

The Big Tech Lending Model

Wei Xiong

Princeton University

(joint work with Lei Liu and Guangli Lu)

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Motivation

- The new global trend of big techs offering lending
 - Alibaba, Tencent, Amazon...
- Big tech lending is fast developing in China, US, Latin America, East Asia, Southeast Asia and Africa

Table 1: Summary of Selected Big Tech Lending

Country	Big Tech Firm	Big Tech Category	Digital Payment	SME Loans	Consumer Loans/ Credit Card	Targeting Platform User	Collaborate with Banks	(Example) SME Lending Program	Max SME Loan Maturity	Max SME Loan Limit
China	Alibaba	Online Retailer	♦	♦	♦	♦	♦	Wangshangdai	24 months	\$285 k
China	Tencent	Social Media	♦	♦	♦	♦	♦	Weihudai	24 months	\$29 k
China	JD	Online Retailer	♦	♦	♦	♦	♦	Jingxiaodai	12 months	\$285 k
China	Baidu	Search Engine	♦	♦	♦		♦	Duxiaoman	12 months	\$29 k
China	Suning	Retailer	♦	♦	♦	♦	♦	Weishangdai	12 months	\$285 k
US	Amazon	Online Retailer	♦	♦	♦	♦	♦	Amazon Lending	12 months	\$750 k
US	PayPal	Payment System	♦	♦	♦	♦	♦	PayPal Working Capital	12 months	\$125 k
US	eBay	Online Retailer	♦	♦	♦	♦		Working Capital Loan	12 months	\$150 k
US	Square Capital	Software/Hardware	♦	♦		♦	♦	Small Business Loan	18 months	\$250 k
US	Apple	Software/Hardware	♦		♦	♦	♦			
US	Google	Search Engine	♦		♦		♦			
Latin America	Mercado Libre	Online Retailer	♦	♦	♦	♦		Fix Installment Loan	24 months	\$196 k
Korea	Samsung	Software/Hardware	♦		♦	♦	♦			
Korea	Kakao	Social Media	♦		♦					
Korea	KT	Telecommunication	♦		♦					
Japan	Rakuten	Online Retailer	♦	♦	♦	♦		Super Business Loan Express	36 months	\$105 k
Japan	Line	Social Media	♦		♦	♦	♦			
Southeast Asia	Grab	Delivery/Ride Hailing	♦	♦	♦	♦		Grab Business Loan	9 months	\$100 k
Southeast Asia	PT Gojek	Delivery/Ride Hailing	♦		♦	♦				
India	Ola Cabs	Ride Sharing	♦		♦					
East Africa/Egypt/India	Vodafone M-Pesa	Telecommunication	♦	♦	♦	♦	♦	M-Shwari/KCB M-PESA	6 months	\$8 k
France/Africa	Orange SA	Telecommunication	♦		♦					



Research Questions

- Big tech lenders are substantially different from other fintech lenders
 - Extensive customer bases, powerful brands
 - Superior **information** about borrowers from data and algorithms
 - Great capacities to **monitor** customer activities inside the ecosystems
- Little direct evidence on the performance of big tech loans
 - Luohan Academy Report (2019), Frost et al. (2019), Ghosh et al. (2021), Ouyang (2021), Hau et al. (2019, 2021), Chen et al. (2021), Huang et al. (2020), Gambacorta et al. (2020)
- We compare **big tech business loans** to SMEs made by MyBank with **regular and online business loans** made by a large traditional bank
 - How risky is big tech lending?
 - Is big tech lending robust to severe economic shocks?
 - How do big tech lenders manage the risk?
 - What do borrowers use the big tech loans for?



Background - Lending by MyBank

- MyBank had lent to over 35 million SMEs
 - MyBank is a subsidiary of Ant Group who owns Alipay
 - Most borrowers are merchants who use Alipay or vendors on Alibaba's e-commerce platforms
- MyBank has unique and extensive information about each borrower's business: cashflow, customer ratings, data along its business chain...
- Alibaba's ecosystem helps MyBank to monitor loan use and repayment
- Convenience in borrowing and repayment
 - 310 model: 3 minutes to apply, 1 second to approve, and zero human intervention

Background – Syndicated Loans with Bank X



- MyBank's lending is primarily funded by syndication with traditional banks
- Our data come from one of its major co-lenders, **Bank X**, a large commercial bank with national coverage across China
 - MyBank is responsible for acquiring borrowers, assessing risk, processing loan applications, and setting interest rates and credit limits
 - MyBank is also responsible for managing the loans after origination
 - Bank X provides the majority of funding, it can reject a loan application, but does not determine the interest rate or credit limit
- Bank X has two lending programs to SMEs of its own
 - **Regular loans**
 - Applications filed in a bank branch and assessed by loan officers in person, may take one week
 - **Online loans**
 - A program designed to facilitate online applications of its best customers (pre-screened)



