Discussion: "The Value of Implicit Guarantees"

by Zoe Tsesmelidakis and Robert C. Merton

Minneapolis Federal Reserve Bank:

Quantifying the "Too Big to Fail" Subsidy

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Overview

- What is the value of the subsidy resulting from an institution being "too big to fail"?
- The paper calibrates a CDS pricing model (CreditGrade) using data prior to the crisis in order to evaluate the subsidy during the crisis
- Using detailed data on bond issuances, the paper computes the per bond subsidy
  - Aggregate subsidy estimate of $365 billion
- Paper is based on the analysis in Schweikhard and Tsesmelidakis (2012)

Illustration: Assessing Fannie and Freddie

- Prior to September 2008, the GSEs Fannie Mae and Freddie Mac were widely assumed to have a government guarantee
  - GSE debt yields between treasuries and AAA financials
- Questions:
  1. What is the cost of the guarantee?
  2. What is the value to shareholders of being able to issue subsidized debt?
- How to answer this question?

A Model of a Bank

Assets		Liabilities	
Cash	250	Deposits	1500
Loans	1750	CDs, Bonds	300
		Equity	200
		Total	2000

- A debt guarantee is a put option on the deposits and bonds.
- If the bank fails, the government pays the difference between par value and recovery value for the deposits and bonds
- We can measure the value of the guarantee by valuing this put, for example using the Black-Scholes model
- Doing so in a one-period setting requires
  - An estimate of asset volatility
  - An assumed time horizon

A More General Framework

- Assume an indefinite horizon and that underlying assets of the firm follow a standard process
- Default occurs when assets hit a barrier
- Infer the volatility of assets from the observed volatility of equity (perhaps using option implied volatility)
- Assume behavior for the firm:
  - How will leverage and scale (payout policy) evolve over time?
  - What is the default rule?
- Given assumed firm behavior and characteristics, it is possible to value the debt guarantee
- Lucas and McDonald (2006, 2010) study the Fannie/Freddie guarantee:
  - Borrowing cost advantage of 20-30 basis points
  - the franchise value of the guarantee makes a firm less willing to go bankrupt

Issues

- Are we measuring guarantee value for a bond or for the firm (which, for example, can grow over time)?
- What is the nature of the guarantee?
  - Fannie and Freddie had a relatively simple business model coupled with a debt guarantee
  - Large banks undertake more complicated activities
- Estimates will depend on the assumed behavior of the institution
  - Does the firm gamble for salvation if in trouble?
  - Does franchise value alter default behavior?
  - Is behavior different for idiosyncratic and systemic events?
- This paper uses the CreditGrades model to calculate CDS premia based on *current* capital structure and stock volatility
  - Issues above are not considered

This Paper

- Estimates theoretical CDS prices during the crisis calibrated to the period before the crisis, as in Schweikhard and Tsesmelidakis (2012)
- Interesting finding (also in Schweikhard and Tsesmelidakis (2012)) that theoretical CDS premia were *lower* during the crisis than actual premia.
  - This is interpreted as evidence of support
  - However it is also true for nonfinancials
- Estimate the subsidy using the CDS-based estimate of support
  - One measure of the subsidy for newly-issued bonds
  - Another for existing bonds that don't fall in price

The Model in This Paper

- Assets follow geometric Brownian motion:

