

Strategic Money and Credit Ledgers

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Introduction

- Historically, credit and payment systems were not only bank-centric.
(E.g. grain trade in early modern England used a “bills-of-exchange” system.)
- But the system that has emerged is based on collateralized bank lending
⇒ problems with financial exclusion, particularly in developing countries.
 - Credit requires a well functioning legal system to seize and value collateral.
 - Sales revenue for SMEs is not collateralizable.
 - Prevents new businesses from starting because they lack collateral.
- Digital ledgers & BigTech platforms reopen interest in non-bank arrangements.

Q. Can new technology be used to create an uncollateralized credit system in a country with weak contract enforcement?

This Talk

- **FinTech vision:** put payments & loans on digital record keeping system ("*ledger*")
 - Producers pay for inputs with uncollateralized IOUs on the ledger.
 - When producers sell outputs, the ledger automatically allocates revenue to repay IOUs.
- **Practical difficulty:** need to *incentivize ledger use* (and disincentivize cash use).
 - Otherwise, agents can sell goods on the side for “cash” and avoid ledger monitoring.
 - Problem: the universal liquidity of cash payment.
- **BigTech platform:** can *force ledger use* and set up an IOU system. Why?
 - Platform can block cash trades on its marketplace, which disincentivizes cash holding.
 - Crowds out private cash trades (and “tokenizes” the economy).
 - Particularly effective in high inflation environments.
 - Other arrangements (e.g. banks, crypto, supply chains) cannot work as successfully.
- **Policy makers:** worry about *platform rents*, walled gardens, and interoperability.

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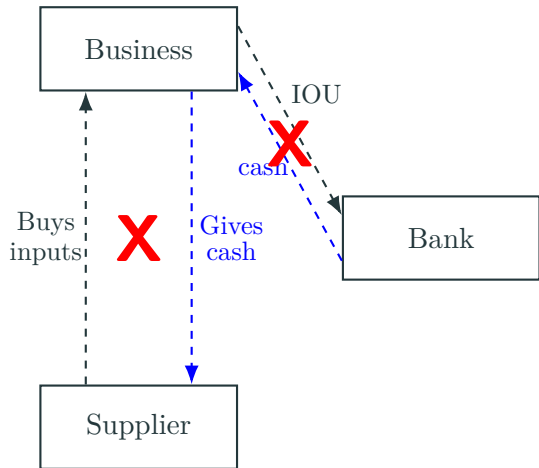
Conclusion

Framework: Businesses Need Credit to Purchase Inputs

- Consider a world with businesses that need to purchase inputs from suppliers. E.g.
 - Farmers purchasing seeds or supplies,
 - Small textile manufacturers purchasing in cloth,
 - Tourism operator purchasing transportation, or
 - Small or medium enterprises (SMEs) more generally.
- Businesses are small/young without existing wealth or collateral
⇒ Need to issue IOUs or get credit to buy inputs.
- However, imperfect legal system for contract enforcement.
⇒ Hard to pledge future output to purchase inputs.

Collateralized Bank Lending: is Not Possible

Today



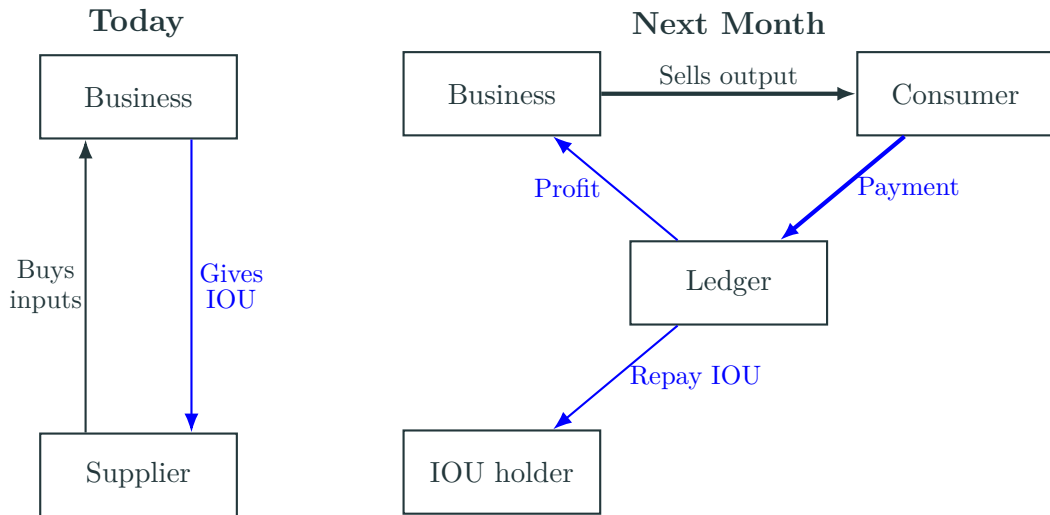
- Business has no collateral.
- So, cannot get resources from a bank to purchase inputs.
- It needs a way to credibly promise future sales revenue.

