmatrix} 1 & t & t^2 \end{bmatrix}'$

a unit shock in τ_t^I, where $\tau_t^I = 1 - \frac{r_t^M}{r_t^T}$, r_t^M represents the one-year tax exempt municipal bond rate, and r_t^T the one-year taxable Treasury bond rate at time t.[5]

We then estimate a state-dependent model given by:

$$z_{t+h} = \alpha_t + d_{t-1}[\Phi_{b,h}(L)w_t + \gamma_{b,h}C_t + \beta_{b,h}\tau_t] + (1 - d_{t-1})[\Phi_{g,h}(L)w_t + \gamma_{g,h}C_t + \beta_{g,h}\tau_t] + \epsilon_{t+h}, \tag{2}$$

where the dummy variable d_{t-1} takes the value of one in high-unemployment states or bad times (b), and zero in good times or low-unemployment states (g). All coefficients, except those on the deterministic terms, are allowed to vary across states. The estimated $\beta_{n,h}$ for $n \in b, g$ correspond to the state-dependent responses.

Table A.1 in the online appendix provides a detailed description of the data.

3 Results

This section first describes the average responses estimated with the linear model and then discusses the results for the state-dependent specification.

3.1 Linear Model

Column 2 of Figure 3 plots the responses for the linear specification. These estimates correspond to the average response over the sample and, hence, over all states. Anticipation of future tax cuts has a short-run negative effect on real GDP per capita, hereafter GDP. The peak decline occurs four quarters after the shock (-0.06%); the negative impact vanishes after three years. These results are consistent with Mertens and Ravn (2012) who estimate a deeper contraction in response to anticipated tax cuts. A key difference between specifications is that they fix the length of the anticipation horizon; instead, the use of the implicit tax rate does not require setting the period of foresight a-priori. Our smaller estimates reflect the average response to tax news over the 1956Q1-2007Q4 period, when the legislative lag ranged from 2 to 17 months.

The contractionary response to tax news shocks is indicative of forward-looking agents postponing their consumption/investment decisions until the tax cuts are realized (see column 2 of Figures 4 and 5). Figure 4 shows a statistically significant decline in personal consumption expenditures that lasts about 12 quarters. Two key insights are derived from disaggregating consumption into durable goods, nondurable goods and services. First, the contractionary effect of tax news on consumption is mainly driven by the response of durables and, to a minor degree, of services. Second, it takes about two years for durable consumption to rebound.

These results complement work by Kueng (2018) who, using household-level data, estimates a decrease in nondurable consumption growth for households with a federal adjusted gross income

[5]To lessen concerns regarding callability, liquidity and default risk that may affect municipal bonds, we only employ AAA-rated municipal bonds to construct the implicit tax rate. See Herrera and Rangaraju (2019) for a detailed discussion on the identification of tax news.

(AGI) in the top quartile, but no change among households with incomes below the median AGI. On one hand, our results confirm that aggregating over households facing different degrees of liquidity constraints would lead a researcher to infer an insignificant response of nondurable consumption to tax news, while missing the significant response of high-income earners. On the other hand, our results indicate tax news lead to a decline in durable consumption. Our findings suggest that household facing liquidity constraints or decision costs are not able to adjust nondurable consumption when future tax cuts are anticipated (Poterba (1989), Reis (2006), and Mertens and Ravn (2012)). Yet, on average, consumers will postpone spending in durable goods until the tax cut is implemented.

Regarding investment, we estimate a negative response to tax news that lasts about ten quarters (column 2 of Figure 5). This finding is consistent with Mertens and Ravn (2012) estimated short-run drop in investment when tax cuts are anticipated. Furthermore, this decline is mainly due to a contraction in residential investment. In brief, foresight may initially hamper countercyclical fiscal policies because economic agents postpone investment until the tax cut is implemented (Ramey (2016) and Mertens and Ravn (2011)).

The estimated response of economic activity to an innovation in the implicit tax rate is consistent with the effect of foresight regarding labor income taxes derived in New Keynesian models (Yang (2005)). This might not come as a surprise since changes in the implicit tax rate are less informative about the timing of changes in corporate taxes than individual income taxes (Leeper *et al.* (2013)).

