The Dissipating Credit Channel: Monetary Policy and Corporate Bond Yields in China

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Abstract

This paper examines the changing transmission of monetary policy to corporate bond yields across credit ratings in China, amidst China's rapid financial development and monetary policy modernization. We integrate heterogeneous monetary policy tools into a unified shock measure, based on a modified heteroscedasticity approach within a structural vector autoregressive framework. Using this monetary policy shock, together with rating-segmented bond data and a local projection analysis, we reveal a significant shift in monetary policy transmission patterns. The pre-2014 results align with credit channel mechanisms, but since that time, lower-rated bonds exhibit significantly weaker responsiveness, especially to monetary easing. A mechanism analysis further shows that changes in the transmission mechanism for the monetary policy appear linked to China's ongoing monetary policy reform process.

Introduction

- **Motivation:**
  - Credit channels are vital to the transmission of monetary policy.
  - Policy adjustments can influence firms' borrowing costs through risk-free interest rates and external finance premiums, as reflected in credit spreads.
  - We aim to clarify the importance of the credit channel in China by investigating the monetary policy transmission, focusing on its impact on corporate bond yields.
- **Research methods:**
  - Identify the existence of China's monetary policy shocks in daily frequency.
  - Use the shock to shed light on its overall transmission patterns to the corporate bond market, and heterogeneous transmission patterns to different corporate bonds with various credit ratings.
- **Main findings, following a monetary policy loosening:**
  - Before 2014, bond yield dispersion tended to decrease or remain unchanged.
  - After 2014, the significant increase in bond yield dispersion suggests that certain bonds, with low credit ratings, may exhibit a distinct lack of responsiveness to the expansionary monetary policy.
  - Bonds with credit ratings below AA exhibit significantly weaker responses to China's monetary policy shocks after 2014.

Empirical Strategy

Identifying China's monetary policy shock

- We estimate the following SVAR model:

$$\Delta Y_t = c + \sum_{\ell=1}^{p} B_\ell \Delta Y_{t-\ell} + D_z Z_t + \varepsilon_t,\ E[\varepsilon_t \varepsilon_t'] = \Sigma,\ \varepsilon_t = \sum_{j=1}^{n} a_j u_{j,t} \quad (1)$$

  - Y_t includes the one-week, one-month, and six-month SHIBOR and the one-year, five-year, and ten-year Treasury yields.
  - We order the monetary policy shock u_t^m the first in u_t, and identifying u_t^m amounts to finding a_1.
  - We implement the heteroscedasticity method and sign restrictions to estimate a_1.
- Event day heteroscedasticity assumptions:
  - Dividing the full sample into two subsamples: the monetary policy days (T_0) when the PBoC's monetary policy announcements are released, and the other days (T_1).
  - We assume the monetary policy shock series is heteroscedastic across T_0 and T_1, whereas all the other $n-1$structural shocks are identically distributed.
  - Define $\Sigma_s = E[\varepsilon_t \varepsilon_t'], t \in T_s, s \in \{0,1\}$, the heteroscedasticity assumption implies
    - $\Sigma_0 - \Sigma_1 = a_1 a_1'$ (2)
- Sign restrictions: the contemporaneous effects of u_t^m on short-term Treasury yields are greater than the effects on long-term yields, in absolute values.
- We adopt the following generalized method of moments to find a_1:

$$min_{a_1}\ [vech(\Sigma_0 - \Sigma_1 - a_1 a_1')]'[V_0 + V_1]^{-1}[vech(\Sigma_0 - \Sigma_1 - a_1 a_1')] \quad (3)$$

$$s.t. \quad \text{sign restrictions}$$

The overall credit channel

- We use the local projection (LP) method to estimate IRFs.
- Use the ``bond yield dispersion" $y_t^{(m)}$ as the dependent variable to explore the overall transmission patterns of u_t^m in the corporate bond market:

$$y_t^{(m)} = |\sum_{i \in S} y_{i,t}^{(m)} - \frac{1}{\#S}\sum_{i \in S} y_{i,t}^{(m)}| \quad (4)$$

  where $y_{i,t}^{(m)}$ is the corporate bond yield with maturity m and credit rating $i \in S$.
- The LP equation:

$$y_{t+h}^{(m)} = \alpha_h + \beta_h^{(m)} u_t^m + \psi_h z_t + \epsilon_{t+h}, 0 \le h \le H \quad (5)$$

- Following a negative monetary policy shock, the decrease (increase) in bond yield dispersion suggests that the loosened monetary policy can reduce (enlarge) credit spreads between high- versus low-rated corporate bonds.