The Data

- Proprietary loan data from **Bank X**
 - Loans originated in Aug 2019 – Dec 2020
- The main sample: 10% random sample of borrowers with **business loans** in three groups:
 - 843,678 **big tech loans** (syndicated loans by MyBank and Bank X)
 - 34,933 **regular loans** (excluding policy loans) by Bank X
 - 113,233 **online loans** by Bank X
- The overlapped sample:
 - The full set of big tech borrowers who have taken at least one online or regular loan from Bank X



Borrower Characteristics (Main Sample)

	Age	Male	Undergrad	High School	Rural	County	City
Big Tech Borrowers	32.8	66%	38%	30%	31%	29%	40%
Online Borrowers	44.3	79%	18%	34%	15%	62%	23%
Regular Borrowers	43.0	83%	12%	26%	20%	58%	22%

	First Loan	First Business Loan	First Uncollateralized Business Loan
Big Tech Borrowers	27%	81%	91%
Online Borrowers	4%	5%	6%
Regular Borrowers	30%	43%	58%

- Big tech loans are more likely to be the first business loans, especially the first non-collateralized business loans, of their borrowers



Borrower Characteristics (Main Sample)

Panel C: Other Loans by Each Borrower

	Collateralized Business Loans	Uncollateralized Business Loans	Collateralized Consumption Loans	Uncollateralized Consumption Loans	Mortgage Loans	Others	All
Big Tech Borrowers	117,172	36,099	40,467	97,946	13,661	28,807	334,152
Online Borrowers	741,676	180,595	160,123	49,872	96,760	96,760	1,325,786
Regular Borrowers	429,065	159,087	73,096	30,252	65,385	65,385	822,270

- Big tech borrowers are much less likely to have other loans outstanding, even when they do, the amount is much smaller
- Big tech loans tend to cover borrowers with much less access to credit



Loan Terms (Main Sample)

Panel A: Overall Statistics

	Number of Loans	Interest Rate	Credit Limit (RMB)	Loan Size (RMB)	Maturity (Months)	Repay Once
Collateralized						
Big Tech	12,099	9.0%	840,509	135,741	11.2	63%
Online	37,917	5.1%	1,186,890	296,619	13.4	93%
Regular	152,991	5.5%	1,277,106	352,571	14.9	90%
Uncollateralized						
Big Tech	843,678	14.6%	71,963	8,367	10.0	15%
Online	113,233	8.6%	180,858	99,487	9.9	90%
Regular	34,933	8.5%	183,644	120,284	13.0	71%

- Bank X's regular loans are mostly collateralized, while big tech and Bank X's online loans are over 98% uncollateralized
- Big tech loans tend to have lower credit limit and much higher interest rate



Repayment Risk

Panel A: Summary Statistics of Payment Overdue

	Number of Loans			Ever Overdue \geq 30days		
	w/o payback record	w payback record	Total	w/o payback record	w payback record	Total
Big Tech	215,135	239,272	454,407	4.2%	1.2%	2.6%
Online	4,048	64,769	68,817	1.1%	1.1%	1.1%
Regular	6,706	12,629	19,335	1.5%	1.7%	1.6%

- The risk of payment overdue is concentrated among borrowers without prior payback history
- For borrowers with payback history, there is no difference in overdue risk across the three types of loans

