

Corporate Liquidity Supply from Non-Bank Intermediaries and the Real Effects of Factoring

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Overview of Factoring

- Firms rely on **short-term financing instruments** to operate under **fixed payment obligations** and **volatile revenues**

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 - Example: wage payments vs sales volatility and trade credit
 - Working capital requirements constrain **production**
- One type of short-term financing is **factoring**, where firms sell their accounts receivable at a discount to obtain immediate liquidity
 - BIS: Global growth, both in absolute terms and in relative importance within non-financial corporations
 - Increasing share of non-bank financial intermediaries vs banks in Brazil
- **Question:** How (and why) do changes in factoring supply affect real outcomes?

Research Question and Methodology

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② **Identification Strategy: Micro-Elasticities**

- **IV Local Projection:** Drawing on the financial market structure, we isolate shocks to factoring supply by examining flows into mutual funds structured to purchase firms' receivables

③ **GE Model: Macro-Elasticities.**

Main results

Factoring is the primary form of working-capital finance in Brazil, and is especially important for smaller and riskier firms

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IV local projection: dynamic responses to a 1 pct pt decrease in the factoring interest rate

- ① **Real activity:** Revenue increases by 6.1 log pts and input expenditure by 3.6 log pts, tapering to 2 log pts after several months
- ② **Input-flexibility substitution:** Firms use fewer temporary employees (2.1 log pts) and more permanent employees (1.1 log pts) in the short run, and more of both in the long run
- ③ **Limited spillovers:** Small effects on trade-credit terms and limited supply-chain spillovers; interest rates on other forms of working capital decline slightly, but borrowed quantities do not change

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Model-based aggregate effects

Model rationalizes firms' behavior: cash-flow volatility → factoring as liquidity for constrained firms, and a macro model implies aggregate responses of 0.3–0.5 pp to an economy-wide 1 pp reduction in the factoring interest rate.

Literature

Empirical estimates of real effects of credit supply shocks: Chodorow-Reich (2014); Zwick, Mahon (2017); Huber (2018); Greenstone et al (2020); Alfaro et al (2021)

- We show a new mechanism (substitution of working capital financing with input expenditure flexibility) and study the main type of financing for small & medium firms

Trade credit: Murfin, Njoroge (2014); Jacobson, von Schedvin (2015); Barrot (2016); Reischer (2020); Garcia-Marin et al (2020); Amberg et al (2021); Gofman, Wu (2022); Min, Shan, Wang (2022); Billett et al (2022); Demir et al (2022); Adelino et al. (2022); Esposito, Hassan (2023); Ersahin, Gianetti, Huang (2023); Bocola, Bornstein (2023)

- For constrained firms, the factoring interest rate is the marginal cost of liquidity through trade credit, and we are the first to show how the factoring interest rate affects trade credit terms

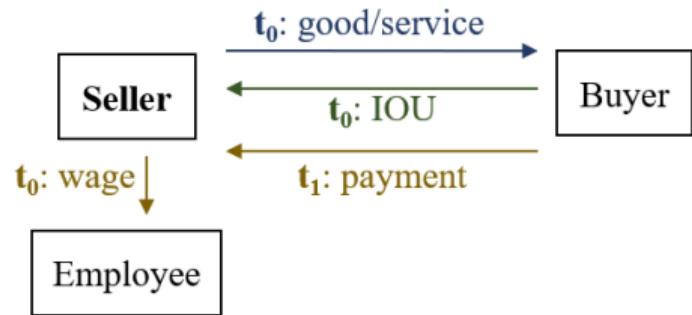
Working capital financing: Kalemli-Özcan et al (2014); Restrepo, Cardona-Sosa, Strahan (2019); Frank, Goyal, Shen (2020); Lian, Ma (2020); Chodorow-Reich et al (2022); Greenwald, Krainer, Paul (2023) Tunca, Zhu (2018); Kouvelis, Zhao (2018); Chen et al (2020); Kouvelis, Xu (2021); Yu (2023); Martins, Schiozer, Linardi (2023); Luck, Santos (2023); Bottazzi et al (2023); Almeida et al (2024, 2025); Amberg et al (2024)

- We are the first to use comprehensive data on all firms in an economy to study working capital financing, and the first to provide causal estimates of factoring interest rate on firms' decisions and outcomes

Nonbank credit supply: Fleckenstein et al (2021); Gopal, Schnabl (2022); Chernenko, Erel, Prilmeier (2022); de Fiore, Gambacorta, Manea (2023) Fund flows: Coval, Stafford (2007); Edmans, Goldstein, Jiang (2012); Wardlaw (2020); van der Beck (2022); Dou, Kogan, Wu (2023); Darmouni, Siani, Xiao (2023)

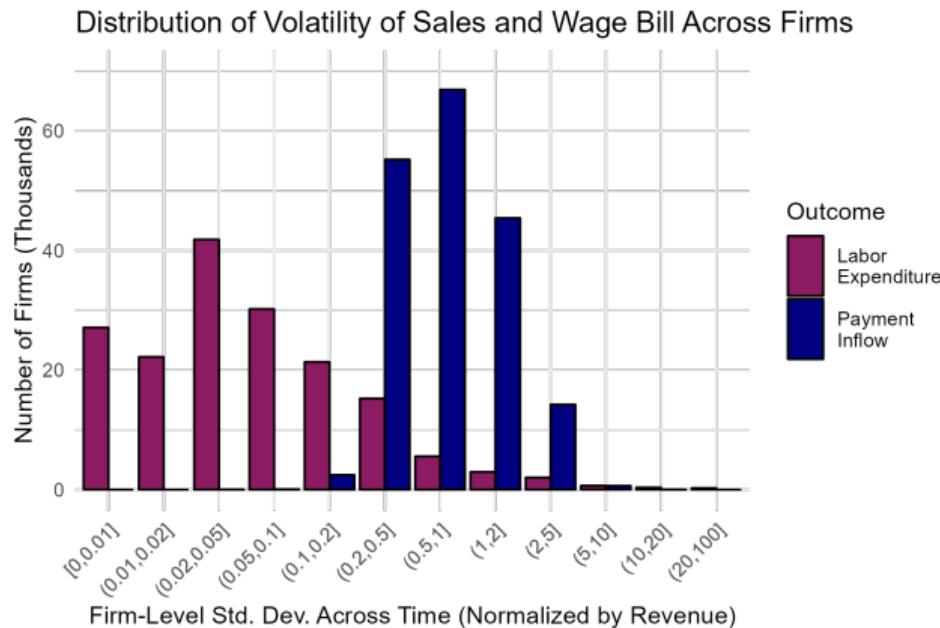
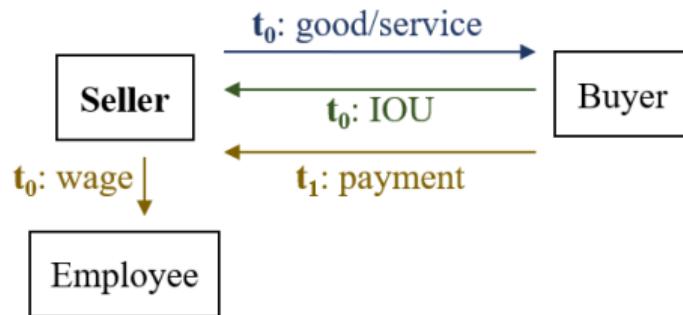
- Receivables fund flows shift factoring prices and liquidity provision

