

A Theory of Payments-Chain Crises

By Saki Bigio

Discussion by Julian Kozlowski, FRB St. Louis

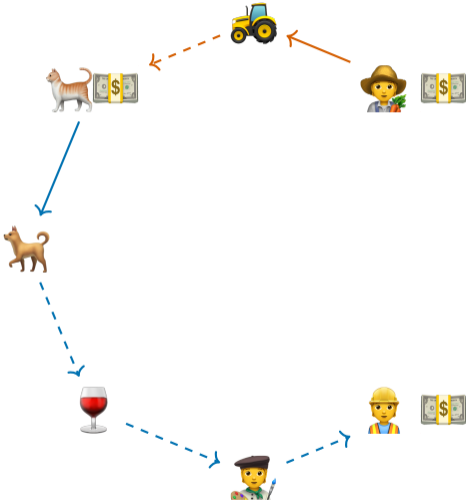
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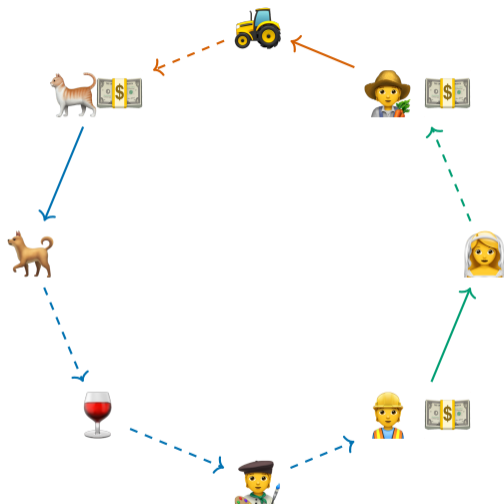
Payment Chains



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- ▶ This paper provides a beautiful [theory of payment chains](#)
- ▶ Note the close connection with textbook example of [velocity of money](#)




A Theory of Payment Chains

Order types:

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- ▶ **Chained:** paid after the client receives a payment from other transaction (μ)

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Frictions:

- ▶ Production starts once there is **proof of funds**
 - ▶ **Spot order:** starts immediately
 - ▶ **Chained order:** proves funds only after the execution of previous payment
- ▶ **Limited commitment** provokes a delay in fund transfers
 - ▶ After the customer proves funds to start an order, the funds are only released after the fraction $1 - \delta$ order's output is inspected

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Crises: Incorporate the payments-chain network into a business cycle model

Three Comments

1. Trade credit
2. Velocity of money
3. Quickpay

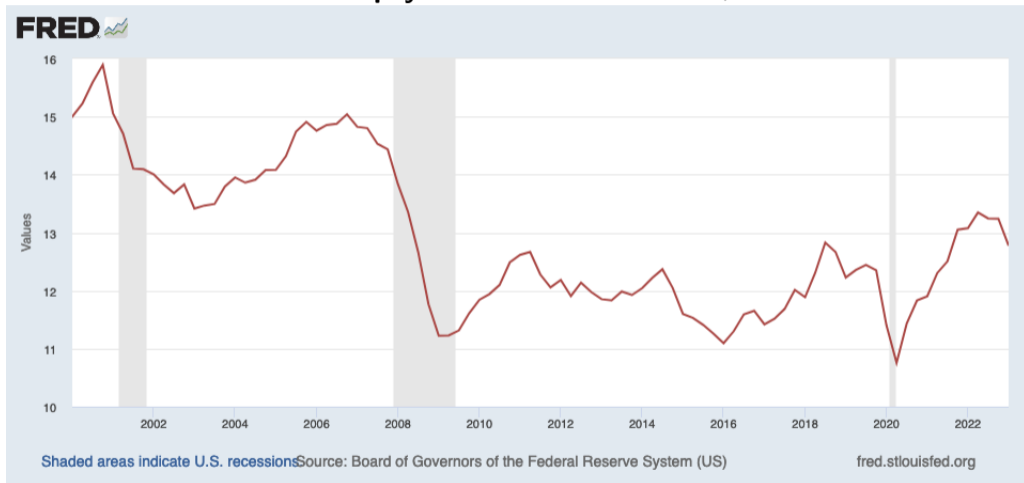
1. Trade Credit

Payments chain literature focus on **trade credit**

- ▶ Trade receivables are 17% of financial assets, trade payables are 13% of liabilities
- ▶ 2/3 of global trade is supported by trade credit
- ▶ Firms rely on trade credit as financing (Demirgüç-Kunt Maksimovic 2001)
- ▶ Importance of trade credit for the propagation of corporate bankruptcy (Jacobson Von Schedvin 2015)

