



**Emily Schussheim**  
**Ezra Stiles College Class of 2021**  
**Class of 1960 John Heinz Government Service Fellowship**  
**United States of America**

### **Economic Policy Research at the Federal Reserve Board**

This past summer, I worked as an Economic Research Intern at the Federal Reserve Board in Washington D. C. thanks to the generous support of this fellowship. At the Fed I contributed to two different research projects, one of which I had been originally hired to contribute to and the second of which I sought out independently when I met academics and lawyers working on that respective team once I was in Washington. Both research experiences were incredibly valuable and challenging for me and I am thankful for how my work there has impacted my computational and economic journey at Yale.

The first research project I worked on was the project I had originally been hired to do when I applied for the internship over the winter of my sophomore year. For this project, I worked with economists in the Current Macroeconomic Conditions section of the Research and Statistics Division of the Federal Reserve, a division tasked with housing economists dedicated to different policy and econometric problems in academic economics. The Current Macroeconomic Conditions section, among many research responsibilities, has the job of using econometric models to fore-cast and nowcast (a forecast limited to a few weeks in the future) U.S. Gross Domestic Product, and I was hired with my computational and economic background to try to study and improve on their methodology.

Since while I was familiar with the econometric modeling the team was using to forecast I obviously am not a professional econometrician, I communicated to my team early I would be most excited by using my computer science skillset to contribute to their forecasting from a machine learning approach. Naturally, my first responsibility on this team was to put together a cohesive literature review regarding previous attempts to model GDP and other economic indexes like inflation using machine learning techniques so I could understand the theoretical possibilities and restrictions or problem areas in taking such an approach.

After creating the literature review and sharing it with my overseeing economists, I was ready to study machine learning technically so as to build a model and put together a short paper using the model and evaluating its effectiveness to communicate my findings to the Current Macroeconomic Conditions section. I was somewhat familiar with machine learning methods from my coursework at Yale, but I also had to take time to do a more in-depth self-study of the various models my literature review had deemed effective.

I also had to familiarize myself with using the platform for machine learning in the language R and the structure I would take towards evaluating the effectiveness of each model I tested. I ended up using a diverse array of machine learning models for GDP forecasting and running them using the data input into the econometric models the section uses currently. I put together my results and found that a few machine learning models were powerfully predictive, findings that my economists were excited about.

After finishing that report, I set out to build a more complicated model referenced in some of the academic papers I had read that some economists thought was promising and that the team could use to predict GDP once I completed it. This model, a neural net, was new material to me and I spent a lot of time researching its structure and trying to understanding its nature and effectiveness. I assembled the neural net in the language

Python and set it up such that my economists could easily use it as well, which they were interested in and told me would spend more time evaluating.

I was slightly disappointed at the Fed to realize that my current macroeconomic conditions team would not be doing any work with financial regulation or financial stability indicators as I had assumed, because this is an area for a lot of interest for me, so I sought out academics and lawyers working in the Supervision and Regulation division of the Federal Reserve to see if there was any small research project I could undertake in addition to all the work I was doing for Current macroeconomic Conditions. Luckily, a research team called Strategy Policy and Planning reached out to me and said I could get involved in some analysis on their financial stability research, which I was really excited about.

The second research team I worked with, Strategy Policy and Planning, was a task force of young academics assembled in the wake of the financial crisis focused on understanding the state of financial stability in large systemically-important American banks, or G-SIBs (globally systemically important banks) meaning that any of their individual failures would mean sure disaster for the global financial system. They put me on a research project analyzing correlations and discontinuities in these banks' financial stability reporting using key indexes like leverage and different metrics developed through the last ten years of changing international banking regulation by the three Basel Accords, for example Common Equity Tier 1 or Risk-Weighted Asset.

I was excited to be able to contribute to this team by creating graphs and investigating the balance sheets of these large financial institutions from databases I had access to at the Federal Reserve, tracking the evolution of different variables like the ones mentioned and how they changed in relation to related variables, or failed to update over the last ten years, looking for inconsistencies or more information about the condition of risk in these large banks now as compared to after the financial crisis.

Without disclosing too much confidential information about my findings, I successfully put together interesting reports and exhibits for the Strategy Policy and Planning team that they gave me helpful feedback on and used to forward their research, and I was happy to learn a lot about financial regulation and try to understand how these large and complex financial institutions function, and consider if there are areas of regulation I'd be excited with investigate with further in research.

I am studying Economics and Computer Science at Yale, so the work I did in machine learning has been beneficial to my computer science coursework and has made me more excited about computational solutions to big data problems. It has also given me ideas for a thesis my senior year based on the analytical data techniques I used for the Current Macroeconomic Conditions section, and has broadened my machine learning skill set as I consider professional opportunities.

In Economics, I truly enjoyed my work in financial regulation and have been reaching out to professors in the department to continue the financial stability research I have started, possibly as a thesis my senior year. I'm really curious about the behavior and risk-appetitive of large financial institutions, especially in the wake of the financial crisis, and feel very passionately about this subject after my time this summer.

Without the fellowship's financial support I would not have been able to get as much intellectual and professional stimulus out of this amazing opportunity. I am very appreciative to the fellowship for making this experience possible!