UNC KENAN-FLAGLER BUSINESS SCHOOL

International Arbitrage Premia

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Discussant: **Andrei S. Gonçalves**

2022 WSIR

Outline

The Paper in a Nutshell

- Linear SDF: $M^{\star}_{t+1} = a_t + b_t \cdot r_{t+1}$
- Estimate from $\mathbb{E}_t[M^{\star}_{t+1}] = 1/R_{f,t+1}$ and $\mathbb{E}_t[M^{\star}_{t+1} r_{t+1}] = 0$
- Problem: sometimes implies $M^{\star}_t < 0$
- Polynomial SDF: $M_{t+1} = w_{0,t} + w_{1,t} \cdot r_{t+1} + w_{2,t} \cdot r^2_{t+1} + \ldots$
- Estimate from
- Study the Residual Mispricing: $RMP_{t+1} = M^{o}_{t+1} - \mathbb{E}_t[M^{o2}_{t+1}]$

  where $M^{o}_t = M_t - M^{\star}_t$

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Figure 1: Time series of international residual mispricing

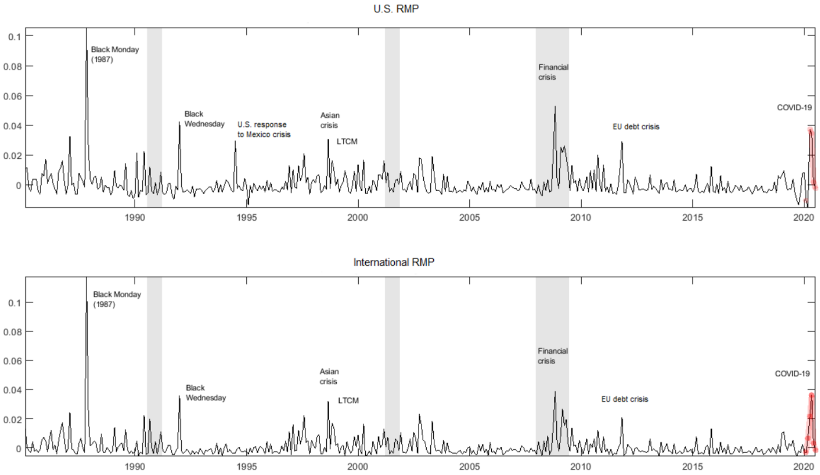

Table 1: Determinants of RMP

Panel A: U.S. Residual Mispricing

Financial uncertainty	0.441***				0.392***	
	[0.086]				[0.063]	
VIX		0.500***				0.490***
		[0.112]				[0.103]
Intermediary leverage			0.234***		0.056	-0.006
			[0.073]		[0.049]	[0.058]
TED spread				0.258**	0.132	0.082
				[0.127]	[0.095]	[0.080]
R^2	19.2%	24.9%	5.3%	6.5%	21.8%	26.8%

Panel B: International Residual Mispricing

Financial uncertainty	0.445***				0.396***	
	[0.095]				[0.069]	
VIX		0.506***				0.494***
		[0.138]				[0.126]
Intermediary leverage			0.206***		0.016	-0.047
			[0.072]		[0.050]	[0.062]
TED spread				0.289**	0.173	0.123
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R^2	19.6%	25.4%	4.0%	8.2%	22.6%	27.7%

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Table 5: RMP and statistical arbitrage in the data

