UNIVERSITÉ PARIS 1
PANTHÉON SORBONNE

Vulnerable Growth Report

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Contents

1 Reproduction with Euro Area data

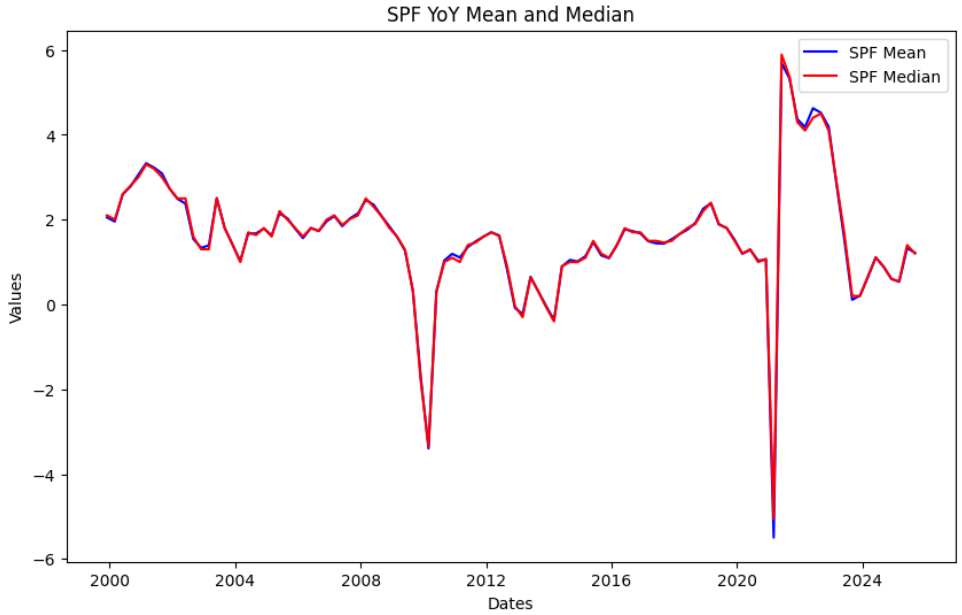
First, I reproduced the results of the paper using the code and data provided by the professor. I had to replace NFCI to CISS, change the Excel sheet and reduce the rolling window for the quantile regression with a rolling window approach from 40 to 30.

Then I get the Survey of Professional Forecaster (SPF) from the 1st Quarter 1999 to the 4th Quarter 2024. With it, I only keep the forecasts for the Year-On-Year change in real GDP.

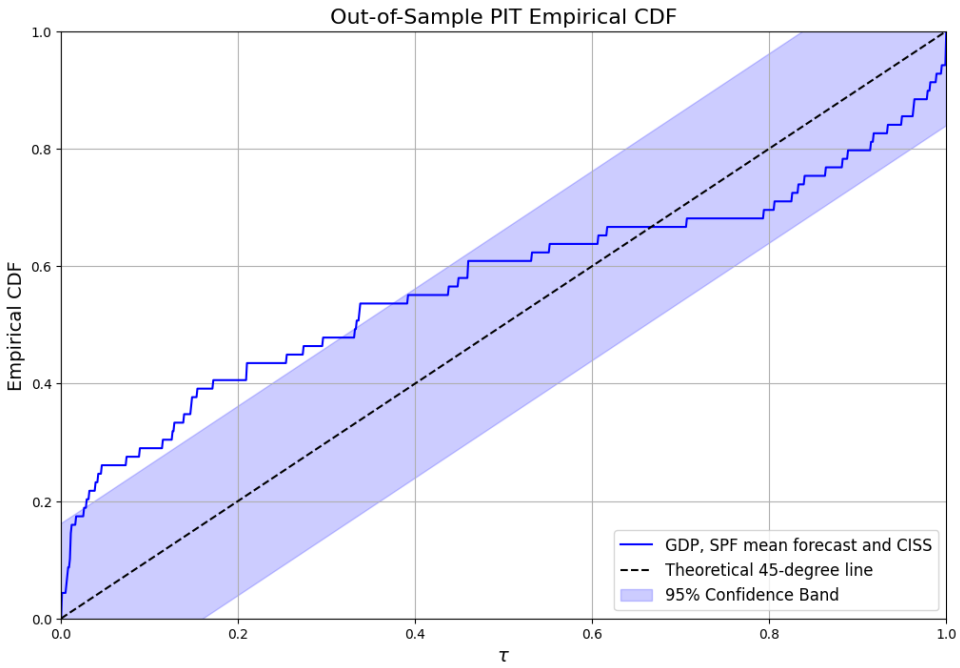
The SPF is published every quarter, the second month of each quarter. Each forecaster receives a questionnaire during the first month of each quarter. When they answer this questionnaire, they are aware of all data published until the previous quarter included.