Trade Credit Declines in Recessions

Trade payables to total liabilities, %



Trade Credit

- ▶ What is the connection between chained orders and trade credit?
- ▶ Business-cycle model: chained payments interpreted as account receivables

Trade Credit

- ▶ What is the connection between chained orders and trade credit?
- ▶ Business-cycle model: chained payments interpreted as account receivables
- ▶ I would like to interpret $1 - \delta$ as the cost/delay due to trade credit
 - ▶ Actual time cost? Or financing cost?
- ▶ Advantage: Available to map the model to data and facts on trade credit
- ▶ If not, what exactly captures δ and how can we measure it?

International Trade Credit

- ▶ Riskier destinations use **cash**, safer countries finance using **trade credit**
- ▶ Variation in δ across countries may explain this fact

Financed by	Cash in Advance consumer		Trade Credit producer		Letter of Credit bank	
Top 1	Ukraine	58.3	Denmark	92.9	China	32.0
2	Kenya	50.0	Finland	92.3	India	32.0
3	Nigeria	45.5	Norway	90.0	Jordan	30.7
Bottom 1	United Kingdom	2.5	Ukraine	16.7	Norway	0.0
2	Sweden	5.6	Lebanon	18.0	Costa Rica	0.0
3	Belgium	6.3	Kenya	23.0	Puerto Rico	0.0
Mean		22.2		60.3		10.8

Note: FCIB International Credit & Collections Survey. Share of firms that state Cash in Advance, Open Account, or Letter of Credit as top payment method for transacting with the country in 2010 for 59 countries. Schmidt-Eisenlohr (2013).

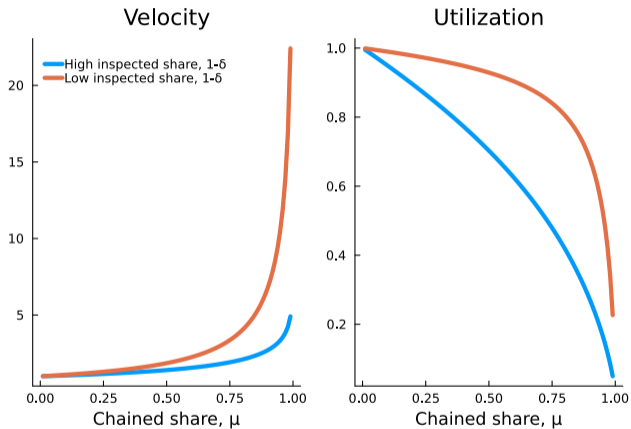
2. Velocity of Money

- ▶ μ is the share of chained orders \rightarrow Money supply = $1 - \mu$
- ▶ Velocity of money, $Mv = PY$

$$\mathcal{V}(\mu, \delta) = \frac{\mathcal{Y}(\mu, \delta)}{1 - \mu} = 1 + \frac{\mu}{1 - \mu} \mathcal{A}(\mu, \delta) \geq 1$$

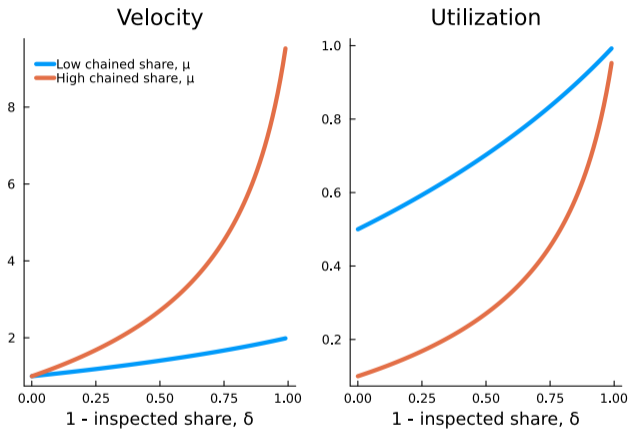
- ▶ Note: Aggregate output \mathcal{Y} also is capacity utilization