Cash Flow Volatility



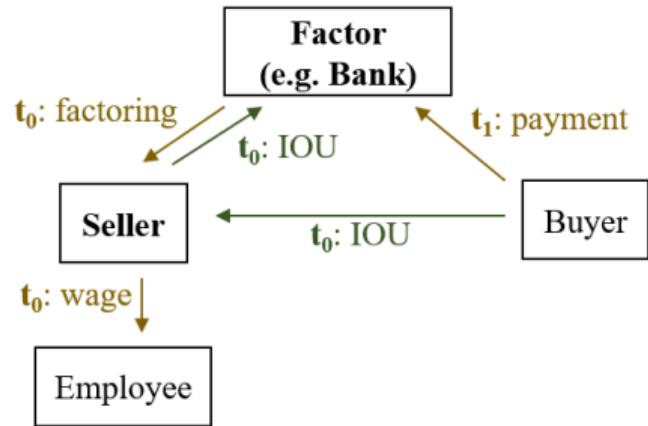
Cash Flow Volatility

Volatile inflows vs rigid payroll create liquidity risk that distorts production and labor choice

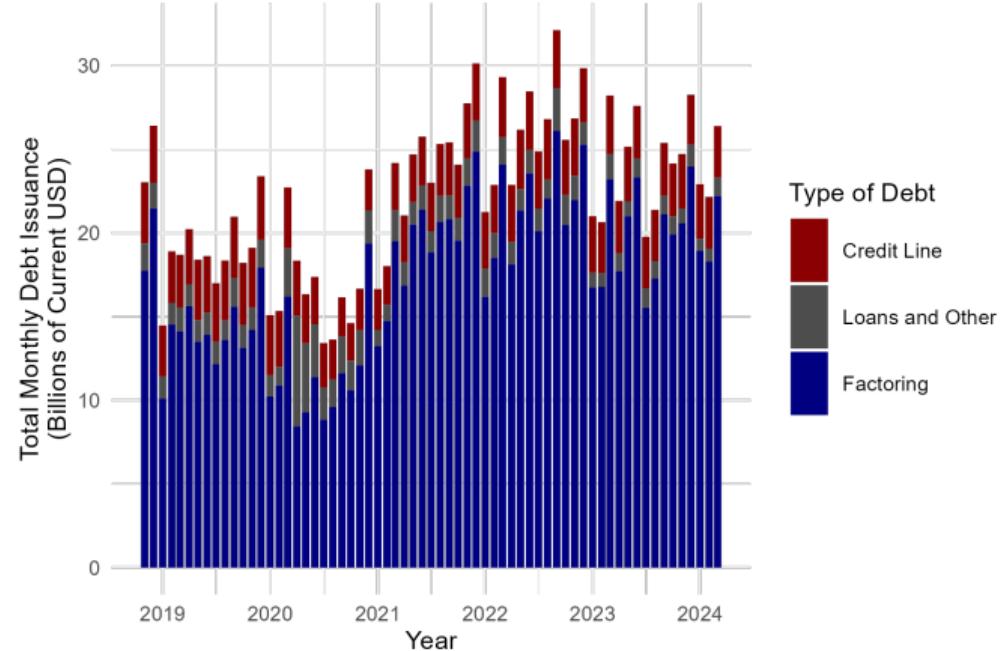
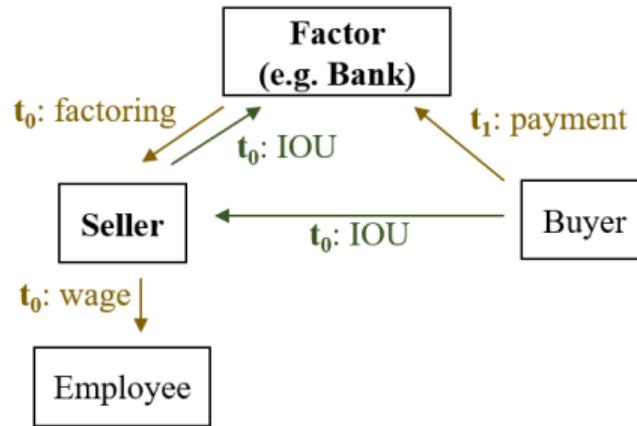


Firms use working capital financing (WCF) to resolve this demand for liquidity

Factoring Provides Liquidity by Advancing Cash on Receivables



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Factoring is the main tool firms use to stabilize cash flow

By credit score

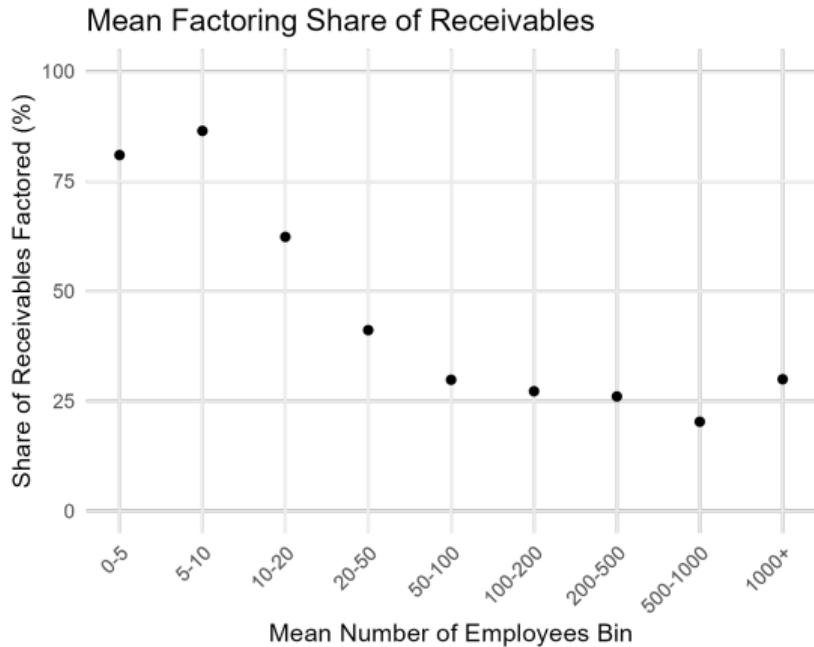
With trade credit

Worldwide

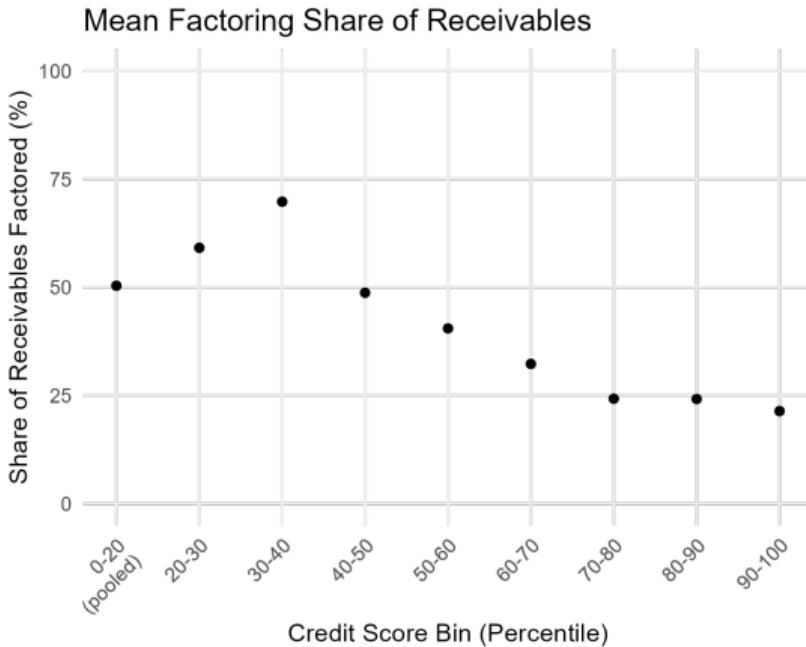
Trade finance

Small and Low Creditworthiness Firms Factor the Most

Factoring shares by firm size (left) and credit score (right)