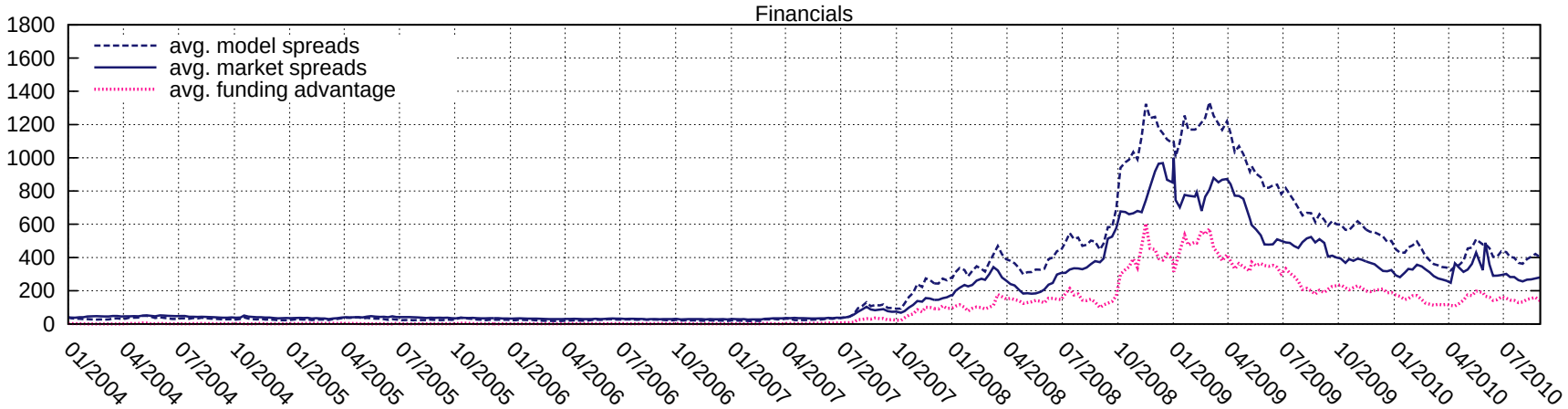
$$dV_t/V_t = \mu_V dt + \sigma_V dW_t$$

- Debt recovery value, L, is uncertain
- Default occurs when assets reach the (uncertain) recovery value, so default can result in a jump
- Solve for the fair CDS premium
  - This is the CreditGrades model (Finger and et al., 2002)
  - Default barrier is selected so that the price computed using the CreditGrades model matches the observed CDS prices
- Calibration through July 2007

Model Calibration

- The main non-observable inputs are the mean recovery rate, $\bar{L}$, and the variance of the recovery rate, λ.
- Choosing these provides significant flexibility, much like picking an implied volatility in option pricing
- Given $\bar{L}$ and λ, the CDS price will be determined by the stock price and volatility
  - Reminiscent of implied volatility calculations in option pricing — you can fit the model but without assurance that the model makes sense
- Theoretical/market price difference is interpreted as a measure of support

Figure 1, Tsesmelidakis and Merton (2012)

