The Great Wall of Debt: Real Estate, Political Risk, and Chinese Local Government Credit Spreads

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MIT Gourd Conference
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Infrastructure Development in China

High-speed railway in Hainan

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Infrastructure Development in China

Shanghai Tower ($2.4 billion)
the world’s second-tallest building.

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Most Infrastructure are Financed by Chengtou Bonds

- construction
- high-speed train
- bridges and roads
- public transportation
- water supply and environment services
- ...
- real estate such as land development, low-income housing projects.

• China does not have *bona fide* municipal bonds
• Instead, China’s tremendous growth in infrastructure development is financed to a large extent through **Chengtou bonds (CTB)**, also known as *urban construction and investment bonds*. 
Chengtou Bond Issuance

- 1992: first CTB, Pudong development bond, RMB 500 million
- By 12/31/2016: total outstanding of RMB 7.28 trillion
- The annual growth rate is 85% during 2008 - 2014
## China CTB vs USA Muni

<table>
<thead>
<tr>
<th>USA: Muni</th>
<th>China: CTB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Municipal Bond</strong></td>
<td><strong>Corporate Bond</strong></td>
</tr>
<tr>
<td>Federation: central govt bears no responsibility</td>
<td>Central govt implicit guarantee</td>
</tr>
<tr>
<td>Investor: individuals (50%)</td>
<td>China’s shadow banking (80%)</td>
</tr>
<tr>
<td>Have little systemic risk</td>
<td>Affects financial stability</td>
</tr>
<tr>
<td>More transparent</td>
<td>More opaque</td>
</tr>
<tr>
<td>Debt does not have to be backed by physical collateral</td>
<td>Collateral is often required: the use-right of land, bridges, etc.</td>
</tr>
<tr>
<td>Tax-exempt</td>
<td>Non tax-exempt</td>
</tr>
</tbody>
</table>

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Research Question

While its large size, fast growth, and the central role in China’s development make the Chengtou bond market interesting to study in and of itself, there are distinctive features that makes it uniquely suited to investigating the effect of government guarantees, political risk, and distortions in market pricing induced by such effects.

- What market distortion does the implicit government guarantee exert on Chengtou bond pricing?
  - provincial risk exposure to the central government
  - local government solvency, in particular, the real estate market
  - local government political risk
Related Literature

- Market distortion under government guarantee
  - Targeted limited number of securities (Husain, Mody, and Rogoff, 2005)
  - Guarantee is suddenly imposed on selective securities (Levy and Schich, 2010)
- Municipal bond and corporate bond pricing
- Real estate
- Political risk
Example 1: ‘09 Hu Chengtou 0982024.IB

Shanghai Tower ($2.4 billion)
Example 1: ‘09 Hu Chengtou 0982024.IB

- Issue: 2/27/2009
- Size: RMB 5 BIL (USD 0.77 BIL)
- Tenor: 8-year
- Yield: 4.3%
- Rating: AAA
- Issuer: Shanghai Chengtou Corporation.
  - founded in 1992 by Shanghai Municipal Government
  - owned 100% by Shanghai State-owned Assets Supervision and Administration Commission (SASAC) since 2003
  - business: 27 subsidiaries covering roads and bridges, water supply, environment, and real estate
  - performance in 2013: total asset, 363bil RMB, net income 1.05bil RMB (0.33bil RMB returns to SASAC)
Example 2: 1180075.IB

- Issue: 4/11/2011
- Size: RMB 1 BIL (USD 0.15 BIL)
- Tenor: 7-year
- Yield: 6.99%
- Rating: AA
- Issuer: Ordors City Construction Investment Group
  - founded and owned by Ordos Municipal Government
  - business: **land sales and land development** in Kangbashi District
“Ordos, China: A Modern Ghost Town”

Source: *Time Magazine*
Other Media: *BBC, Time, CNN, WSJ, Forbes, HuffPost, The Atlantic*, etc

- Eerie Quiet: streets remain empty even during the morning commute
Local Government Finances

1 Proliferation of local government debt was triggered by the 2008-2009 global financial crisis and China’s QE.
   - 2.8 tril RMB in the QE is shouldered by local governments.

2 However, local governments
   - Can NOT levy additional sales, property, or income tax.
   - Can NOT borrow directly from banks or issue bonds.

