

Fintech Expansion

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Food Truck Borrower

- ▶ **Limited enforcement**

- ▶ Kyotaki and Moore (1997), Hart and Moore (1990).

- ▶ Bank: physical collateral—truck.

- ▶ Square (payment): revenue-based loans, acquires info.

*“A fixed percentage of your **daily card sales** is automatically deducted until your loan is fully repaid... **Loan eligibility** is based on a variety of **factors related to your business**, including its payment processing volume, account history, and payment frequency... Additionally, we don't require a personal guarantee for your business to take a loan.”*

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- ▶ Bank's collateral vs. fintech's data is general in SMB

- ▶ Small firms in Lian and Ma (2022), Gopal and Schnabl (2023), Gambacorta et al (2022), Berger and Udell (1998)

This Paper

New credit competition framework

- ▶ Fintech: front-end service empowers **enforcement** and **flexible info acquisition**
- ▶ Bank: **physical collateral**

Results

- ▶ Fintech's **coarse learning**: sets “single-threshold” to screen out
 - ▶ Despite flexible info acquisition and no commitment.
- ▶ Fintech lending is not so disruptive
 - ▶ ↑Fintech's info technology → ↑bank profits
 - ▶ Long-term co-existence
- ▶ Out-of-market predictability facilitates expansion to new markets.
 - ▶ Early fintech industry: “unbanked” segments.

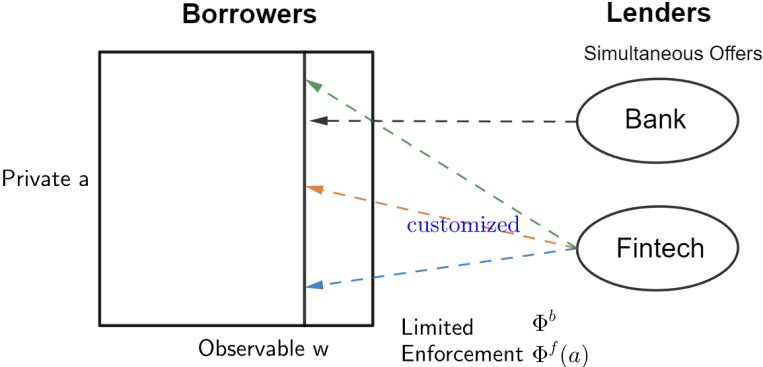
Road Map

Model

Equilibrium: Coarse Learning

Implications

Model Preview



Setting: Borrowers

Type (w, a)

- ▶ At $t = 0$ buys food truck (\$1): own funds w + borrows $1 - w$; at $t = 1$ generates a and repays.
 - ▶ Observable quality w . Each w indexes a market.
 - ▶ **Productivity a is private info**: CDF $G(\cdot)$ over $[\underline{a}, \bar{a}]$. Revealed at $t = 1$.

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Limited enforcement (LE)

- ▶ At $t = 1$, lender $j \in \{b(ank), f(intech)\}$ is only able to “seize” Φ^j , so actual repayment is

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- ▶ The same borrower is of **different value to lenders** via Φ^j

Borrower choice

- ▶ At $t = 0$, if two offers r^b, r^f , chooses lower **actual cost**.

Setting: Bank

LE: lends against physical collateral

$$\Phi^b = \theta$$

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- ▶ Robust if $\Phi^b = \theta + \gamma a$.

Bank lending strategy

- ▶ Renegotiation-proof quotes: bank chooses $r^b(w)$ s.t. collateral constraint

$$(1+r^b(w))(1-w) \leq \theta$$

- ▶ Riskless bank loans
- ▶ Unbanked: $w < 1 - \theta$.

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Cannot acquire info about a

- ▶ Emphasize fintech's info acquisition.

