Problem Set 5

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I would like to understand how economic policy uncertainty at time t-1 affects systemic risk contributions of banks at time t. Main systemic risk measures that are widely accepted and used in the literature are SRISK, DeltaCoVaR, SES, MES and LVG as mentioned in PS1. All of these measures are based on the similar idea that when the financial system as a whole is undercapitalized, even one bank's failure could be problematic. However, it is important to mention that when the aggregate capital is at least a proportion (it is accepted as 8% - Tier 1 capital - for the regulatory purposes) of aggregate assets, then a bank's failure can be overcome via bank mergers and acquisitions.

Capital can be raised via debt and equity markets. Therefore, these systemic risk measures depend on the stock market returns of each bank in the past 100 trading days. SRISK states that conditional on the CRSP-value weighted stock returns are less than 5% of the distribution of returns in the past 100 trading days, what is the capital shortfall i.e., the average stock returns for each bank and their leverage? SES measure relies on the same logic with SRISK but it further extends the measure by including a horizon in which the aggregate capital shortfall is taken into consideration. It is a linear combination of two different measures: MES and LVG. MES stands for the marginal expected shortfall of each bank in terms of equity capital given there is an aggregate capital shortfall in the stock markets while LVG (leverage) refers to the same term with regards to debt capital. DeltaCoVaR is another systemic risk measure which has a reverse logic compared to SRISK and SES. It measures the contribution of each bank to the aggregate capital shortfall when a bank moves from its median state to a capital shortfall state (5 percentile of stock returns). Note that these measures will be used as a robustness check yet the main dependent variable will be SRISK.

Economic policy uncertainty (EPU) measure indicates the ambiguity of economic policies within the market. It has four dimensions: News, tax, CPI and federal and local

expenditures. News-based EPU measures the amount of articles published in the top 10 newspapers in the U.S. where three keywords are embedded: economic, policy and uncertainty. The second dimension considers the tax-code related uncertainty that agents will face in the following years. This second component employs dollar value-weighted numbers of federal tax code provisions that are planned to be ceased in the upcoming ten years. The last two components reflect policy related uncertainty in macroeconomic variables by computing the standard deviation of individual professional forecasters quarterly estimates for next years consumer price index (CPI), federal expenditures and local expenditures. CPI-based EPU indicates the uncertainty in the monetary policy whereas federal- and local expenditures-based EPU on goods and services indicate the uncertainty in the fiscal policy. These four components are first normalized with their standard deviations and then, averages for each of the standardized components are calculated. Finally, weights are given to each average standardized component such as $\frac{1}{2}$ for the News-based EPU and $\frac{1}{6}$ for each of the rest of the components to calculate the overall EPU index.

To better understand my data, I would like to see the univariate results of scatter plot between EPU and NSRISK (which is the normalized version of SRISK with each bank's market capitalization in the corresponding time period). Then, as accepted widely in the literature, I will employ log of EPU for the same figure. It is important to note that `month_nsrisk_new_new` denotes NSRISK in month t, `overall_pu_lag1` denotes overall EPU measure in month t-1 and `log_overall_pu_lag1` denotes the natural logarithm of overall EPU measure in month t-1.