3 Local officials promotion crucially depends on performance
   - The fiscal pressure elevates beyond normal balance.
   ⇒ To answer the challenge, LGFV!
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   ⇒ To answer the challenge, LGFV!

- What role does LG play in the CTB pricing? Does LG play any role?
One Pseudo Default

In April 2011, Yunnan Highway Development and Investment Co. Ltd. made one-sided announcement that they will only pay interest but not principal of its debt.

- **Reason**: cash-flow pressure
- **Solution**: Yunnan Provincial Government immediately asked the firm to withdraw the claim, then coordinated the payment
- **Impact**: panic in the debt market, more attention to local government implicit guarantee

Other signals of government intervention:

- **National Development and Reform Commission (NDRC)** subsequently relaxed the approval process for bond issuance ⇒ **CTB issuance doubled in 2012 compared to 2011**
- **The Ministry of Finance and the NDRC** encourage SWAP from riskier LGFV debt to safer low-yield long-term municipal bonds.
Hypotheses and Main Findings

1. Given the central government implicit guarantee, there still exists a large heterogeneity in chengtou bond yields

2. Conventional risk factors:
   - Credit risk matters, but in a less degree compared to similar corporate bonds
   - Illiquidity matters in an opposite way, most liquid CTB are those with higher yield, indicating investors’ intention to reach-for-yield while taking advantage of gov’t guarantee
   - Issuer (LGFV) solvency does not matter much after including issuer dummies
3. Implicit government guarantee

- Provincial-level real estate performance is the most important driving factor – One standard deviation increase in local RE GDP, contributes to 8.6% decrease in CTB yields, supporting the “growth engine” story

- Provincial-level political risk, a novel measure based on anti-corruption campaign in China, significantly elevate CTB yields

- Conditional on high political risk, RE GDP actually elevate CTB yields; only low corruption provinces enjoy low financing costs with high real estate GDP
Data

- Chengtou bonds
- Corporate bonds issued by SOEs as control group
- Firm-level financial conditions (leverage, profitability, ROA, etc.)
- Province-level economic conditions
  - Various components of local GDP, RE, service, retail, etc
  - Local real GDP growth, fiscal surplus ratio, leverage, volatility
- Country-level economic barometers
  - CDS, FDI, FX, RF, CA, RET

- Source: WIND, Ministry of Finance, Provincial Finance Bureaus
CTB Excess Yield

\[ Y_{ijt} = y_{ijt}^{CTB} - y_{it}^{CGB} \]

- \( y_{ijt}^{CTB} \), chengtou bond yield which is calculated from bond features and transaction prices

- \( y_{it}^{CGB} \), matching central government bond yield which is calculated from (i) CTB cash flows, and (ii) zero-coupon curve of Chinese central government bonds (Svensson, 1994)
H1: Central Government Guarantee

- The implicit central government guarantee suggests that all CTBs have similar yields, regardless of issue province
Heterogeneity of CTB Excess Yields

- Dispersion varies over time, even wider when the median level is high

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Given the central government guarantee, CTB yields still exist significant economic heterogeneity across provinces!
### H2: Conventional Risk Factors

<table>
<thead>
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<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
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</thead>
<tbody>
<tr>
<td><strong>RATING</strong></td>
<td>-0.33***</td>
<td>-0.35***</td>
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<tr>
<td></td>
<td>(-15.17)</td>
<td>(-14.32)</td>
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<tr>
<td><strong>TURNOVER</strong></td>
<td></td>
<td>0.07***</td>
<td></td>
<td>0.04**</td>
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<td></td>
<td></td>
<td>(4.10)</td>
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<td>(2.59)</td>
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<tr>
<td><strong>SIZE</strong></td>
<td></td>
<td></td>
<td>-0.13***</td>
<td></td>
<td>0.03</td>
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<td></td>
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<td></td>
<td>(-5.58)</td>
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<td>(0.90)</td>
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<td><strong>TTM</strong></td>
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<td></td>
<td>0.06</td>
<td>0.08***</td>
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<td></td>
<td>(1.56)</td>
<td>(2.96)</td>
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<td>Month Dummy</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>Cluster (Province)</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>Obs</td>
<td>20357</td>
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<tr>
<td>Adj $R^2$</td>
<td>0.348</td>
<td>0.192</td>
<td>0.211</td>
<td>0.188</td>
<td>0.362</td>
</tr>
</tbody>
</table>

- Credit risk matters
- Illiquidity matters in an opposite way, most liquid CTB are those with higher yield, indicating investors try to take advantage of gov’t guarantee
H3: Proxy of Implicit Government Guarantee

A. Provincial risk exposure to the central government

B. Local government solvency and performance

C. Local government political risk
Fact 1: Land Sales are a Key Revenue Source for LG

Source: Ministry of Finance, 2014
Fact 2: RE Tax accounted for 40% of LG’s Total Tax

Source: Ministry of Finance, 2014
Fact 3: LG’s Reliance on RE Leads to Revenue Instability

LG own-source revenue are highly volatile.

