Econ 286 Project: A Causal Fact*

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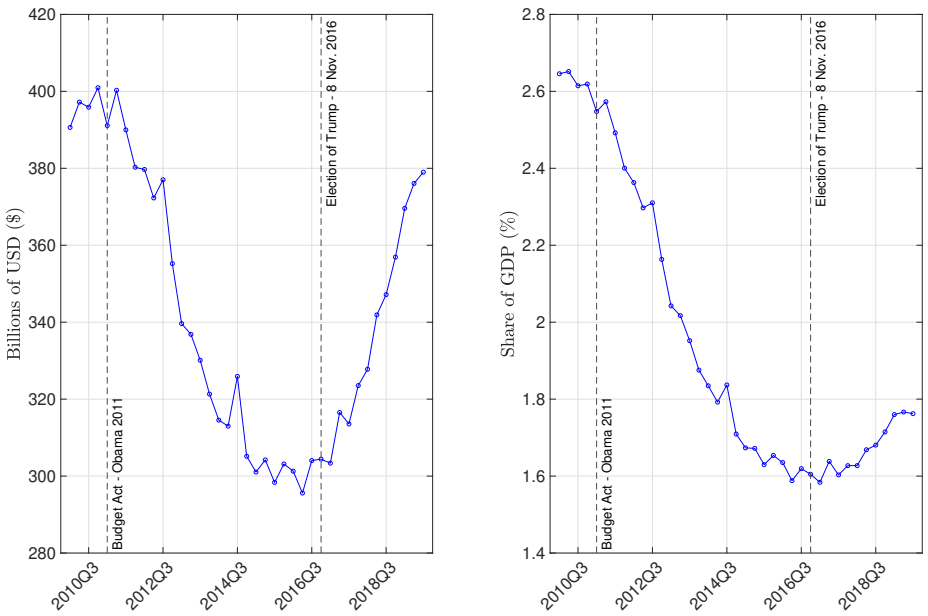
1 Motivation

Figure 1 shows the evolution of quarterly defense procurement spending from 2010 onward.

Figure 1: Defense Procurement Spending



Defense procurement spending is constructed as in Briganti and Sellemi (2022). Left figure values are in levels (billions of dollars). In the right panel, data is divided by GDP.

Procurement spending had been following an upward trend until 2011, when the enactment of the Budget Control Act introduced budget sequestration for military spending.[1] This measure was meant to control the large growth of public debt started with the Bush Tax Cuts of 2001

*I wish to turn my Econ286 project into a potential job market paper which fits into my broad dissertation research theme: "*Essays on fiscal policy and its anticipation effects*".

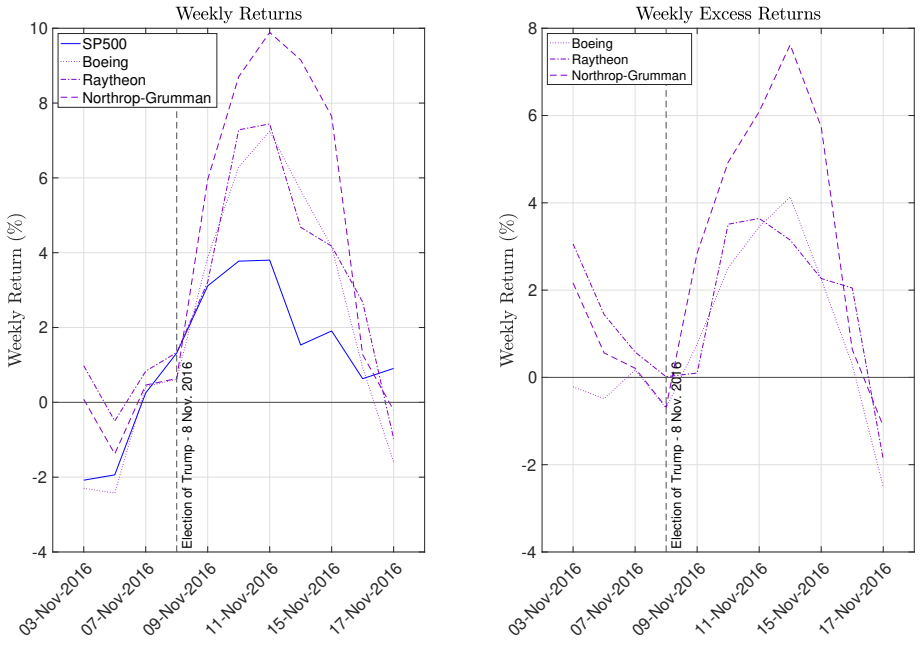
[1] Alesina, Favero, and Giavazzi (2014) consider the Budget Control Act of 2011 an expenditure based fiscal consolidation, exogenous to output fluctuations.

