

The SOE Premium and Government Support in China's Credit Market

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Joint work with Zhe Geng from SAIF

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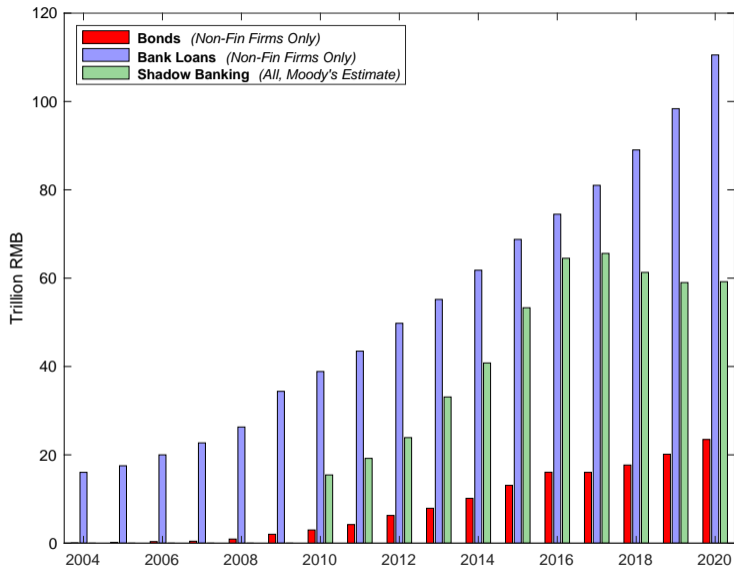
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Bonds: transparent, driven by concerns over credit risk.

Bank Loans: opaque, relational, and clouded by other factors.

Shadow Banking: more opaque.

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 - ▶ Impact of government support on price discovery.
 - ▶ Impact of allocational inefficiency on firm fundamentals.

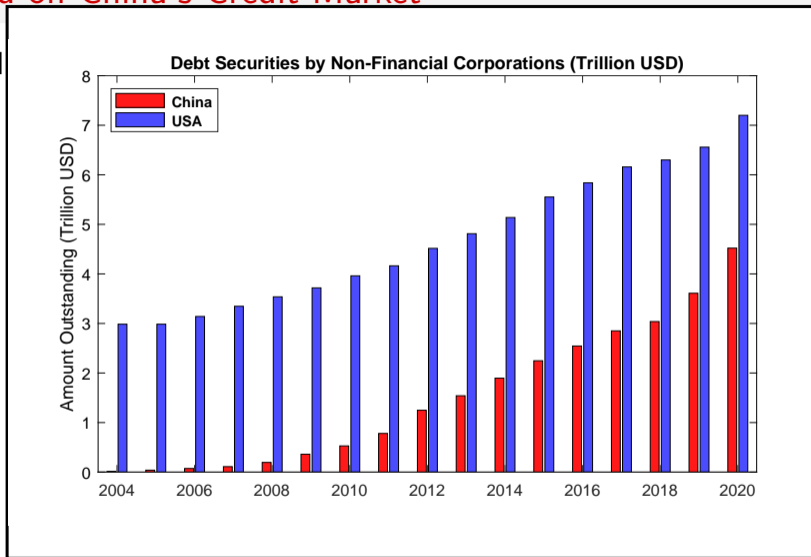
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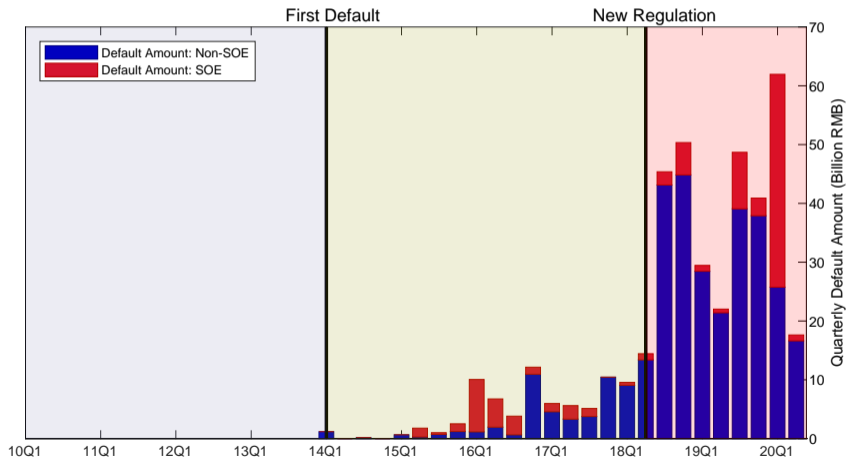
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- Two landmark events: March 4, 2014 and Apr 27, 2018.

