TBTF-related moral hazard and banker psychology

• Version 1, full awareness: “I know that the government will bail us out if we crash, so let me take on more risk and earn the upside”

• Version 2, self-deception: “Hey, our investments earn us a spread relative to what we pay for funding in the markets. That’s because we’re so smart at finding arbitrage opportunities/we are providing such valuable intermediation services/we are such a well-run business... Let’s do more of it.”

• Version 2 seems more plausible—and this paper gets to precisely this version of the TBTF problem: Lack of market discipline from funding markets.
Quantifying the subsidy

- Merton model: Equity and risky debt as options on the assets
- Distance to default (DD) = How many s.d. does asset value exceed face value of debt
- Identification of TBTF subsidy (simplified): Credit spread regression
  \[
  y = \beta DD + \gamma TBTF + e
  \]
- Assumption: DD correctly reflects default risk of TBTF banks that would prevail in *counterfactual* world without implicit guarantees
- Results: TBTF subsidy \(\approx\) $20bn annual pre-crisis. One might view this as quite small.

Comments

Four reasons why application of Merton model in this paper might understate TBTF subsidy:

- Embedded optionality in bank assets
- Government guarantee is an asset that raises distance to default
- Use of historical data in calibrating Merton model
- Do implicit guarantees only affect credit spreads of TBTF banks?
Embedded optionality in bank assets

- Assumption in Merton model: Asset value with constant variance, log-normally distributed at debt maturity
- However: Bank assets include portfolios of embedded options. Examples:
  - loan portfolio = portfolio of default-free debt combined with short put options
  - super-senior tranches = default-free debt combined with far-OTM short put options
- Consequence:
  - variance rises as asset value falls
  - distribution of asset value at debt maturity not log-normal
  - standard deviation of log value is not all that informative about probability of default
  - Merton model underestimates default risk

Merton model assumption: Constant variance

[Graph showing the impact of a shock to asset value on the log asset value and face value of debt over time.]
Short put options embedded in bank assets: Asset variance increases after negative asset value shock

Embedded optionality in bank assets: Where does it matter most?

Where is substantial underestimation of default risk most likely?

- big banks with big derivatives positions
- in “good times” when options embedded in bank assets are far OTM
- comparison with corporates (which do not have short-put-option-like assets to the same extent)
Government guarantee is an asset that raises DD

- Paper, fn. 7: “… the implicit guarantee… does not prevent a financial institution from … having its equity wiped out... Distance to default captures these losses and, therefore, does not reflect the implicit guarantee itself.”
- But, government guarantee is an asset that raises the distance to default prior to debt maturity

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<th>Assets</th>
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<td>TBTF guarantee</td>
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Example: Debt with $F = 100$. Asset value $A = 100$ (w/o guarantee). Let $r_f = 0$ and $t < T$.

- w/o guarantee: $A = F$, and hence $DD = 0$
  - debt risky with market value $D = 90$
  - equity with market value $E = 10$

Back out $A$ and $DD$ from observed $E$ and $F$ yields $A = 100$ and $DD = 0$.

- with guarantee with $PV = 10$: $A = 100 + 10 = 110 > F$
  - $D = 100$
  - $E = 10$

Back out $DD$ from observed $E$ and $F$ yields $A = 110$ and $DD > 0$.

⇒ measured $DD >$ counterfactual $DD$ w/o guarantee
⇒ TBTF subsidy underestimated
Calibrating the Merton model

- Merton model calibrated with equity standard deviation measured over past 12 months
- Suppose recently volatility was very low and stock price high. Following logic of Merton model...
  - asset volatility very low
  - asset value must be very high for stock price to be high
  - asset value many s.d. away from default threshold
  - this justifies the low observed credit spread
  - regression estimate of TBTF subsidy very small
- However, recent volatility is a bad forecaster of crises. What may really be going on is...
  - tail risk still high despite low recent volatility
  - credit spread would be high in absence of implicit guarantee
  - TBTF subsidy big
- It would be useful to feed the Merton model with data that includes some crisis periods.

Do implicit guarantees affect credit spreads only of TBTF banks?

- Identification of subsidy in this paper assumes that banks that are not among the biggest don’t benefit from subsidy
- But perhaps smaller banks also benefit
  - TBTF institutions may be able to sell underpriced tail-event insurance to other financial institutions?
  - Linked to TBTF counterparties in derivatives and wholesale funding markets?
  - Smaller banks “too correlated to fail” rather than TBTF in crises?
- If so, the relative comparison of credit spreads of smaller banks with those of TBTF banks does not capture full amount of implicit subsidies
Summary

- Paper tackles an important and difficult task
- Evidence quite convincing that TBTF subsidy exists
- Estimates of the subsidy’s magnitude are likely biased downward
- Extending the Merton model to better account for bank asset risk dynamics would help to improve the estimates