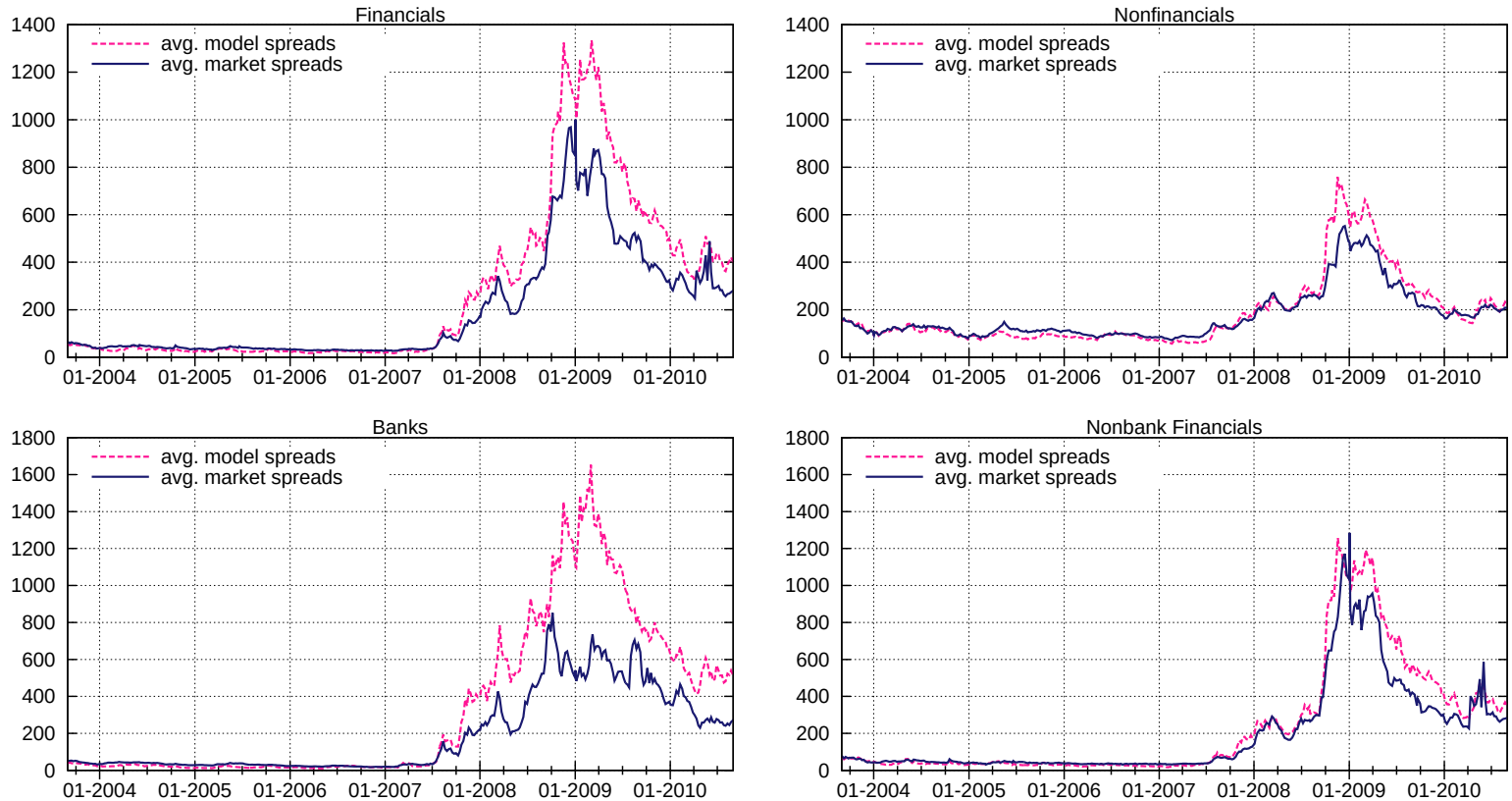


- Calibration period ends in July, 2007
- After that, model exceed market spreads
- The authors want the model/market difference be due to a subsidy

Figure 2, Schweikhard and Tsesmelidakis (2012)

Figure 2: Predicted versus Observed CDS Spreads – Sector Aggregates

These charts depict the evolution of weekly averages of stock-implied model (dashed line) and CDS market spreads (solid line) in basis points for sector aggregates during the period 2004 to 2010. Model predictions are based on the basic calibration scheme outlined in Section III.A.



Interpretation

- Note that nonfinancials behave similarly to financials
  - Can we still interpret the behavior of financials as reflecting a subsidy?
- Can we interpret the differences as a structural change?
  - Suppose the difference reflects the government's efforts to rescue the economy as a whole
  - Or perhaps the difference is due to a change in the model (not just the inputs) due to the crisis
  - The valuation of CDS must depend on both idiosyncratic and systematic risk. Their relative importance changed after 2007

The Subsidy Measure

Two measures of the subsidy:

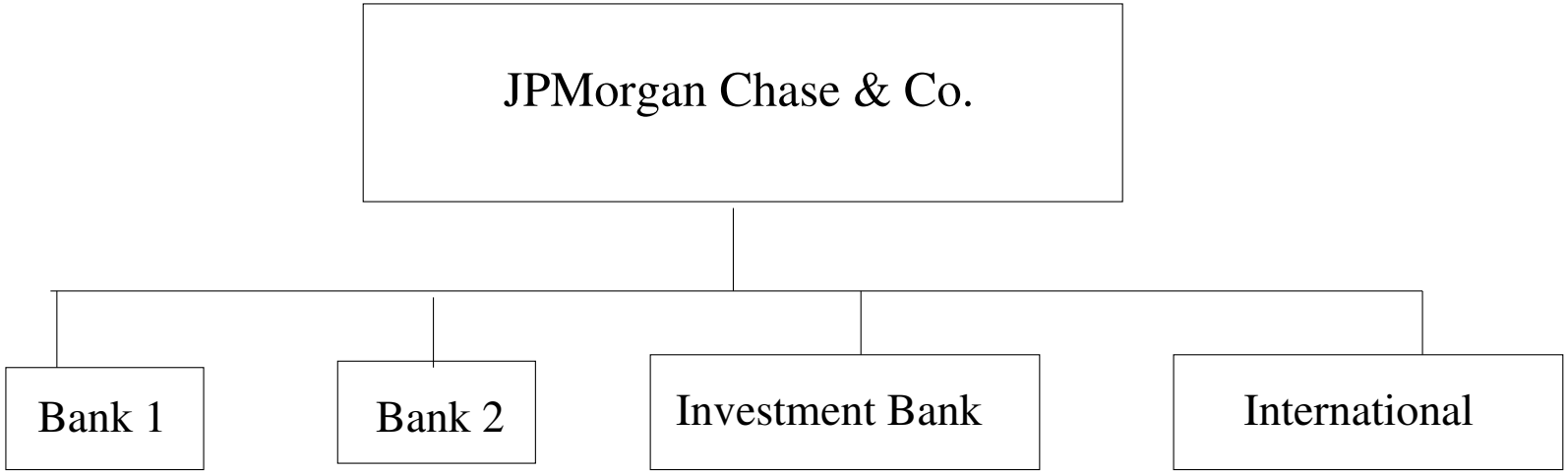
1. For newly issued bonds, how much greater is the price due to the subsidy (shareholder subsidy, $129 billion)
2. For existing bonds, how much bond price fall is avoided by the bond being guaranteed (bondholder subsidy, $236 billion)