Setting: Fintech Lender

Enforcement $\Phi^f(a) = \beta a$. Repayment

$$\min \left\{ (1 + r^f) (1 - w), \beta a \right\}$$

Enabled by front-end service

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- ▶ Also applies to exclusion threat: Alibaba, BNPL

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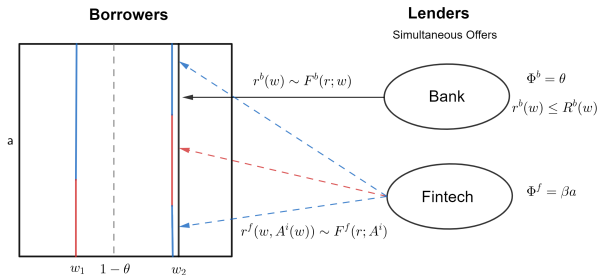
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Information acquisition and customized lending

- ▶ Technology: for w , fintech **secretly** acquires **any partition** $\mathcal{P}^w = \{A^i(w)\}$ at entropy cost $cl(\mathcal{P}^w)$.
- ▶ At $t = 0$: fintech jointly chooses \mathcal{P}^w and lending decisions $m^f(A^i; w)$ and rates $r^f(A^i; w)$ for each $A^i \in \mathcal{P}^w$.
 - ▶ Info acquisition unobservable to bank (no commitment).

Model Summary and Remarks



- ▶ Canonical credit competition: **common value auction**.
 - ▶ **IO approach**, lender affinity: inelastic substitutability between options
- ▶ Here, “**private value**” to lenders, but financing options are **fungible to borrowers**.

Borrower Choice and Adverse Selection to Fintech

- ▶ A borrower compares

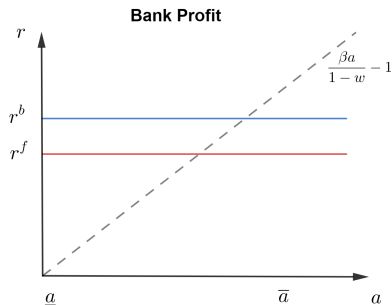
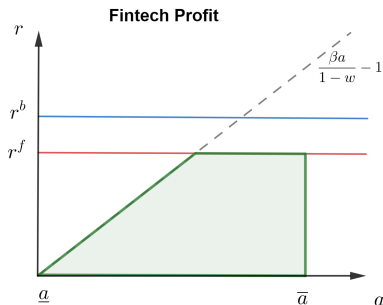
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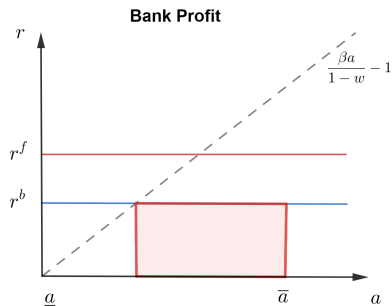
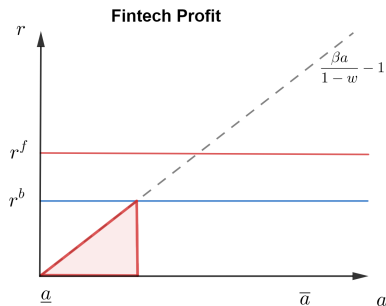
$$r^b \text{ vs. } \min \left\{ r^f, R^f(a) \equiv \frac{\beta a}{1-w} - 1 \right\}$$

- ▶ In w , if $r^f < r^b$, all borrowers choose the fintech



Borrower Choice and Adverse Selection to Fintech

- ▶ If $r^f > r^b$, low- a borrowers choose the fintech and default.



- ▶ **Only fintech suffers from adverse selection**

Lender Payoffs

- ▶ ✓ Lender payoffs with fixed quotes r^b, r^f
- ▶ Lender payoff: **expected** quote from competitor
 - ▶ **Mixed strategy** $F^b(\cdot), F^f(\cdot)$
 - ▶ **Fintech's private info** $\mathcal{P}^w = \{A^i\}$ and customized offers

Equilibrium Definition

$w \geq 1 - \theta$: credit market equilibrium

1. Given the fintech's strategy, the bank solves

$$\max_{r^b(w) \leq R^b(w)} \pi^b(r^b; w)$$

2. Given the bank's strategy, the fintech solves

$$\max_{\mathcal{P}^f, w} \sum_{A^i \in \mathcal{P}^f, w} \mathbb{P}(A^i) \left[\max_{m^f(A^i), r^f(A^i)} m^f(A^i) \pi^f(r^f | A^i; w) \right] - C(\mathcal{P}, w)$$