and worsened by the Great Recession. The Bush tax cuts were scheduled to expire in 2010, thus creating the so called fiscal cliff. The expiration was postponed to 2012 by the Obama administration which, however, used the Budget Control Act to reduce the debt's growth. The fiscal cliff issue was finally resolved on January 1st 2013 with the enactment of the ATRA, which turned the Bush Tax Cuts permanent, except for high-income households. Most importantly, the ATRA did not cancel the budget sequestrations for defense spending which, in fact, kept falling. The spending cuts created lot of distress among the military personnel (e.g. see Pentagon's announcement here and an interview of Fox News to Lt. Col. Matthew "Pablo" Brown, at the end of 2016, describing the actual conditions of aircraft military bases).

The path of defense procurement spending reversed after the election of Donald Trump to President of the United States. Trump had been promising to boost defense pending since the beginning of his campaign as this CNN video and this article both show. Trump kept his promise once he got elected. In fact, the budget for defense spending increased since the beginning of his mandate as explained in this article and so did defense procurement spending, as shown in Figure 1.

How did the stock market and, in particular, the stock-price of defense contractors respond to the election of Donald Trump? This question is answered by Figure 2, which shows in its left panel the weekly returns of the three majors defense contractors (i.e. Boeing, Raytheon and Northrop-Grumman) and the one of the S&P500, all around the Trump's election day. The right panel of Figure 2 shows the excess returns of the three contractors relative to the S&P500.

Figure 2: Stock Market Reaction to Trump's Election



The response is generally positive. This is not surprising since the election of a Republican candidate has a positive stock market response, since investors expect corporate business tax cuts, which, in turn, boost profits.[2] However, if investors expect more defense spending, the

[2]In fact, Trump did cut the corporate tax rate from 39% down to 21% in December 2017 with the enactment

response of the stock-price of defense contractors should be stronger than the one of the market. This is confirmed by Figure 2. I interpret this stronger response as a direct evidence that investors were expecting - correctly - higher future defense spending.[3]

Research Question: I intend to study the effects of this "*defense news shock*" on the regional economic activity. Did households and firms respond to a shock to expected future level of defense spending? In particular, can we use cross-sectional heterogeneity across regions (e.g. counties, CBSAs, states) in terms of dependence on procurement spending to study anticipation effects of government spending?

Intuitively, richer regions have a higher share of Ricardian households and should react to news of future spending more than poorer areas. Similarly, regions which have historically received lot of procurement spending relative to the local economic activity should also be more exposed to news of spending shocks (e.g. individuals are more attentive to news related to military spending in a region where a large military base is located). Ideally, I can exploit the different regional exposure to the Trump's defense news shock to estimate anticipation effects, if any.

Why is this relevant?

