Global Currency Hedging with Common Risk Factors

by Wei Opie and Steven Riddiough

Discussion by
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The questions

How should global investors manage their foreign exchange (FX) exposure?

Can the forecastable component of currency factors help in hedging foreign exchange exposure on equity and bond portfolios?

Can a currency portfolio provide diversification benefits?

The paper

Opie and Riddiough propose a hedging strategy that

- builds on the mean-variance hedging approach
  Glen & Jorion 1993
- employs global currency factors
  Lustig & Verdelhan 2007; Lustig et al 2011; Lustig et al 2011; Verdelhan 2018; Menkhoff at al 2011; Riddiough & Sarno 2012; Rafferty 2012; Della Corte et al 2016
- exploits the predictable components of factors Verdelhan 2018

Their DCF hedging strategy outperforms leading alternative approaches ... and not only by loading up on risk, but it offers diversification.

The picture

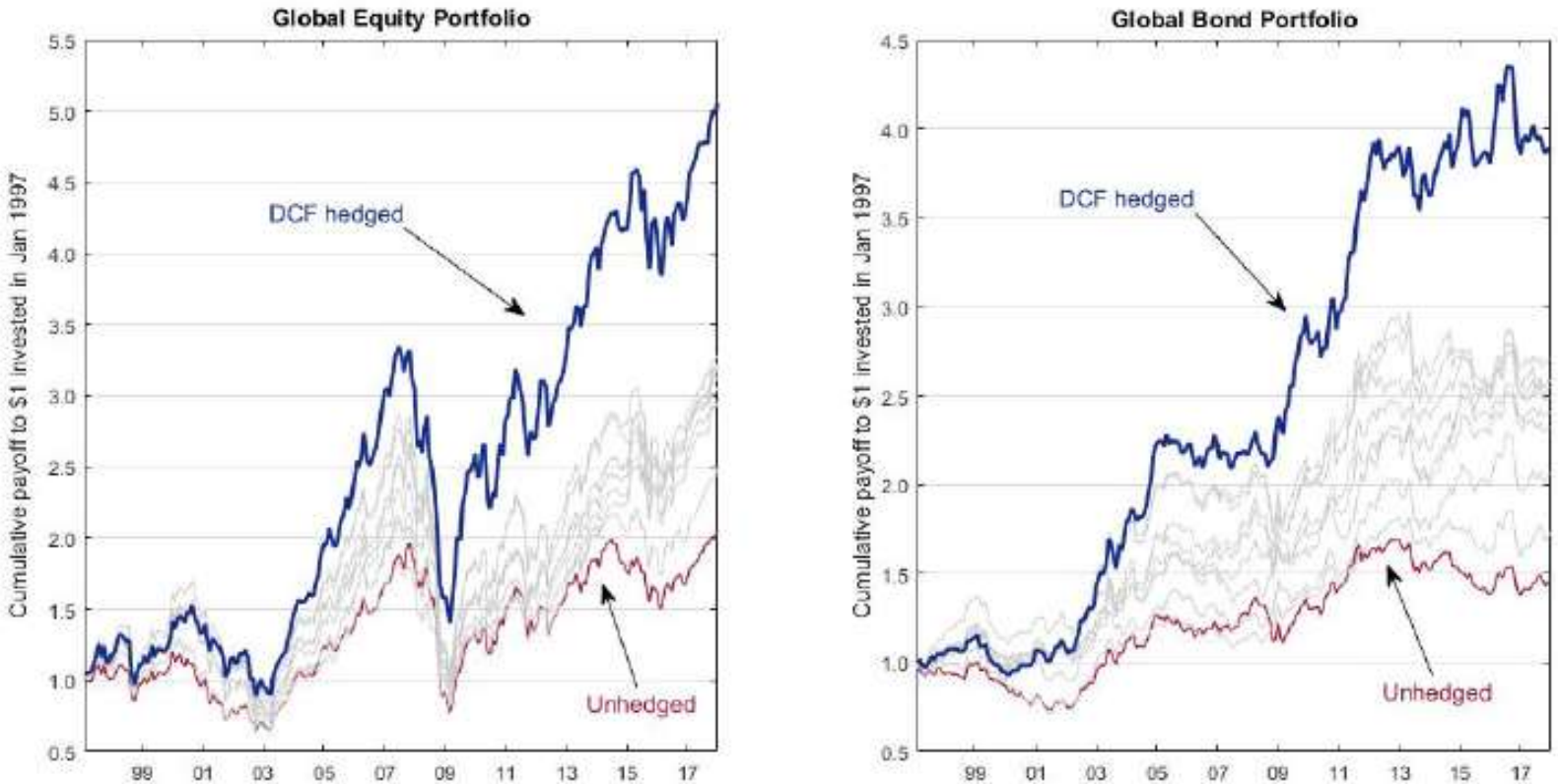

Figure 2: Cumulative Payoff to Investing in Global Equity and Bond Portfolios

A really nice paper!

Why?

