Misvaluation of Investment Options
by Evgeny Lyandres, Egor Matveyev, and Alexei Zhdanov

Discussant: Guojun Chen¹

¹Nanyang Business School

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Outline

Overview

Detailed Comments
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Overall Comments

- Intriguing and important ideas.
  - First to estimate and measure mispricing of growth options at firm level.
- Some questions needed to be answered.
The authors establish a simple model,

\[ V_0(K,x) = AP(K,x) + GO(K,x) \]

The reality is \( V(K,x) \), try to structurally estimate the parameters and fit: \( \tilde{V}_0(K,x) \).
- Parameters are industry level.
- State variables \((K,x)\) are firm level.

Measure of undervaluation/overvaluation:

\[ M = \frac{\tilde{V}_0(K,x)}{V(K,x)} \]

\( M \) generates economically significant alpha.
The relation is only present in firms with high proportions of investment options, or more precisely, firms with high GO/AP ratios.

Conclusion: misvaluation of investment options.

How can we interpret these results?

- What are $M$ measuring?
- Misvaluation or misspecification?
- What does GO/AP capture?
- More details on misvaluation?
- Some more robustness checks.
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Detailed Comments
What Are $M$ Measuring?

- After the scaling effect, the model here has only one state variable: the profit-to-capital ratio $\pi/K$,

$$\tilde{V}_0(K, x) \equiv K \tilde{Q}_0 \left( \frac{\pi}{K} \right)$$

- So the misvaluation measure $M$ is simply a nonlinear function of $\pi/K$ over average $Q$:

$$M = \frac{\tilde{V}_0(K, x)}{V(K, x)} = \frac{\tilde{Q}_0 \left( \frac{\pi}{K} \right)}{V/K}$$

- What are the new information here, as both profitability and BTM have been known pricing factors?
  - Why would this be a new pricing factor?
  - Possibly the nonlinear functional form or the industry-specific parameters matter here.
  - Dig deeper here. For example, would a universal set of parameters generate similar results?
Misvaluation or Misspecification?

- $M$ essentially measures the distance of the model to the reality.
  - The authors have recognized the possibility of model misspecification.

- However, it would still be better if they could rule out more possibilities, even on the empirical side.

- Things to be ruled out include:
  - financial constraints and cash holdings.
  - tangible versus intangible assets.
  - R&D investment intensity.
  - and more.
What Does GO/AP Capture?

- The GO/AP ratio is MONOTONIC to profits-to-capital ratio:

\[
\frac{GO}{AP} = \frac{C}{K} \left( \frac{\pi}{K} \right)^{\beta_1 - 1}
\]

  - sorting on GO/AP = sorting on profitability (given the same industry parameters).

- Is it equivalent to say the relation between $M$ and returns is only present in high profitable firms?
  - Simply double sort on profits-to-capital ratio then $M$ to check?
More Details on Misvaluation?

- Suppose the authors have established that there is misvaluation on investment options.
- More details are still needed:
  - What kind of misvaluation is that? Is it due to sentiment (systematic behavioral bias) or information asymmetry (unsystematic noise in a rational model)? Additional tests with analyst coverage and dispersion may help.
  - Is it a systematic risk factor? Or just a short-lived mistake, which is an arbitrage opportunity? Time series performance of the long-short strategy may help.
  - Why such misvaluation is persistent and time-varying?
  - Some real life examples help.
Some More Robustness Checks

- When estimating alpha, there are also additional factors to be excluded:
  - sentiment factor
  - Pastor-Stambaugh illiquidity factor
- Extreme misvaluation happens in high R&D, low institutional ownership, and high volatility firms. The authors may also want to control them.