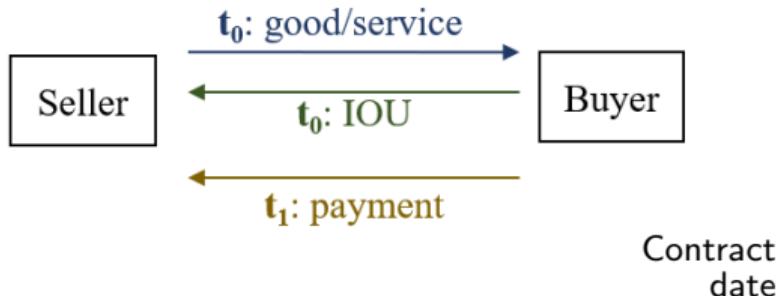
(a) by decile of firm size proxied by wage bill



(b) by decile of firm credit score

Background on Trade Credit in Brazil

In Brazil, most firm-to-firm transactions use boletos, the invoice payment rail, specifying the amount, the *contract* date, and the *due* date of payment from the buyer to the seller



		RECEBO DO PAGADO			
 Santander	033-7	03399.54349			72610000006000
Beneficiário		Agência / Código do Beneficiário	3669/5434203	Espécie	Quantidade
Adyen a serviço de [merchantName]				REAL	Nº do número
Numero do documento	CPF / CNPJ	Data de Vencimento		Válor Documento	R\$ 60,00
(-) Descontos / Abatimentos	(+) Outras despesas	(+) Mais / Multa	(+) Outros acréscimos	(+) Valor Corrigido	
[shopperName] [socialSecurityNumber]		Autenticação Biométrica			
Instruções		[shopperStatement]			

Corte no linka shor

 Santander		033-7	03399.54349	72610000006000
Local de pagamento		Vencimento		
Pagável em qualquer banco até o vencimento		24/08/2017		
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Adyen a serviço de [merchantName]		3689/5434203		
Data do Documento	Nº do Documento	Esfera e Doc.	Auxílio	Data Processamento
27/07/2017		DM	N	27/07/2017
Nome do Banco	Carteira	Exploração	Quantidade	Valor
	102	REAL		R\$ 60,00
Instruções (busto de responsabilidade do Beneficiário)				
[shopperStatement]				
<input type="checkbox"/> Descontos / Abatimentos <input type="checkbox"/> Outras deduções <input checked="" type="checkbox"/> Mora / Multa <input type="checkbox"/> Outros acréscimos <input type="checkbox"/> Valor Cobrado				
Pagador: [shopperName] [socialSecurityNumber]				



Author manuscript; available in PMC 2013 January 1.

FICHA DE COMPENSACÃO

Trade Credit, Payments, Factoring, and Bank Credit Data

We construct a comprehensive transaction-level dataset of boletos from the Central Bank of Brazil (BCB), from November 2018 to March 2024

- 21.4 billion transactions, 204 thousand sellers to firms, 470 thousand buyers

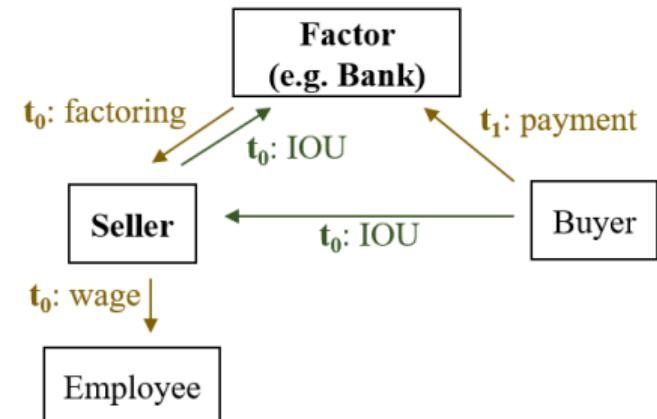
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- 21.4 billion transactions, 204 thousand sellers to firms, 470 thousand buyers

Along with comprehensive transaction-level data for bank transfers (TED), instant payments (PIX), and credit operations (SCR), also from the BCB

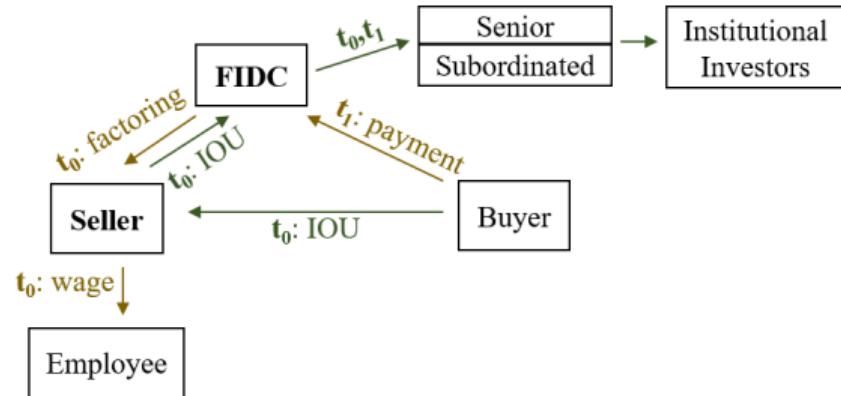
- **We create a comprehensive data on factoring for all firms in the Brazilian economy**



Identifying shocks to factoring supply: Receivables Funds (FIDCs)

FIDCs are mutual funds whose primary assets are receivables purchased directly from firms (suppliers)

- 73% of assets are receivables, most of the remainder are Brazilian T-bills
- 762 FIDCs, mostly multi-sector; 251k suppliers sell receivables to FIDCs



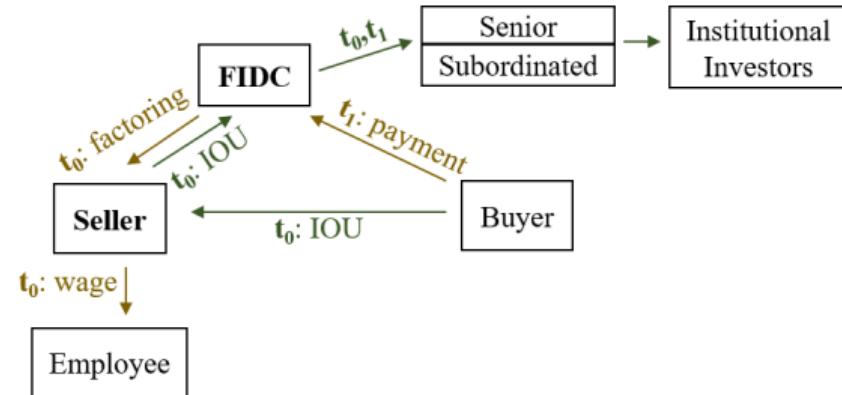
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FIDCs securitize shares to institutional investors

- Similar to mortgage-backed CDOs in the US



[FIDC spreads have decreased over time](#)

[FIDC vs banks summary table](#)

[FIDC size](#)

[FIDC diversification](#)

[FIDC IV construction](#)

[Monetary policy response](#)

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[Factoring by Firm Size & Credit Score](#)

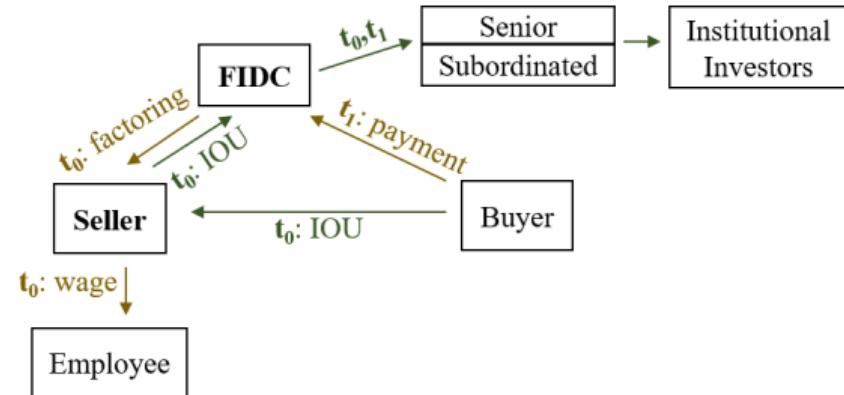
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We construct flows to FIDCs, and firms' exposure, using:

- Fund by share class by month data on returns and NAV from CVM
- Transaction-level fund operations from BCB

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Estimation: IV Regression on the Firm-Month Panel

How does a supply shock to working capital financing, through the factoring interest rate, impact firms' trade credit terms, production decisions, and firm performance?