Velocity & Utilization



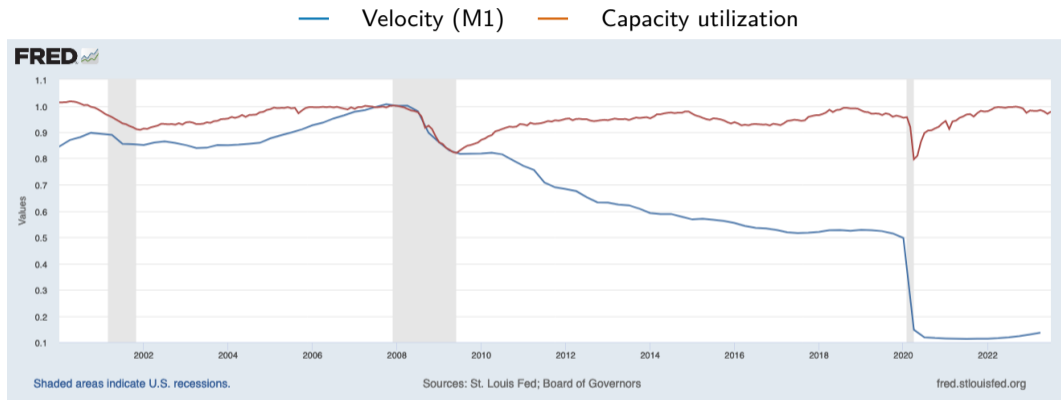
- ▶ An increase of chained orders (higher μ): lower utilization and higher velocity

Velocity & Utilization



- ▶ An increase of inspected share (lower δ): lower utilization and lower velocity

Velocity and Capacity Utilization Decrease in Recessions



- ▶ Consistent with an increase of the inspected share during recessions
- ▶ **Payment-Chain Crisis:** How does the full model respond to a δ shock?

What Happened during the Financial Crisis?

- ▶ Costello 2020, JPE “*Credit Market Disruptions and Liquidity Spillover Effects in the Supply Chain*”
 - ▶ Suppliers **tighten financing terms** to retailers and **require cash on delivery**
 - ▶ Detailed transactions data, Almeida et al. 2012 identification
 - ▶ Fraction of long-term debt coming due during the initial phase of the financial crisis
 - ▶ Suppliers impacted by a shock:
 - ▶ Reduce the volume of credit to downstream customers
 - ▶ Respond to the shock first by cutting trade credit, followed later by a cut in sales
- ▶ Evidence suggests that **during a payments-chain crisis** there is more cash transactions and less credit.
- ▶ Can this be an endogenous response to a shock to the inspected share, δ ?

3. Fiscal Policy: when the government pays matters & Quickpay

- ▶ Quickpay reform of 2011: Accelerated payments to a subset of small business contractors of the U.S. federal government, cutting the time taken between invoice approval and payment from 30 to 15 days.
- ▶ Barrot and Nanda 2020, JF “*The Employment Effects of Faster Payment: Evidence from the Federal Quickpay Reform*”
 - ▶ Treated firm: Employment growth
 - ▶ Crowding out of non-treated firms' employment
 - ▶ Overall net employment effect is positive
 - ▶ Employment effect is close to zero in tight labor markets
 - ▶ General-equilibrium effects of large-scale interventions can lead to lower aggregate outcomes depending on labor market conditions

A Theory of Payments-Chain Crises

- ▶ Well-crafted theory of payment chains
- ▶ Large body of empirical evidence supports the theory
- ▶ May be worth adding some of this data to the paper
- ▶ Explore variation/shocks to δ as triggers of payment-chain crises