The Financial Soundness of US Firms 1926-2011: Financial Frictions and Business Cycles

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November 30, 2012

Organization

1. Objectives and Methodology

2. Findings

3. Comments and Suggestions

Background and Objectives

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- Kiyotaki and Moore (1997), Carlstrom and Fuerst (1997), Bernanke et al (1999), Cooley and al (2004), Jermann and Quadrini (2011)
- Gilchrist et al (2011), Gomes and Schmid (2011), Gourio (2012)
- Geanakoplos (2010), Allen and Gale (2007)

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Leverage and the capital structure become important determinants of firm decisions and aggregate outcomes.

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In a few papers the entire cross-sectional distribution of firms is a key state variable

- But unfortunately still not in most of them
- Early generation models rely only on the mean

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- Builds on Leland (1994)
- Relies only on readily available **firm-level** data on equity return volatility

The Classic Model of the Levered Firm

The market value of **equity**

$$e(z,k,b) \quad = \quad \max_{k',b'} \left[d(z,k,k',b,b') + \beta \mathbb{E}_z e(z',k',b') \right],$$

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The enterprise or **asset** value

$$v(z,k,b) = \max_{k',b'} \left[\pi(z,k) - i(k,k') + \beta \mathbb{E}_z v(z',k',b') \right],$$

The market value of the **liabilities**

$$v(z,k,b) - e(z,k,b)$$

The Classic Model with Optimal Default

The value of equity

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$$z^d = \max\{z : e(z,k,b) = 0\}$$

Probability of Default

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$$F(z^d(k,b)) \simeq \alpha_1 \ln(k) + \alpha_2 \ln(b/k) + ...$$

- Altman (1968), Ohlson (1980), Campbell et al (2008)

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Key simplifications: Leland (1994)

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$$cb/(1-\beta) - -V^B$$

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- When equity is free to pick (optimal) default then $x(z, b) > 0$

However it is also possible that $x(z, b)$ is negative - equity is a short position on the default option.

- If default is triggered by some covenant violation, or some **liquidity** shortage

Default and Asset Values

Default threshold is obtained in terms of asset values

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Empirical Issues

- What is the empirical distribution of asset values, G?

Distance to Insolvency

Assume $G(\cdot)$ is lognormal with variance σ_v.

- Probability of Default is

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In continuous time

- The number of steps to reach default

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The KMV-style estimates

- Just assume $v^d = cb/(1-\beta) = V^B$
- The so-called *Distance to Default*

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Use the fact that:

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Unfortunately this is the case where its also uninteresting

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Practically this means $1/\sigma_e$ could actually be either smaller or larger than the Distance to Insolvency

$$\frac{v(z) - v^d}{v(z)} \frac{1}{\sigma_v}$$

Empirical Findings

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But a few empirical issues also arise

- Equity volatility is volatile: e.g. the crash of October 1987
- Equity volatility does not mean much for unlevered firms

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   - Between 2000 and 2011 33% of US firms who failed to make payments on their debt (a default event) never filed for bankruptcy