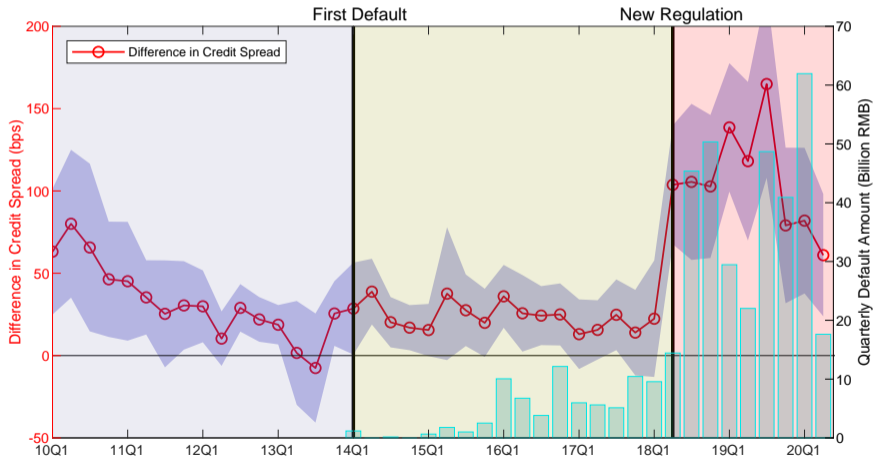
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The Time-Varying SOE Premium

$$\text{CreditSpread}_{i,t} = a + \mathbf{b} \text{NSOE}_{i,t} + c \text{Rating}_{i,t} + \sum_k \text{Controls}_{i,t}^k + \epsilon_{i,t}$$



Contributions to the Literature

- The macro literature on credit misallocations and their impact on China's growth:
 - ▶ Brandt and Zhu (2000), Dollar and Wei (2007), Hsieh and Klenow (2009), Song, Storesletten, and Zilibotti (2011), Lardy (2019), Cong, Gao, Ponticelli, and Yang (2019), and Huang, Pagano, and Panizza (2020).
 - ▶ **Our paper:** Use **credit market** to uncover the opaque credit allocation, and document the severe **segmentation in pricing** post 2018Q2 and its real impact.
- The asset-pricing literature studying the information content of credit spreads:
 - ▶ Evidence from the US: Collin-Dufresne, Goldstein and Martin (2001), Campbell and Taksler (2003), Bao (2009), Bao, Pan, and Wang (2011), and others.
 - ▶ **Our paper:** The **information content** of credit spreads in China.
- Government support and credit spreads:
 - ▶ Berndt, Duffie, and Zhu (2019): Bailout probability and banks' credit spreads.
 - ▶ **Our paper:** **Government support** and credit spreads in China.

Growing Literature on China's Credit Market

- Overview: Hu, Pan and Wang (2019) and Amstad and He (2019).
- Government guarantee in
 - ▶ SOE bonds: Jin, Wang and Zhang (2018).
 - ▶ Chengtou Bonds: Bai and Zhou (2018) and Liu, Lyu and Fu (2017).
- Other topics:
 - ▶ Wang, Wei, and Zhong (2015) on yield-chasing retail investors.
 - ▶ Mo and Subrahmanyam (2019) on liquidity.
 - ▶ Chen, Chen, He, Liu and Xie (2019) on pledgeability.
 - ▶ Chen, He, and Liu (2020) on the growth of Chengtou bonds.
 - ▶ Ding, Xiong, and Zhang (2020) on issuance overpricing.
 - ▶ Gao, Huang, and Mo (2020) on credit enhancement.
 - ▶ Huang, Liu, and Shi (2020) on the determinants of short-term credit spreads.

Summary Statistics: Bond-Level Data

	Non-SOE Listed			SOE Listed			Non-SOE Unlisted			SOE Unlisted		
	mean	med	std	mean	med	std	mean	med	std	mean	med	std
NumIssuers	367			403			403			1,795		
NumBonds	923			1,477			1,518			7,061		
CreditSpread (%)	2.47	1.94	2.39	1.39	0.99	1.41	2.82	2.48	1.85	1.58	1.31	1.18
Rating	2.43	3.00	0.85	1.69	1.00	0.84	2.33	2.00	0.81	1.98	2.00	0.86
Maturity (yr)	2.97	2.79	1.25	3.33	2.95	1.70	3.11	2.81	1.47	3.59	3.23	1.86
IssueSize (billion)	1.03	0.80	0.89	2.00	1.20	2.56	1.09	1.00	0.92	1.67	1.00	2.18
Age (yr)	1.75	1.53	1.26	2.01	1.61	1.67	1.66	1.38	1.31	2.29	1.86	1.86
Coupon (%)	5.91	5.90	1.24	5.13	5.10	1.09	6.11	6.20	1.31	5.79	5.80	1.25
Embed	0.63	1.00	0.48	0.39	0.00	0.49	0.56	1.00	0.50	0.26	0.00	0.44
Exch	0.69	1.00	0.46	0.53	1.00	0.50	0.48	0.00	0.50	0.21	0.00	0.41
ZeroDays (%)	77	88	26	86	93	18	85	93	20	88	94	16
Turnover (%)	31	13	62	35	10	80	48	15	117	63	21	144
TradingDays (day)	15	8	18	10	5	12	10	5	13	8	4	11