- Brings together different strands of the literature
- Systematic in approach
- Impressive and useful results
- Very clearly written

Currency risk factors

Basic idea:

$$
\begin{aligned}
0 &= E(m_{t+1}, R^e_{t+1}) \\
&= E(m_{t+1})E(R^e_{t+1}) + cov_t(m_{t+1}, R^e_{t+1})
\end{aligned}
$$

$$
\begin{aligned}
E(R^e_{t+1}) &= -\frac{cov_t(m_{t+1}, R^i_{t+1})}{E(m_{t+1})} \\
\overbrace{\qquad}^{\text{excess return}} &= \underbrace{\frac{-cov_t(m_{t+1}, R^i_{t+1})}{var_t(m_{t+1})}}_{\text{risk exposure, } \beta_{i,t}} \underbrace{\frac{var_t(m_{t+1})}{E(m_{t+1})}}_{\text{risk factor, } \lambda}
\end{aligned}
$$

Currency factors

1. Time-series regression

$$R_t^i = \alpha_i + \beta_{i,t}^{dol}\lambda_t^{dol} + \beta_{i,t}^{car}\lambda_t^{car} + \epsilon_{i,t}$$

where R_t^i are bilateral returns; λ's are currency factors (average returns vs dollar, high-to-low carry), β's are estimated exposures
Fama & MacBeth 1973, Fama & French 1993; Lustig & Verdelhan 2007

Is there a Fama MacBeth 2-step procedure to get λ's?
- 3.3 sounds like λ's are constructed directly from data
- 4: refers to Verdelhan 2018; Lustig, Roussanov & Verdelhan 2011

Opie & Riddiough: Dynamic Currency Factor Hedging

2. If the factor has a forecastable component, then the currency return has a predictable component Verdelhan 2018:

$$\begin{aligned} \lambda_t^j &= \varsigma_{j,t} + \psi_{j,t} X_{t-1} + \eta_{j,t} \\ E(R_{t+1}^i) &= \alpha_i + \beta_{i,t}^{dol} E_t \lambda_{t+1}^{dol} + \beta_{i,t}^{car} E_t \lambda_{t+1}^{car} \end{aligned}$$

X_t includes, $s_t - f_t$, FX vol, TED spread, Δ commodity price

3. Use $E(R_{t+1}^i)$ to maximise vol-adj. portfolio return, $\mu_{p,t+1}$:

$$max\, E_t(\mu_{p,t+1} - \tfrac{\gamma}{2}\sigma_t^2(\mu_{p,t+1}))$$

Currency Factor Predictability

	Dependent variable: *dollar* factor returns $(t+1)$					Dependent variable: *carry* factor returns $(t+1)$				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
					coefficient estimates					
Δ*fx volatility (t)*	-0.010*				-0.006	-0.019**				-0.013**
	(0.007)				(0.010)	(0.006)				(0.007)
Δ*commodity returns (t)*		0.181***			0.172***		0.253***			0.223***
		(0.056)			(0.058)		(0.107)			(0.093)
avg forward discount (t)			0.171**		0.179**			0.049		0.056
			(0.100)		(0.092)			(0.109)		(0.098)
Δ*TED spread (t)*				0.005	0.001				0.013	0.008
				(0.010)	(0.009)				(0.014)	(0.011)
constant	0.001	0.000	0.000	0.001	0.000	0.004***	0.004***	0.004**	0.004	0.004**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
					goodness-of-fit					
R^2	0.006	0.023	0.011	0.000	0.038	0.017	0.034	0.000	0.004	0.045
F-stat	2.31	8.95	3.94	0.31	3.56	6.38	12.85	0.23	1.56	4.28
	[0.13]	[0.00]	[0.05]	[0.58]	[0.01]	[0.02]	[0.00]	[0.63]	[0.21]	[0.00]
Nobs	367	367	367	367	367	367	367	367	367	367

Change in volatility, commodity price and forward discount provide information.

Opie & Riddiough exploit the cumulative effect of many small predictable gains.

Comment: Why Dollar-Carry?

My cursory reading of the global currency factors literature:

- dollar & carry Lustig et al 2011; Verdelhan 2018
- volatility/uncertainty Menkhoff at al 2011 - related to carry
- value Menkhoff et al 2016 - related to carry
- volume Gargano et al 2019 - adds information
- skewness Rafferty 2012 - outperforms carry
- NFA Della Corte et al 2016 - outperforms carry
- GDP gap Colacito et al 2019 - uncorrelated w/ others
- gravity Lustig & Richmond 2016, Aloosh & Bekaert 2019
- ...
- momentum - little value for equities or currencies,
  ... despite being a popular trading approach

Comment: Why Dollar-Carry?

Macroeconomics literature:
Rossi (2013): predictability most apparent for

- Taylor rule (**relative inflation, output gap**)
  Molodtsova et al 2011; Giacomini & Rossi 2010, Rossi & Inoue 2012
- or **net foreign assets**
  Gourinchas & Rey (2007); Della Corte, et al (2012); Alquist & Chinn 2008
- linear models with few parameters

Liquidity:
Adrian et al 2011; Valchev 2017; Engel and Wu 2018

Aside: Someone, please write a Rossi-syle review of the global currency factor literature!

Comment: risk aversion

Coefficient of risk aversion, $\gamma \in [2, 3, 4]$
Plausible range is a bit wider [1:10]?
Do results hold over the [1:10] range?

- Nice result if it robust across wider range
- Interesting if not

Summary

Nice paper!
... that brings together the literature on global currency factors, with hedging technology to show potential value of a small predictable component, quantitatively.

Large cumulative effects of small out-of-sample gains.

Not clear that dollar and carry benchmarks are the best strategy.

Free lunch: In principle, exploiting the predictability means loading up on risk.
... but there are also potential diversification gains.