Is Bank Debt Special for the Transmission of Monetary Policy? Evidence from the Stock Market

Ali Ozdagli
Federal Reserve Bank of Boston
(joint with Filippo Ippolito and Ander Perez)

May 6th, 2014
Overview of Results

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   - Financial Intermediaries and Monetary Policy are at the heart of the recent financial crisis.
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  - ⇒ **answer:** new detailed debt structure data (Capital IQ)
  - Bank Debt = Term Loans + Lines of Credit
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    - bank-firm matching: LPC Dealscan (syndicated loans)
    - bank characteristics: Call Reports, Bankscope
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- Control for firm financial constraints and other firm characteristics
Data Sources and Sample (II)

- Sample: U.S. publicly listed firms, 2003-2008
  - No detailed firm debt structure data pre 2003
  - No conventional monetary policy post 2008

- Firm characteristics: Capital IQ and Compustat, annual level

- Stock returns: CRSP

- Monetary policy surprises: calculated as in Kuttner (2001) and Bernanke and Kuttner (2005)
Similar response of stock prices to Federal funds rate surprises across sample periods
1. Is Bank Debt Special?
Is Bank Debt Special?

Specification

\[ Ret_{i,t} = \beta_0 + \beta_1 Surprise_t + \beta_2 \left( \frac{BankDebt}{At} \right)_{i,t-1} \]
\[ + \beta_3 Surprise_t \times \left( \frac{BankDebt}{At} \right)_{i,t-1} \]
\[ + \gamma Controls_{i,t-1} + \lambda Surprise_t \times Controls_{i,t-1} + \varepsilon_{i,t}, \]
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\[ Ret_{i,t} = \beta_0 + \beta_1 Surprise_t + \beta_2 (BankDebt / At)_{i,t-1} + \beta_3 Surprise_t * (BankDebt / At)_{i,t-1} + \gamma Controls_{i,t-1} + \lambda Surprise_t * Controls_{i,t-1} + \epsilon_{i,t}, \]

- Bank debt specialness: \( \beta_3 \neq 0 \)
## Is Bank Debt Special?

Bank debt using firms are more responsive to monetary policy shifts.
<table>
<thead>
<tr>
<th></th>
<th>(1) No Controls</th>
<th>(2) With Controls</th>
<th>(3) Controls and Ind. FE</th>
<th>(4) Event-indust. Clustering</th>
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</thead>
<tbody>
<tr>
<td>Surprise</td>
<td>-4.97***</td>
<td>-8.02***</td>
<td>-7.44***</td>
<td>-7.44</td>
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<tr>
<td></td>
<td>(-13.03)</td>
<td>(-17.72)</td>
<td>(-3.99)</td>
<td>(-0.83)</td>
</tr>
<tr>
<td>Surprise*(BankDebt/At)</td>
<td>-14.10***</td>
<td>-16.34***</td>
<td>-16.77***</td>
<td>-16.77***</td>
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<tr>
<td></td>
<td>(-4.35)</td>
<td>(-4.17)</td>
<td>(-4.10)</td>
<td>(-3.82)</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>(5) Including Credit Lines</th>
<th>(6) Other Controls</th>
<th>(7) Firm Fixed Effects</th>
<th>(8) Instrumental Variable</th>
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</thead>
<tbody>
<tr>
<td>Surprise</td>
<td>-8.07</td>
<td>-9.09</td>
<td>-8.04***</td>
<td>-8.06***</td>
</tr>
<tr>
<td></td>
<td>(-0.90)</td>
<td>(-1.02)</td>
<td>(-3.33)</td>
<td>(-17.12)</td>
</tr>
<tr>
<td></td>
<td>(-3.10)</td>
<td>(-3.02)</td>
<td>(-2.69)</td>
<td>(-0.59)</td>
</tr>
</tbody>
</table>
Are results driven by short-term debt nature of bank debt?

- Results are robust to adding controls and firm/year fixed effects, alternative clustering.
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- Instrumental Variable regression uses measures of visibility (membership of NYSE or SP500), uniqueness (% rated in the same industry), tangibility Faulkender and Petersen (2008, RFS), Santos and Winton (2008, JF).
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- Maybe it is a simple interest channel because bank debt is relatively short term. But higher short-term debt does not imply higher responsiveness.
2. The Interest Rate Pass-Through Channel
Interest Rate Pass-Through Channel