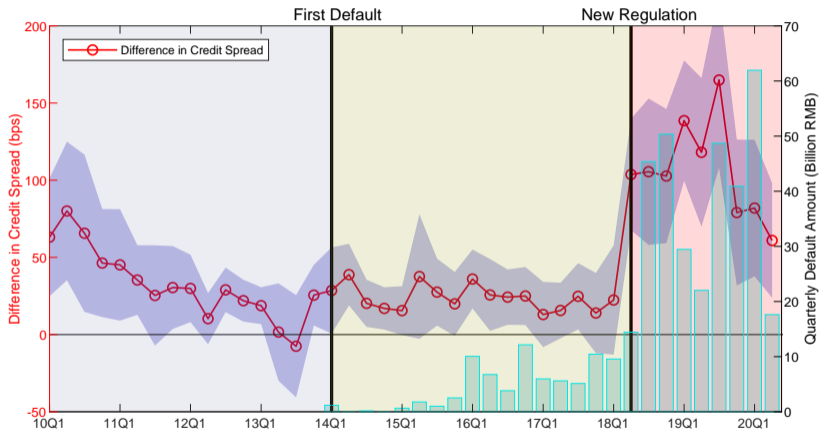
Measuring the SOE Premium

Quarterly panel regressions with quarter and industry fixed effects:

$$\text{CreditSpread}_{i,t} = a + \mathbf{b} \text{NSOE}_{i,t} + c \text{Rating}_{i,t} + \sum_k \text{Controls}_{i,t}^k + \epsilon_{i,t}$$

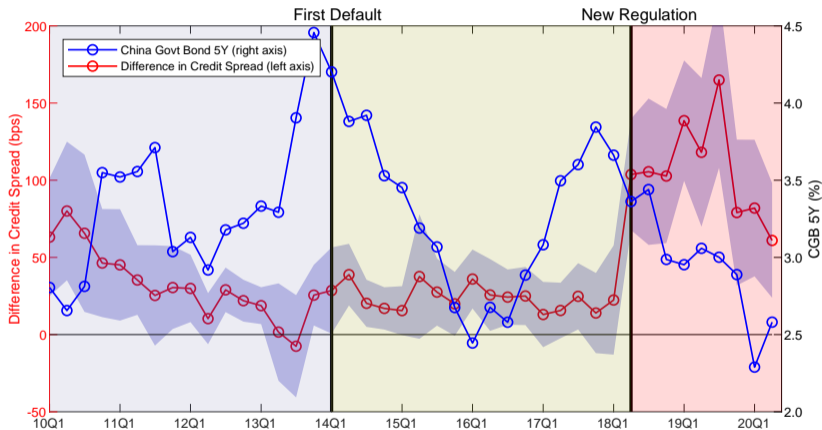
	Listed Firms			Unlisted Firms		
	Phase I	Phase II	Phase III	Phase I	Phase II	Phase III
NSOE	0.20*** [3.08]	0.21*** [3.58]	1.06*** [7.78]	0.16*** [3.47]	0.79*** [12.92]	1.54*** [17.28]
Rating	0.51*** [6.39]	0.53*** [10.96]	1.24*** [4.84]	0.54*** [14.11]	0.41*** [16.89]	0.46*** [14.58]
Observations	4,344	10,072	5,348	21,525	45,315	16,999
Adjusted R-squared	0.543	0.468	0.385	0.544	0.382	0.457

The SOE Premium, Credit Cycles, and Government Policies



- 2014Q1: First default.
- 2014-16: Credit boom.
- 2016-17: 降杠杆
Deleveraging campaigns.
- 2018Q2: 资管新规
New regulations on asset management.
- Since Nov 2018:
Efforts to reassure the private sector.

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Behind the Exploding SOE Premium