3. A borrower (w, a) who receives two offers $\{r^b, r^f\}$ picks the lower offer

$$\min \left\{ r^b, \min \left\{ r^f, R^f(a) \right\} \right\}$$

Road Map

Model

Equilibrium: Coarse Learning

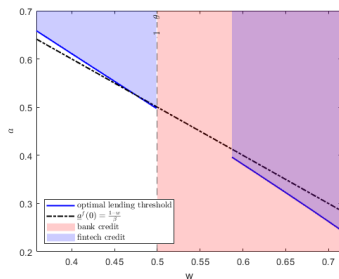
Implications

Coarse Learning

Theorem. Equilibrium is unique. The fintech's info acquisition

$$\mathcal{P}^{*f,w} = \{[\underline{a}, \hat{a}), [\hat{a}, \bar{a}]\},$$

and rejects borrowers with $a < \hat{a}$.

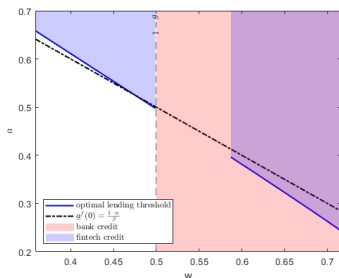


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and rejects borrowers with $a < \hat{a}$:



1. $w \geq 1 - \theta$: bank always lends, while fintech lends when $a \geq \hat{a}$. $\{r^b, r^f\}$ are randomized over $[\underline{r}, R^b]$. Both lenders make profits.
2. $w < 1 - \theta$: fintech offers $r^f = R^f(\bar{a})$ to borrowers $a \geq \hat{a}$.

Threshold \hat{a} : MR (profit from \hat{a}) = MC (info cost $c \log \left[\frac{1-G(\hat{a})}{G(\hat{a})} \right]$)

Intuition for “Single-Threshold” Structure

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where bank eqm strategy is $F^b(r) = 1 - \frac{r}{\hat{r}}$.

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► $w < 1 - \theta$ monopolist fintech: **debt contract**

► $R^f(\bar{a})$ to extract βa (effectively price discriminate ex post).

Fundamentally, No Winner's Curse to Bank

Why such eqm bank strategy?

Bank only reacts to r^f , not implied info \Rightarrow No info rent for fintech.

- ▶ E.g., Perfect info ($c = 0$) and customized $r^f(a)$: bank strategy same as in Thm 1.
- ▶ “Private value” provides good intuition
- ▶ $\Phi^b(a) = \theta + \gamma a$: bank loans endogenously riskless in competition

Uniqueness when $c > 0$

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Information: screen out vs. rent in canonical model (common value)

- ▶ Finer information induces strategic response: Milgrom and Weber (1982), He, Huang and Parlatore (2023)

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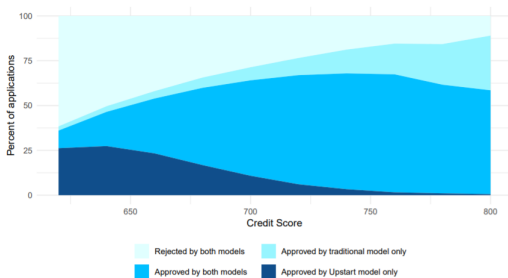
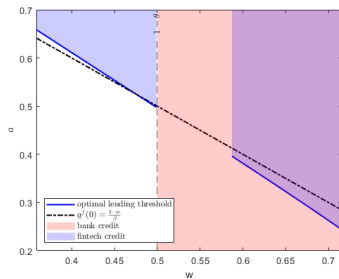
Equilibrium: Coarse Learning

Implications

Why is Unsecured Lending So Coarse?

