Misallocation or Risk-Adjusted Capital Allocation

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Question

- How much of variation in MPK due to risk?
- DSZ’s answer: $\approx 30\%$
Why Important?

- MPK dispersion usually attributed to misallocation
- But, “distortions” are just nonstructural wedges
Contributions of DSZ

- Provides factor to account for dispersion of MPK
- Moves toward connecting macro and finance
Source of 30% Result

- Use standard Euler equation:

\[ 1 = E_t M_{t+1} (MPK_{i,t+1} + 1 - \delta) \]
\[ = E_t M_{t+1} (\theta X_{t+1}^\beta Z_{i,t+1} K_{i,t+1}^{\theta-1} + 1 - \delta) \]

- With some algebra, can show:

\[ E_t mpk_{i,t+1} = \alpha_t + \beta_i \gamma(x_t) \sigma^2_\epsilon \]
\[ \Rightarrow \sigma^2_{E_t[mpk]} = (\sigma_\beta \gamma(x_t) \sigma^2_\epsilon)^2 \]

where \( X \) is aggregate TFP and \( \epsilon \) is its innovation
Source of 30% Result

\[
\sigma^2_{E_t[mpk]} = (\sigma_\beta \gamma(x_t) \sigma^2_\epsilon)^2
\]

- Little variation in aggregate TFP, e.g., \(\sigma_\epsilon = .007\)

\[
\Rightarrow \text{Tiny } \sigma_\epsilon^4 = 2.4 \times 10^{-9}
\]

\[\Rightarrow \text{DSZ need risk-sensitive investors and large } \sigma_\beta\]
My Discussion

- Why are high MPK companies more risky?
- How accurate is DSZ’s measure of capital?
- What are implications for the macroeconomy?
Why are high MPK companies risky?

- Premise of paper is MPK dispersion due to risk
  - But, DSZ missing Fama-French like narrative
    - Is DSZ’s new risk factor just picking up size?
Sort Companies by MPK and Size

• Consider sorting firms
  ◦ First by market capitalization (size)
  ◦ Then by DSZ’s proxy for MPK

• What are the annual returns?
Returns: MPK vs Size

Punchline: Most of dispersion in small cap firms
DSZ’s Measure of Capital

- Compustat’s PPENT:
  - Measures book not reproducible capital
  - Misses intangibles
• *Intellectual property products* investment included:

  ○ R&D

  ○ Artistic originals

  ○ Software (first introduced in 1999)

• While much investment still missing, category is large...
• Private fixed nonresidential investment, 2012

  22% Structures

  45% Equipment

  33% Intellectual property

• Also have data for detailed industrial sectors
Information (NAICS 51)

- Intellectual property
- Equipment
- Structures

2007 Investment total = 100
Intangible-Intensive Companies

- Consider large companies by
  - R&D spending
  - Brand building

- Any systematic variation in MPKs and returns?
Punchline: No pattern
Implications for Macroeconomy

- 500 largest firms account for most of NIPA value added
- What if DSZ restrict attention to these?
Recap

- Questions for DSZ:
  - Why are high MPK companies more risky?
  - How accurate is DSZ’s measure of capital?
  - What are implications for the macroeconomy?