Discussion of:

Understanding the Cross-section of Global Equity Valuations and Expected Returns

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Basic Idea

- Impressive goal:
  - estimate the relative importance of expected future fundamentals and expected returns to explain variation in asset prices.
- Conclusions:
  - ... a small set of characteristics explains the majority of variation in a panel of firm-level valuation ratios across countries.
- Other Questions:
  - what information do investors use?
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Findings

- Basic Idea:
  - start with a simple model in which investors use a set of characteristics to forecast a firm's future profitability and to assess its riskiness.
  - use firm characteristics to explain the cross-sectional variation in valuation ratios.
- Findings:
  - a set of six characteristics explains the majority of variation in a panel of valuation ratios in the US, Euro, Japan, and GB regions.
  - the same characteristics predict about a third of the variation in firms future profits across all of the regions
    - The coefficients are similar, but not exactly the same.
  - the difference in the coefficients from the valuation model and growth regressions, multiplied by the characteristics, must be an estimate of long-horizon expected return.
    - Why do these differences arise?
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The Model

- Two Period model
- CARA-Normal setting.
- Firms/Assets $n = 1, \ldots, N$; each is unit supply.
- Investors $i = 1, \ldots, I$, with initial wealth A_{0i}, disagree about firm prospects
  - $\gamma_i = \left(\frac{\gamma}{A_{0i}}\right)$ makes model "CRRA-light."

Investor Optimization

- Each investor maximizes expected time 1 utility:

$$\max_{\mathbf{Q}_i} \mathbb{E}\left[-\exp(-\gamma_i A_{1i})\right]$$

where

$$A_{1i} = A_{0i} + \mathbf{Q}_i'(\mathbf{D}_1 - \mathbf{P})$$

or, dividing and multiplying by $\mathbf{B}_0$, and using $\mathbf{D}_1 = \mathbf{B}_0 \circ \boldsymbol{\rho}$

$$A_{1i} = A_{0i} + \mathbf{q}_i'(\boldsymbol{\rho} - \mathbf{P}/\mathbf{B})$$

where $\mathbf{q}_i$ denotes the number of dollars of book held by agent i.

Firms & Beliefs

- The vector of terminal payoffs $\mathbf{D}_1$ is:

$$\mathbf{D}_1 = \mathbf{B}_0 \circ \boldsymbol{\rho}$$

where $\boldsymbol{\rho}$ = ROE from $0 \to 1$, and is governed by a single-factor structure:

$$\boldsymbol{\rho} = \mathbf{g} + \boldsymbol{\beta}\mathrm{F} + \boldsymbol{\eta}$$

- Agents disagree about $\mathbf{g}$ and $\boldsymbol{\beta}$; their beliefs are linear functions of firm characteristics $\mathbf{X}$ (N×K).

$$\begin{aligned} \mathbb{E}^i[\mathbf{g}] &= \mathbf{X}\boldsymbol{\lambda}_i^g + \boldsymbol{\nu}_i^g \\ \mathbb{E}^i[\boldsymbol{\beta}] &= \mathbf{X}\boldsymbol{\lambda}_i^\beta + \boldsymbol{\nu}_i^\beta \end{aligned}$$

  - where the $\boldsymbol{\lambda}_i$s are (K×1), and are specific to each investor.

Implications

- In this setting, the FOC for each investor is:

$$\mathbf{q}_i = \frac{1}{\gamma_i \sigma^2} \underbrace{(\mathbf{g}_i - \mathbf{MB})}_{=\mathbb{E}^i[\mathbf{R}]} - \frac{c_i}{\gamma_i \sigma^2} \boldsymbol{\beta}_i$$

or, in terms of the projection of onto the characteristic matrix $\mathbf{X}$:

$$\mathbf{q}_i = \frac{1}{\gamma_i \sigma^2} \left[-\mathbf{MB} + \mathbf{X}(\boldsymbol{\lambda}_i^g - c_i \boldsymbol{\lambda}_i^\beta) + (\boldsymbol{\nu}_i^g - c_i \boldsymbol{\nu}_i^\beta) \right]$$

Implications

- Imposing market clearing gives:

$$\mathbf{MB} = \mathbf{X}\left(\sum_i m_i \boldsymbol{\lambda}_i\right) + \sum_i m_i \boldsymbol{\nu}_i$$

where

$$\begin{aligned}
\boldsymbol{\lambda}_i &= \boldsymbol{\lambda}_i^g - c_i \boldsymbol{\lambda}_i^\beta - \gamma_i \sigma^2 \mathbf{1} \\
\boldsymbol{\nu}_i &= \boldsymbol{\nu}_i^g - c_i \boldsymbol{\nu}_i^\beta \\
m_i &= \left(\frac{\gamma_i^{-1}}{\sum_i \gamma_i^{-1}}\right) = \left(\frac{A_{0i}}{\sum_i A_{0i}}\right)
\end{aligned}$$

- That is, the MB ratio for each firm is a wealth-weighted average of its perceived alpha, part of which is explained by characteristics and some of which is not.

