

regression follows closely with RR’s regression used to measure the effect of a monetary policy shock on output:

Where ΔR_t is the difference in the log of R&D intensity, α is a fixed effect, and S_{t-j} is the RR monetary policy shock. In keeping with RR, I plan to use 12 lags to allow a monetary policy shock to impact R&D intensity up to three years after a shock. Below I include various firm level controls to take advantage of Compustat’s panel data:

$$\Delta R_{f,t} = \alpha_{f,0} + \sum_{j=1}^{12} \beta_{f,j} S_{t-j} + cZ_{j,t-1} + \varepsilon_{f,t}$$

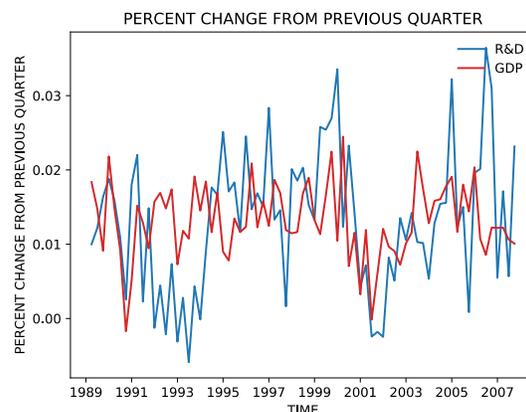
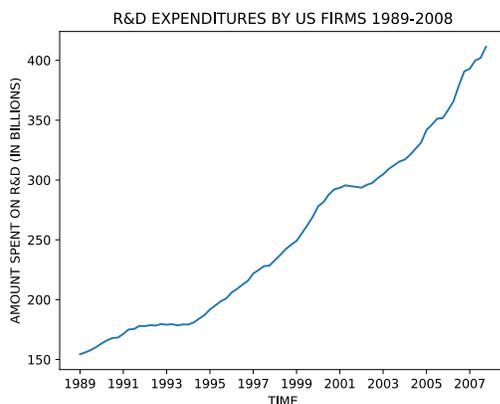
Here $Z_{j,t-1}$ represents a vector of firm controls. These controls include historic R&D intensity, firm age, and liquidity. This allows me to consider differences across firms and the lag ensures these values are known at the time of the shock. I plan to use Newey-West standard errors to account for lags in shifts of R&D intensity.

1.3 Data

There is online access to a RR monetary policy shocks dataset extended until 2008 (Wieland and Yang). Through Compustat I have quarterly firm level data since 1989. Compustat data allows me to add firm level controls and create groupings of firms based on characteristics. This data includes firm industry, R&D expenditures, IPO date, revenue, cash and short-term investments, and current liabilities. My dataset includes 260,550 observations with 10,309 unique firms. Together, these two datasets give me 31 years of data to evaluate the effect of monetary policy shocks on R&D intensity.

1.4 Preliminary Results / Summary of Work

I downloaded the necessary datasets for RR shocks and Compustat data. To check that R&D moves around during the business cycle, I began by plotting R&D expenditures and observed the downward motion of R&D around recessions. Plotting the percent change from previous quarter for both GDP and R&D, showed that R&D expenditures do not remained stagnant throughout the business cycle. In addition, I used Excel to correlate FRED’s GDP and R&D quarterly data series and got a .9950 correlation coefficient. I have also tried to find alternative data sources; however, I still believe Compustat is the best source for quarterly data.



1.5 Related Research

There are two strains of literature that I draw from, research related to monetary policy shocks and economic research focusing on R&D. Using an empirical macroeconomics approach, I hope to contribute knowledge about the impact of monetary policy on R&D.

Research on Monetary Policy Shocks

Romer and Romer 2004 - "A new measure of monetary shocks: Derivation and implications."

Romer and Romer 1989 - "Does Monetary Policy Matter? A New Test in the Spirit of Friedman and Schwartz"

Nakamura and Steinsson 2018 – "High Frequency Identification of Monetary Non-Neutrality: The information effect"

Javier Bravo Nieto 2019 - "Differences in industry responses to monetary policy shocks: A study of industry financials, equity prices, and valuation"

Dedola and Lippi 2005 - "The monetary transmission mechanism: Evidence from the industries of five OECD countries"

Ottonello and Winberry 2019 - "Financial Heterogeneity and the Investment Channel of Monetary Policy"

Wieland and Yang Forthcoming - "Financial Dampening"

Research on R&D

Anzoategui, Comin, Gertler, and Martinez 2019 - "Endogenous Technology Adoption and R&D as Sources of Business Cycle Persistence"

Chu and Lai 2013 - "Money and the Welfare Cost of Inflation in an R&D Growth Model"

Moran and Queralto 2017 - "Innovation, Productivity, and Monetary Policy"

2. Relevant Coursework

- List the courses that you have taken in economics or other departments at Columbia or elsewhere that are relevant to your proposed topic
- Do not include the core economics courses (1105, 3211, 3213 and 3412)

Macroeconomics and the formation of expectations, Industrial Organization

3. Other Relevant Experience

If you have work, research or other experience that is relevant to the topic then list it here

- This summer I served as a research assistant to Urooj Khan and Sehwa Kim in the business school. Both of these professors work in the accounting department and this experience gave me knowledge about how companies disclose financial information on quarterly and annual reports. This general understanding will be helpful in evaluating R&D financial data.

Through both of their projects I strengthened my data cleaning skills and skills in STATA, Python, and Excel.

- September 2019 – June 2020 I was a research assistant to Miguel Acosta (PhD student). Working for Miguel I compiled a dataset of FOMC speeches and events which caused me to become interested in the impacts of Fed announcements. I also worked with Blue Chip Expectations data and Federal Fund Futures. Through this position I gained experience and confidence with Python, LaTeX, Bloomberg Terminals, reading academic literature, and working with/creating/cleaning datasets – all skills useful for a thesis.

At the end of the semester, I helped Miguel on a revise and submit process which was enlightening to the entire research process. It helped me understand the never-ending process of research and how papers are submitted to journals. On this project I learned more about the FOMC through reading minutes. I additionally cleaned data and improved my regression capabilities using python.

- The spring of 2019 I served as a research assistant to Louise Guillouet (PhD student). I spent a semester largely building a dataset. This experience taught me the importance of high quality, useful data, and helped me understand the complications that arise when creating datasets. I learned how to think creatively to find data that was hard to compile.
- Summers 2018 and 2019 I worked (first as an intern, then as a Biological Science Technician) for the National Park Service (NPS) studying aquatic ecology. Aquatic ecology and economics are very different fields; however, the large datasets and regression analysis are similar to those I encounter in economics. There are many ongoing projects at NPS, so I gained experience dealing with issues that arrive late in the research process. In these areas, I believe research at the NPS was great preparation for completing a senior thesis.

1. Copy and paste the list of economics courses and grades from your Columbia DAR