A Supply and Demand Approach to Equity Pricing

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Discussant: **Andrei S. Gonçalves**

2021 Adam Smith Workshop

Outline

The Model in a Nutshell...

Capital Supply :

$$\omega_n = \frac{1}{\gamma} \cdot \frac{\mu_n - r_f}{\sigma_n^2} - \omega_{\delta,n}$$

$$= \frac{1}{\gamma \cdot \sigma_n} \cdot \lambda_n - \omega_{\delta,n}$$

$$\Downarrow$$

$$\lambda_n = \gamma \cdot \sigma_n \cdot \omega_n + \gamma \cdot \sigma_n \cdot \omega_{\delta,n}$$

$$= \gamma \cdot W_0^{-1} \cdot \sigma_n \cdot V_n + \gamma \cdot \sigma_n \cdot \omega_{\delta,n}$$

$$= \gamma \cdot W_0^{-1} \cdot Q_n + \gamma \cdot \sigma_n \cdot \omega_{\delta,n}$$

Capital Demand :

$$Q_n = \sigma_n \cdot V_n$$

$$= \sigma_n \cdot \frac{\mathbb{E}^{\mathbb{Q}}[CF_n]}{1 + r_f}$$

$$= \sigma_n \cdot \frac{\mathbb{E}^{\mathbb{Q}}[(a_n + z_n) \cdot \sigma_{CF,n} \cdot K_n]}{1 + r_f}$$

$$= \sigma_{CF,n}^{\eta+1} \cdot \left(\frac{a_n - \lambda_n}{1 + r_f}\right)^{\eta}$$

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$$\lambda_n = a_n - (1 + r_f) \cdot \left(\frac{Q_n}{\sigma_{CF,n}^{\eta+1}}\right)^{1/\eta}$$

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Demand and Supply Shifts: $\boldsymbol{\lambda_n} \times \boldsymbol{Q_n}$

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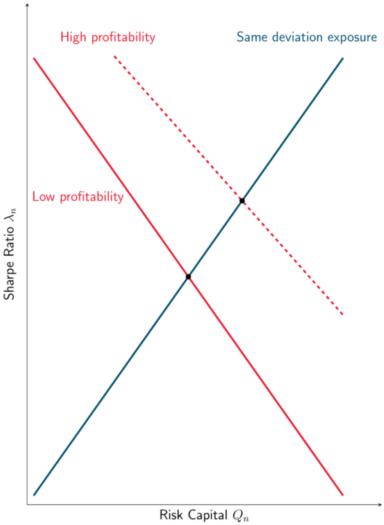
(a) **Variation in Profitability**



Demand and Supply Shifts: $\boldsymbol{\lambda_n} \times \boldsymbol{Q_n}$

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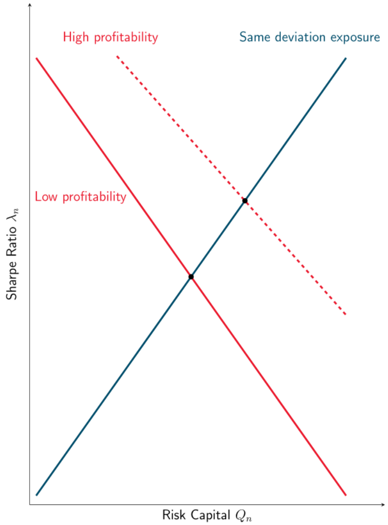
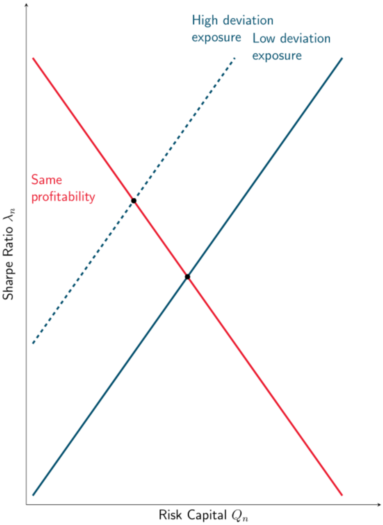