- Floating vs. fixed-rates
  - Widespread use of floating-rates in bank loans
    - floating rates: 72% (our sample), 90% (Faulkender (2005))
  - Prevalence of fixed-rates in nonbank liabilities
    - floating rates: 10% (our sample), 7% (Faulkender (2005))
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  - Monetary policy actions $\Rightarrow$ reference rates $\Rightarrow$ cost of existing bank loans for firms
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- The key word is *"existing loans"* whereas firm/bank balance sheet channel and traditional interest channel works through new loans.
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- Duca & VanHoose (JMCB, 1990) and Woodford (JME, 1996) “Loan Commitments and Optimal Monetary Policy.”
Interest Rate Pass-Through Channel
Test: all else equal, bank debt using firms that engage in interest rate risk hedging should be less responsive to monetary policy.
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Use text-search algorithm to collect floating-to-fixed rate hedging from SEC 10-K filings.
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Use text-search algorithm to collect floating-to-fixed rate hedging from SEC 10-K filings

Example

COMPANY NAME: NETSMART TECHNOLOGIES INC
"The term loan bears interest at LIBOR plus 2.25%. We have entered into an interest rate swap agreement with the Bank for the amount outstanding under the term loan whereby we converted our variable rate on the term loan to a fixed rate of 7.1% in order to reduce the interest rate risk associated with these borrowings."
Interest Rate Pass-Through Channel: Empirical Specification

- Test: all else equal, bank debt using firms that engage in interest rate risk hedging should be less responsive to monetary policy

- Run same regression as before that tested for bank debt specialness, but for subsamples of hedgers and non-hedgers

- Pass-through channel: coefficient \( \beta_3 \) in

\[
Ret_{i,t} = \beta_0 + \beta_1 \text{Surprise}_t + \beta_2 (BankDebt/At)_{i,t-1} + \beta_3 \text{Surprise}_t \ast (BankDebt/At)_{i,t-1} + \gamma \text{Controls}_{i,t-1} + \lambda \text{Surprise}_t \ast \text{Controls}_{i,t-1} + \epsilon_{i,t},
\]

is significantly lower for non-hedgers
## Pass-through Channel - The Role of Hedging

<table>
<thead>
<tr>
<th></th>
<th>(1) Non-Hedgers</th>
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<tbody>
<tr>
<td><strong>Surprise</strong></td>
<td>-5.08*</td>
<td>-6.83**</td>
<td>-5.76**</td>
<td>-6.34**</td>
</tr>
<tr>
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<td>(-1.91)</td>
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<tr>
<td><strong>BankDebt/At</strong></td>
<td>0.13</td>
<td>1.94***</td>
<td></td>
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<td></td>
<td>(-2.36)</td>
<td>(-0.40)</td>
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<td><strong>Difference (Double Interaction Terms)</strong></td>
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<td>15.28</td>
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**Firm Controls**
- YES
**Firm FE**
- YES
**Surprise*Firm Controls**
- YES
**Industry-Date Clustering**
- YES
**Observations**
- 11,788
- 12,335
- 11,788
- 12,335
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Firm Controls: YES, YES, YES, YES
Firm FE: YES, YES, YES, YES
Surprise*Firm Controls: YES, YES, YES, YES
Industry-Date Clustering: YES, YES, YES, YES
Observations: 11,788, 12,335, 11,788, 12,335
Instrument for hedging: tax convexity (Graham and Smith (1999), Campello, Lin, Ma, and Zou (2011))

Relevance condition
- convex corporate income tax schedule $\rightarrow$ incentive to hedge

Exclusion restriction
- tax convexity unlikely to have direct first-order effect on sensitivity of stock prices to monetary policy shocks

Tax convexity a function of volatility of taxable income, serial correlation of taxable income, investment tax credits, net operating losses, and presence of small negative (positive) taxable income
Robustness: Instrumental Variables Analysis

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<th>(2) IV1</th>
<th>(3) IV2</th>
<th>(4) IV3</th>
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<td>(-1.73)</td>
<td>(-1.97)</td>
<td>(-1.67)</td>
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<tr>
<td>Surprise*(BankDebt/At)</td>
<td>-49.30***</td>
<td>-122.79***</td>
<td>-104.77***</td>
<td>-123.59***</td>
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<td>(-3.72)</td>
<td>(-3.82)</td>
<td>(-3.18)</td>
<td>(-3.79)</td>
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<tr>
<td>Surprise*(BankDebt/At)*Hedging</td>
<td>59.25***</td>
<td>175.73***</td>
<td>147.08***</td>
<td>176.92***</td>
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<td></td>
<td>(3.55)</td>
<td>(3.56)</td>
<td>(2.90)</td>
<td>(3.53)</td>
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<td>Hausman test (p-value)</td>
<td>1.000</td>
<td>0.999</td>
<td>0.995</td>
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<tr>
<td>Firm FE</td>
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<td>Firm Controls</td>
<td>YES</td>
<td>YES</td>
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<td>YES</td>
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<tr>
<td>Surprise*Firm Controls</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
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<td>Observations</td>
<td>20,298</td>
<td>20,298</td>
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Hausman test cannot reject hypothesis of exogeneity, suggesting endogeneity of hedging not a big concern. Similar results hold if we use variable rate debt.
Hedging and Financial Constraints