The heterogeneous responses of corporate bond yields with different credit ratings

- Use the ``pass-through measure" $P_{i,h}^{(m)}$ to quantify the transmission efficiency of u_t^m to corporate bonds with different credit ratings:

$$P_{i,h}^{(m)} = \sum_{j=1}^{h} \beta_{i,j}^{(m)} / \sum_{j=1}^{h} \beta_{TB,j}^{(m)},\ i \in S, 0 \le h \le H \ (6)$$

- We estimate $P_{i,h}^{(m)}$ in one step as an instrumental variable estimation, from which we can estimate the standard error of the pass-through measure directly and thereby implement statistical tests of the validity of our results:

$$\sum_{j=0}^{h} y_{i,t+j}^{(m)} = \alpha_{i,h} + P_{i,h}^{(m)} \sum_{j=1}^{h} y_{TB,t+j}^{(m)} + \phi_h z_{i,t} + \omega_{i,t+h}, i \in S, 0 \le h \le H \quad (7)$$

  using u_t^m as instrument for $\sum_{j=1}^{h} y_{TB,t+j}^{(m)}$, where $y_{TB,t}^{(m)}$ is the Treasury yield.
- Both the sign and the magnitude of $P_{i,h}^{(m)}$ are meaningful.
  - $P_{i,h}^{(m)} > (<) 0$ indicates that the direction of the (cumulative) effect of u_t^m on corporate bond yield with credit rating i is the same (opposite) as that on the Treasury yield.
  - $P_{i,h}^{(m)} > 1$ indicates that the (cumulative) effect of u_t^m on corporate bond yield with credit rating i surpasses that on the Treasury yield, suggesting a tendency toward decreasing spreads between corporate bonds and Treasury yields.
  - $P_{i,h}^{(m)} = 1$ provides a threshold for assessing the transmission efficiency of the monetary policy in terms of corporate bond yields, and we formally test it (which represents H_0) in the empirical exercise.

The data

The VAR data

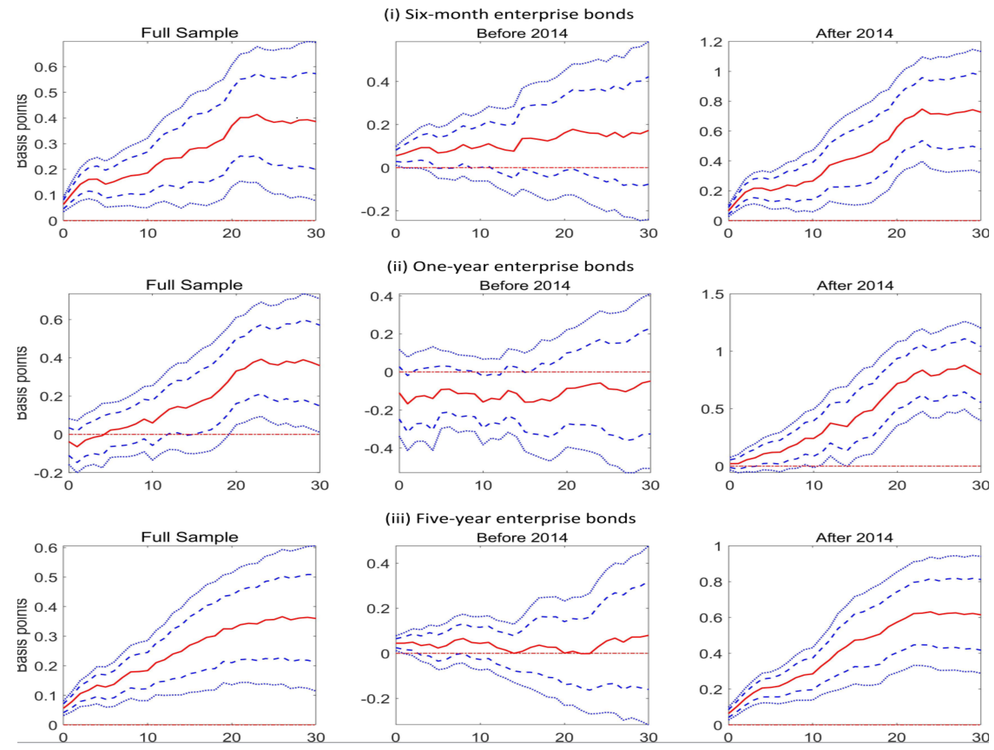
- The VAR data spans from January 4, 2009, when SHIBOR was developed as a pricing benchmark and a reference for pricing financial products by the PBoC, to December 31, 2021.
- $T_0 = 47$, including all the overall adjustments of the required reserve ratio, the benchmark deposit/lending rates, and the rate on the PBoC's medium-term lending facility.