FinTech Vision: Move Onto a Digital Recording System (“Ledger”)

- A ledger is simply a digital record keeping system with:
 - Token or asset balances: wealth held by different agents using ledger.
 - Contracts: coded instructions for executing transactions conditional on information.
 - Information: that has been provided to the ledger.
- FinTech vision is conduct financial payments through the ledger.
- So, the ledger can automatically use sales revenue to settle IOUs.

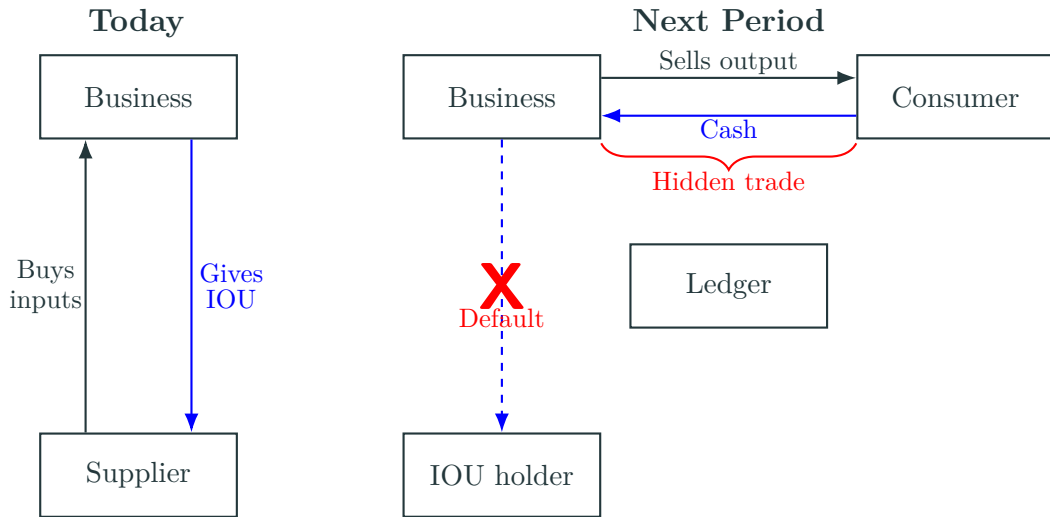
Idea: moving all payments & contracts into one “ecosystem” ensures IOU repayment.

FinTech Vision: Payments and Contracting Through a Ledger



What can go wrong with the FinTech vision?

Cash Payments Lead to Default



Case Study: FinTech in India

- [Rishabh and Schäublin, 2021] studies FinTechs and debt repayment in India.
- Finds that non-performing borrowers:
 - Drop their non-cash sales, right after loan disbursal, by 18%.
 - Divert about 11% of their transactions right after disbursal
- Argues that: *“By persuading their customers to not pay ... using the lender’s POS but with alternative means of payments (e.g. cash), a merchant can circumvent the automatic repayment to the payment company.”*

Can a BigTech platform “*rescue*” the FinTech vision?

