

HW 2  
FINM 35900: Macro-Finance  
Due start of class, date of canvas deadline

Answer the questions in written form, including figures, as needed. **Note that you do not need to submit slides for this assignment this week (you still must do so for your current event), to give you more time to work on your project proposals (due the same day as this problem set).** You should submit on canvas:

- One PDF with your write-up (no .docx files)
- One Notebook/Python script with your code (.ipynb/.py/.r).
- (Optionally) a data preview of less than 5MB in size.

*Financial cycles*

1. What is the market pricing to occur to the Federal Funds rate by end of next year? Be explicit about the numerical level it is priced to be at by end of next year and what this implies about the number of interest rate cuts.
2. What does history suggest about how investors may want to be invested in macro assets over the next year as a result? Justify your answer quantitatively and specific about what asset classes have typically benefited in these environments, which have not, and what fraction of the time this has been true.
3. Do you think your answer to (2) makes sense to extrapolate into how investors should behave right now? Why or why not?

*Macro regimes*

4. Choose two different<sup>1</sup> macro variable data series you can get monthly data on that you think matter for macro asset prices. Choose series that have data available since at least 1995 (you may look back further and will learn more in what follows if you do). Why do you think they matter for macro asset prices, and how? (Be explicit, e.g., “when X happens to variable Y, I would expect asset price Z to go in direction Q”.)
5. Define macro regimes since at least 1995 using these data series. Characterize the regimes and be explicit about dates.
6. Quantitatively characterize macro asset performance (equity, government bonds, commodities, credit) during the regimes you specify. What generalizations and conclusions can you make about asset performance during different macro regimes, as you have defined them? Why do you think these generalizations make sense or don’t make sense?
7. Do you think you should use the same risk metrics during each macro regime to characterize risk? Why or why not? If you should be considering different metrics, what are they and when should you consider them?

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<sup>1</sup> Different meaning that they are not in the same general area (e.g., growth, rates, inflation, trade, etc.).

## Mini-project question

### *Risk parity*

At a high level, risk parity funds do some form of risk budgeting by asset class as a way to guide their strategy. You are tasked with evaluating a simple risk parity strategy by taking into account that correlations are time varying.

8. Observing correlations
  - a. From HW 1 you should already have total returns series for US stocks and bonds since 2000. Using weekly returns, estimate the full sample equity-bond return correlation from 2000 to 2019 (inclusive).
  - b. Now estimate the rolling 1-year equity-bond return correlation over the same sample. What do you notice?
9. Historical performance
  - a. Suppose you manage a risk parity fund where you allocate the same risk budget to US stocks and to bonds, using as your measure of risk the 1-year trailing return volatility.<sup>2</sup> No leverage, buying on margin or shorting are allowed, and you must be 100% allocated across stocks and bonds combined (no cash or uninvested capital is allowed). What would be the allocation to stocks and bonds, on average, over the life of the fund from 2000 to 2019. Plot how this allocation changes over time.
  - b. What would the average risk of the fund be from 2000 to 2019? How does this change over time? What amount is due to equity and what amount due to bonds?
  - c. Why do you think risk parity is a strategy that is followed, particularly in this case as it relates to stock and bonds?
10. 2021 to the present
  - a. From 2021 to the present, what happened to a fund's performance if the fund followed the risk parity strategy we have thus far outlined? (look at 2022 and 2025 in particular)
  - b. Why did this happen? Both explain and justify your answer quantitatively. How does it relate to the equity-bond return correlation from 2021 to the present?
  - c. What implications do you think this should have for risk parity funds and risk management of these?
11. *Nonrequired extension: include commodities as a third asset class in the portfolio, repeat the analysis, and discuss your findings.*

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<sup>2</sup> Note that you can ignore covariance of stocks and bonds when computing the risk parity weights based on risk budgeting. This is because you would need to make heroic assumptions to attribute the covariance effect on portfolio risk to either stocks or bonds explicitly enough such that you would know how to allocate the weight.