Discussion of “The End of Market Discipline”
Acharya, Anginer, Warburton
Andrew Atkeson
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What this paper does

• Estimate a “hedonic” model of corporate bond spreads

• with Bond-specific, firm-specific, and macro controls

• including Merton distance to default (DD) as a measure of firm-specific risk

• estimates that TBTF firms have lower spreads than their smaller financial peers

• The estimated gap in spreads for TBTF firms is interpreted as measure of an implicit TBTF subsidy

• I find the estimated pre-crisis subsidy to be “disappointingly” small.
Discussion Outline

• Concern about Merton DD as measure of risk
  • Do regulatory changes show up in DD?
  • Was risk priced in advance of the crisis?
• Does DD capture the “risk” that occurred?
  • The term structure of credit risk in the crisis
• How should we even think about the cost of TBTF?
  • a pricing versus an engineering approach
  • pricing: how much individual firms would have to pay for unbacked funding under current market arrangements
  • engineering: how much would it cost firms in the aggregate to implement safer market arrangements?
Theory behind Merton’s DD

• **Theory:** Equity holders exercise option to walk away from the firm when two conditions hold

  • 1) Firm is insolvent
  • 2) Creditors are demanding cash
Appendix 1: The EDF Public Firm Model

The equity market provides an estimate of the future prospects of each firm. The dividend discount stock valuation model is based on this premise, of course. However, a company's stock price isn't an assessment of its creditworthiness. We need only to think of a highly leveraged firm, which can have a great stock price performance while also carrying a significant risk of default. In this way stock prices differ from spreads in the credit default swap and corporate bond markets. Credit spreads contain factors other than default risk, for example, an assumed loss-given default rate and a general market price of risk. However, there can be no doubt that credit markets are highly focused on default, and that wider spreads equate to higher risk. By contrast, there is only a weak connection between company stock prices and realized default rates.

The EDF Public Firm model builds on insights contained in the Black-Scholes-Merton (BSM) structural model of default risk, the original work on which dates from the 1970s. Figure 11 provides a visual representation of the Public Firm model, and encapsulates the model's two main drivers.

The first driver is the difference between the market value of the firm's assets and the book value of its liabilities at a future point in time. In Figure 11, the future point in time equates to a one-year horizon ($T=1$); the expected mean level of the market value of assets is the grey line, and the book value of liabilities is the red line. The differential between the assets and liabilities is a measure of leverage, or financial risk, with a smaller differential equaling greater leverage, and thus more risk.

The other driver is the expected asset volatility (represented by $\sigma$ – the blue line is just one such possible path). Asset volatility is a measure of business risk.

In this way the model incorporates the components of classic credit analysis — business risk and financial risk — that are familiar to all practitioners. In the Public Firm model, default is assumed to occur when the market value of a firm's assets falls below the book value of its liabilities, i.e., when it has negative net worth. The probability of this occurring is approximately equal to the shaded area in the right tail of the distribution in Figure 11. In the model the probability that the obligations will not be met is a function of the firm's distance to default (DD), which represents the number of standard deviations that the firm's asset value is away from the default point. DD can also be viewed as a volatility-adjusted market-based measure of leverage. DD is a crucial concept in the Public Firm model. Obviously, DD is reduced (and default risk)

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Figure 11 - Default Process in the Structural Model

Creditors demand cash here default happens if firm is insolvent on this date
Theory behind Merton’s DD

• **Key Parameters:**

  • 1) Leverage adjusted for asset volatility

  • 2) Timing of cash flows demanded by creditors

• **Regulation** should impact financial firms’ choice of 1) and 2)

• Do we see that in the data?
Do we see evidence of the impact of regulatory changes on DD for big banks?

Figure 15: A comparison of the log median measured DI for the largest 50 financial and non-financial firms in terms of market capitalization, 1962-2012. The horizontal lines indicate the position of our benchmark cuts (DI=1,2,3,4) on the log scale.