(b) **Variation in Exposure to the Deviation Portfolio**

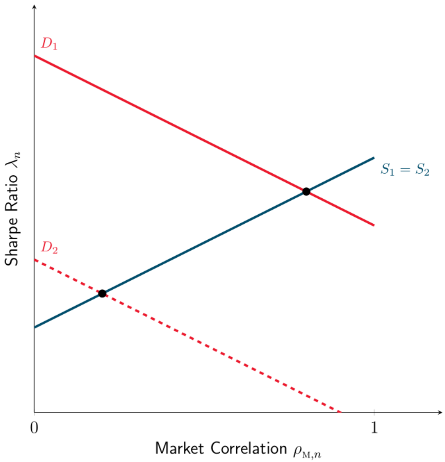


Demand and Supply Shifts: $\boldsymbol{\lambda_n} \times \boldsymbol{\rho_{M,n}}$

$$\rho_{M,n} = \frac{\overline{\rho} \cdot N \cdot \overline{Q} + (1 - \overline{\rho}) \cdot Q_n}{Q_M}$$

Demand and Supply Shifts: $\lambda_n \times \rho_{M,n}$

(a) **Same Exposure to the Deviation Portfolio**



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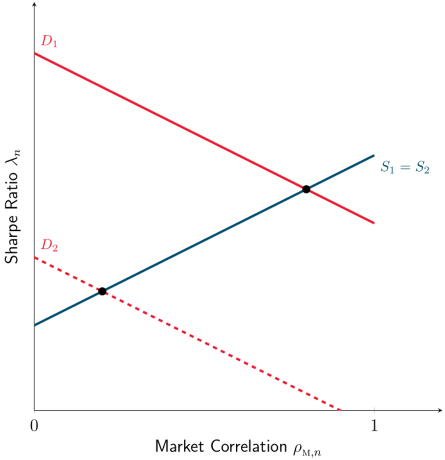

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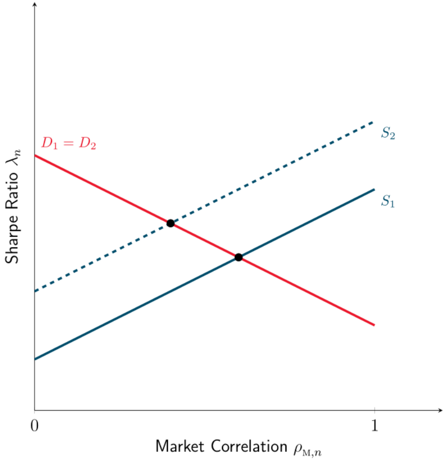
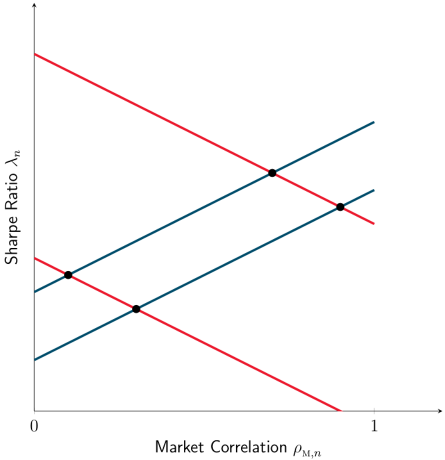


Demand and Supply Shifts: $\lambda_n \times \rho_{M,n}$

(c) **Demand Heterogeneity Dominates**



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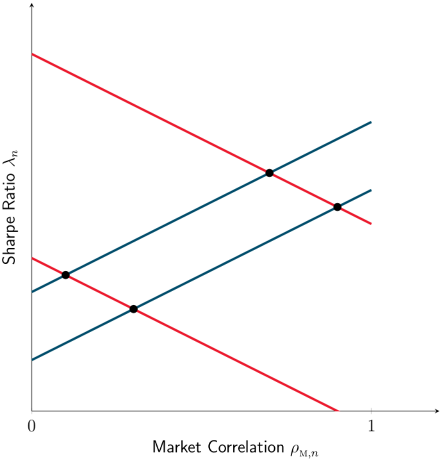
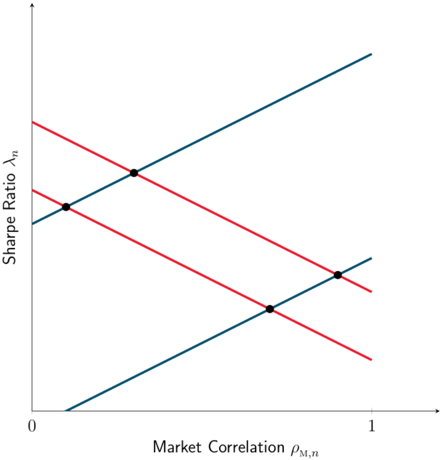
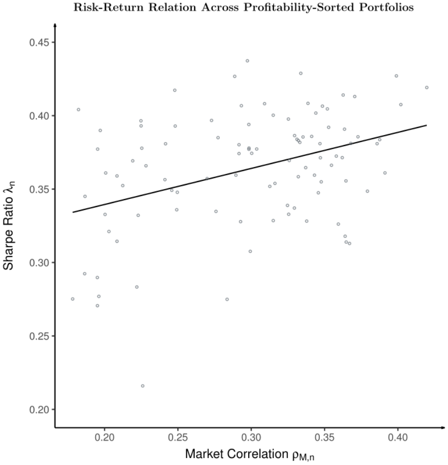
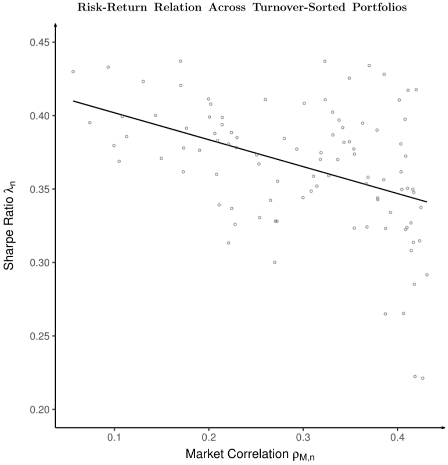