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Causal equation: β_h is the effect of a 1 pct pt increase in factoring interest rate $r_{j,t}^{\text{Fac}}$ on firm j 's outcomes $y_{j,t}$ in month $t + h$:

$$y_{j,t+h} = \alpha_{j,h} + \alpha_{t,h} + \beta_h r_{j,t}^{\text{Fac}} + \varepsilon_{j,t+h}.$$

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Shift-share IV: institutional investors' flows to FIDCs drive expected purchases $e_{j,t}$ of firm j 's receivables

- Quasi-exogenous flows (e.g. from liquidity-driven asset reallocation by institutional investors)
- Endogenous exposure, sticky across time

Constructing the Shift-Share IV: Flow-Induced Purchases

Since FIDCs' assets have short maturity, we use flow-induced purchases and "issuance" rather than trading (literature uses bond or equity funds)

- $x_{j \rightarrow f, t}$ is fund f 's purchases of firm j 's receivables
- $X_{f, t}$ is fund f 's total purchases of assets
- $F_{f, t}$ is the net inflow to fund f : $F_{f, t} := \frac{\text{NAV}_{f, t} - \text{NAV}_{f, t-1}}{\text{NAV}_{f, t-1}} R_{f, t}$

Fund by factoring type by month exposure $e_{j, t}$ to funds' flows is

$$e_{j, t} := \sum_f \underbrace{\frac{x_{j \rightarrow f, \underline{t}}}{X_{f, \underline{t}}}}_{\text{Shares}} \underbrace{F_{f, t}}_{\text{Shifts}}$$

where \underline{t} denotes the cumulative mean until time t (also tested n -month rolling windows; similar magnitudes with less precision)

First Stage: Seller firm's factoring interest rate $r_{j,t}^{\text{Fac}}$ on normalized exposure $e_{j,t}$ to fund flows

$$r_{j,t}^{\text{Fac}} = \alpha_j + \alpha_t + \gamma_1 e_{j,t} + \varepsilon_{j,t}$$

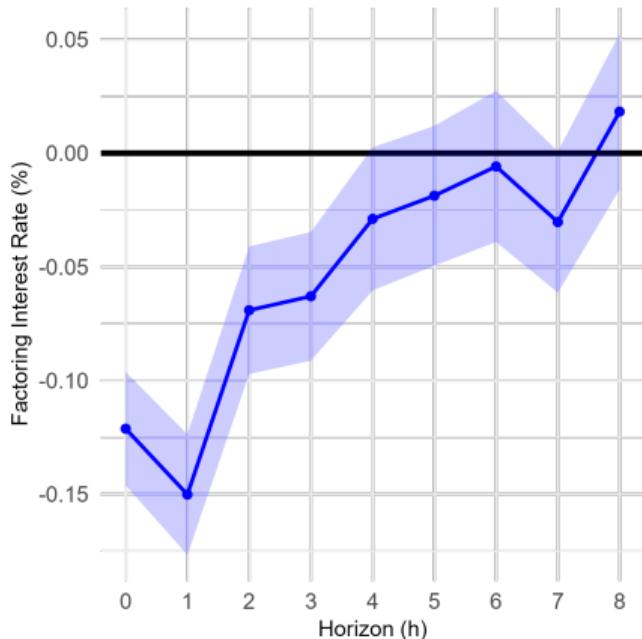
First Stage	
IR Factoring Issuance (All)	
(1)	
$e_{j,t}$	-0.1212*** (0.0127)
Num. Obs.	3,956,731
Num. Firms	322,087
Num. Months	65

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; · $p < 0.1$

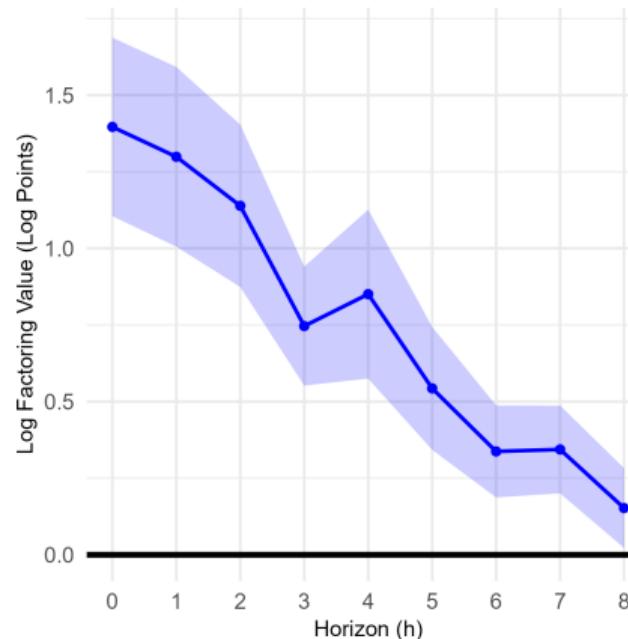
Notes: These regressions use data from the Central Bank of Brazil. The dataset is at the firm by month level, with firm and month fixed effects, and **standard errors clustered at the firm level are in parentheses**. If a firm does not factor in a given month, then there is no interest rate, and the observation is dropped from the regression.

Dynamic Effects: Local Projection First Stage

Dynamic first stage: how does the receivable demand shock $e_{j,t}$ pass through to the factoring interest rate and quantity (volume of receivables sold)? $r_{j,t+h}^{\text{Fac}} = \alpha_{j,h} + \alpha_{t,h} + \beta_h e_{j,t} + \varepsilon_{j,t+h}$



(a) Factoring Interest Rate

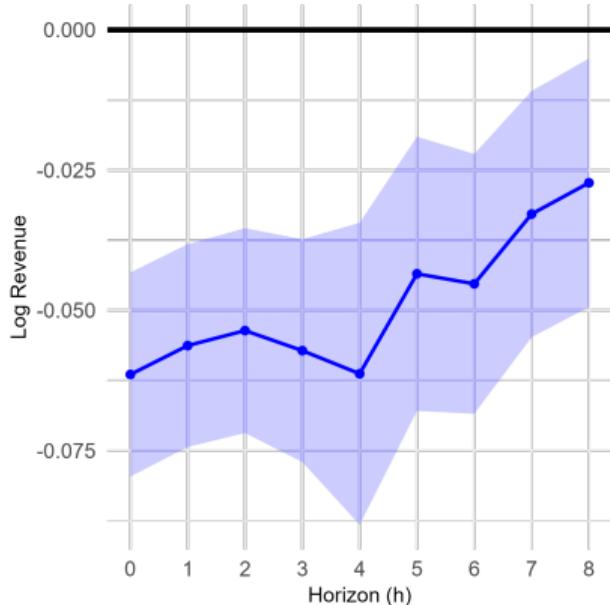


(b) Factoring Quantity

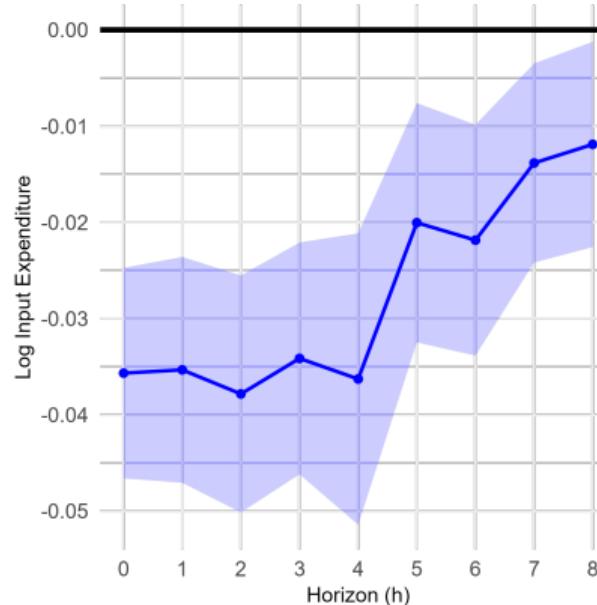
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Dynamic Effects: IV Local Projection for Revenue and Expenditure Outcomes