3.2 State-Dependent Model

That tax foresight can hinder countercyclical policies is well-known (see House and Shapiro (2006) and Yang (2005)). However, less in known regarding possible state-dependence in the response to tax foresight. Does the contractionary effect induced by foresight depend on the state of the economy?

Columns 3 and 4 of Figure 3 illustrate the GDP response to anticipation about future tax cuts in bad and good times. For ease of comparison, all the responses are plotted in the first column. The last column reports the t-statistic of the null hypothesis that the difference between the responses, at horizon h, in high and low-unemployment states is different from zero ($H_0 : \beta_{b,h} - \beta_{g,h} = 0$). Two results stand out. First, the decline in real GDP is statistically significant in bad times, but insignificant in good times. The response in bad and good times are statistically different at horizons lower than seven quarters (see Figure 3 and Table 1). Second, the response in bad times is more persistent than the average response estimated with the linear specification.

What components of GDP explain the differential response across bad and good times? Do aggregate consumption and investment respond differently to tax news in low and high-unemployment states? Figure 4 illustrates how, in bad times, news of a future tax cut results in curtailed consumption. The decline in bad times is only somewhat larger than the average response. The difference in the response across good and bad times stems from durable consumption (see column 5 of Figure 4).

Figure 5 plots the response of investment. Differences in the estimated responses between the linear and state-dependent model resemble those for durable consumption. In bad times, the effect on aggregate investment is slightly larger and more persistent than in the linear model; this is mainly due to a larger drop in nonresidential investment. In good times, the decline in nonresidential investment is smaller and less persistent. The last column of Figure 5 and Table 1 indicate a significantly larger contraction in nonresidential investment when foresight of a tax cut hits the economy in high-unemployment states. However, in the short-run, residential investment falls more in low-unemployment state. Indeed, the p-value for the test of equality in the response in good and bad states at $h = 4$ is 0.061 (see Table 1).

We note that our finding of a contractionary effect is robust to using a threshold value of 6.5% unemployment and employing the NBER recession dates to define the states.[6]

In summary, our results suggest that foresight about future tax cuts is contractionary during bad times while is mostly statistically insignificant in good times. In bad times, agents delay durable consumption and, especially, nonresidential investment. In good times, the decline in consumption and investment is less persistent, and hence, does not lead to a contraction in real GDP. Our results indicate that foresight regarding future tax cuts can hinder countercyclical tax policies during periods of high unemployment, while having little effect during periods of expansion.

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[6]For brevity, we report the results of these robustness checks in Figs. B.1–B.7 of the on-line appendix.

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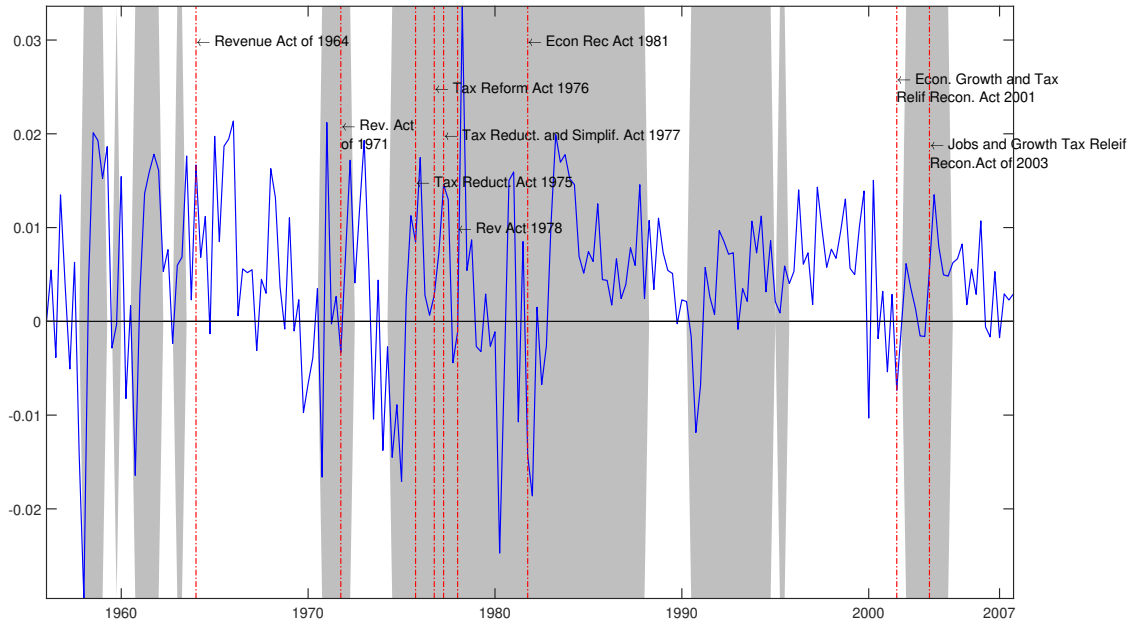
Table 1: Response of GDP and the Components: State-Dependent Model

