Risk Factors in Currency Markets Cont'd

Anisha Ghosh*

*McGill University

Asset Management – November 7th 2019

Q

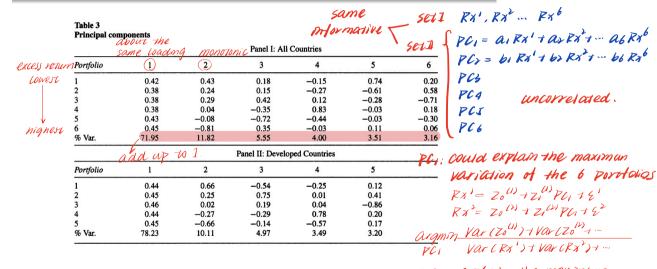
Outline

- 1 Lustig, Roussanov, and Verdelhan (2011)
 - Common Factors in Currency Returns
 - Cross-Sectional Asset Pricing

Methodology

- Linear factor models predict that average returns on a cross-section of assets can be attributed to risk premiums associated with their exposure to a small number of risk factors.
- These factors capture common variation in individual asset returns.
- A principal component analysis of the currency portfolios reveals that two factors explain more than 80% of the variation in returns on these six portfolios.

Principal Components



Interpretation

- 1 Explain most of variation
- a Have clear mterpretation
 - The first principal component explains 70% of the common variation in portfolio returns, and can be interpreted as a level factor, since all portfolios load equally on it.
 - The second principal component, that is responsible for almost 12% of common variation, can be interpreted as a slope factor, since portfolio loadings increase monotonically across portfolios.

Note: Average excess returns increase monotonically across portfolios \Rightarrow the second principal component is the only plausible candidate risk factor that might explain the cross-section of portfolio excess returns (since none of the other principal components exhibit monotonic variation in loadings).

Two Candidate Risk Factors

quided by PC.

$$RX = \frac{1}{6} \sum_{i=1}^{6} Rx^{i}$$

RX

The average currency excess return, RX: is the average portfolio return of a U.S. investor who buys all foreign currencies available in the forward market (the correlation of the first principal component with RX is .99).

Carry Trade Factor: HMLFX Foreign Exchange

The difference between the return on the last portfolio and the one on the first portfolio (the correlation of the second principal component with HML_{FX} is 94). This is the return in dollars on a zero-cost strategy that goes long in the highest interest rate currencies and short in the lowest interest rate currencies.

$$HMLFX = RX^{b} - RX^{l}$$



Assessing the Performance of Factors

 A linear factor model implies that the expected excess return is equal to the factor risk price times the beta of each portfolio:

$$E[Rx^{j}] = \lambda \qquad \beta^{j}$$
factor prices portfolio betas
$$E[Rx^{j}] = \beta^{j}_{Rx} E(Rx) + \beta^{j}_{HmLFx} E(HmL)$$

$$= [E(Rx)] E(HmL)] \begin{bmatrix} \beta^{j}_{Rx} E(Rx) \\ \beta^{j}_{HmLFx} E(HmL) \end{bmatrix}$$

Approach to Estimation

- A two-stage ordinary least squares (OLS) estimation:
 - 1 Step 1: Run a time-series regression of returns on the factors.
 - Step 2: Run a cross-sectional regression of average returns on the betas.

Model Evaluation

Table 4 Asset pricing—U.S. investor

Panel I: Risk Prices

	All Countries							Developed Countries						
	AHMLEY	λ_{RX}	bHMLFY	b_{RX}	R ²	RMSE	x ²	$\lambda_{HML_{FX}}$	λ_{RX}	bHMLFX	b_{RX}	R ²	RMSE	χ ²
GMM_1	5.50	1.34	0.56	0.20	70.11	0.96		3.29	1.90	0.29	0.20	64.78	0.64	
	[2.25]	[1.85]	[0.23]	[0.32]			14.39%	[2.59]	[2.20]	[0.23]	[0.23]			45.969
GMM_2	5.51	0.40	0.57	0.04	41.25	1.34		3.91	3.07	0.35	0.32	-55.65	1.34	
	[2.14]	[1.77]	[0.22]	[0.31]			16.10%	[2.52]	[2.05]	[0.22]	[0.22]			52.229
FMB	5.50	1.34	0.56	0.20	70.11	0.96		3.29	1.90	0.29	0.20	64.78	0.64	
	[1.79]	[1.35]	[0.19]	[0.24]			9.19%	[1.91]	[1.73]	[0.17]	[0.18]			43.649
	(1.79)	(1.35)	(0.19)	(0.24)			10.20%	(1.91)	(1.73)	(0.17)	(0.18)			44.259
Mean	5.08	1.33	()				3.14	1.90						

Q

Model Evaluation cont'd