At the very beginning of my second Jupyter Notebook, I explain which date I select for each quarter publication in order to have the YoY data.

With these data, I create a new dataframe named dfpivot where the columns are the different forecasters, and the rows are the dates at which the YoY growth rate of the real GDP is predicted. I can then compute the mean and median and plot them :



I then compute the PITs empirical CDF that I compare to the theoretical CDF. I had to modify the rolling window and the starting index for the out-of-sample prediction SPF starts in 1999.



2 Ranking of the forecasters

I then rank the forecasters by comparing their forecast to the actual growth rate of the real GDP YoY for the same date. I removed forecasters who haven't contributed more than 70 times.
I perform a mean squared error to rank the forecasters.

Here are the top 3 forecasters for the YoY growth rate of real GDP :

Forecaster	MSE result
70	4.96
92	5.11
84	5.32

3 Litterature review

- Nina Boyarchenko Tobias Adrian and Domenico Giannone. "Vulnerable Growth". In: *American Economic Review* (2019)

This paper examines how GDP growth depends on financial and economic conditions. It finds that tighter financial conditions increase downside risks to GDP, while upside risks remain stable, leading to left-skewed distributions during recessions. Using quantile regressions, the study highlights that lower quantiles of GDP growth are particularly sensitive to financial conditions. Metrics like downside entropy and expected shortfall are

introduced to quantify these risks. The findings emphasize the need for macroeconomic models to account for financial stability, showing that financial conditions play a critical role in predicting growth vulnerabilities. Robustness checks confirm the stability of the results.

- Matteo Mogliani Laurent Ferrara and Jean-Guillaume Sahuc. "High-frequency monitoring of growth at risk". In: *International Journal of Forecasting* (2022)

This paper extends the Growth-at-Risk (GaR) approach to capture high-frequency financial conditions in real time. Using Bayesian MIDAS quantile regressions, it combines a financial stress index and a financial conditions index to provide daily GaR measures for the euro area. This high-frequency GaR indicator demonstrates strong GDP nowcasting capabilities, offers early signals of economic downturns, and tracks the real-time impact of monetary policies. During the Covid-19 pandemic, it effectively highlighted tail risks to GDP. This approach enhances central banks' ability to monitor and address financial risks promptly.

- Adrian, T., Grinberg, F., Liang, N., Malik, S. and Yu, J. (2022). The Term Structure of Growth-at-Risk. American Economic Journal: Macroeconomics

This paper examines the relationship between financial conditions and GDP growth distribution across 11 advanced economies. It finds that loose financial conditions lower short-term downside risks to GDP growth but increase medium-term risks, especially when coupled with rapid credit growth. Using quantile regressions, the study highlights the significant impact of financial conditions on the lower 5th percentile of GDP growth (growth-at-risk). The results emphasize the importance of incorporating higher-order moments and the endogeneity of financial conditions into macroeconomic models to better account for medium-term risks.

4 Bibliography

[1] Nina Boyarchenko Tobias Adrian and Domenico Giannone. “Vulnerable Growth”. In: *American Economic Review* (2019).

[2] Matteo Mogliani Laurent Ferrara and Jean-Guillaume Sahuc. “High-frequency monitoring of growth at risk”. In: *International Journal of Forecasting* (2022).