Estimating Demand

- Estimate an international asset demand system, following Koijen and Yogo (2019).
  - a large number of investors hold relatively few stocks. To deal with this, they propose a new shrinkage estimator loosely related to Black and Litterman (1991) for estimating expected returns.
- Investors' demands are modeled as a function of prices, characteristics, and latent demand.
  - latent demand captures unobserved demand effects.
- impose market clearing $\Rightarrow$ equilibrium asset prices.
  - (under various counterfactual scenarios.)
  - extend the model to allow for cross-country substitution.
    - single parameter governs across-country substitution for each group.
    - 0 $\rightarrow$ perfectly segmented (country) markets; 1 $\rightarrow$ identical elasticities. Point estimates are:
    - broker-dealers: 0.10; investment-advisors: 0.32.

Forecasting ROE

- Vuolteenaho (2002) estimates a Campbell and Shiller (1988)-like decomposition for individual firms.
  - By the CS intuition (and math) a high $bm_t = \log(B_t/P_t)$ must reflect either low future ΔBs (low ROEs) or high future returns, or both.
    - Recall that CS find that most of the time variation in market d/p reflects variation in discount rates, not cash-flows.
  - In contrast Vuolteenaho finds that about 83% of the variation in BM ratios reflects variation in future ROEs.
    - "...market-adjusted log returns, the variance of expected-return news is one-fifth of the cash-flow-news variance." (p. 259)
  - In contrast, this paper finds that (non-price-based) characteristics explains 29% of the next 5-year ROEs.
    - This suggests that most of the news about future cash-flows is unrelated to the 6 characteristics used here.[1]
    - The rest of the news is presumably "soft" news.

[1] Foreign Sales, Profitability (Lerner), Sales-to-Book, Dividend-to-Book, Market-Beta, and ln(BE).

Forecasting returns

- in Daniel and Titman (2006), we do something slightly different. In constrast to CS and V, we examine a backward looking decomposition:

$$bm_t = bm_{t-5} + \Delta b_{t-5,t} - \underbrace{\Delta m_{t-5,t}}_{\sim r-t-5,t}$$

- In words, a firm is high bm today, there are three possibilities:
  1. It was high bp 5 years ago.
  2. It had high ROEs ($\Delta b \gg 0$)
  3. It earned low returns $\Delta p \ll 0$.
- *Complications:*
  - Share issuance, splits, etc.

Forecasting returns (2)

- We can also decompose firm returns into the part explained by past ROEs, and the component that isn't (ϵ).

$$\Delta r_{t-5,t} = \gamma_0 + \gamma_1 \cdot bm_{t-5} + \gamma_2 \cdot \Delta b_{t-5,t} + \epsilon_{t-5,t}$$

- $\epsilon_{t-5,t}$ is the past 5-year return that can't be explained by accounting measures.[2]
  - The regression (with all growth measures included) has $R^2_{adj} = 57.1\%$
  - But, in forecasting future stock returns, the past-growth measures do nothing
    - In contrast, the residual strongly forecasts future returns ($t = -4.6$).

[2] We examine growth in log book, sales, cashflow, and earnings.

Intermediary Asset Pricing

- There is a really interesting evolving literature on intermediary asset pricing:
  - e.g., He and Krishnamurthy (2013), Adrian, Etula, and Muir (2014), He, Kelly, and Manela (2017), Haddad and Muir (2018).
- The main idea behind this literature is that if intermediary cost of capital is stochastic, an estimate of that (stochastic) cost of capital can serve as a stochastic discount factor/pricing kernel.
  - e.g., intermediaries will invest less in any given asset, ceteris paribus, if that asset's returns negatively covary with the broker-dealer's leverage.
- The framework here seems ideally suited to provide a better estimation of these effects.

Intermediary Asset Pricing (2)

- However, this model/estimation is hampered by having only a single market factor.
- It shouldn't be hard (?) to extend this framework to allow for multiple risk factors.
  - See, e.g., Daniel, Hirshleifer, and Subrahmanyam (2001); Kozak, Nagel, and Santosh (2018).
- Might provide a richer understanding of the role of biases, constraints, and arbitrage activity in the price formation process.

Conclusions

- The small set of characteristics used here do explain a lot of the x-sectional variation in bm ratios and in future ROEs.
  - However, there is a considerable amount that remains unexplained.
- Strikingly, while bm ratios forecast substantial x-sectional variation in future returns, the evidence suggests that fundamental characteristics do not.
  - The question of what does explain mispricing/discount-rates remains tantilizing.

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