Understanding the importance of anticipation effects of government spending is an open research question in the fiscal policy literature. For instance, Fisher and Peters (2010) and Perotti (2014) downplay the role played by anticipation effects, unlike Ramey (2011), which stressed their importance. Recent findings of Coibion, Gorodnichenko, and Weber (2020) using households survey data support the idea that households do not associate higher future debt with higher future taxes; this goes against the Ricardian behavior of agents and is in support of a theory where households have cognitive discounting (see Gabaix (2020)). In a recent paper with Victor Sellemi we propose a different explanation for the anticipation effects of government spending using aggregate time series data.[4] In particular, we explore the possibility that GDP moves before G (i.e. anticipation) because procurement spending is recorded with a delay in the NIPA data. In turn, this suggests that the early move of GDP is actually due to the early stage production/response of government contractors to newly awarded contracts, rather than other more complex anticipation mechanisms (e.g. the negative income effect of Ricardian households). Our results suggest that: (i) production smoothing of government contractors is the main channel of anticipation; (ii) the Ricardian behavior of households in response to G-shocks (a.k.a. negative income effect) might play a less relevant role in the anticipation effects of government spending.

I intend to add to the literature by providing direct evidence of existence (or not) of anticipation effects of government spending.

2 Identification

As noted in Ramey(RIDGE Conf. - 2022), a shock to expectations will have real economic effects if three conditions are met. Firstly, the shock needs to be *salient*, that is, it must be related to a big event which is not overlooked by economic agents. The presidential election of 2016 was definitely a salient fact. Secondly, the shock needs to be *comprehensible*, that is, economic agents need to understand the causal chain of events. In this case, the fact that the stock price

of the Tax Cuts and Jobs Act.

[3] Fisher and Peters (2010) also use cumulative excess returns of defense contractors to construct a defense news variable.

[4] The most recent version of the paper will be presented at the Macro lunch seminar on May 16th.

of defense contractors increased much more than the market signals that agents were indeed expecting higher future defense spending, proving that the shock was comprehensible. Thirdly, economic agents take action in response to a change in their expectations about future level of defense spending. In other words, the shock needs to be *actionable*. Given that the shock is both salient and knowledgeable, we want to test whether the shock was actionable: do agents respond to expectations of future defense spending?

Ideally, given an outcome $Y_{r,t}$ and defense spending $G_{r,t}$ in a given region r and time t we want to estimate the following:

$$Y_{r,t+h} = \beta_h \cdot \underbrace{\mathbb{E}[G_{r,t+K} - G_{r,t}|\mathcal{I}_t]}_{\text{Defense News Shock}} + \phi \cdot Y_{r,t-1} + \xi_{t+h} \quad K > 0$$

where β_h is the estimand.

Since we don't observe an exact regional shock to the change in defense news expectations I need to construct a proxy for it. I use the weekly excess returns of defense contractors around the Trump's election day to measure the expected change in the path of future defense spending of a particular defense contractor (i.e. *shifter*). Then, I redistribute the shock across regions using the average amount of defense spending of contractor f in region r in the 10 years preceding the election of Trump, $G_{f,r}$, divided by the average size of the regional economy, GDP_r (i.e. *share*).

Therefore:

$$\mathbb{E}[G_{r,t+K} - G_{r,t}|\mathcal{I}_t] \approx V_{r,t} := \sum_{f \in \mathcal{F}(r)} \underbrace{\tilde{R}_{f,9Nov2016}}_{\text{Excess Return}} \cdot \frac{G_{f,r}}{GDP_r}$$

where the summation is taken over the set of large contractors active in region r, that is $\mathcal{F}(r)$. Therefore, variable $V_{r,t}$ measures the regional change in expectations about the future path of defense spending. The news shock will be stronger whereby the region is heavily dependent on defense procurement spending. This is because in high defense spending regions (i) agents are more salient and knowledgeable about defense spending and (ii) economic agents likely have more stakes in defense contractors.