Variables	**horizon**	**States**		**Significance level of difference**
		High Unemployment	Low Unemployment	p-Values
	4	-0.063	0.004	0.009
GDP	8	-0.041	-0.042	0.114
	12	0.032	-0.070	0.559
	4	-0.041	-0.014	0.089
Consumption	8	-0.063	-0.028	0.099
	12	0.167	-0.009	0.796
	4	-0.078	-0.005	0.169
Durables	8	-0.085	-0.308	0.171
	12	0.226	-0.088	0.002
	4	0.0216	-0.142	0.765
Nondurables	8	-0.006	-0.145	0.870
	12	0.029	-0.996	0.666
	4	-0.081	0.005	0.363
Services	8	-0.029	0.005	0.443
	12	0.012	0.035	0.830
	4	-0.473	-0.058	0.002
Investment	8	-0.383	-0.208	0.001
	12	0.019	-0.137	0.956
	4	-0.241	-0.317	0.061
Residential	8	-0.043	0.081	0.618
	12	0.360	0.095	0.087
	4	-0.253	-0.249	0.002
Nonresidential	8	-0.372	-0.336	0.000
	12	-0.321	-0.152	0.001

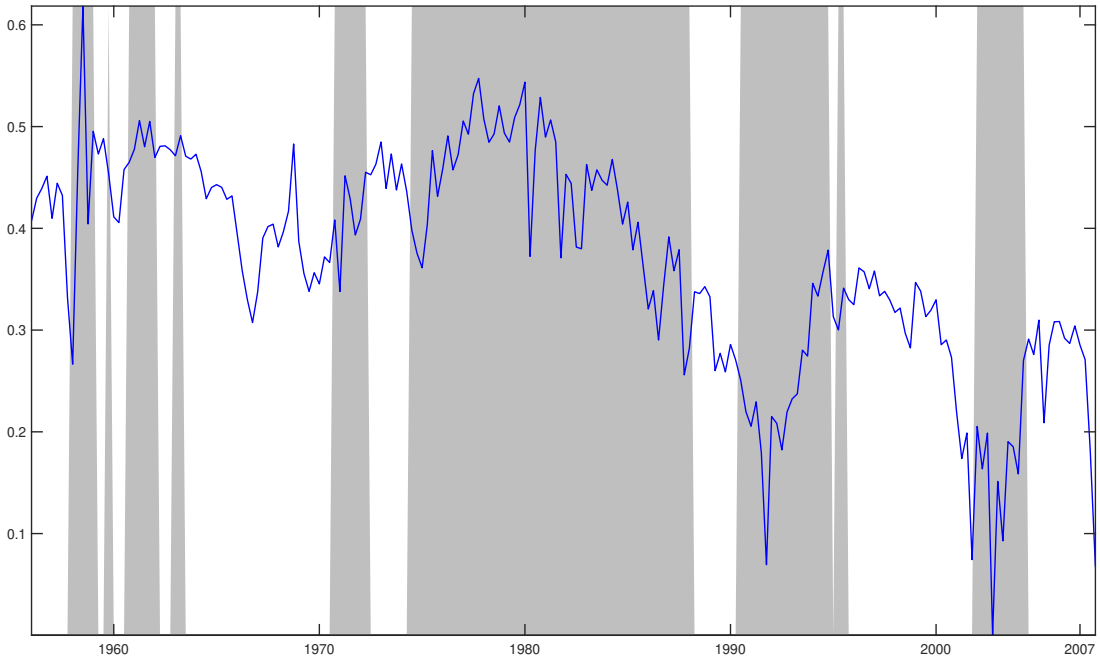
Note: The last column of the table shows the p-values for the test that the estimates differ across states. The p-values for differences in estimates across states are based on heteroscedastic- and autocorrelation-consistent (HAC) standard errors.