- ▶ Lenders have a lot of data
- ▶ Unsecured lending to SME and consumers is **unsophisticated**
 - ▶ Business credit cards offers same rate to all customers etc.
 - ▶ Even on observably different dimensions (information is “free”)
- ▶ **My model explanation: the competing secured lending option**
- ▶ Empirical implication: customization depends on competition environment
 - ▶ Issuing loans
 - ▶ Later fees

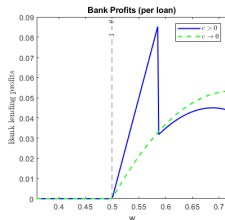
Specialization and Competition



Fintech Disruption

Improvement in fintech's lending technology

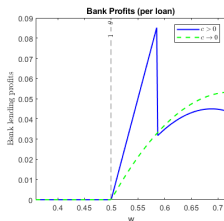
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- ▶ $\beta \uparrow$ Enforcement friction \downarrow : differentiation \downarrow .
- ▶ $c \downarrow$ Info technology \uparrow : better targeted lending.
 - ▶ Fintech screens out more “lemons” who are bank’s good customers.

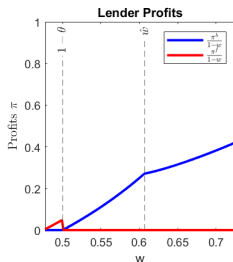
Long term co-existence

- ▶ Bank still earns profits, and building front-end infrastructure is costly

Early-Stage Operations and Expansion

$c = \infty$: early-stage fintech industry.

- **Proposition.** When the bank is present, fintech makes zero profits.

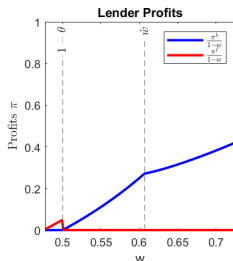


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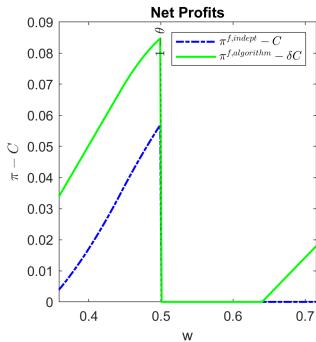
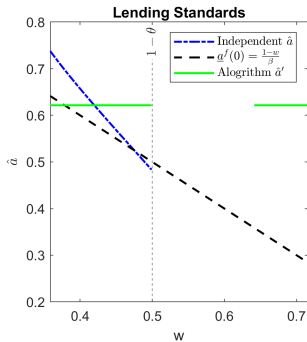
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Out-of-market forecasts greatly reduces learning cost.

- \mathcal{P} is algorithm to identify latent traits in new markets

$$C(\mathcal{P}^{w'}) = \begin{cases} \delta cl(\mathcal{P}^w) dw, & \text{if } \mathcal{P}^{w'} = \mathcal{P}^w, \text{ (unbanked } \rightarrow \text{ banked)} \\ cl(\mathcal{P}^{w'}) dw, & \text{if } \mathcal{P}^{w'} \neq \mathcal{P}^w. \end{cases}$$

Expansion and Out-of-market Forecast



Conclusion and Discussions

- ▶ Digital disruption
 - ▶ Payment fintechs, Bigtechs and platforms (Apple, Amazon, Walmart)
- ▶ This paper: collateral vs. data-based lending, **fintech's information is about screening**

Credit competition (asset side loan making)

- ▶ Sharpe (1990), Broecker (1990), Hauswald and Marquez (2003): Information improves credit extension and generates rents.
- ▶ Fintech lending with better info processing?
 - ▶ Open banking (He, Huang and Zhou, 2023) disrupting bank's data monopoly

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- ▶ IO implications more nuanced.
 - ▶ Bank invest in IT and fintechs.
 - ▶ Departures from canonical theory: This paper—each type of lending serves certain borrowers better. He, Huang and Parlato (2023)—soft information is becoming “hardened”.

Conclusion and Discussions

Funding side makes banks unique

- ▶ Kashyap, Rajan and Stein (2002), “sleepy depositors”, DSS (2017)
- ▶ Is bank’s liquidity service challenged?
 - ▶ U.S. payment companies, still “bank rail”.
 - ▶ China: 100% reserves of Alipay and Wechat Pay (narrow banking).
- ▶ Value of traditional credit/maturity transformation
 - ▶ Rise of market-based intermediation: in the retail side, fintechs.
 - ▶ Fintechs are “servicers”; large players like Alibaba relies on ABS (before regulation).
 - ▶ New bank charters are difficult: Square—ILC, SoFi—OCC chartered.