Dynamic IV regressions: how do firms' revenue and input expenditure at horizon $h \geq 0$ respond to the receivable demand shock, scaled by the time t impulse? $y_{j,t+h} = \alpha_{j,h} + \alpha_{t,h} + \beta_h r_{j,t}^{\text{Fac}} + \varepsilon_{j,t+h}$



(a) Log Revenue (IV)

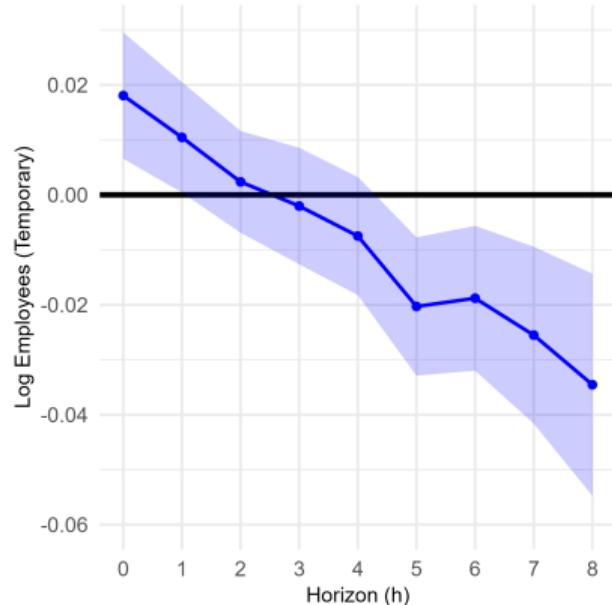


(b) Log Input Expenditure (IV)

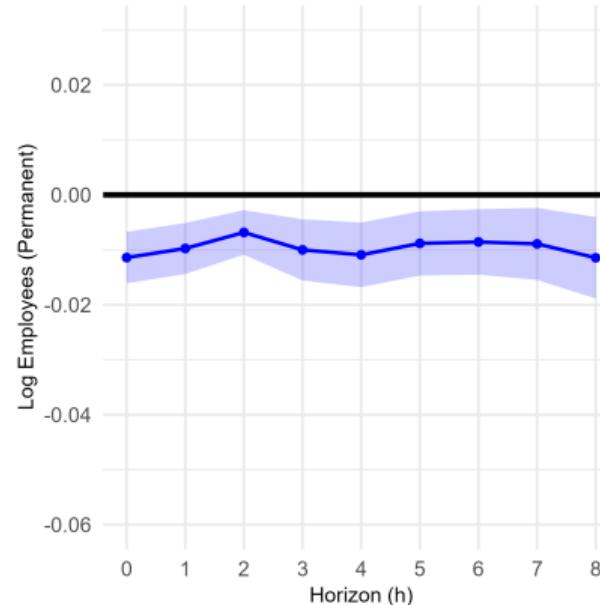
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Dynamic Effects: IV Local Projection for Labor Demand Outcomes

Dynamic IV regressions: how do firms' labor demand at horizon $h \geq 0$ respond to the receivable demand shock, scaled by the time t impulse? $y_{j,t+h} = \alpha_{j,h} + \alpha_{t,h} + \beta_h r_{j,t}^{\text{Fac}} + \varepsilon_{j,t+h}$



(a) Log Temporary Labor (IV)

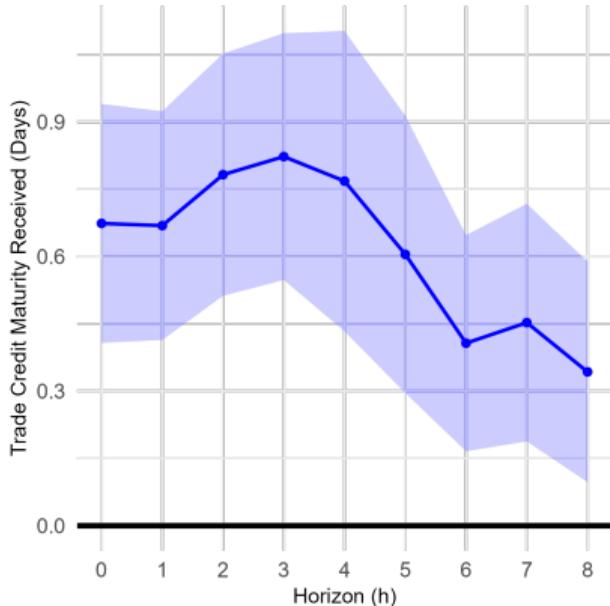


(b) Log Permanent Labor (IV)

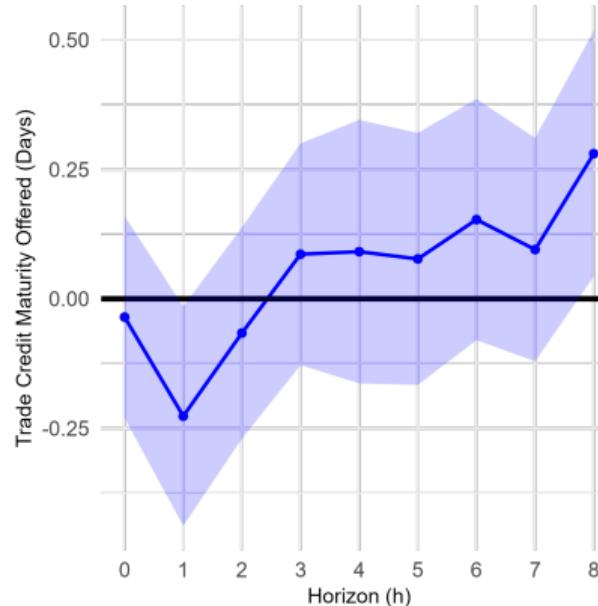
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Dynamic Effects: IV Local Projection for Trade Credit Outcomes

Dynamic IV regressions: how do firms' trade credit terms at horizon $h \geq 0$ respond to the receivable demand shock, scaled by the time t impulse? $y_{j,t+h} = \alpha_{j,h} + \alpha_{t,h} + \beta_h r_{j,t}^{\text{Fac}} + \varepsilon_{j,t+h}$



(a) Log Trade Credit Received (IV)



(b) Log Trade Credit Offered (IV)

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Heterogeneity Overview

We test two dimensions of firm heterogeneity:

- IV regressions with interactions of firm type (size, credit score, HHI) θ_k

$$y_{j,t} = \alpha_j + \alpha_t + \sum_k \beta_k \hat{r}_{j,t}^{\text{Fac}} \theta_{j,k} + \varepsilon_{j,t}.$$