(d) **Supply Heterogeneity Dominates**



Demand and Supply Shifts: $\boldsymbol{\lambda_n} \times \boldsymbol{\rho_{M,n}}$





$$\rho_{M,n}(\underset{+}{a_n}, \underset{-}{\delta_n})$$

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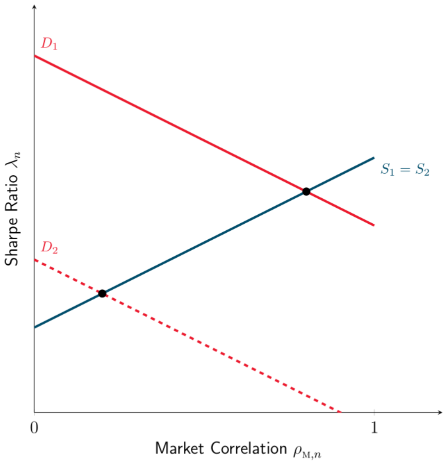

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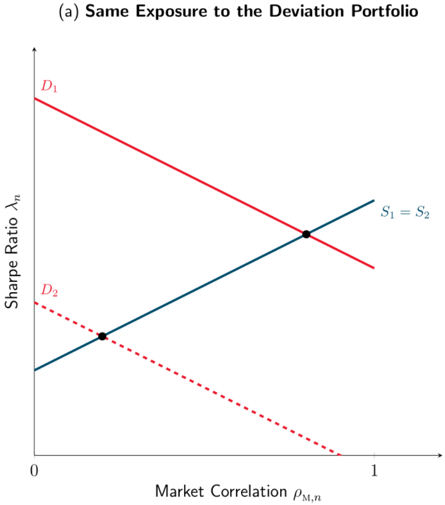

Anomalies

- **Supply Side**: Betting Against Beta

- **Demand Side**: Value, Investment, Profitability, and Size:

Anomalies

- **Supply Side**: Betting Against Beta

$$
\begin{aligned}
\frac{\alpha_n}{\sigma_n} &= \lambda_n - \lambda_n^{CAPM} \\
&= \rho_{M,n} \cdot (\lambda_M - \delta_M \cdot \gamma) + \delta_n \cdot \gamma - \rho_{M,n} \cdot \lambda_M \\
&= \gamma \cdot \delta_n - \gamma \cdot \delta_M \cdot \rho_{M,n}
\end{aligned}
$$

$$
\boxed{\rho_{M,n}(\underset{+}{a_n}, \underset{-}{\delta_n})}
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$$\frac{\alpha_n}{\sigma_n} = \lambda_n - \lambda_n^{CAPM}$$

$$= \rho_{M,n} \cdot (\lambda_M - \delta_M \cdot \gamma) + \delta_n \cdot \gamma - \rho_{M,n} \cdot \lambda_M$$

$$= \gamma \cdot \delta_n - \gamma \cdot \delta_M \cdot \rho_{M,n}$$

$$\boxed{\rho_{M,n}(\underset{+}{a_n}, \underset{-}{\delta_n})}$$

- **Demand Side**: Value, Investment, Profitability, and Size:

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Table 3: **OLS and 2SLS Estimates of Supply and Demand Schedules**