Land Sales are the most volatile component of LG revenues.
H3B: Real Estate and Other Measures of LG Solvency

• Hypothesis: growth engine
  – high real estate GDP ratio helps boost local governments revenue, generate better cash flow to support CTB, hence decrease CTB yields

• Hypothesis: ghost town
  – high real estate GDP ratio may create an oversupply problem, thus negative shock in RE market will dampen local economies hence increase CTB yields
Overall, Real Estate is the Growth Engine

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<th>(6)</th>
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<tbody>
<tr>
<td><strong>REAL ESTATE GDP</strong></td>
<td>-0.17***</td>
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<td></td>
<td>-0.21***</td>
<td>-0.18***</td>
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<td></td>
<td>[-5.48]</td>
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<td>[-5.13]</td>
<td>[-3.76]</td>
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<tr>
<td><strong>SERVICE GDP</strong></td>
<td>-0.01</td>
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<td>-0.04</td>
<td>-0.04</td>
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<td>[-0.41]</td>
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<td>[-1.15]</td>
<td>[-1.25]</td>
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<tr>
<td><strong>RETAIL GDP</strong></td>
<td>-0.11***</td>
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<td>0.04</td>
<td>0.06</td>
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<td>[-3.30]</td>
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<td>[0.87]</td>
<td>[1.36]</td>
<td></td>
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<tr>
<td><strong>HOTEL GDP</strong></td>
<td></td>
<td>0.08**</td>
<td>-0.03</td>
<td>-0.04</td>
<td></td>
<td></td>
<td></td>
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<td>[1.98]</td>
<td>[-0.48]</td>
<td>[-0.66]</td>
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<tr>
<td><strong>GDP GROWTH</strong></td>
<td></td>
<td>0.04</td>
<td>0.03</td>
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<td>[1.09]</td>
<td>[0.50]</td>
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<tr>
<td><strong>FISCAL DEFICIT</strong></td>
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<td>0.11**</td>
<td>0.05</td>
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<td>[2.62]</td>
<td>[1.41]</td>
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</tbody>
</table>

- Control for bond characteristics, size, ttm, liquidity
- Control for province risk exposure $\beta$s
- Control for time dummies and cluster at province level
Alternative Real Estate Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Coefficient</th>
<th>T-Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAND COST</td>
<td>-0.09*</td>
<td>-1.74</td>
</tr>
<tr>
<td>RE TAX</td>
<td>-0.11**</td>
<td>-2.78</td>
</tr>
<tr>
<td>RE PRICE</td>
<td>-0.16***</td>
<td>-6.01</td>
</tr>
<tr>
<td>RE LOAN</td>
<td>-0.16***</td>
<td>-4.62</td>
</tr>
<tr>
<td>RE INVEST</td>
<td>-0.01</td>
<td>-0.16</td>
</tr>
</tbody>
</table>

- Control for bond characteristics, size, ttm, liquidity
- Control for province risk exposure
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H3C: Political Risk

- CTB yields reflect the local governments backing income stream and their willingness to bail-out, which is affected by local political risk.
- Plus, real estate market is the hotbed of corruption.

- Political risk increases the CTB excess yields — value destruction
  - provinces with higher political risk is unlikely to have stable future revenue income and hence should have higher cost of financing
  - Butler, Fauver, and Mortal (2009), Mauro (1995)

- Political risk decreases the CTB excess yields — greasing the wheels
  - provinces with more officials involved in graft probes, especially high-ranking ones, are typically the provinces with good economic development and aggressive political leaders.
  - Amore and Bennedson (2013), Dreher and Gassebner (2013)
Political Risk Measures

- Compile a list of individual officials in graft investigations published on the CCDIs website during 2012 to 2014, the anti-corruption campaign period.