Figure 1 shows the relationship between NSRISK and EPU whereas figure 2 shows the relationship between NSRISK and log of EPU on the next page. Figure 1 reveals that there could be a positive relationship between NSRISK and EPU however, even though these values are winsorized at 1%, there is a big jump for the values of 0 and 250 in terms of each bank's contribution to systemic risk. Therefore, one should be aware of the skewness in the NSRISK distribution which will be shown in Figure 3. Yet, following the literature, the relationship between NSRISK and log of EPU is more clear and distributionally smooth (Figure 2). Even though univariate results indicate a small positive slope (shown through the red line), I will construct the econometric model and run the multivariate regressions.
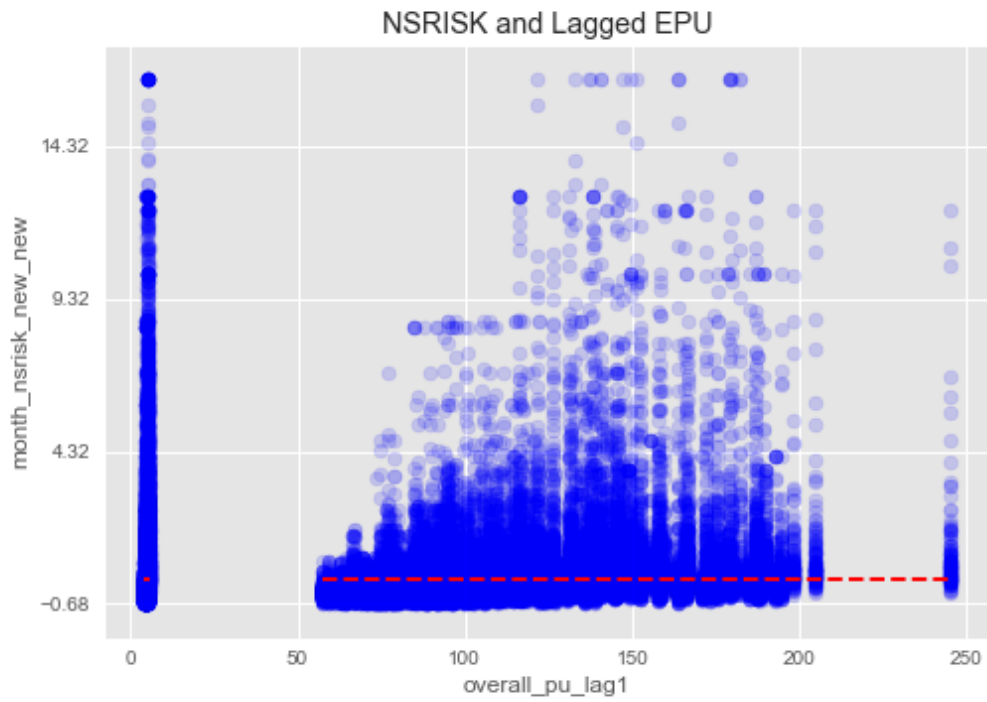
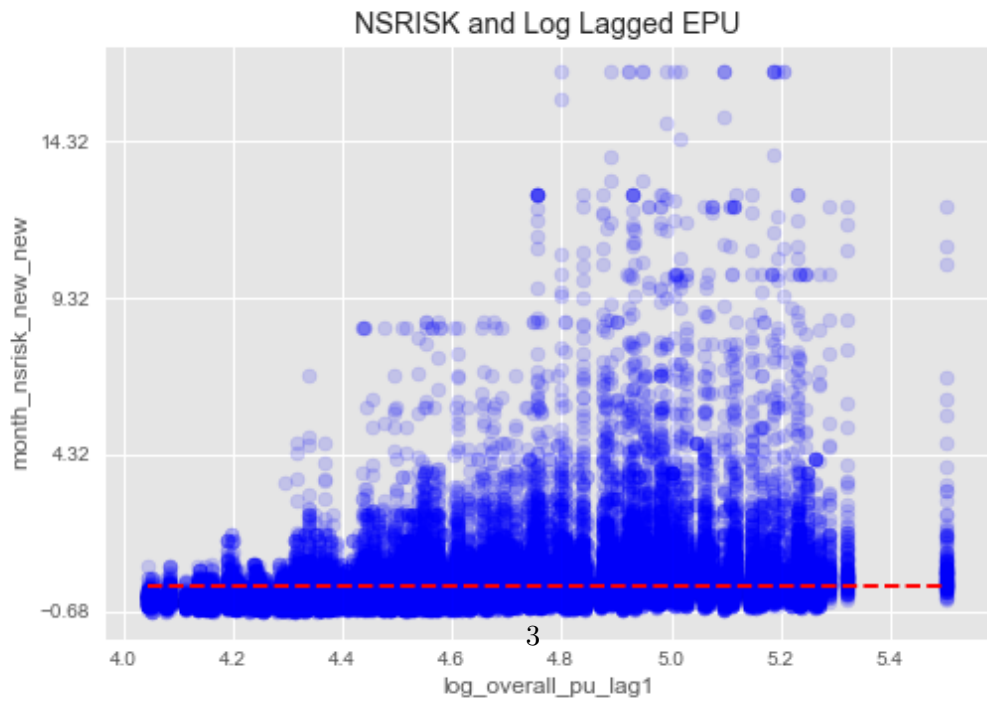Figure 1: Relationship between NSRISK and EPU