	OLS		2SLS			
	Supply	Demand	Supply		Demand	
	Sharpe Ratio	Sharpe Ratio	Market Corr.	Sharpe Ratio	Log Risk Capital	Sharpe Ratio
	(1)	(2)	(3)	(4)	(5)	(6)
Supply						
Market correlation	0.166***					
	(0.018)					
Fitted market correlation				0.220**		
				(0.073)		
Turnover	−0.042***		0.106***	−0.047***	0.680***	
	(0.004)		(0.002)	(0.008)	(0.015)	
Demand						
Risk capital (in logs)		-0.002				
		(0.002)				
Fitted risk capital (in logs)						−0.035***
						(0.005)
Profitability		0.003***	0.011***		0.098***	0.006***
		(0.001)	(0.000)		(0.003)	(0.001)
Year fixed effects	No	No	No	No	No	No
Industry fixed effects	No	No	No	No	No	No
F statistic	65.4***	7.2***	2,061.1***	29.0***	1,288.0***	29.0***
Number of observations	11,433	11,433	11,433	11,433	11,433	11,433

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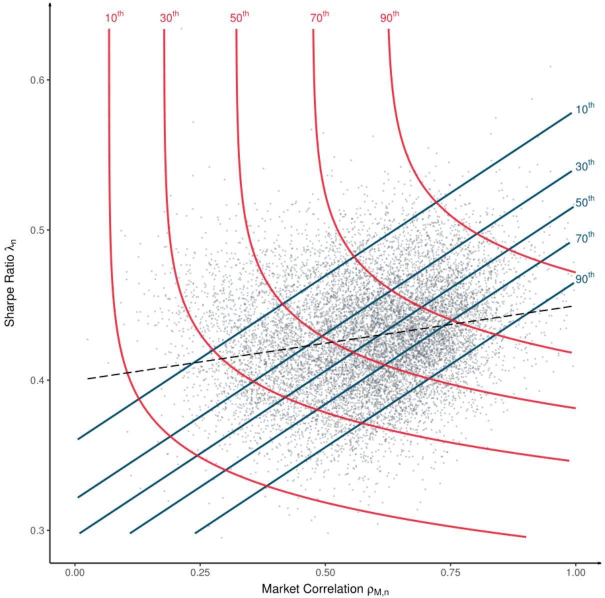
Equilibrium Outcomes & Supply and Demand Schedules



Outline

The Paper

My Comments

Final Remarks

1) Explore $\sigma_{CF,n}$ Heterogeneity

$$\lambda_n = a_n - (1 + r_f) \cdot \left(\frac{Q_n}{\sigma_{CF,n}^{\eta+1}} \right)^{1/\eta}$$

- Endogenous variables (Q_n, λ_n, $\rho_{M,n}$, ...) are functions of $\sigma_{CF,n}$
- Explore the model implications of $\sigma_{CF,n}$ heterogeneity
- Example: $\lambda(\underset{+}{a_n}, \underset{+}{\delta_n}, \underset{?}{\sigma_{CF,n}})$
- When estimating the Demand Schedule:

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2) Explore $\rho_{CF,n}$ Heterogeneity

$$\boldsymbol{\lambda} = \gamma \cdot W_0^{-1} \cdot \boldsymbol{\rho} \cdot \boldsymbol{Q} + \gamma \cdot \boldsymbol{\delta}$$

- The CF correlation matrix, ρ, can incorporate heterogeneity
- Currently: (i) $Cor(z_i, z_j) = \overline{\rho}$ or (ii) unrestricted ρ matrix
- Explore implications of 1-factor model for z_n:
- Can you connect results to papers that explore "cash flow betas" (e.g., Bansal, Dittmar, and Lundblad (2005 JF))?

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$$\Downarrow$$

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- $Cor(a_{n,t}, u_{S,n,t}) = 0?$
  - Suppose there is a missing risk factor, f
  - β_n^f may be a function of a_n (e.g., Kelly, Pruitt, and Su (2019))
  - $Cor(a_{n,t}, u_{S,n,t}) \neq 0?$

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- The model generates several anomalies (qualitatively)
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5) Miscellaneous Comments

1) $CF_n = (a_n + z_n) \cdot \sigma_{CF,n} \cdot K_n$ with $K_n = (\frac{\eta+1}{\eta} \cdot I_n)^{\eta/(\eta+1)}$

   - $c_n = I_n - (\frac{\eta+1}{\eta} \cdot I_n)^{\eta/(\eta+1)}$ reflects adjustment cost (not DRS)
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- Major contribution (obvious ex post, not ex ante):

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