- Why are there two different subsidies?
- Isn't #1 the premium that bondholders pay for #2?
- Suppose the debt had an explicit government guarantee
  - Bondholders would receive the risk-free rate.
  - In this case, would we talk about a bondholder subsidy at all?
  - Shareholders would receive the low risk-free financing rate

A $2T Bank in Reality: JPM, 2012

Assets		Liabilities	
Cash, due from banks	53.7	Deposits	1193.6
Deposits with banks	121.8	Commercial Paper	55.4
Reverse repos	296.3	Repos	240.1
Securities Borrowed	119.0	Other borrowed funds	26.6
Trading assets	450.0	Trading: Debt, Equity	131.9
Securities	371.1	Accounts Payable	195.2
Loans	711.8	Other	63.2
Other Assets	235.2	Long-term Debt	249.0
		Equity	204.1
Total	2359.1		2359.1

Bank Structure



- JPMC has 53 direct subsidiaries, 391 subsidiaries in all
- Which activities take place where?
- Which activities are effectively subsidized?
- Most debt is issued by the parent; what happens if a subsidiary is in trouble?

When is there a Subsidy?

- Banks are complicated and interconnected: much financing and trading is with other financial institutions
  - Repurchase agreements are significant, for example
- Is a government rescue linked to size or interconnections?
- Is a government rescue linked to the state of the economy?
- One could imagine a rescue of the repo market without a rescue of particular derivatives transactions
- How would one assess the size of the subsidy in that case?

Credit Risk

- Why presume that credit risk lowers the CDS premium?
- The argument is that the CDS seller might fail, so the buyer won't pay the fair price for the contract.
  - Initial collateral and marking to market should equate buyer and seller credit risks.
  - In this case, both parties still face the symmetric risk of a large price move creating a failed margin call for the counterparty
  - If collateral is not collected properly, the result could go the other way (if a non credit-worthy CDS buyer might fail a margin call, the premium could be greater)
- Conclusion: premiums might not be affected by credit risk
- How important is this?

Concluding Comments

- This paper offers a novel look at the value of being too-big-to-fail.
- Some of the main arguments in the paper require elaboration
- It would be interesting to see some back-of-the-envelope calculations: Given the size of bank balance sheets, what yield spread is consistent with the estimates?
- It would also be interesting to look at the details of the estimates for one bank.

Finger, C. C. and et al., 2002, *CreditGrades Technical Document*, Technical report, Riskmetrics Group, Inc.

Lucas, D. J. and McDonald, R. L., 2006, "An Options-Based Approach to Evaluating the Risk of Fannie Mae and Freddie Mac," *Journal of Monetary Economics*, 53(1), 155–176.

Lucas, D. J. and McDonald, R. L., 2010, "Valuing Government Guarantees: Fannie and Freddie Revisited," in D. J. Lucas, (ed.) "Measuring and Managing Federal Financial Risk," chapter 6, pp. 131–161, University of Chicago Press.

Schweikhard, F. A. and Tsesmelidakis, Z., 2012, "The Impact of Government Interventions on CDS and Equity Markets," Unpublished.

Tsesmelidakis, Z. and Merton, R. C., 2012, "The Value of Implicit Guarantees," Unpublished.