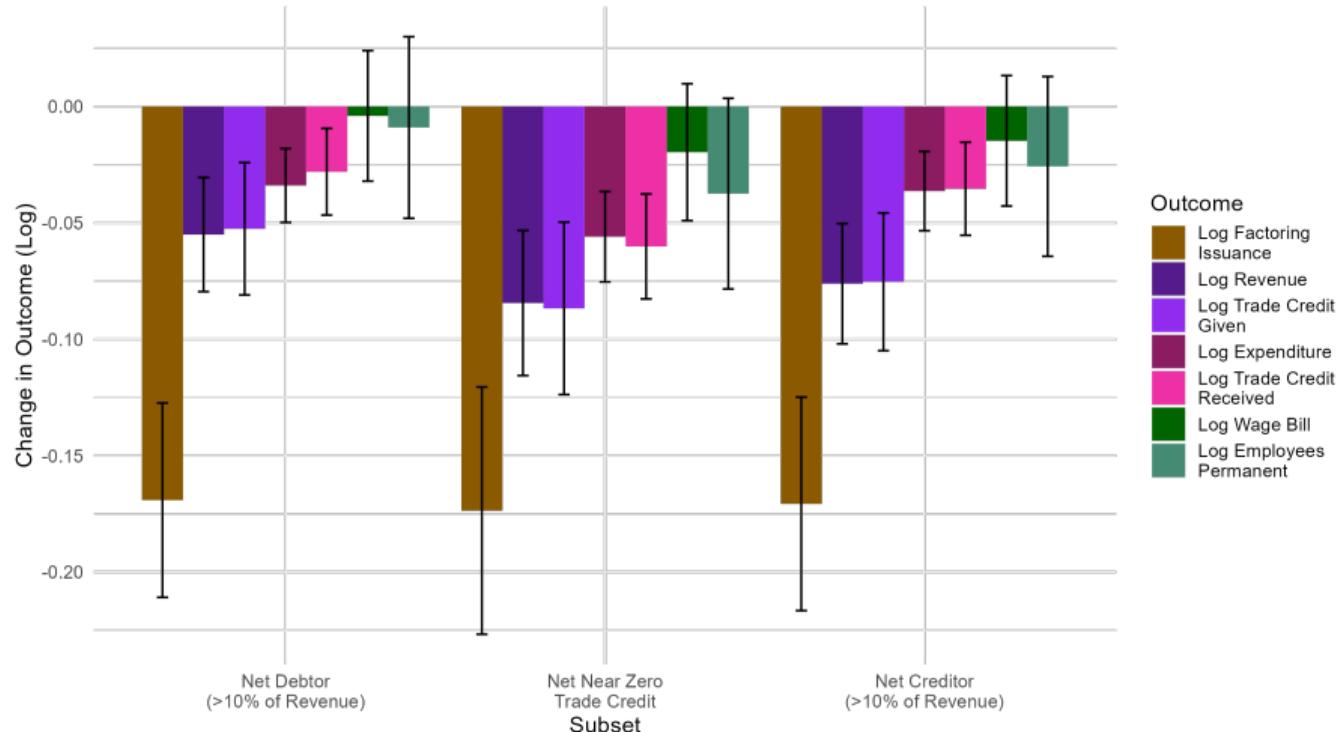
- IV quantile regressions: how do firms at different points in the outcome distribution respond to the factoring interest rate?

$$Q_{\tilde{y}_{j,t}}(\tau | \tilde{\hat{r}}_{j,t}^{\text{Fac}}) = \beta(\tau) \tilde{\hat{r}}_{j,t}^{\text{Fac}} + \varepsilon_{j,t}(\tau)$$

where \tilde{y} and $\tilde{\hat{r}}$ are de-means on firm and month FE

No significant heterogeneity in interaction regressions; in the quantile regressions for revenue and input purchase, the bottom quantiles had larger effects

Heterogeneity By Firm Type: Interaction with Trade Credit Position



Maturity

Size

Sector

Credit Score

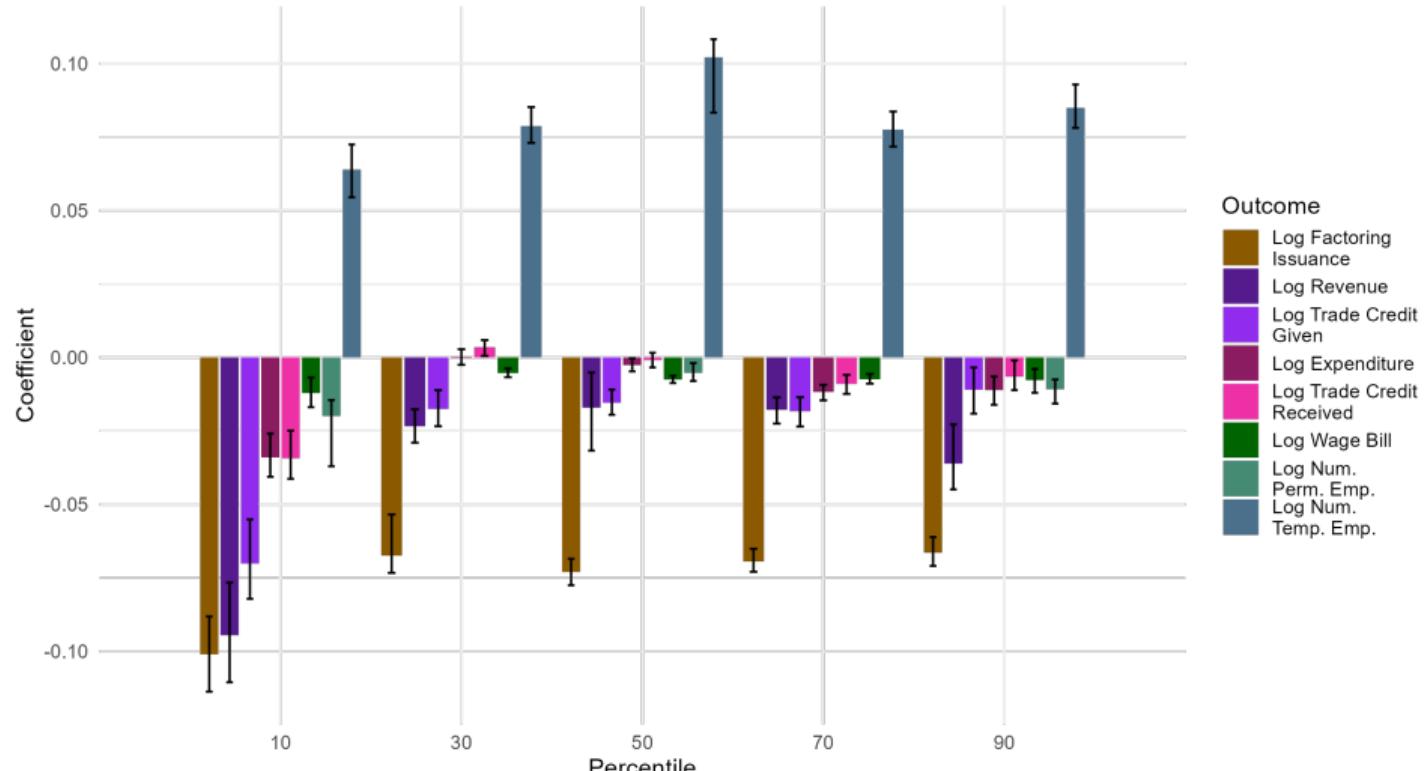
Trade Credit

HHI

Bilateral HHI

Buyer Risk

Quantile Regression: Main Outcomes



This graph uses Koenker (2005) rank inversion for SEs.