Figure 1: Tax Events and GDP Growth



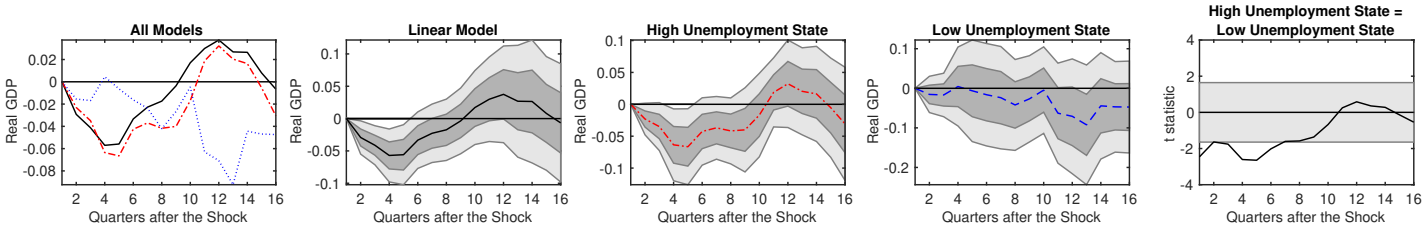
Note: The figure plots the real per-capita GDP growth rate. The shaded regions reflect periods when the unemployment rate was above the threshold value. The vertical dash-dot line shows tax events intended to stimulate the economy.

Figure 2: Implicit Tax Rate



Note: The figure plots the implicit tax rate. The shaded regions reflect periods when the unemployment rate was above the threshold.

Figure 3: Response of Real GDP to News of a Future Tax Cut



Note: The figure illustrates the responses to a negative innovation in the implicit tax rate. The solid black line denotes the response in the linear model, the red dash-dotted line is the response in high-unemployment states and the blue dashed line is the response in low-unemployment states. The dark and light shaded regions represent 68% and 95% confidence intervals. The last column shows t-statistics for the null of equality of the responses in high and low-unemployment states. The shaded area in the fifth column is ± 1.96.