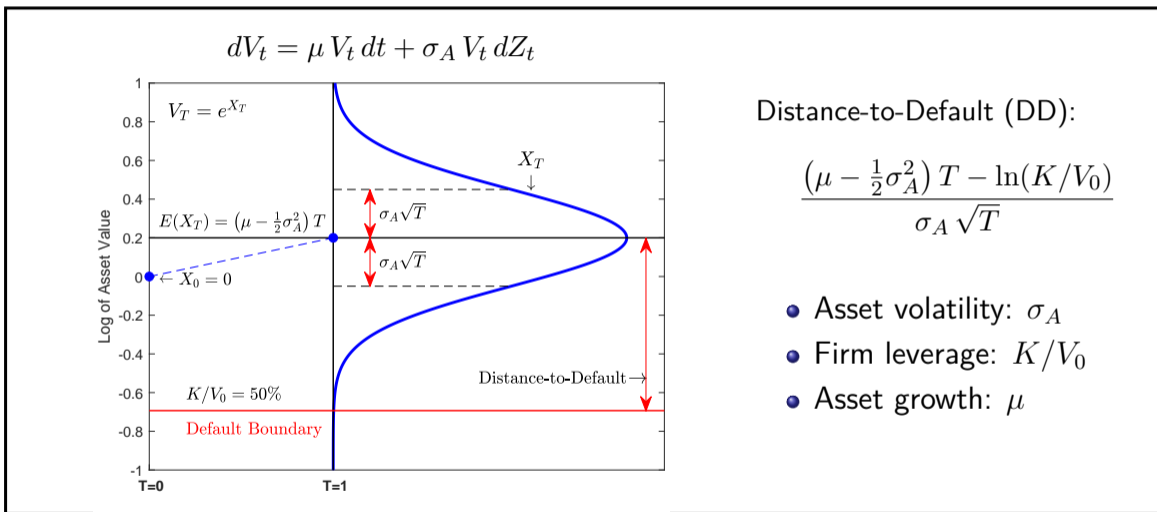
- Government-led credit tightening policies:
 - ▶ Severely weakened the demand from the asset-management industry in China.
 - ▶ Shrunk the financing and re-financing channels of corporate issuers.
- Competing explanations:
 - ▶ **Government support:** Lacking government support, non-SOEs are more vulnerable than SOEs. Akin to a run on non-SOEs, investors seek safety in SOE bonds and shun non-SOE bonds.
 - ▶ **Credit quality:** Due to over-borrowing and over-expanding, non-SOEs are weak in fundamental strength and ill prepared for the credit contraction.

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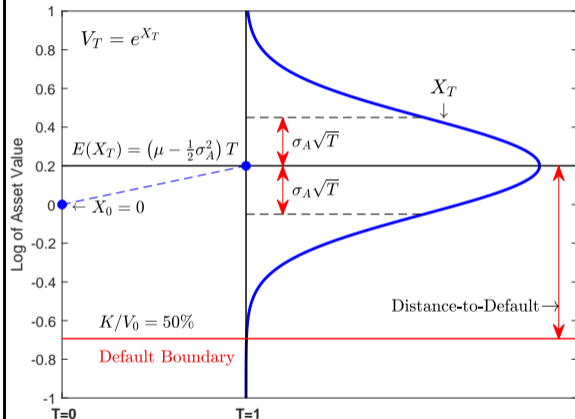
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Key Measures: Credit Quality and Government Support



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$$dV_t = \mu V_t dt + \sigma_A V_t dZ_t$$



Quarterly Calibration

- Default boundary K : current liabilities plus one half of long-term debt.
- Asset value V and volatility σ_A :
 - ▶ Equity: a call option on asset:

$$E_t = V_t N(d_1) - e^{rT} K N(d_2)$$

- ▶ E_t : market cap by quarter end.
- ▶ σ_E : estimated using daily stock returns within the quarter.

Key Measures: Credit Quality and Government Support

- **Default Measure (DM)**: inverse of Merton's distance to default (DD).
 - ▶ Measured quarterly, using firms' equity and balance-sheet information:

$$DM_t = DD_t^{-1} \quad \text{and} \quad DD = \frac{(\mu - \frac{1}{2}\sigma_A^2) T - \ln(K/V_0)}{\sigma_A \sqrt{T}}$$

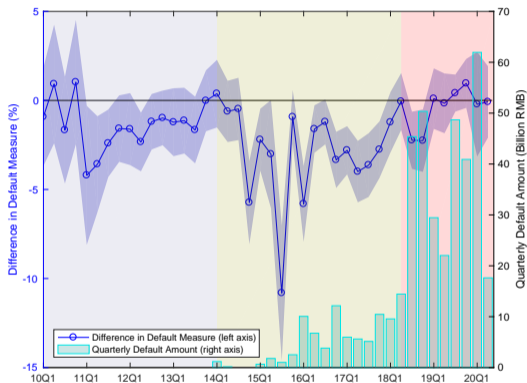
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- ▶ Issuers with higher DM: lower credit quality and more likely to default.

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Default Measure: NSOE – SOE

$$DM_{i,t} = a + \mathbf{b} \text{NSOE}_{i,t} + c \text{Rating}_{i,t} + \sum_k \text{Controls}_{i,t}^k + \epsilon_{i,t}$$

	DM (%)		
	Phase I	Phase II	Phase III
NSOE	-1.50*** [-2.95]	-3.08*** [-4.23]	-0.55 [-0.91]
Rating	0.79* [1.94]	-0.18 [-0.51]	1.60*** [3.13]
Obs	4,344	10,072	5,350
Adj R²	0.151	0.660	0.331

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- ▶ Issuers with higher DM: lower credit quality and more likely to default.
- **The Non-SOE Dummy (NSOE)**: divides firms into two solid blocks.
 - ▶ Defined by the affiliation, state or non-state, of the end-controller of the firm.
 - ▶ Government: central or local SASAC, government institutions, and SOEs.