Figure 2: Relationship between NSRISK and Log of EPU

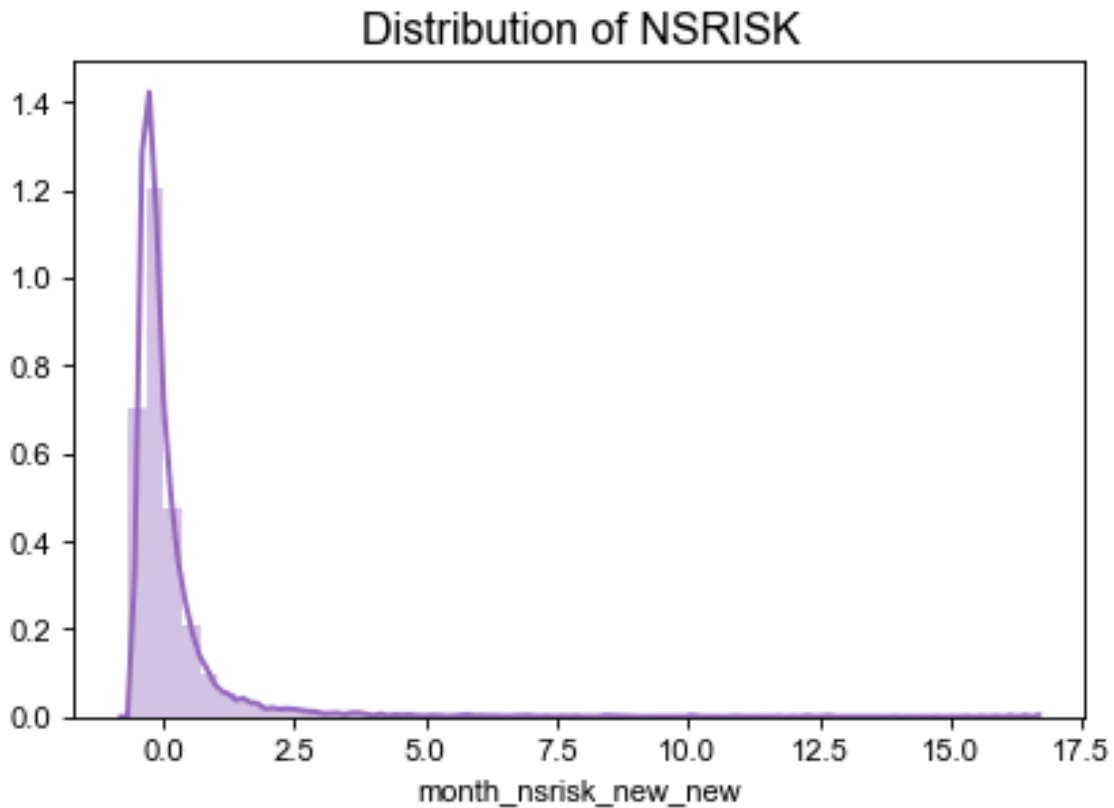Now, lets consider the distribution of NSRISK via its histogram in Figure 3.

Figure 3: Distribution of NSRISK

As shown in Figure 3, the distribution of NSRISK is left skewed, which means that the capital shortfall of banks are mostly either negative or very small positive values. Given that the dataset covers years from 1986 to 2015 in U.S., most of the banks were healthy in this time-period on average. However, there are some banks in some periods that were in trouble in terms of their capital. Due to the skewness in the NSRISK measure, the log of NSRISK will also be employed as a robustness check.