Figure 4: Response of Consumption to News of a Future Tax Cut

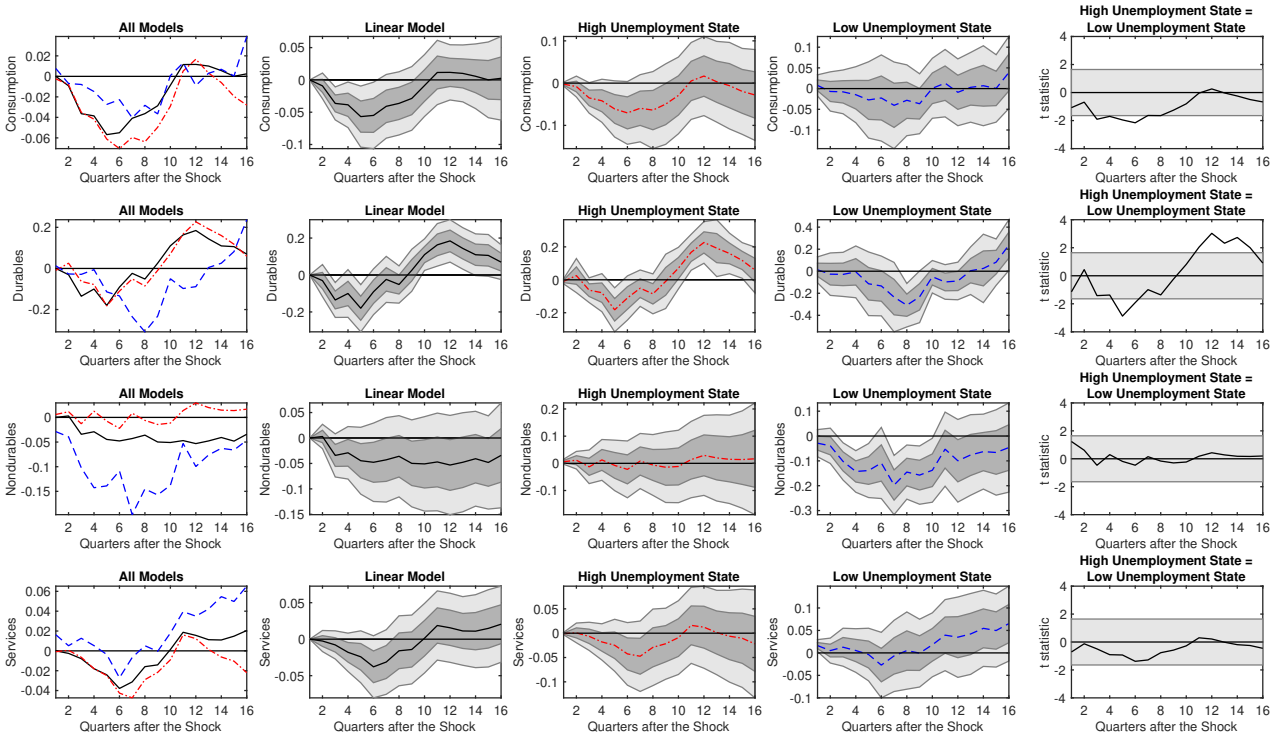
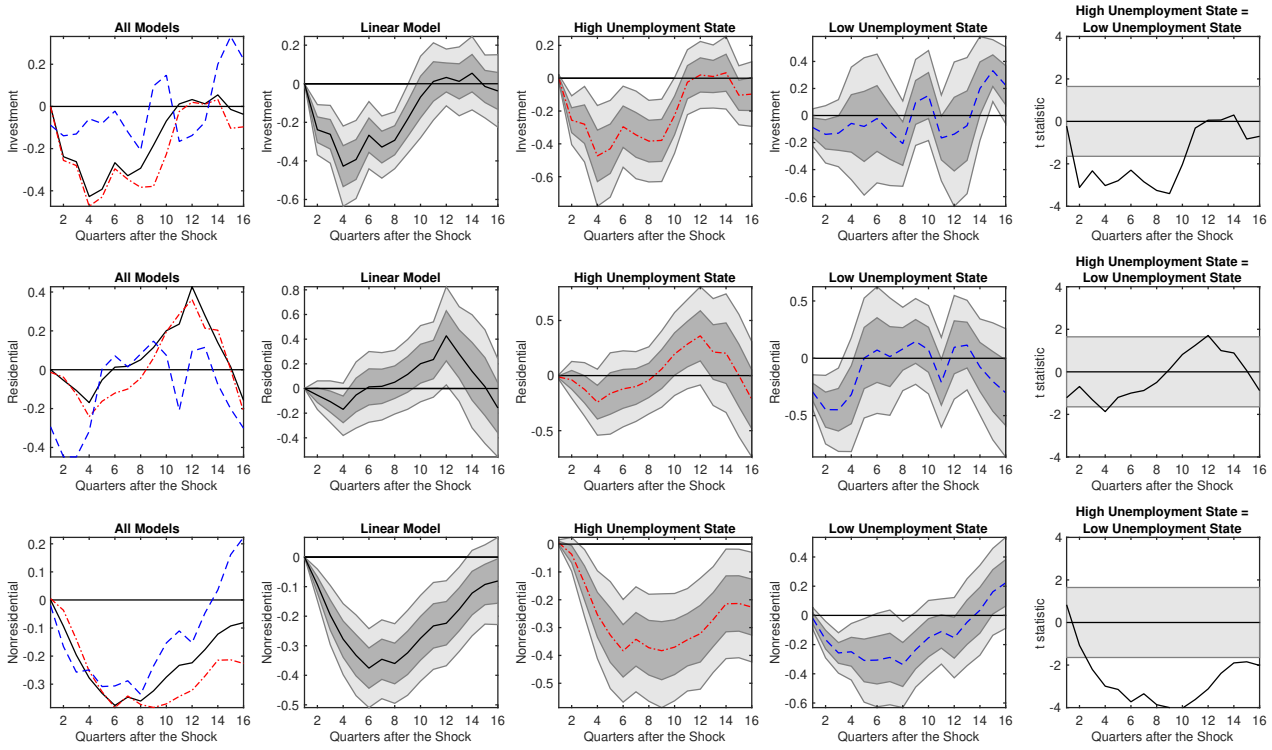


Figure 5: Response of Investment to News of a Future Tax Cut



Note: See notes for Figure 3.