# Discussion of "Currency Management by International Fixed Income Mutual Funds" by Sialm and Zhu

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# An Important Contribution

- When investing abroad, there is currency risk

- How do investors manage this risk?
- Lots of guidance from theory and textbooks
- Little evidence and no data

- This paper collect new data and answers the question

# Theory

- N risky asset and a risk-free rate
- The expected excess return matrix is $\mu$
- The vcov matrix is $\Sigma$
- Mean-variance investors, risk aversion $\gamma$

$$\max_w w'\mu - \frac{1}{2}\gamma w'\Sigma w$$

- The optimal portfolio choice is

$$w = \gamma\Sigma^{-1}\mu$$

# With Foreign Assets and Currency Risk

- N = 2, one asset and one forward
- Return on foreign assets with currency risk $r_{t+1} + \Delta s_{t+1} - r_{f,t}$
- Return on forward $s_{t+1} - f_t$
- Partition $\mu$ and $\Sigma$

$$\mu = \left[ \begin{array}{c} \mu_x \\ \mu_f \end{array} \right] = \left[ \begin{array}{c} E_t[r_{t+1} + \Delta s_{t+1} - r_{f,t}] \\ E_t[s_{t+1} - f_t] \end{array} \right]$$

$$\Sigma = \left[ \begin{array}{cc} \Sigma_{xx} & \Sigma_{xf} \\ \Sigma_{fx} & \Sigma_{ff} \end{array} \right]$$

- The regression coefficients and the conditional vcov matrix

$$\beta = \Sigma_{ff}^{-1}\Sigma_{fx}$$
$$\Sigma_{x|f} = \Sigma_{xx} - \beta'\Sigma_{ff}\beta$$

## With Foreign Assets and Currency Risk

- The optimal portfolio

$$w = \left[ \begin{array}{c} w_x \\ w_f \end{array} \right] = \left[ \begin{array}{c} \gamma(\Sigma_{x|f}^{-1}\mu_x - \Sigma_{x|f}^{-1}\beta'\mu_f) \\ \gamma\Sigma_{ff}^{-1}\mu_f - \beta w_x \end{array} \right]$$

- The simplest case $\beta = 1$, $\mu_f = 0$

$$w = \left[ \begin{array}{c} w_x \\ w_f \end{array} \right] = \left[ \begin{array}{c} \gamma\Sigma_{x|f}^{-1}\mu_x \\ -w_x \end{array} \right]$$

  - The asset weight is the one based on the conditional vcov without currency risk
    $(\Sigma_{xx} - \Sigma_{ff})$
  - The forward position is the opposite of the asset position
- $-\gamma\Sigma_{x|f}^{-1}\beta'\mu_f$: the "cost" of hedging on the expected asset return
- $-\beta w_x$: risk management/currency hedging
- $\gamma\Sigma_{ff}^{-1}\mu_f$: the currency trade

# Findings

- the basic fact: $w_f \neq 0$, $w_f = 7\% w_x$
  - about 90% of international fixed income funds use currency forwards
  - the notional amount of foreign currency forward sales 19.9%; purchases 13.1%; net exposure is 6.8% of fund total net assets (TNA)
- currency hedging: $w_f = \gamma \Sigma_{ff}^{-1} \mu_f - \beta w_x$
  - $w_f$ is negatively associated with $w_x$
  - in the cross-section, when $w_x^i$ increases by 1, $w_f^i$ decreases by -0.27 for G10 and unchange for EM
  - $w_f$ is positively associated with the concentration of foreign currencies (diversification lowers $\beta w_x$)
  - $w_f$ is low when uncertainty is high

# Findings

- currency trading: $w_f = \gamma \Sigma_{ff}^{-1} \mu_f - \beta w_x$
  - $w_f$ increase with $\mu_f$ implied by momentum and carry (a basket against dollar)
  - across currencies, $w_{f,1}$ higher than $w_{f,2}$ when $\mu_{f,1}$ higher than $\mu_{f,2}$ implied by momentum and carry
- institutional features:
  - after poor performance, funds reduce the currency exposure
  - institutional share classes hedge less
- performance: $w_x \mu_x + w_f \mu_f$
  - funds with low currency exposure exhibit higher returns, lower volatility, and higher Sharpe ratios
  - the major differences are from $w_f \mu_f$
  - $w_f^A < w_f^B < 0$, $\mu_f < 0$, then $w_f^A \mu_f > w_f^B \mu_f$