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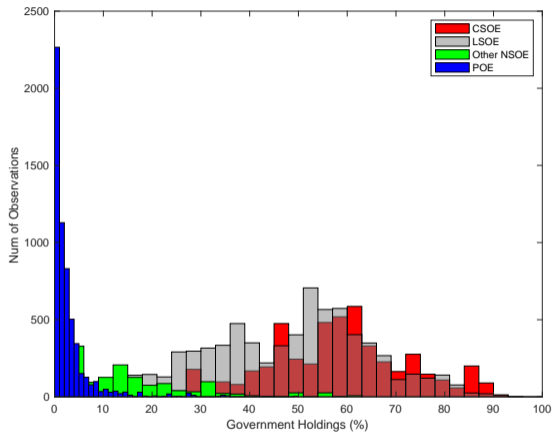
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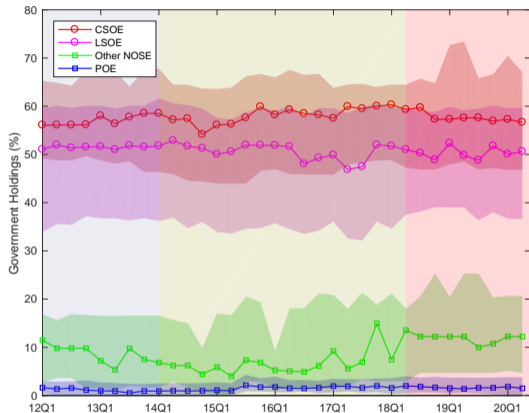
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Bond×Quarter Distribution



Quarterly Variation

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 - ▶ Built from the ground up and has not been studied for credit pricing.
 - ▶ Informative both across and within the samples of SOEs and non-SOEs.

Summary Statistics: Equity-Level Data

	Non-SOE Listed											
	All			Phase I			Phase II			Phase III		
	mean	med	std	mean	med	std	mean	med	std	mean	med	std
# Firms	367			178			315			227		
Equity Size (log)	23.30	23.26	1.02	22.57	22.48	0.93	23.31	23.28	0.88	23.77	23.70	1.08
Leverage (%)	58.55	59.06	15.29	55.76	56.43	12.84	57.39	57.89	15.27	62.67	62.47	15.97
Asset Growth (%)	24.96	20.91	19.42	28.69	24.45	21.24	24.69	20.65	19.64	23.08	19.50	17.28
Asset Volatility (%)	22.95	19.72	15.50	22.13	21.19	10.34	26.04	21.61	17.44	17.33	14.59	12.21
Default Measure (%)	21.18	18.07	12.78	18.70	17.87	6.59	22.48	18.45	14.97	20.21	17.50	10.60
Govt Holdings (%)	5.07	2.03	8.36	4.97	1.59	8.72	4.51	1.93	7.50	6.23	2.99	9.55
Ctrl Holdings (%)	36.41	32.81	17.43	36.55	33.18	18.83	36.90	33.32	16.78	35.35	32.05	17.69
	SOE Listed											
	All			Phase I			Phase II			Phase III		
	mean	med	std	mean	med	std	mean	med	std	mean	med	std
# Firms	403			256			340			252		
Equity Size (log)	23.71	23.56	1.34	23.31	23.05	1.40	23.71	23.52	1.28	24.05	23.98	1.28
Leverage (%)	61.67	64.05	14.90	61.18	62.99	14.61	61.19	63.51	15.70	63.00	65.96	13.56
Asset Growth (%)	14.32	12.11	13.04	19.69	17.01	14.23	12.82	11.15	12.99	12.11	10.38	10.37
Asset Volatility (%)	17.18	13.31	13.83	15.07	12.89	9.54	21.41	16.69	16.24	11.46	8.51	9.07
Default Measure (%)	22.56	18.79	15.12	18.39	17.70	7.83	26.78	21.33	18.91	18.71	17.10	9.26
Govt Holdings (%)	51.93	53.86	16.76	52.08	53.85	17.34	51.22	53.60	16.71	53.08	54.65	16.26
Ctrl Holdings (%)	45.50	46.00	16.39	47.19	48.81	17.20	45.26	45.54	16.45	44.41	44.92	15.40

Explaining the SOE Premium: Credit Quality vs Government Support

$$\text{CreditSpread}_{i,t} = a + \mathbf{b} \text{NSOE}_{i,t} + \mathbf{c} \text{DM}_{i,t} + \mathbf{d} \text{GovtHoldings}_{i,t} + e \text{Rating}_{i,t} + \sum_k \text{Controls}_{i,t}^k + \epsilon_{i,t}$$

	Phase I			Phase II			Phase III		
NSOE	0.20*** [3.08]	0.20*** [2.95]	0.20** [2.46]	0.21*** [3.58]	0.25*** [4.32]	0.18* [1.68]	1.06*** [7.78]	1.09*** [7.76]	-0.09 [-0.48]
DM		-0.13 [-0.40]			1.26*** [4.52]			4.78*** [5.24]	
GovtHoldings			0.00 [0.01]			-0.08 [-0.37]			-2.81*** [-7.82]
Rating	0.51*** [6.39]	0.51*** [6.29]	0.51*** [6.23]	0.53*** [10.96]	0.53*** [11.23]	0.52*** [11.01]	1.24*** [4.84]	1.16*** [4.73]	1.20*** [4.66]
Obs	4,344	4,344	4,344	10,072	10,072	10,072	5,348	5,348	5,348
Adjusted R²	0.543	0.543	0.543	0.468	0.476	0.468	0.385	0.402	0.398