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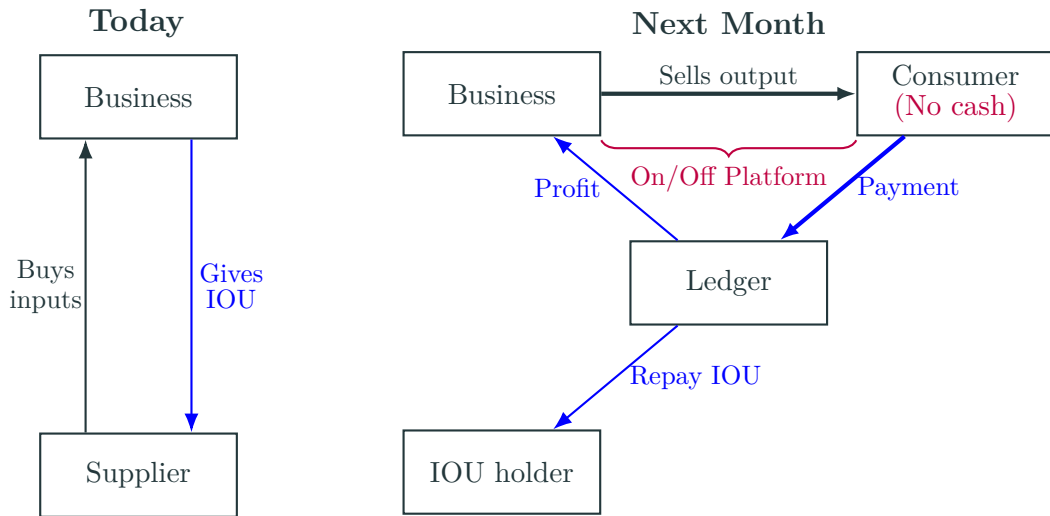
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Platform-Ledger Economy: Platform Controlling Trading & Ledger

- Same framework as before but with a trading platform.
- There are now two **trading technologies** for connecting goods traders:
 - **Private platform (p)** that is controlled by profit maximizing operator
 - **Off the platform (o)** - open public marketplace.
- Platform provides the trading technology *and* the settlement ledger:
 - Prevents agents from making payments using cash
⇒ **stored cash is not “universally liquid” anymore**
 - Charges markup $\mu > 0$ (or offers subsidy $\mu < 0$) when agents trade on the platform.

Outcome: If sufficiently many traders use the private platform and the markup is sufficiently low, then agents stop holding cash.

Platform Breaks Liquidity of Cash And Forces Trade Through Platform



Intuition: Platform Ledger Crowds Out Cash Trades

- Imagine you are producer looking to sell your goods privately for “cash” and default.
- You can only do this if there is a counterparty who has stored a “suitcase of cash”.
- I.e., your ability to default depends on *other agents*’ choice of payment technology.
- Even though the platform only controls *some* trades,
 - ...it can disincentive *all* agents from holding “cash” by blocking its use on platform,
 - ...which effectively shuts down the possibility of default side trades,
 - ...so the only option in all trades is to use the monitored ledger system.

A platform *can* set up a system on uncollateralized IOUs
but *will* it do so?

Q. Will The Platform Set up Ledger? A. Only if it is Very Large

- (i) *If the platform controls a sufficiently large fraction of trade, it sets the maximum markup μ that is incentive compatible with full production and no default:*
 - Platform internalizes that creating an IOU market leads to more trade and fees.
- (ii) *If platform controls a sufficiently small fraction of trade, then it does not set up a ledger to enforce contracts.*
 - Platform would need to subsidize trade to make platform exclusion sufficiently costly to discourage cash holdings.

Only a dominant trading platform will set up the ledger and expand contracting
...and it uses its market power to charge high markups.