- Collect information on corrupt officials titles and rankings, and categorize individuals into five rankings

  - **GRAFT–TIGERS**, the rank-weighted index;

  - **GRAFT–FLIES**, the number of graft cases.
Corruption: Officials named in CCDI Graft Reports

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H3C: Provincial Political Risk

<table>
<thead>
<tr>
<th></th>
<th>GRAFT–TIGERS</th>
<th>GRAFT–FLIES</th>
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<tbody>
<tr>
<td></td>
<td>0.15***</td>
<td>0.14***</td>
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<tr>
<td></td>
<td>[3.74]</td>
<td>[3.99]</td>
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<td></td>
<td>0.05</td>
<td>0.03</td>
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<tr>
<td></td>
<td>[0.94]</td>
<td>[0.67]</td>
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</tbody>
</table>

- Control for bond characteristics, size, ttm, liquidity
- Control for province risk exposure
- Control for time dummies and cluster at province level
- We confirm the value destruction hypothesis.
- There is a significant and economically meaningful positive relationship b/w risk-adjusted CTB yields and political risk proxies.
## Event Study on Corruption Announcement

<table>
<thead>
<tr>
<th>Event</th>
<th>AR(-1)</th>
<th>AR(0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: First corruption in each province</td>
<td>0.168</td>
<td>-0.204</td>
</tr>
<tr>
<td>B: Tiger graft in each province</td>
<td>-0.187</td>
<td>0.027</td>
</tr>
<tr>
<td>in Top 5 provinces with highest corruption index</td>
<td>-0.392***</td>
<td>-0.265***</td>
</tr>
<tr>
<td>in Bottom 5 provinces with lowest corruption index</td>
<td>-0.230</td>
<td>0.09</td>
</tr>
<tr>
<td>in Top 5 provinces with largest corruption cases</td>
<td>0.143</td>
<td>-0.139</td>
</tr>
<tr>
<td>in Bottom 5 provinces with smallest corruption cases</td>
<td>-0.241</td>
<td>-0.206</td>
</tr>
</tbody>
</table>

- Announcement of TIGER events have significant impact for provinces with highest corruption index
- Provinces with more severe corruption have lower CTB yields
## Real Estate, Political Risk, and their Interaction

<table>
<thead>
<tr>
<th></th>
<th>REAL ESTATE GDP</th>
<th>GRAFT–TIGERS</th>
<th>GRAFT–FLIES</th>
<th>RE GDP * TIGERS</th>
<th>RE GDP * FLIES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-0.16***</td>
<td>0.14***</td>
<td>0.03</td>
<td>-0.02</td>
<td>0.07***</td>
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<td>[-5.15]</td>
<td>[3.99]</td>
<td>[0.67]</td>
<td>[-0.49]</td>
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<td>-0.14***</td>
<td>0.08***</td>
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<td>0.07***</td>
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<td></td>
<td>[-5.10]</td>
<td>[2.89]</td>
<td>[-1.58]</td>
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<td>[3.34]</td>
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<td></td>
<td>-0.18***</td>
<td>0.07*</td>
<td>-0.03</td>
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<td></td>
<td>[-6.66]</td>
<td>[2.07]</td>
<td>[-0.84]</td>
<td>[-1.61]</td>
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<td>-0.16***</td>
<td>0.05*</td>
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<td>[-6.69]</td>
<td>[1.91]</td>
<td>[-0.64]</td>
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</tbody>
</table>

- Control for bond characteristics, size, ttm, liquidity
- Control for province risk exposure
- Control for time dummies and cluster at province level
- Conditional on political risk, provinces with higher RE GDP have higher financing cost, i.e., higher CTB yields.
Conclusion

- Given the central government implicit guarantee, there still exists a large heterogeneity in chengtou bond yields

- Conventional bond pricing factors such as credit and liquidity risk has weaker or opposite impact for CTB, due to implicit government guarantee

- Implicit gov't guarantee is the most important pricing factor of CTB
  - Provincial-level real estate performance is the dominating driver – One standard deviation increase in local RE GDP, contributes to 8.6% decrease in CTB yields
  - Provincial-level political risk, a novel measure based on anti-corruption campaign in China, significantly elevate CTB yields
  - Conditional on high political risk, RE GDP actually elevate CTB yields; only low corruption provinces enjoy low financing costs with high real estate GDP
THANK YOU!
Jennie.bai@georgetown.edu