The corporate bond yields data

- The main instruments in the corporate bond market are enterprise bonds (EB), exchange-traded corporate bonds (ECB), and medium-term notes (MTN), which account for more than four-fifths of all outstanding corporate bonds.
- Among all corporate bonds, those rated below AA account for an average share of around 10%, on par with the share of B-rated bonds in the U.S. corporate bond market.

The Results

The dissipating credit channel, I



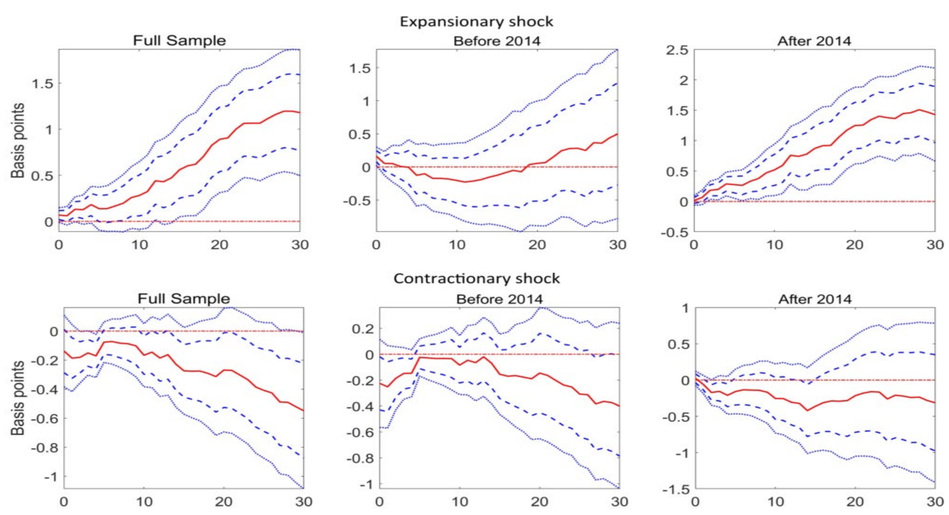
The dissipating credit channel, II

		Before 2014								After 2014							
Maturities	h	AAA	AAA-	AA+	AA	AA-	A+	A	BBB+	AAA	AAA-	AA+	AA	AA-	A+	A	BBB+
Six month	1	0.96	0.92	0.98	0.97	0.96	0.90	0.89	0.89	1.02	1.00	1.04	0.99	0.89	0.89[c]	0.89	0.90
		(0.09)	(0.10)	(0.08)	(0.09)	(0.09)	(0.11)	(0.11)	(0.12)	(0.10)	(0.12)	(0.13)	(0.13)	(0.11)	(0.11)	(0.11)	(0.12)
	10	1.01	0.99	1.03	1.05	1.08	1.01	0.96	0.97	1.17[c]	1.19[c]	1.26[s]	1.23[s]	1.04	1.05	1.03	1.04
		(0.10)	(0.10)	(0.10)	(0.09)	(0.10)	(0.10)	(0.11)	(0.12)	(0.14)	(0.14)	(0.13)	(0.13)	(0.11)	(0.14)	(0.14)	(0.13)
	20	1.07	1.04	1.11	1.18[c]	1.27[c]	1.21[c]	1.10	1.10	1.07	1.07	1.14	1.11	0.90	0.91	0.89	0.88
		(0.11)	(0.13)	(0.13)	(0.14)	(0.19)	(0.17)	(0.15)	(0.17)	(0.14)	(0.15)	(0.16)	(0.15)	(0.14)	(0.16)	(0.16)	(0.15)
	30	1.12	1.10	1.17[c]	1.26[c]	1.44[c]	1.40[c]	1.22[c]	1.18	0.96	0.95	1.00	0.95	0.72[s]	0.74[s]	0.73[s]	0.71[s]
One year	1	1.00	0.96	1.01	1.01	1.02	0.92	0.91	0.92	0.77[s]	0.75[s]	0.76[s]	0.74[s]	0.64[s]	0.63[s]	0.63[s]	0.63[s]
		(0.12)	(0.13)	(0.13)	(0.13)	(0.13)	(0.14)	(0.15)	(0.14)	(0.09)	(0.10)	(0.10)	(0.10)	(0.08)	(0.08)	(0.08)	(0.08)
	10	1.04	1.02	1.05	1.10	1.17[c]	1.04	1.01	1.02	1.02	1.03	1.07	1.01	0.81[c]	0.83[c]	0.83[c]	0.83[c]
		(0.14)	(0.15)	(0.14)	(0.13)	(0.14)	(0.16)	(0.16)	(0.15)	(0.11)	(0.12)	(0.12)	(0.14)	(0.12)	(0.11)	(0.12)	(0.12)
	20	1.05	1.05	1.08	1.19[c]	1.33[s]	1.25[s]	1.16[c]	1.17[c]	0.99	1.00	1.03	0.96	0.72[s]	0.76[s]	0.75[s]	0.73[s]
		(0.10)	(0.10)	(0.12)	(0.11)	(0.14)	(0.14)	(0.14)	(0.16)	(0.15)	(0.16)	(0.16)	(0.17)	(0.15)	(0.14)	(0.14)	(0.16)
	30	1.11	1.13[c]	1.16[c]	1.27[s]	1.49[s]	1.41[s]	1.26[c]	1.26[c]	0.94	0.94	0.95	0.87	0.59[s]	0.64[s]	0.64[s]	0.61[s]
		(0.11)	(0.11)	(0.14)	(0.16)	(0.21)	(0.20)	(0.19)	(0.20)	(0.17)	(0.15)	(0.18)	(0.15)	(0.17)	(0.16)	(0.16)	(0.17)