- Hedging possibly related to financing constraints (Froot, Scharfstein, and Stein (1993), Rampini, Sufi, and Viswanathan (2012))

Regression specification:

\[ \text{Ret}_{i,t} = \beta_0 + \beta_1 \text{Surprise}_t + \beta_2 \text{Surprise}_t \left( \frac{\text{BankDebt}_{i,t}}{\text{At}_{i,t}} \right) + \beta_3 \text{Surprise}_t \left( \frac{\text{BankDebt}_{i,t}}{\text{At}_{i,t}} \right) \text{FinConstraint}_{i,t} + \text{second order terms} + \gamma \text{Controls}_{i,t} + \lambda \text{Surprise}_t \text{Controls}_{i,t} + \epsilon_{i,t} \]

Pass-through channel: \[ \beta_2 > 0 \]

Is the effect of hedging greater for financially constrained firms as well? Or is it a simple reallocation between firms and lenders?
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+ \beta_3 \text{Surprise}_t \times (\text{BankDebt} / \text{At})_{i,t-1} \times \text{FinConstraint}_{i,t-1} \\
+ (\text{second order terms}) \\
+ \gamma \text{Controls}_{i,t-1} + \lambda \text{Surprise}_t \times \text{Controls}_{i,t-1} + \epsilon_{i,t}
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The pass-through channel is more than a simple reallocation of cashflows between firms and lenders.
## Hedging and Financing Constraints

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1) ALL</th>
<th>(2) OLD</th>
<th>(3) YOUNG</th>
<th>(4) LOW HP</th>
<th>(5) HIGH HP</th>
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</thead>
<tbody>
<tr>
<td>Surprise</td>
<td>-2.36*</td>
<td>-4.20**</td>
<td>1.24</td>
<td>-2.11</td>
<td>-0.88</td>
</tr>
<tr>
<td></td>
<td>(-1.72)</td>
<td>(-2.38)</td>
<td>(0.53)</td>
<td>(-1.14)</td>
<td>(-0.37)</td>
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<td>-26.18*</td>
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<td>-22.98</td>
<td>-46.71**</td>
</tr>
<tr>
<td></td>
<td>(-2.51)</td>
<td>(-1.91)</td>
<td>(-2.37)</td>
<td>(-1.62)</td>
<td>(-2.41)</td>
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<tr>
<td>Surprise*(BankDebt/At)*Hedging</td>
<td>34.95***</td>
<td>30.34*</td>
<td>48.75**</td>
<td>24.29</td>
<td>59.60***</td>
</tr>
<tr>
<td></td>
<td>(2.77)</td>
<td>(1.86)</td>
<td>(2.37)</td>
<td>(1.52)</td>
<td>(2.63)</td>
</tr>
<tr>
<td>Surprise*(BankDebt/At)*Young</td>
<td>6.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.57)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surprise*(BankDebt/At)*HP</td>
<td>-1.99</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.18)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surprise*(BankDebt/At)*Bank Size</td>
<td>-0.86</td>
<td>-0.29</td>
<td>-2.57</td>
<td>0.89</td>
<td>-5.48</td>
</tr>
<tr>
<td></td>
<td>(-0.34)</td>
<td>(-0.07)</td>
<td>(-0.70)</td>
<td>(0.29)</td>
<td>(-1.09)</td>
</tr>
<tr>
<td>Surprise*(BankDebt/At)*T1 Cap Ratio</td>
<td>5.68</td>
<td>14.59</td>
<td>-3.64</td>
<td>12.64</td>
<td>-2.92</td>
</tr>
<tr>
<td></td>
<td>(0.70)</td>
<td>(1.35)</td>
<td>(-0.28)</td>
<td>(1.15)</td>
<td>(-0.22)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.55***</td>
<td>0.64***</td>
<td>0.50***</td>
<td>1.05***</td>
<td>-0.05</td>
</tr>
<tr>
<td></td>
<td>(4.61)</td>
<td>(3.64)</td>
<td>(2.67)</td>
<td>(4.83)</td>
<td>(-0.17)</td>
</tr>
<tr>
<td>Observations</td>
<td>18,608</td>
<td>11,300</td>
<td>7,308</td>
<td>12,521</td>
<td>6,087</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.01</td>
<td>0.02</td>
<td>0.01</td>
<td>0.02</td>
<td>0.01</td>
</tr>
<tr>
<td>Number of gvkey</td>
<td>970</td>
<td>585</td>
<td>457</td>
<td>619</td>
<td>429</td>
</tr>
</tbody>
</table>

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What’s next?

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ZLB implies that the hedging channel should be dead

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Use a shock measure for the unconventional period (Wright, 2014)
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