Repayment Risk

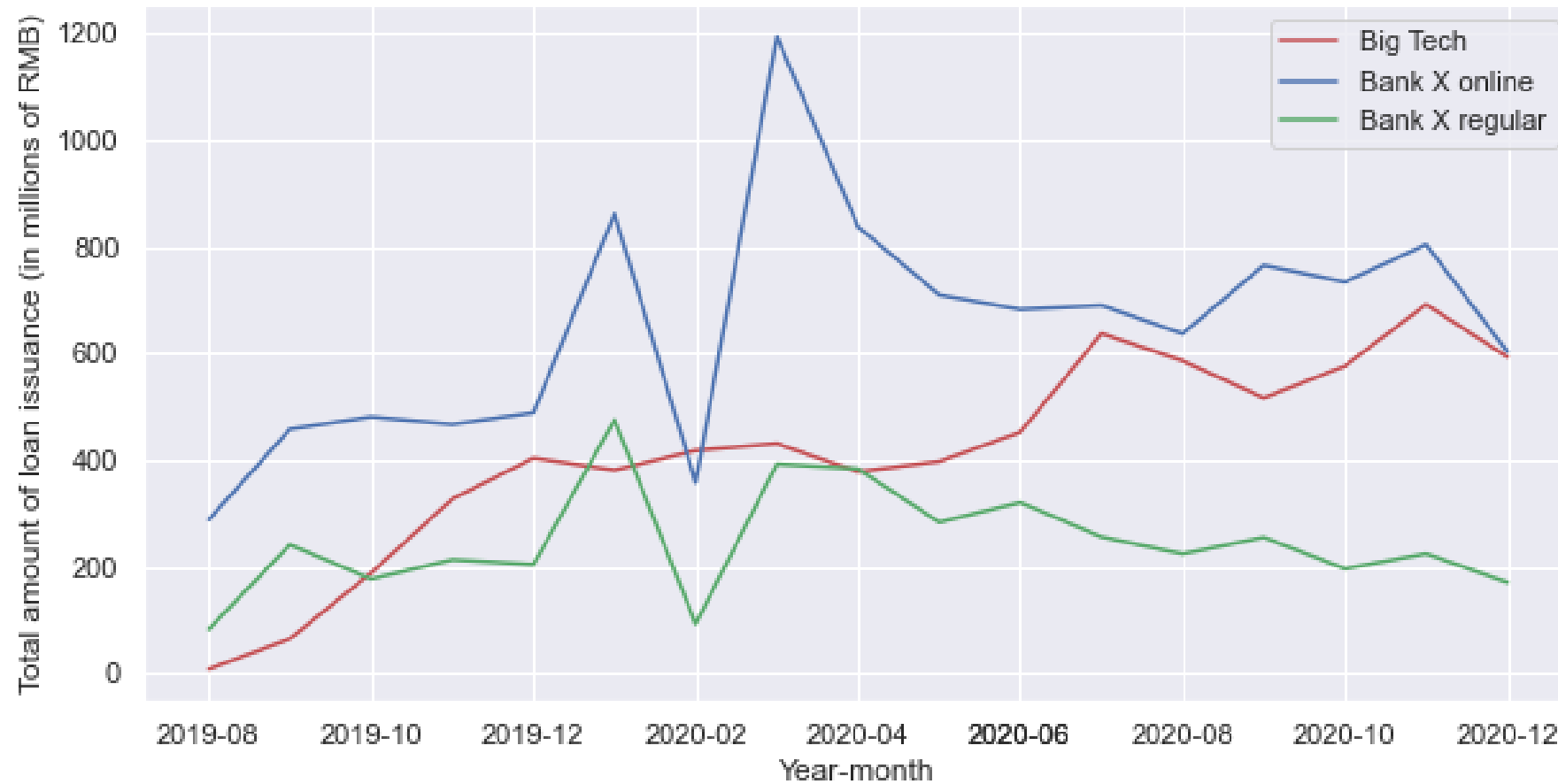
- After controlling for paying off an existing loan, there is no difference in the overdue risk

Panel B: Regression Analysis

	Ever Overdue ≥ 30 days * 100			
Big Tech	1.33*** (0.22)	0.56** (0.24)	-0.60** (0.26)	-0.84*** (0.25)
Online	-0.27* (0.16)	-0.01 (0.23)	0.65*** (0.25)	0.46* (0.25)
Loan Term: 6 months		-1.75*** (0.48)	-1.72*** (0.47)	-1.78*** (0.47)
Loan Term: 12 months		0.22 (0.53)	0.26 (0.53)	0.17 (0.54)
Repay Once		-2.00*** (0.22)	-1.63*** (0.16)	-1.62*** (0.15)
Ever Clear			-2.77*** (0.33)	-2.77*** (0.33)
Exist Loan			1.20*** (0.18)	1.19*** (0.18)
Ever Overdue			8.34 (6.93)	9.39 (6.92)
Has Large Deposit			-0.95*** (0.07)	-0.93*** (0.08)
Log(age)			-0.30** (0.13)	-0.39*** (0.14)
Male			0.01 (0.08)	0.01 (0.08)
County			-0.55*** (0.06)	-0.43*** (0.07)
Rural			-0.54*** (0.09)	-0.43*** (0.09)
Origination Month FEs	Yes	Yes	Yes	No
Industry* Origination Month FEs	No	No	No	Yes
City* Origination Month FEs	No	No	No	Yes
Cluster Variable	Origination Month	Origination Month	Origination Month	Origination Month
Adjusted R-squared	0.00	0.01	0.02	0.03
Observations	542,559	542,559	542,559	542,559