When it works and when it doesn't The identification assumption is:

$$\mathbb{E}\big[V_{r,t} \cdot \xi_{r,t+h} \big| Y_{r,t-1}\big] = 0$$

We need to control for all those variables which correlate with the outcome and our measure of change in expectations, $V_{r,t}$. Let's consider two examples of when we need a control to make it work and when we do not:

- For example, suppose that our "*share*", $\frac{G_{f,r}}{GDP_r}$, correlates with regions which are more republican. This is plausible, since regions which receive lots of defense spending (high share), also have more military personnel which, in turn, has been historically more republican than democrat. Suppose also that following the election of Trump, Republican voters became more positive about the future growth of the economy, thus increasing consumption. Then, we would have a confounder.
  The problem can be solved by controlling for the share of voters who voted for Trump in each region.

- On the contrary, consider now an example which does not undermine the identification strategy. For instance, researchers might be concern that the Trump's election also changed expectations unrelated to the future path of defense spending. In turn, these expectation could have affected the regional economic activity. However, this is not a problem as long

as these other "shocks to expectations" do not correlate with the way defense procurement contracts of large contractors is distributed across regions.

Notice how close the identification strategy is to Nakamura and Steinsson (2014)'s one. The main difference is that we focus on the time change around an election day and that our shifter is not a change in aggregate G, but the excess return of contractors in a given region.

2.1 What Channel of Anticipation Am I measuring?

I intend to construct a model to help me conceptualize what sort of anticipation effects I am capturing with my empirical strategy (i.e. what economic primitive β_h account for?). For instance, agents might respond to expectations on future defense spending because of different reasons:

- Households in regions with high defense spending might increase consumption because their portfolio is concentrated in the defense sector and is now appreciating: *positive wealth effect*.
- Households in rich regions might foresee higher debt in the future, thus reducing consumption today: *negative income effect*.

Which of the two effects prevail?

Nakamura and Steinsson (2014) build a Neo-Keynesian model with two regions with different exposure to local government spending. I could calibrate the model in such a way that one region receives government spending and has stakes in it, and the other does not interact with the government and has no stakes in it. Then, I would extend their model introducing two types of households (TANK): rich Ricardian households and poor non-Ricardian households. I would avoid GHH preferences since they shut down the negative income effect of government spending. Ideally, I would like to construct a credible model which is consistent with the behavior summarized in Table 1:

Table 1: Potential Insight from the Model

	Rich/Ricardian	*Poor/Non-Ricardian*
G Dependent	Negative Income Effect ($C \downarrow$) + Wealth Effect ($C \uparrow$)	Wealth Effect ($C \uparrow$)
G Independent	Negative Income Effect ($C \downarrow$)	No Response

The response of consumption to an increased path of defense spending is stronger in poorer regions heavily specialized in defense production, while it should be negative in rich regions which do not interact with the government. Notice that this theoretical insight can be easily tested in the data.

2.2 Data availability

It is important to make sure I have detailed data to carry out an empirical analysis as well as a model calibration.

- *Procurement Spending Database*: I already have downloaded the whole universe of procurement contracts in the US from 2000 to 2020. The database is very large (71 millions rows and 287 columns. It is approximately 400GBs once data is stored in .dta). The

database contains extremely detailed information on every government transaction at daily frequency.

- *Income Distributions*: In a separate paper with Carlos Goes and Victor Sellemi, we have constructed fine county and zipcode level income distributions available at an yearly frequency from 1998 to 2019.
- *Consumption Data*: two potential sources:
  - The BEA provides quarterly (annual) data on Retail Trade - a very good proxy of consumption - at a State (county/MSAs/urban) level from 2001 onward.
  - The BLS provides access to the CEX PUMS: detailed household level data on consumption expenditure on different items. The analysis can be carried out at a State level since state weights have recently been released (see here).
- *Employment Data*: the BLS provides extremely detailed data on several employment related variables:
  - monthly data on total private sector at a State (MSA) level from 2007 (2011) onward, on: number of employees, average hourly/weekly earnings, average weekly hours worked. Industry breakdown is also available.
  - Annual data on total private sector at a county level from 2001 onward with industry breakdown.

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