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$$\text{CreditSpread}_{i,t} = a + \mathbf{b} \text{NSOE}_{i,t} + \mathbf{c} \text{DM}_{i,t} + \mathbf{d} \text{GovtHoldings}_{i,t} + e \text{Rating}_{i,t} + \sum_k \text{Controls}_{i,t}^k + \epsilon_{i,t}$$

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NSOE	0.20*** [3.08]	0.20*** [2.95]	0.20** [2.46]	0.21*** [3.58]	0.25*** [4.32]	0.18* [1.68]	1.06*** [7.78]	1.09*** [7.76]	-0.09 [-0.48]
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Price Discovery

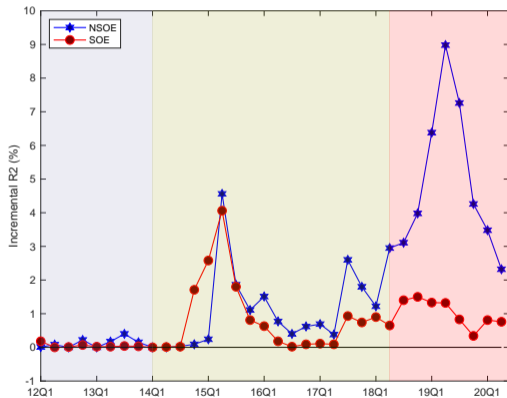
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NSOE	Phase I				Phase II				Phase III			
DM	-0.03 [-0.03]		-0.01 [-0.02]		1.63*** [2.88]		1.62*** [2.89]		7.89*** [3.83]		8.01*** [3.94]	
GovtHoldings	0.45 [1.06]		0.45 [1.05]		0.24 [0.52]		0.12 [0.27]		-5.52*** [-4.56]		-5.69*** [-5.14]	
Rating	0.74*** [2.99]	0.74*** [2.99]	0.75*** [3.05]	0.75*** [3.05]	0.41*** [4.65]	0.41*** [4.82]	0.41*** [4.77]	0.42*** [4.88]	1.64*** [4.34]	1.44*** [4.06]	1.58*** [4.24]	1.37*** [3.85]
Obs	1,372	1,372	1,372	1,372	4,182	4,182	4,182	4,182	2,095	2,095	2,095	2,095
Adj R^2	0.484	0.483	0.484	0.484	0.376	0.386	0.376	0.386	0.367	0.397	0.382	0.413
SOE	Phase I				Phase II				Phase III			
DM	0.09 [0.65]		0.08 [0.58]		1.04*** [3.84]		1.04*** [3.83]		2.09*** [2.65]		1.47* [1.87]	
GovtHoldings	-0.17 [-1.26]		-0.17 [-1.25]		-0.11 [-0.52]		-0.12 [-0.57]		-2.32*** [-6.05]		-2.18*** [-6.02]	
Rating	0.39*** [11.23]	0.39*** [11.20]	0.39*** [11.01]	0.38*** [10.97]	0.55*** [9.50]	0.55*** [9.83]	0.54*** [9.76]	0.55*** [10.06]	0.58*** [4.88]	0.56*** [4.72]	0.53*** [4.70]	0.52*** [4.61]
Obs	2,972	2,972	2,972	2,972	5,890	5,890	5,890	5,890	3,253	3,253	3,253	3,253
Adj R^2	0.542	0.542	0.543	0.543	0.500	0.508	0.500	0.508	0.386	0.393	0.412	0.415