Canay (2011) SE

Maturity

Hours Worked

Summary of Empirical Results and Overview of Model

One percentage point decrease in factoring interest rate causes

- Large increases in factoring (15.4 log pts), revenues (6.1 log pts), and intermediate input expenditure (3.6 log pts).
- Wage bill rises by 0.56 log pts, decomposed into differential changes across labor contracts: permanent labor increases by 1.1 log pts, and temporary labor decreases by 2.1 log pts.
- *Heterogeneity:* Estimates are similar across all metrics of firm heterogeneity, except that net creditors of trade credit have larger effects compared to net debtors

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The purpose of the model is to

- ① Rationalize the micro-level empirical estimates
- ② Compute responses of aggregate outcomes to a change in the aggregate factoring spread
 - Innovation in digital technology (e.g. receivables tokenization), central bank policy (e.g. registries), and rising investor demand for receivables portend a continued decrease in factoring spreads

Model Setup: Firm Block

- **Firms:** A unit continuum of monopolistically competitive firms producing differentiated goods across two periods, morning (0) and afternoon (1)
- **Production Function:** Firms use a Cobb-Douglas production function over labor ℓ and intermediate inputs x with labor share α

$$\text{Aggregation: } Y_t = \left(\int_{j=0}^1 y_{jt}^{\frac{s-1}{s}} dj \right)^{\frac{s}{s-1}}, \quad P = \left(\int_{j=0}^1 p_j^{-(s-1)} dj \right)^{-\frac{1}{s-1}} \equiv 1.$$

- **Payments:** Wages are always upfront, so are afternoon sales
 - Morning sales: Trade credit with payment in afternoon
- **Liquidity Shocks:** ϵ_j share of morning receivables y_{j0} does not arrive, with firm type $\zeta_j = \mathbb{E}_0 \epsilon_j$

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Model Setup: Labor and Financing

- **Labor Types:**

- Permanent labor ℓ^P : Fixed for both periods, more productive by ψ in afternoon.
- Temporary labor ℓ_t^T : Adjustable at each period t .

- **Labor Composite:** Constant elasticity of substitution $\sigma > 1$ with share ς on permanent labor:

$$\ell_{jt} = \left(\varsigma (\psi_t \ell_j^P)^{\frac{\sigma-1}{\sigma}} + (1 - \varsigma) (\ell_{jt}^T)^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}.$$

- **Factoring:**

- Firms factor B_j^F in the morning with credit limit varying with morning receivables y_{j0}
- Factoring interest rate R_j^F is based on the expected share ζ_j of shocked inflows; ζ_j is close to 0 for most firms

$$R_j^F = \frac{\beta^{-1} \mu^F}{1 - \zeta_j}.$$

Model Setup: Firm Problem in Morning

Taking as given wages $\{w^P, w_t^T\}$ and factoring interest rate R_j^F , choose ℓ_j^P and B_j^F along with other inputs to maximize expected firm value subject to cost of default η :

$$\max_{\{y_{jt}, x_{jt}, \ell_j^P, \ell_{jt}^T, B_j^F\}} \pi_j := \beta \mathbb{E}_0 [\pi_{j1} + \eta \mathbb{1}\{\pi_{j1} < 0\}] + B_j^F - \ell_j^P w^P - \ell_{j0}^T w_0^T,$$

$$\text{s.t. } B_j^F \leq \frac{p_j y_{j0}}{R_j^F},$$

$$B_j^F \geq \ell_j^P w^P + \ell_{j0}^T w_0^T,$$

$$\pi_{j1} := p_j y_{j1} - \ell_j^P w^P - \ell_{j1}^T w_1^T - P x_{j1} + \tilde{m}_{j1},$$

$$\tilde{m}_{j1} := (1 - \epsilon_j) (p_j y_{j0} - R_j^F B_j^F) - P x_{j0}.$$

where \tilde{m}_{j1} is a firm's residual cash in the afternoon from the morning, net of factoring and input purchase

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Model Setup: Firm Problem in Afternoon

Taking as given wages $\{w^P, w_t^T\}$, decisions made in morning $\{y_{j0}, x_{j0}, \ell_j^P, \ell_{j0}^T, p_j, B_j^F\}$, and shock realization ϵ_j , maximize residual profits

$$\begin{aligned} & \max_{x_{j1}, \ell_{j1}^T} \pi_{j1} := p_j y_{j1} - \ell_j^P w^P - \ell_{j1}^T w_1^T - P x_{j1} + \tilde{m}_{j1}, \\ & \text{s.t.; } y_{j1} = \tilde{\ell}_{j1}^\alpha x_{j1}^{1-\alpha}, \\ & \tilde{\ell}_{j1} = \left(\omega (\psi \ell_j^P)^{\frac{\sigma-1}{\sigma}} + (1-\omega) (\ell_{j1}^T)^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}, \\ & \frac{p_j}{P} = \left(\frac{y_{jt}}{Y_t} \right)^{-\frac{1}{s}}, \\ & \ell_{j1}^T, x_{j1} \geq 0. \end{aligned}$$

where the $\frac{p_j}{P}$ equation is the standard CES FOC from the aggregator firm's objective function

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Model Setup: Household

Representative household, disutility $\xi > 1$ from labor, relative preference $\nu \in \mathbb{R}$ for permanent vs temporary labor

$$u_t(c_t, \ell_t^T) = \log(c_t) - \sum_{t=0}^1 \left[\frac{1}{\xi} (\ell^P + \ell_t^T)^\xi - \nu(\ell^P - \ell_t^T) \right].$$

Household problem:

$$\begin{aligned} & \max_{\{c_0, c_1, \ell^P, \ell_0^T, \ell_1^T\}} \log(c_0) + \beta \log(c_1) - \sum_{t=0}^1 \left[(\ell^P + \ell_t^T)^\xi + \nu (\ell^P - \ell_t^T) \right], \\ \text{s.t. } & c_0 + c_1 = 2\ell^P w^P + \sum_t \ell_t^T w_t^T, \\ & 1 = 2\ell^P + \ell_0^T + \ell_1^T. \end{aligned}$$

Model Equilibrium

Given model parameters, firms optimize in morning and afternoon, households optimize, and markets clear in each period:

$$Y_t = \left(\int_{j=0}^1 y_{jt}^{\frac{s-1}{s}} \right)^{\frac{s}{s-1}} = c_t + \int_{j=0}^1 x_{jt} \, dj,$$

$$\int_{j=0}^1 \ell_j^P \, dj = \ell^P,$$

$$\int_{j=0}^1 \ell_{jt}^T \, dj = \ell_t^T.$$

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Model Calibration

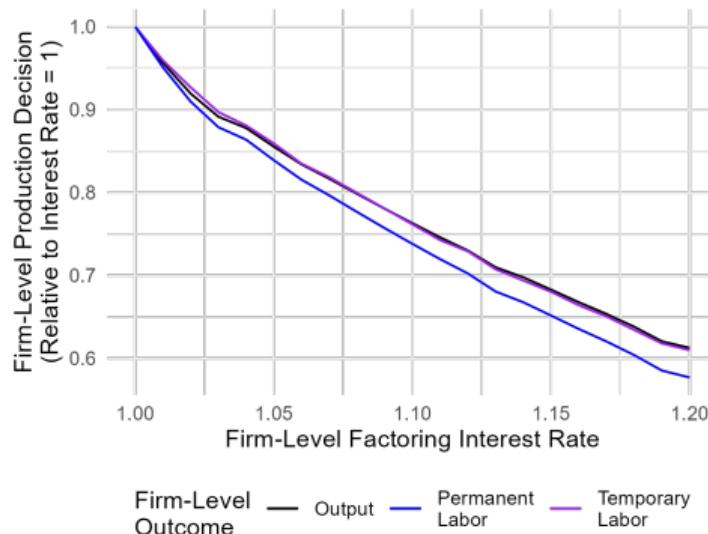
Parameter	Value	Description	Method
α	0.43	Cobb-Douglas labor	Data: Expenditure share
ψ	1.31	Gain to experience	Data: Ratio of existing to new hire wage for permanent vs temporary
μ^F	1.13	Factoring markup	Data: IR minus (default rate + 3-month T-bill)
σ	1.80	EoS permanent vs temporary labor	Data: Regression
ω	0.89	CES share parameter on permanent employees	Data: σ and model-derived moment
ν	0.009	Relative labor preference term	Data: model-derived moment
ξ	5.48	Exponential disutility of labor supply, equiv. to a Frisch elasticity of 0.22	BCB
s	11	EoS across differentiated goods	BCB
β	0.979	Discount rate between morning and afternoon	Data: 3-month T bill
η	0.25	Cost of default	Glover (2016).