Five year	1	0.67[s]	0.62[s]	0.64[s]	0.63[s]	0.62[s]	0.55[s]	0.56[s]	0.59[s]	0.82[s]	0.80[s]	0.78[s]	0.72[s]	0.65[s]	0.64[s]	0.65[s]	0.66[s]
		(0.09)	(0.09)	(0.09)	(0.09)	(0.07)	(0.07)	(0.07)	(0.09)	(0.10)	(0.10)	(0.11)	(0.12)	(0.11)	(0.11)	(0.10)	(0.10)
	10	0.84[s]	0.79[s]	0.87[c]	0.88[s]	0.87[s]	0.77[s]	0.80[s]	0.78[s]	1.45[s]	1.40[s]	1.43[s]	1.26[c]	1.05	1.08	1.06	1.06
		(0.09)	(0.08)	(0.08)	(0.07)	(0.07)	(0.07)	(0.06)	(0.06)	(0.20)	(0.20)	(0.23)	(0.24)	(0.22)	(0.23)	(0.24)	(0.24)
	20	0.92	0.88[c]	0.97	1.02	1.00	0.90	0.92	0.94	1.45[s]	1.37[s]	1.41[s]	1.21	0.94	0.95	0.93	0.88
		(0.12)	(0.11)	(0.15)	(0.11)	(0.13)	(0.11)	(0.10)	(0.10)	(0.24)	(0.22)	(0.25)	(0.25)	(0.22)	(0.23)	(0.25)	(0.27)
	30	0.97	0.94	1.03	1.11	1.13	0.97	0.98	1.03	1.36[c]	1.26	1.31[c]	1.09	0.78[c]	0.78	0.75[c]	0.68[c]

Further analysis

- We use the flowing nonlinear LP model to capture the asymmetric effects of monetary policy:

$$y_{t+h}^{(m)} = \alpha_h + \beta_{h,+}^{(m)} \max(u_t^m, 0) + \beta_{h,-}^{(m)} \min(u_t^m, 0) + \psi_h z_t + \epsilon_{t+h}, 0 \le h \le H \quad (8)$$



- It is the loosening policy that leads to the dissipating credit channel.
- Before 2014, China's money supply was fueled primarily by foreign exchange inflows.
  - The PBoC regulated the money supply using quantitative tools such as required reserve ratios and the issuance of central bank bills.
- Its approach began to shift when the influx of foreign exchange slowed down after 2014.
  - The PBoC ensures the supply of the monetary base by open market operations and new liquidity facilities, such as the standing lending facility, pledged supplementary lending, and medium-term lending facility (MLF).
  - These new policy instruments, act like refinancing mechanisms, from the PBoC to commercial banks, and they necessitate eligible collateral.
  - We infer that corporate bonds with ratings below AA generally are not acceptable as collateral.
- The transformation of China's monetary policy therefore might have led to a divergence in the bond market.
- The PBoC's preference for high-quality collateral indirectly increased the attractiveness of higher-rated bonds; lower-rated bonds, ineligible as collateral, instead faced a relative decline in demand.