“Bond Funds and Credit Risk”
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• Summary

• The Empirics

• The Theory

• Conclusion
Mutual Fund Bond Ownership Affects Pricing of Credit Risk

- One-period theoretical model of a firm who must roll-over debt purchased (in part) by flow-motivated investors

  → Theoretical predictions:
    ▶ **Active mutual fund ownership at time of rollover increases credit risk of low credit quality firms.**
    ▶ Effect stronger for funds with stronger flow concerns and with more concave flow-performance relationship.

- Find **strong empirical support** for their predictions using mutual fund holdings data from Morningstar and CDS data from Markit running **extensive** set of tests:
  1. Several instrumental variable panel regressions of CDS on **fund holding share** with several (credit rating, maturity... ) interaction dummies and on various subsamples.
  2. Two natural experiments representing exogenous shocks to flows:
    ▶ funds around mechanical Morningstar 5-year ratings change,
    ▶ PIMCO funds due to Bill Gross departure.
The IV baseline approach

- Use Morningstar monthly fund holdings data from 2001 to 2015, for 1,128 funds classified as corporate or general by CRSP.
- Use 5-year monthly MARKIT CDS spreads for senior unsecured debt.
- Construct monthly **Fund Holding Share**: fraction of an issuer's total amount of bond outstanding held by active bond funds.
- Instrument with **Counterfactual FHS**: for each active fund use equally weighted portfolio based on set of issuers held within last three-years.
- Run following instrumental variable regression:

\[
FHS_{i,t} = \beta_0 + \beta_1 \cdot \text{Counterfactual FHS}_{i,t} + \beta \cdot \text{Controls}_{i,t} + \epsilon_{i,t}, \quad \text{(first stage)}
\]

\[
CDS\ Premiun_{i,t+1} = \gamma_0 + \gamma_1 \cdot FHS_{i,t} + \gamma \cdot \text{Controls}_{i,t} + \eta_{i,t+1}, \quad \text{(second stage)}
\]

- Baseline results (column (2) is with time fixed effects)

<table>
<thead>
<tr>
<th></th>
<th>Dependent variable: 5-year CDS spread (bps)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>FHS (%)</td>
<td>1.310*** (3.51)</td>
</tr>
<tr>
<td>1-year stock return (%)</td>
<td>-0.904*** (-7.45)</td>
</tr>
<tr>
<td>Historical volatility (%)</td>
<td>5.112*** (9.51)</td>
</tr>
</tbody>
</table>

→ A 1-std dev increase in FHS of 21% increases CDS on average ~ 25bps (i.e., 18%).
Questions on IV approach

▶ Role of the controls in the first vs. second stage regression?

\[
FHS_{i,t} = \beta_0 + \beta_1 \cdot \text{Counterfactual } FHS_{i,t} + \beta \cdot \text{Controls}_{i,t} + \epsilon_{i,t}, \quad (\text{first stage})
\]

\[
CDS \text{ Premium}_{i,t+1} = \gamma_0 + \gamma_1 \cdot FHS_{i,t} + \gamma \cdot \text{Controls}_{i,t} + \eta_{i,t+1}, \quad (\text{second stage})
\]

→ Would be interesting to see first stage regression results and possibly drop controls from the first stage?

▶ How are Active funds defined?

→ Refine classification based on fund turnover (≃ Chen, Huang, Sun, Yao and Yu (2022))

▶ FHS instrument is based on idea that funds hold a relatively limited and stable set of names (≃ Kojien-Yogo (2019) instrument).

→ Identification from the cross-section in the Panel.

→ Run regression (5) in changes to test whether time-series change in FHS increases CDS?
Many additional tests

▶ Dummies and subsample analysis of the IV approach, and
   1. a credit rating or 1-year stock return dummies,
   2. an imminent bond maturity dummies,
   3. general market conditions dummies,
   4. differential effects in subsamples based on funds with above or below median (i) 12-month fund return, (ii) 12-month fund flow volatility, (iii) management size, (iv) asset share of load fee classes.

▶ Natural quasi-experiment approach:
   1. Exogenous shock to flows due to mechanical Morningstar 5-year ratings change
   2. Exogenous *(was it really?)* shock to PIMCO fund flows due to Bill Gross departure.