Credit Supply around Covid-19





Loan Performance After COVID-19

- There is no evidence of overdue risk rising for big tech loans **originated** after the COVID-19 shock
 - By contrast, Ben-David et al. (2021) and Bao and Huang (2021) find that p2p lending in the US and China during the COVID-19 crisis was not as robust as bank lending

	Ever Overdue ≥ 30 days*100			
Big Tech	2.01*** (0.01)	-0.85*** (0.17)	-0.88*** (0.18)	-2.21*** (0.30)
Big Tech \times Post COVID-19 Shock	-0.53*** (0.18)	-0.79** (0.35)	-1.20*** (0.26)	-1.10*** (0.17)
Online	-0.52*** (0.00)	0.92*** (0.20)	1.00*** (0.21)	0.91*** (0.20)
Online \times Post COVID-19 Shock	0.03 (0.24)	-0.13 (0.42)	-0.61* (0.35)	-0.51* (0.30)
Loan Term: 6 months		-1.53*** (0.44)	-1.54*** (0.48)	-1.38*** (0.52)
Loan Term: 12 months		0.45 (0.59)	0.41 (0.61)	0.62 (0.66)
Repay Once		-2.20*** (0.13)	-2.16*** (0.13)	-1.80*** (0.10)
Interest Rate				6.79*** (1.27)
Log(Loan Size)				-0.40*** (0.08)
Borrower Variables	No	Yes	Yes	Yes
Origination Month	Yes	Yes	No	No
Industry \times Origination Month	No	No	Yes	Yes
City \times Origination Month	No	No	Yes	Yes
Cluster Variable	Origination Month	Origination Month	Origination Month	Origination Month
Adjusted R-squared	0.00	0.02	0.03	0.03
Observations	191,616	191,616	191,616	191,616



Early Repayment

- If a borrower takes a loan to finance its business expansion, it is unlikely to repay the loan before the short maturity of 6 or 12 months.
- **Hypothesis:** there is no difference in the repayment speed of the big tech loans and the conventional loans.



Early Repayment

Panel A: Distribution of the Ratio of Repayment Time to Loan Maturity

	N	Mean	Std.	Min	5%	10%	25%	50%	75%	90%	95%	Max
Big Tech	515,711	0.46	0.44	0.00	0.00	0.01	0.04	0.28	1.00	1.00	1.00	11.13
Online	74,921	0.74	0.37	0.00	0.03	0.10	0.48	0.96	1.00	1.00	1.00	18.48
Regular	21,253	0.77	0.32	0.00	0.06	0.18	0.60	0.93	1.00	1.00	1.00	2.54

- Half of the big tech loans are paid off at 28% of the scheduled maturity
 - i.e., 6 weeks for a 6-month loan
- A quarter of the big tech loans are paid off at 4% of the maturity
 - i.e., 1 week for a 6-month loan

Early Repayment

- Big tech borrowers are more likely to repay before maturity
 - More likely to meet short-term liquidity needs, rather than long-term financing
- Fast repayment makes the borrower less concerned by high interest rates and reduces loan risk

Panel B: Regression Analysis of Early Repayment

	Repayment Time to Maturity	
Big Tech	-0.40*** (0.01)	-0.46*** (0.01)
Online	-0.01 (0.01)	0.06*** (0.01)
Interest Rate	-0.01 (0.06)	-0.03 (0.04)
Log(Credit Limit)	-0.00 (0.00)	-0.00 (0.00)
Loan Term: 6 month	0.04*** (0.01)	0.03*** (0.01)
Loan Term: 12 month	0.00 (0.01)	-0.02* (0.01)
Loan Term: greater than 12 month	-0.12*** (0.04)	-0.06 (0.04)
Repay Once	-0.13*** (0.01)	-0.09*** (0.00)
Log(Age)		0.06*** (0.01)
Male		-0.01*** (0.00)
County		-0.01*** (0.00)
Rural		-0.03*** (0.00)
Ever_Clear_BigTech		-0.35*** (0.01)
Exist_Clear_BigTech		0.11*** (0.01)
Ever_OVD_BigTech		0.25*** (0.04)
Has Large Deposit		-0.05*** (0.00)
Industry*Origination Month	No	Yes
City* Origination Month	No	Yes
Cluster Variable	Origination Month	Origination Month
Adjusted R-squared	0.07	0.23
Observations	611,885	611,885





Why Is Interest Rate So High?