Evolving Contents of Price Discovery

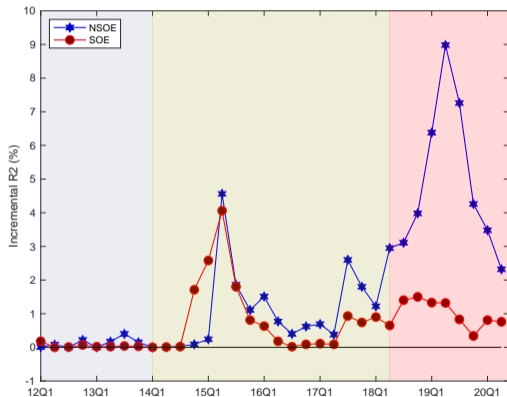
Evolving Contents of Price Discovery

Default Measure, Incremental R2

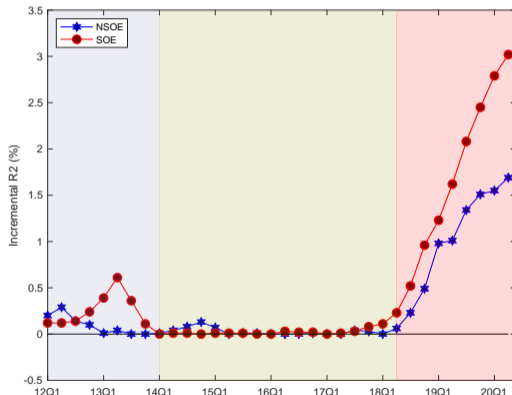


Evolving Contents of Price Discovery

Default Measure, Incremental R2



Government Holdings, Incremental R2

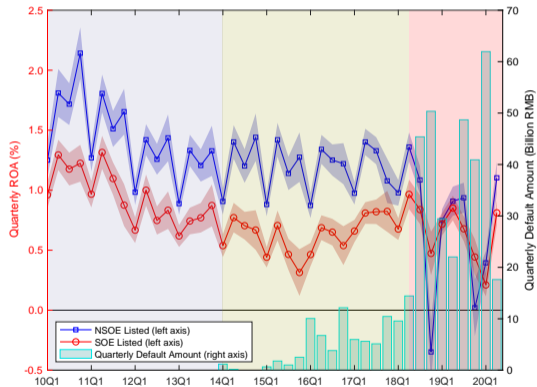


The Real Impact

- The differentiation between SOEs and non-SOEs is among the most important friction in China's economy.
- Widely documented:
 - ▶ The inefficiency of China's SOEs and their preferential access to debt financing.
 - ▶ The importance of the private sector: 60% of GDP, 70% of innovation, 80% of urban employment, and 90% of new jobs.
- How has the severe credit segmentation since 2018Q2 affected the non-SOEs?

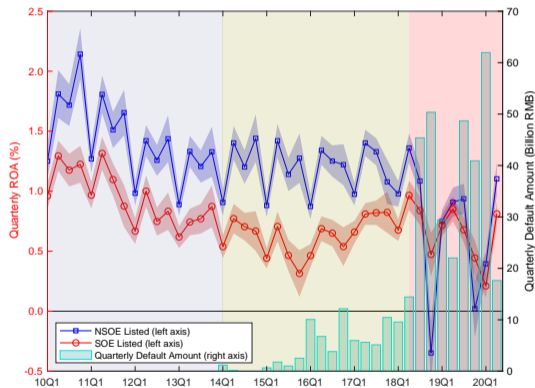
The Real Impact

Return on Assets



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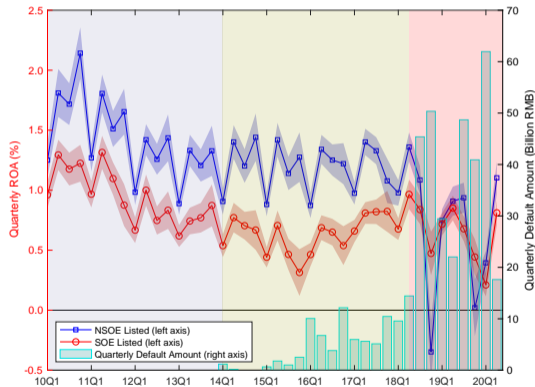


$$ROA_{i,t} = a + \mathbf{b} \text{NSOE}_{i,t} + c \text{EquitySize}_{i,t} + \epsilon_{i,t}$$