# Comment: Holding Period

- Fixed income securities are long term
- Case 1: hold to maturity
    - to hedge long-term bonds without long-term forwards
    - interest rate swaps: 1 euro long term, to 1 euro short term, to 1 dollar short term, to 1 dollar long term
    - does SEC filings have information on swaps?
    - if they are reaching for yield, they are likely to hedge more
- Case 2: frequent trading
    - from the holding data, what is the average holding period vs maturity?
    - larger long and short positions may be due to more frequent trading
    - they may do more currency trades
- Suggestion: examine long-term vs short-term funds

## Comment: Volatility

- Hedging is about variance and covariance
- Empirically, $\Sigma_{fx} = 0$ and $\beta = \Sigma_{ff}^{-1}\Sigma_{fx} = 0$
- Volatility does not affect the hedging ratio

- Expected currency return is also about variance and covaraince
- $w_f = \gamma\Sigma_{ff}^{-1}\mu_f - \beta w_x$
- High volatility, high expected return on dollar, low $\mu_f$, lower $w_f$

# Comment: Volatility

- Suggestion: some volatility in the literature? WUI is not about currency

|  | $\beta$ | $(s.e.)$ | $R^2$ |
|---|---|---|---|
| consumption vol (Lustig, Roussanov, Verdelhan 2013) | 3.75 | (3.19) | 0.19 |
| exchange rate vol (Fang and Liu 2021) | 0.22 | (3.46) | 0.17 |
| policy approval/uncertainty (Liu and Shaliastovich 2022) | -0.19 | (3.00) | 016 |

- Suggestion: the cross section of vol
  - especially idio vol may be more about $\beta$ and $\Sigma_{ff}^{-1}$ than $\mu_f$
  - Della Corte, Ramadorai, and Sarno (2016)

# Comment: Performance

- Why do high currency exposure funds perform so poorly?

|  | 1 low | 5 high | low - high |
|---|---|---|---|
| currency exposure | -0.01 | 0.97 | -0.98 |
| average return | 3.16 | 0.44 | 2.70 |
| currency return | -0.47 | -3.02 | 2.56 |
| bond return | 4.09 | 3.76 | 0.34 |

- Is this consistent with the overall exposure of 7% (-1%, 11%)

- Performance: $w_x \mu_x + w_f \mu_f$
  - $\mu_f$ is approximately the average return on a foreign basket
  - $w_f^A < w_f^B < 0$, $\mu_f < 0$, then $w_f^A \mu_f > w_f^B \mu_f$

## Comment: Performance

- "One caveat to our performance analyses is that U.S. dollar significantly appreciated against foreign currencies in our sample, so the realized returns of hedged and unhedged portfolios do not necessarily reflect their expected returns."
- The short sample is a limitation

|           | foreign basket | carry | value | momentum |
|-----------|---------------|-------|-------|----------|
| 1984–2020 | 1.76          | 6.88  | 2.96  | 1.63     |
| 2010–2018 | −0.63         | 1.77  | 0.45  | −0.27    |

- The underperformance (2.56%) is still larger than any strategy
- Suggestion: let's hedge the exposure of high exposure portfolios and check the performance

# Comment: Performance



Cumulative Returns — value, momemtum, dollar, carry
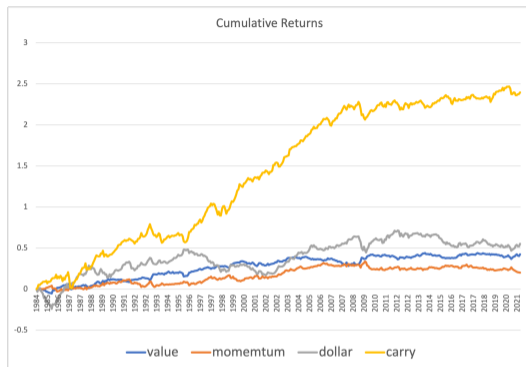
- Suggestion: evaluate the performance of funds along two dimensions
  - currency exposure and currency trade
  - some measures: who do carry trades, who long forward, who holds forwards and bonds in different currency

# Comment: Currency Overlays

- $w_f = \gamma \Sigma_{ff}^{-1} \mu_f - \beta w_x$ even if $w_x$ is pre-determined
- currency overlays: first choose $w_x$ then $w_f$
- in a joint determination
- $w_x = \gamma(\Sigma_{x|f}^{-1} \mu_x - \Sigma_{x|f}^{-1} \beta' \mu_f)$
- Do funds change bond positions with $\mu_f$ in the cross section?

# Comment: G10 vs EM

- G10 should be more systemic than EM, why not hedging EM currencies?
- most currency strategies are larger in EM
- the cost can be large
- Suggestion: test if they hedge less on low liquidity and high cost currencies (bid-ask spread)