	MDI	CIP 3M	CIP 1Y	CIP 2Y	CIP 3Y	CIP 5Y	CIP 7Y	CIP 10Y
Panel A: Contemporaneous regressions								
U.S. Residual Mispricing								
β	0.331*	0.320*	0.302**	0.361**	0.348**	0.331***	0.255***	0.190***
	[0.171]	[0.195]	[0.132]	[0.145]	[0.141]	[0.121]	[0.099]	[0.069]
R^2	10.7%	9.8%	8.7%	12.7%	11.8%	10.6%	6.1%	3.2%
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	MDI	CIP 3M	CIP 1Y	CIP 2Y	CIP 3Y	CIP 5Y	CIP 7Y	CIP 10Y
β	0.285*	0.267	0.245*	0.318**	0.319**	0.296**	0.222**	0.178***
	[0.148]	[0.201]	[0.143]	[0.150]	[0.141]	[0.123]	[0.098]	[0.069]
R^2	7.8%	6.8%	5.6%	9.8%	9.8%	8.4%	4.5%	2.8%
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$$\mathbb{E}_t[r_{j,t+1}] = \alpha_j + \beta_j \cdot RMP_{dom,t} + \varepsilon_{j,t}$$

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Table 7: RMP index and asset returns

	Equity	Currency
λ	$0.035^{\star\star\star}$	$0.040^{\star\star\star}$
	(5.233)	(5.077)
RMSE	0.0008	0.0003
R^2	40.8%	90.1%

Outline

The Paper

My Comments

Final Remarks

1) $M_t > 0$ vs No-Arbitrage (Under Incomplete Markets)

- No-Arbitrage $\iff \exists \; SDF_t > 0$
- The linear (tradable) SDF is $M^{\star}_{t+1} = a_t + b_t \cdot r_{t+1}$
- $M^{\star}_t < 0$ does not imply arbitrage opportunities exist under $M^{\star}_t$
- We could have $M_t = M^{\star}_t + M^{o}_t > 0$ with $M^{o}_t \perp \mathbb{R}_t$
- So, whether $M^{\star}_t < 0$ implies arbitrage opportunities depends on whether M^{o}_t prices other assets or not
- This discussion needs to be present in the text (+ it motivates testing whether M^{o}_t prices assets beyond $M^{\star}_t$)

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- In the CAPM, $M_t^\star = a - b \cdot r_{m,t}$ with $b > 0$
- So, we can only have $M_t^\star < 0$ if $r_{m,t} >> 0$ (good times!)
- Similar logic applies to multifactor models
- But M_t^o is constructed such that $M_t = M_t^\star + M_t^o > 0$
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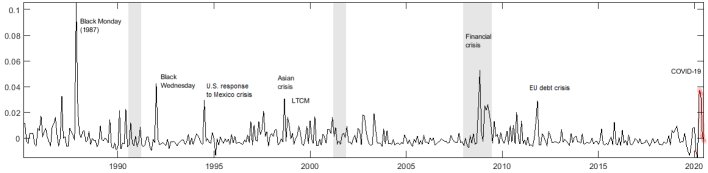

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- What drives that? (b_t? $b < 0$? ...)

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- The paper links RMP_t to arbitrage activity (e.g., Table 5)
- The implicit logic:
- But the paper also argues that RMP_t is priced (e.g., Table 7)
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4) Estimating Risk Prices (λ)

- In the paper,
- If we want to test whether RMP_t enters the SDF:
- This is an issue since λ flips sign when using realized returns
- This approach can be justified if $RMP_t = \mathbb{E}_t[f]$ where f_t is the relevant risk factor in the SDF
- But in this case a clean discussion of the economics behind this analysis is needed

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$$\mathbb{E}_t[r_{j,t+1}] \; = \; \alpha_j \, + \, \beta_j \cdot RMP_t \, + \, \varepsilon_{j,t}$$

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Other Comments

1. The interpretation of RMP_t as the profit associated with an insurance strategy implicitly assumes that M_t^o is a tradable payoff. I suggest you add a discussion of this aspect

2. D/P is a typical state variable predicting the equity premium. I suggest you add D/P to the set of state variables used to estimate $\mathbb{E}_t[\cdot]$

3. Typical models induce an exponential SDF. I suggest you provide a more detailed discussion about why a polynomial SDF is preferred over an exponential SDF

Outline

The Paper

My Comments

Final Remarks

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  - Explores RMP empirically, especially its link to uncertainty, recessions, and arbitrage activity
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