	Quarterly ROA (%)		
	Phase I	Phase II	Phase III
NSOE	0.56*** [7.76]	0.52*** [8.83]	0.13 [1.07]
EquitySize	0.18*** [6.00]	0.19*** [6.33]	0.35*** [8.69]
Constant	-3.54*** [-4.85]	-4.33*** [-6.04]	-7.40*** [-9.76]
Obs	15,724	18,533	10,868
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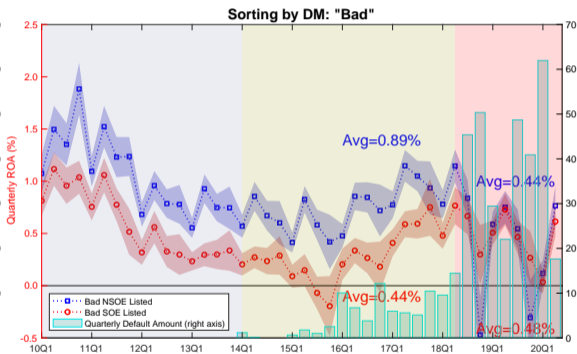
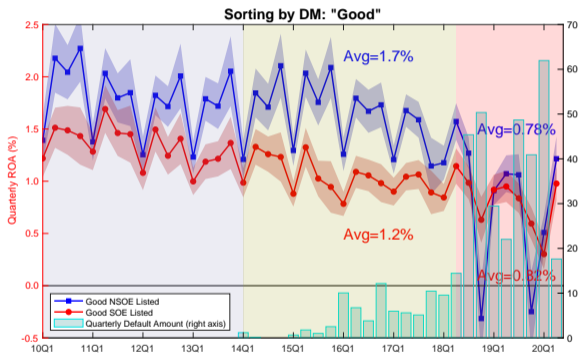
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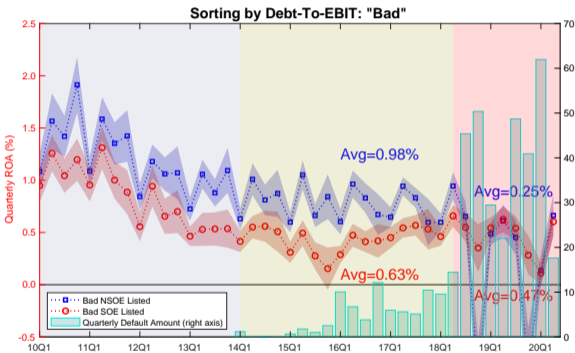
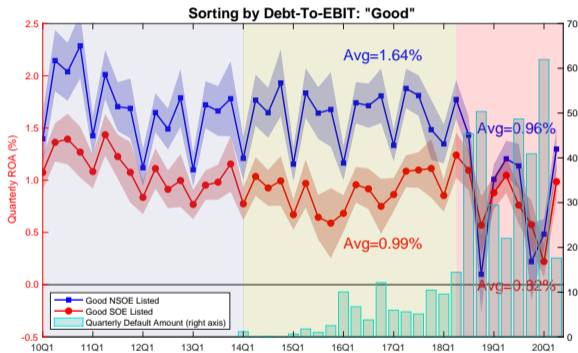
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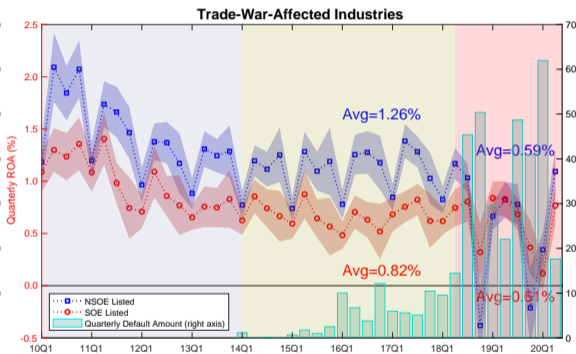
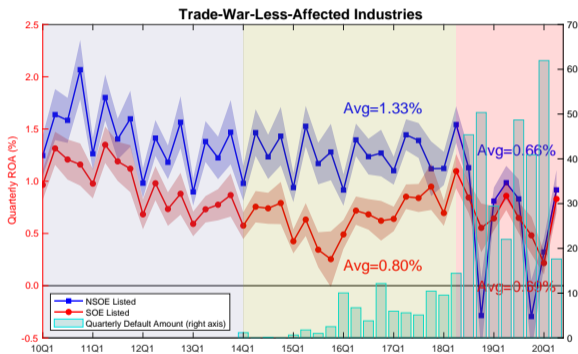
The Real Impact: "Good" and "Bad" Firms by Default Measures



The Real Impact: "Good" and "Bad" Firms by Interest Coverage



The Real Impact: US-China Trade War



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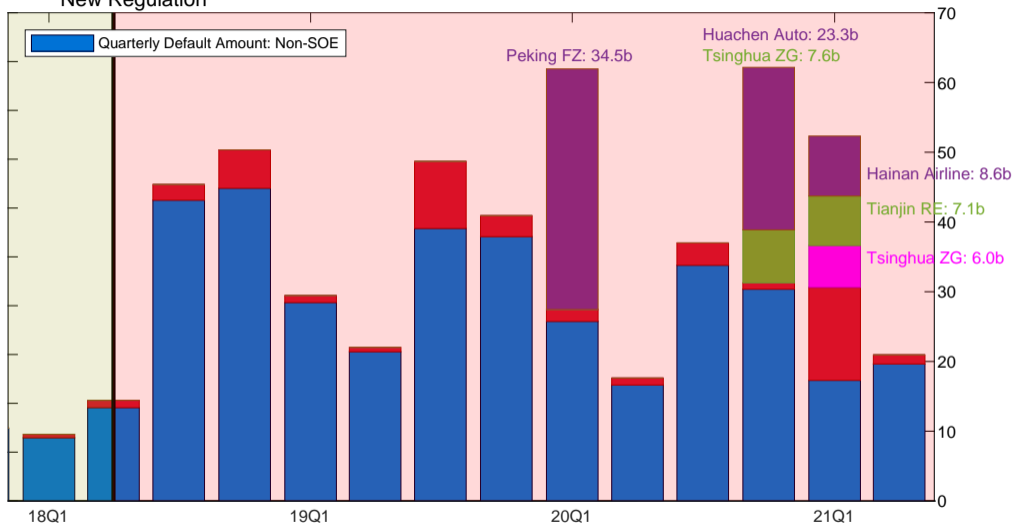
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New Regulation



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 - ▶ The explosive SOE premium is a reflection, not the unique cause.