Figure 16: A comparison of the log median measured DI for the Government Backed Large Financial Institutions and the largest 50 non-financial firms in terms of market capitalization, 1962-2012. The horizontal lines indicate the position of our benchmark cuts (DI=1,2,3,4) on the log scale.
Do we see evidence of the impact of regulatory changes in DD for big banks?

- My guess is that the answer to this question is **no**
- The authors should be able to check this easily comparing DD for large and small financials back into the 1960’s or 1970’s
Was risked price before this crisis **in the cross section**?  
A look at Moody’s EDF by sector

**Figure 5 — Median EDF Metrics for Single A Entities by Sector**

EDF does not vary across types of firms pre crisis
Was risked price before this crisis **in the cross section**? A look at Big US Financial Firms vs. Big Canadian Banks

**Canadian Big 5 vs. US Big GBLFI’s**

Similar pre-crisis

Canadian banks stronger in and after crisis
Was the **level of risk** priced before this crisis?

EDF metric for Lehman Brothers vs. its sector

In hindsight, no

EDF was low in absolute terms for large financials pre crisis
Does DD (or EDF) measure the risk we care about for banks?

- In structural credit risk models, two parts to risk
  - Risk the firm is or becomes insolvent over some time horizon
  - Risk that the creditors demand cash of the firm when it is insolvent
- Merton’s DD measures the first but not the second since the timing of payments is fixed
- Can we see these two risks separately in the term structure of credit spreads?
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Sun (2010)  

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The model holds the book value of liabilities constant over a one-year horizon. This assumption is relaxed when calculating EDF measures for longer terms.

No possibility of default except here
Upward sloping term structure in a Leland Model

Figure 2.2: Impact of $\lambda$ on Default Probability ($V_0/(\bar{L}D) = 2, \sigma = 0.25$)

Term structure of CDS spreads in a Leland model is upward sloping.
In the crisis, the term structure of credit risk **inverted**

Actual Credit Spreads of BANK OF AMERICA CORP

6 month CDS rise above 5 year CDS
Extremely so for Citigroup
Less so for a sounder bank?

Actual Credit Spreads of JPMorgan CHASE & CO

- 6 mo
- 5 year
Does this make sense for Walmart too?
And Exxon-Mobil?

Actual Credit Spreads of EXXON MOBIL CORP

[Graph showing credit spread data over time]
And Procter and Gamble?
What was the risk?

- Whatever happened in the crisis, it raised near term credit spreads to very high levels for lots of firms.
- See the same phenomenon in short-term lending rates during the crisis
- Merton Model does not capture this risk
- Might call this “liquidity risk”
- Risk of a sudden demand for a large amount of cash when a firm is insolvent
- Is the short term credit spread a measure of this risk?
Modeling the liquidity risk

Figure 11 - Default Process in the Structural Model

The payment date $T$ can jump forward if short term creditors don’t roll over debt. If insolvent, this triggers default.
Example of a sudden demand for cash

**Bear Stearns Liquidity**

*In the four days before Bear Stearns collapsed, the company’s liquidity dropped by $16 billion.*

**IN BILLIONS OF DOLLARS, DAILY**

- In the four days before Bear Stearns collapsed, the company’s liquidity dropped by $16 billion.

**SOURCE:** Securities and Exchange Commission
Measuring the TBTF Subsidy

- **pricing** versus an **engineering** approach

- pricing: how much firms would have to pay for funding without the TBTF policy under current market arrangements

  - a measure of the subsidy to each firm

  - this paper is an example of a pricing approach

- engineering: how much would it cost firms in the aggregate to implement safer market arrangements?

  - Get different answers if there are spillovers in risk
An Engineering Approach to measuring the TBTF subsidy

• How much capital and long term debt do TBTF firms need to for the system as a whole to have to have stable funding?

• Is the cost gap between their current (or pre-crisis) funding model and a safe (immune to runs) funding model the subsidy afforded by TBTF policies?

• Can we measure this funding cost gap?