⇒ All support their tested hypothesis that
   ▶ Active mutual fund ownership at time of rollover increases credit risk of low credit quality firms, and that
   ▶ The effect if stronger for funds with stronger flow concerns and with more concave flow-performance relationship.
Comment on impact around Bond maturities

Table 5. Fund Holdings and Credit Risk around Bond Maturities
In this table we present the estimation results of the two-stage-least-square regressions of CDS spreads. In the regressions, we include an interaction variable between fund holding share (FHS) and the maturity indicator variable, Maturity indicator. The maturity indicator variable takes the value of one if the firm has a maturing bond within the next month and zero otherwise. Control variables are identical to those in Table 2, whose coefficient estimates we do not report. t-statistics based on standard errors that are robust to heteroskedasticity and two-way clustered by firm and time are reported in parentheses below the coefficient estimates. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

<table>
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<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>FHS (%)</td>
<td>1.578***</td>
</tr>
<tr>
<td></td>
<td>(4.24)</td>
</tr>
<tr>
<td>FHS (%) ×</td>
<td></td>
</tr>
<tr>
<td>Maturity indicator</td>
<td>1.641**</td>
</tr>
<tr>
<td></td>
<td>(2.34)</td>
</tr>
<tr>
<td>Maturity indicator</td>
<td>-56.780**</td>
</tr>
<tr>
<td></td>
<td>(-2.42)</td>
</tr>
<tr>
<td>Controls</td>
<td>YES</td>
</tr>
<tr>
<td>Time FE</td>
<td>NO</td>
</tr>
<tr>
<td>No. of obs.</td>
<td>45,462</td>
</tr>
</tbody>
</table>

► CDS is much lower if a firm has a bond maturing in subsequent month!

→ ≠ liquidity concerns due to roll-over?

► Impact of stand-alone maturity indicator >> impact of FHS

→ might be useful to run estimates on sub-sample controlling for size, rating, liquidity...
The model setup

- Firm owned by equity holders with **deep-pockets** who *set prices of bond at roll-over to full willingness to pay of bond-holders*

- Value to equity holder at roll-over of (i) paying off $1 principal to old debt-holders, (ii) owning assets that pay $\bar{V} > 1$ with *prior prob* $\gamma_v$, and (iii) issuing new bonds:
  $$-1 + e^{-R_f \gamma_v} \bar{V} + \left[ p - e^{-R_f \gamma_v} \right]$$
  - full-equity cont value
  - profits from new bond issuance

- Funds get a signal $s = \{0, \bar{V}\}$ that is informative if they are good.

- They don’t know their type. In equilibrium, invest only if $s = \bar{V}$ given *posterior* $\gamma_v^{post}$.

- Because flow-motivated investors have non-pecuniary (i.e., private value) motives to buy bonds at roll-over, willing to pay:
  $$p_f = e^{-R_f \gamma_v^{post}} + \kappa(\text{flow-premium or discount})$$
  - risk-neutral value
  - $>0$ if prob(good type) ↑ else $<0$

- Prop 3: flow-motivated investors pay less (more) for low (high) credit quality bonds than risk-neutral profit maximizing investor *with same signal.*
Questions on the model

Q1? Why does the deep-pocketed equity-owner accept to sell bonds at a price lower than the fair-price paid by a standard risk-neutral profit maximizing investor?
   ▶ Is she constrained to roll-over the short-term debt?
   ▶ If not, should there be a participation constraint?

Q2? What information is available to the equity-owner?
   ▶ Does she observe/infer the same signal as the fund investors?
   ▶ Does she know more than fund investors?
   ▶ Would there be signalling information conveyed to the market by the decision to roll-over at ‘bad’ prices?
Comments

- Dynamics?
  - Good and bad type investors are ex-ante identical and make identical decisions in the one-period model.
  - In a dynamic repeated game, would learning separate good and bad type funds and lead to vanishing discount/premia?

- Co-existence of flow-sensitive and normal investors implies clientele and differential pricing (section 2.6):
  - Low credit quality firm receives less than fair price from flow-sensitive investors will seek most funding from normal investors.

⇒ Clientele equilibrium with both cross-section of firms and investors in the spirit of Amihud and Mendelson (1986) (~ Chen, Huang, Sun, Yao and Yu (2022))?
  - Expect flow-sensitive investors will hold mostly high-credit quality firms
  - Stronger when funding conditions are tighter (TED spreads, volatility...)

- Link to liquidity and liquidity risk
  (e.g., Mahanti, Nashikkar, Marti Subrahmanyam, Chacko, and Mallik (2018))

- Link to the Credit-Risk premium puzzle?
Conclusion

- Interesting theoretical model

- Many tests of specific predictions of their theory that support the idea that supply of capital affects the pricing of credit risk.

- Many implications for future research:
  - What does clientele equilibrium look like?
  - Dynamics?
  - Link to bond liquidity?
  - Link to credit risk-premium?