- Fixed cost of making a loan
 - The cost of making a big tech loan is negligible
- The lender's market power on a pool of locked-in borrowers
 - Some big tech borrowers have alternative credit access at lower interest rates
 - They choose the big tech loans for convenience
- High interest rates may serve as a screening device
 - Default cost for the borrowers is high, due to the enforcement on the ecosystem, e.g., Brunnermeier and Payne (2024)
 - High interest rates screen borrowers with short-term liquidity needs, in contrast to Stiglitz and Weiss (1981)

Interest cost and Convenience



- Interest cost scales with time, and is low if borrowers pay back fast

Panel A: Interest Expense Per Loan

	Count	Mean	Std.	Min	5%	10%	25%	50%	75%	90%	95%	Max
Big Tech	515711	372	1001	0	0	1	7	61	320	969	1669	68772
Online	74921	4460	6075	0	6	96	454	2178	6618	13200	18740	60566
Regular	21253	6563	10319	0	16	321	1203	3699	7737	15000	23869	339549

- Borrowers' frequent borrowing reveals big tech lending's convenience

Panel B: Number of Loans Per Borrower

	No. Borrowers	Mean	Std.	Min	5%	10%	25%	50%	75%	90%	95%	Max
Big Tech	140019	6	9.5	1	1	1	1	3	7	13	20	518
Online	49795	2.3	3.2	1	1	1	1	1	2	4	7	100
Regular	22115	1.6	1.8	1	1	1	1	1	1	3	4	61



Overlapped Borrowers

- A small set of big tech borrowers also have access to Bank X's regular or online loans

Panel A: Summary Statistics

	No. of Borrowers	No. of Loans	Interest Rate	Credit Limit	Loan Size	Repay Once	Maturity	Payback to Maturity	No. of Loans Per Borrower	Ever Overdue ≥ 30 days
Big Tech	6,684	42,548	14.5%	97,762	15,097	22.9%	10.0	41.4%	6.4	0.4%
Online	4,929	12,768	8.7%	169,447	82,916	75.3%	9.8	77.5%	2.6	0.9%
Regular	1,829	3,165	9.0%	179,186	125,293	66.1%	12.8	83.0%	1.7	1.5%

- The sample of overlapped borrowers show the same patterns: small loans, high interest rates, fast repayment



Overlapped Borrowers

- Perhaps these borrowers have run out of credit limits from Bank X?
 - A substantial fraction of loans are made to borrowers with cheaper Bank X credits available, revealing their preference for big tech loans' convenience

Panel B: Summary statistics by whether the borrower has credit limit from Bank X at the time of borrowing BigTech loans

	Number of loans	Number of borrowers	Interest rates	Loan size	Remaining Bank X credit limit	Loan Term	Pay back to Maturity
Bank X Credit Available	24,302	4,669	14.7%	14,493	171,632	9.9	39.8%
Bank X Credit Unavailable	18,246	4,356	14.3%	15,900	9,840	10.1	44.3%



Analysis of the Overlapped Sample

- Big Tech loans borrowed with cheaper Bank-X credit available have lower default risks

Panel D: Compare payment overdue
Ever overdue ≥ 30 days $\times 100$

	Big Tech vs. Regular		Big Tech vs. Online	
Big Tech	-0.66*	0.53	-0.73**	-0.13
	(0.38)	(0.45)	(0.34)	(0.33)
Big Tech \times Bank X Credit Available	-1.04***	-0.57**	-0.42***	-0.15
	(0.23)	(0.26)	(0.16)	(0.19)
Loan Term: 6 months	0.89***	0.66**	0.14	0.29*
	(0.35)	(0.30)	(0.29)	(0.17)
Loan Term: 12 months	1.79***	0.36	0.75**	0.71***
	(0.36)	(0.22)	(0.30)	(0.18)
Repay Once	-0.82***	0.08	-0.41**	0.39**
	(0.20)	(0.19)	(0.16)	(0.17)
Borrower FE	No	Yes	No	Yes
Origination Month FE	Yes	Yes	Yes	Yes
Cluster Variable	Origination month	Origination month	Origination month	Origination month
Adjusted <i>R</i> -squared	0.01	0.53	0.00	0.50
Observations	5724	5724	19365	19365

Conclusion



- The big tech loans are not more risky, despite their higher interest rates and the borrowers' lower credit quality
 - Different from p2p lending, e.g., Tang (2019), De Roure et al. (2021), Di Maggio and Yao (2021), Wang and Overby (2021), Ben-David et al. (2021) and Bao and Huang (2021)
- The big tech lending model:
 - The big tech loans are used to meet short-term liquidity needs, as borrowers repay quickly, far before the maturity, and borrow frequently
- A set of mechanisms
 - Information advantage to screen potential borrowers in its ecosystem
 - Monitoring through its ecosystem
 - Convenience
 - High interest rates
 - When cost of default is high, higher interest rates help to screen borrowers who intend to prepay early