To assess the relationship between undercapitalization of banks and NSRISK measure, one should analyze the bar chart and the scatter plot between capital adequacy of banks and NSRISK as in Figures 4-5.
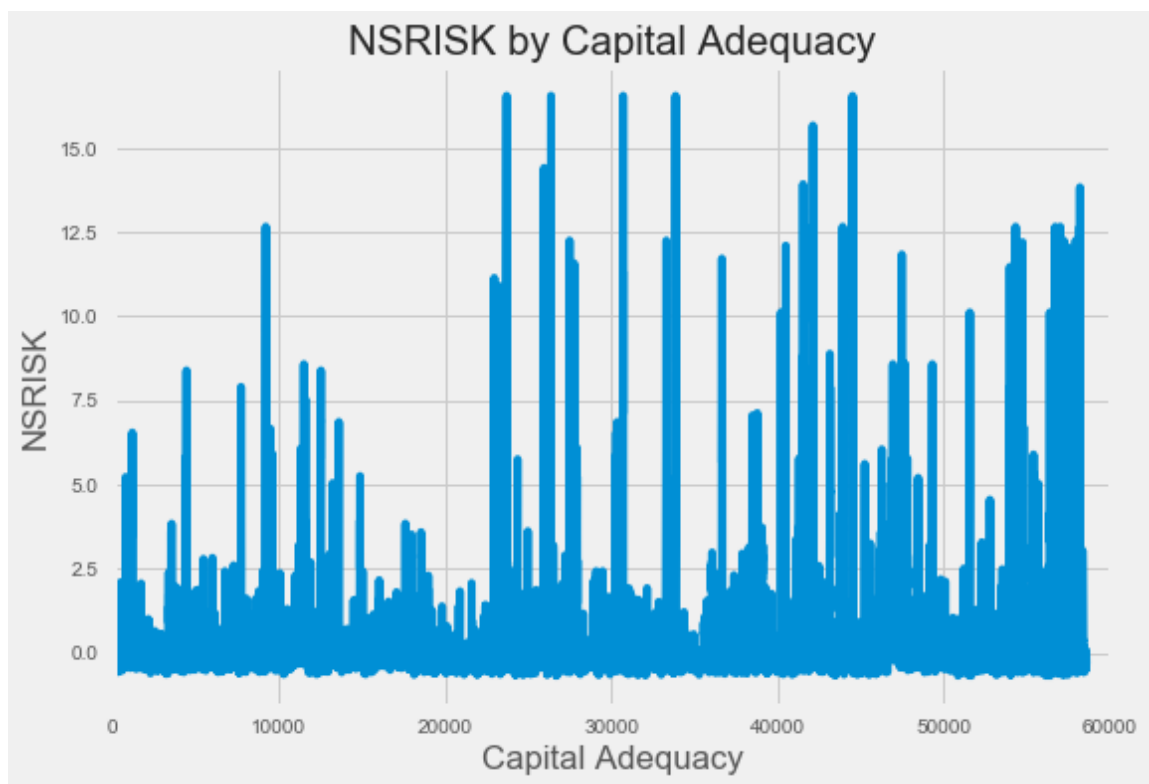
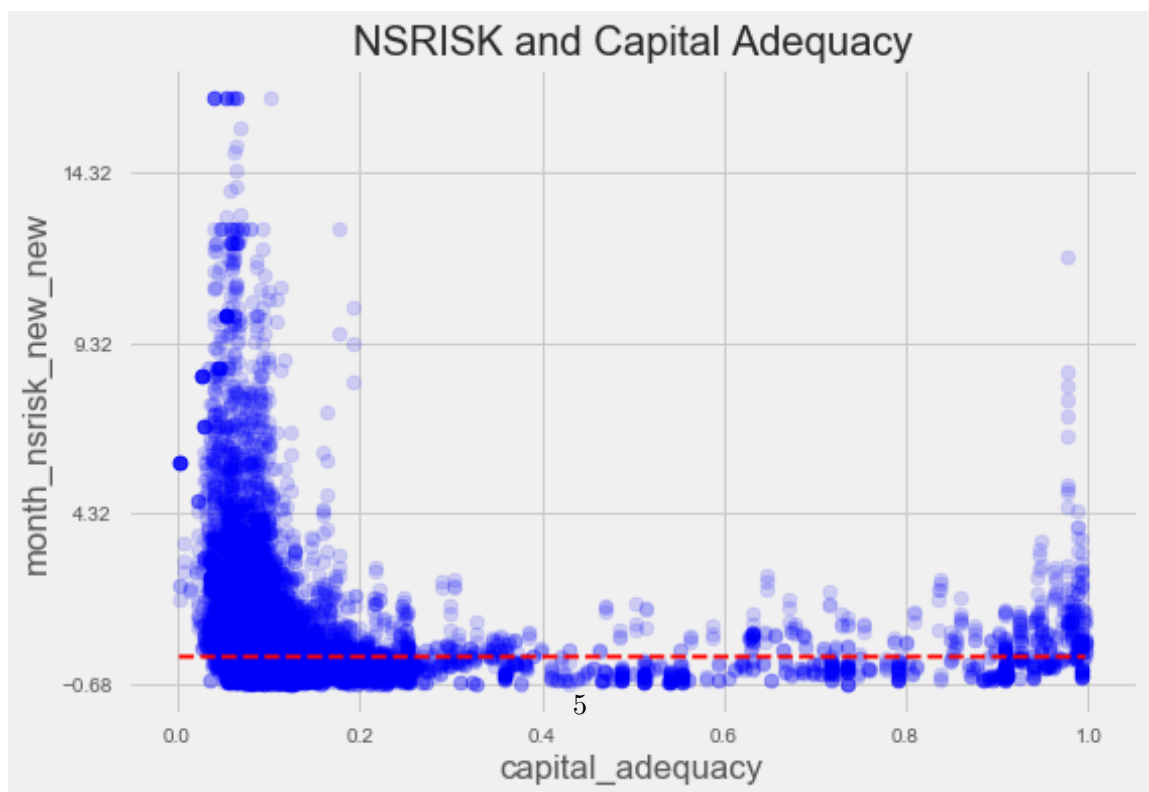Figure 4: Relationship between NSRISK and Capital Adequcy

Figure 5: Relationship between NSRISK and Capital Adequcy

Capital adequacy of banks refers to the ratio of total equity capital over gross total assets. As shown in Figures 4 and 5, the banks that are relatively undercapitalized are the ones contributing highly to the systemic risk. Therefore, a researcher should take capital adequacy of banks into account when examining the impact of EPU on NSRISK. This is important to understand that a channel through which EPU may affect NSRISK is capital adequacy.