Case Study: Chinese BigTech

- E.g. China's My Bank of Alibaba ecosystem [Liu et al., 2022]
- 98% uncollateralized, small loans
- Easy to apply, short-term liquidity needs (repaid before maturity)
- Financial inclusion: young/first-time borrowers with short credit history, rural areas

1. Ledgers are only useful if they are “backed”.
(Then the ledger system works like in [Kocherlakota, 1998].)
2. Crowding out (universality of) “input good” payments eliminates “side-trading”
(Addresses problems in [Jacklin, 1987], [Farhi et al., 2009].) [CBDC with privacy]
3. Platform enables uncollateralized IOUs to be enforced w/o repeated interaction
(Addresses [Holmström and Tirole, 1998], [Kiyotaki and Moore, 1997])
4. Natural monopoly: only large platform w/ ledger, incentivizes IOU repayment.

What are the potential *policy* and *regulatory* responses?

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1. Public ledger to settle payments (e.g. “CBDC” or broad FedNow).
2. Regulated competition between platform ledgers.
3. Regulator forces exchange rate/interoperability between platform ledger and cash/CBDC.

1. Public Ledger Extension (e.g. “CBDC” or broad FedNow)

- Now, the government offers a public ledger technology to settle trades. Options:
 - (i) **Private “payment” CBDC**: only provides payment settlement & respects agent privacy,
 - (ii) **“Smart” CBDC**: ...also records and settles contracts.
- If the government provides a private “payment” CBDC and the platform cannot block CBDC (no “walled garden”), then platform will not setup an IOU system.
- If the government creates a “smart” CBDC and eliminates physical cash, then all contracts are enforced and optimal production occurs.

Trade-off: efficient payment system vs efficient contracting system.

2. Competing Ledger Extension: Regulation

- **Two platforms** $n \in \{1, 2\}$, no open public marketplace
 - Each platform potentially manages ledger, and
 - Each platforms choose a markup μ^n
- All transactions are observed by one of the two platforms:
 - Default: write contract on ledger n , then default/trade on other platform $\neg n$.
- The regulator:
 - Allows platforms to cooperate on excluding defaulting agents.
 - Does not allow the platforms to collude on setting markups at times.

Outcomes: (i) the larger trading platform provides a monopoly ledger,
(ii) the other platform pays fees for using the ledger,
(iii) consumer surplus is higher but markups are not eliminated.

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Q. What About Other Potential Ledger Providers?

- **Q. Can a bank or credit bureau** provide a ledger with uncollateralized loans?
 - Not in our environment.
 - Key feature of the trading platform: it can break the universal liquidity of cash by restricting its use on the platform.
 - Banks or credit bureaus cannot similarly influence the liquidity of cash.
- **Q. Can an industrial supply chain** (e.g. automotive industry) provide a ledger?
 - Platform can write IOUs denominated in broad consumption basket.
 - Industrial supply chain concerns only a subset of goods (e.g. things related to cars) .
 - ⇒ IOUs are not denominated in overall consumption basket.
 - ⇒ “Exchange rate risk” when IOUs repay (e.g. cars to broad consumption basket) .
 - Broader sectors (e.g. agriculture) would be more able to set up a ledger.

Q. What Are The Macroeconomic Implications?

1. General equilibrium interest rate movements “lock-in” agents to the platform
 - High markups encourage agents to trade on the public marketplace.
 - This increases demand for cash, which limits loan supply and increases the interest rate.
 - This partially offsets the markup disincentive to trade on platform.
2. Loose monetary policy increases the profitability of the platform’s IOU system
 - $\uparrow$ money growth $\Rightarrow$ $\downarrow$ return on money $\Rightarrow$ money is less competitive with ledger IOUs.
 - $\uparrow$ Platform/ledger currency market power $\Rightarrow$ they can charge higher markups.

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- Can **BigTech platform “rescue” FinTech vision** of uncollateralised lending by operating centralized, record keeping device (= ledger)?
 - When *can* and when *will* it do so? (easier in high inflation environment)
- **Policy and Regulation:** platform rent extraction vs. credit extension
 - **CBDC design:** private vs. smart CBDC ledger
 - **Competition** between platforms (but single ledger)
 - Regulate token-cash **exchange rate** (“lower walls of walled garden”)
- **Other ledger operators:** Banks? Industry platform?
- Macro-lessons:
 - higher mark-ups raises equilibrium interest rates
 - interaction with monetary policy/inflation
 - loss of control

Thank you

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