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Model Results: Firm-Level (PE) vs Aggregate (GE)

On the left is the partial equilibrium, changing R_j^F while holding equilibrium outcomes constant



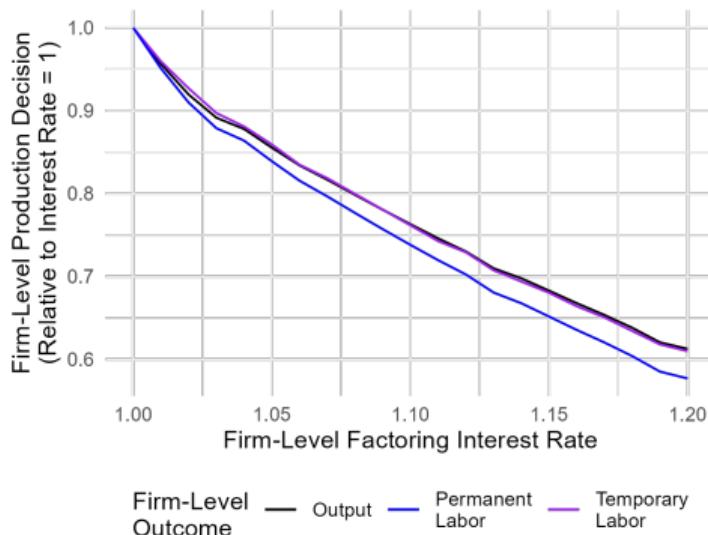
Factoring share

Heterogeneity

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Model Results: Firm-Level (PE) vs Aggregate (GE)

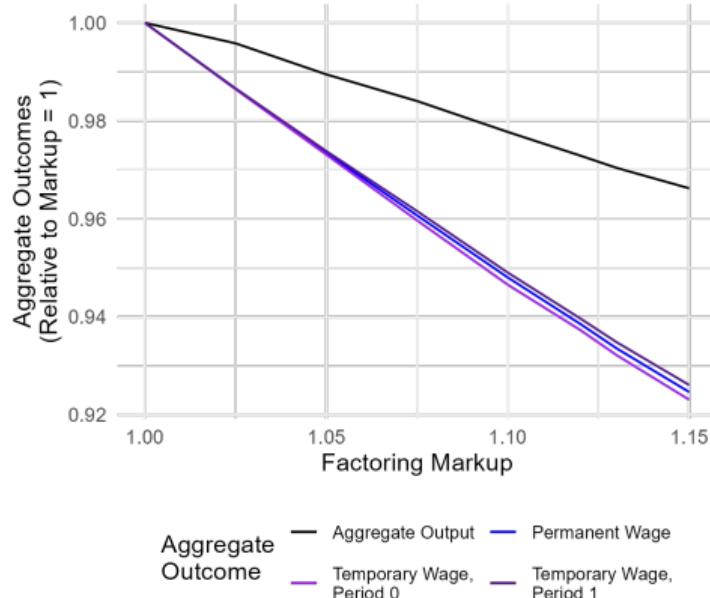
On the left is the partial equilibrium, changing R_j^F while holding equilibrium outcomes constant
On the right is the general equilibrium, changing the economy-wide factoring markup μ^F



Factoring share

Heterogeneity

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Conclusion

- Factoring is an important type of working capital financing for firms, especially small and credit-constrained firms
 - Factoring mitigates cash flow volatility and supports firms in extending trade credit despite financial constraints
 - Factoring spreads have decreased in Brazil alongside increased total FIDC AUM
- Regressions: A decrease in the firm-level factoring interest rate leads to large increase in firms' sales, with smaller increases in input purchases and substitution from temporary to permanent labor demand
- Model: Comparably large partial equilibrium effects to the regression estimates
 - General equilibrium effects of a decrease in the aggregate factoring spread are an order of magnitude smaller
- Future research will explore how ongoing policy reforms and fintech innovations affect the supply and demand of working capital financing

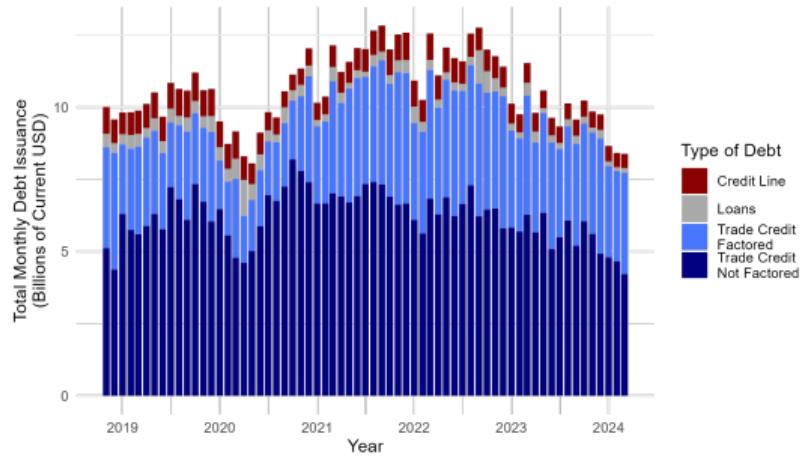
Factoring and Trade Finance

- Factoring differs from **letters of credit** (LoC), a guarantee from the buyer's bank without upfront payment
- Receivables-backed loans and reverse factoring (buyer-initiated) are less common
- Factoring is well-suited to tokenization and programmable payments
- In international trade, trade insurance and LoC (intermediated through ex-im banks) are more popular than factoring, although this could change with cross-border payment interoperability and standardization of contract enforcement

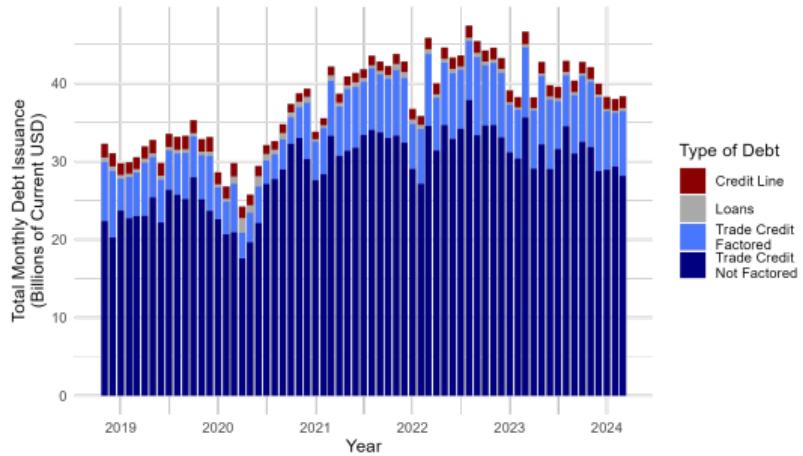
[Return to Factoring Definition](#)

Working Capital Financing Trend by Firm Credit Score

Firms with low credit score (left) factor a larger share of trade credit than firms with high credit score (right)



(a) Low Credit Score



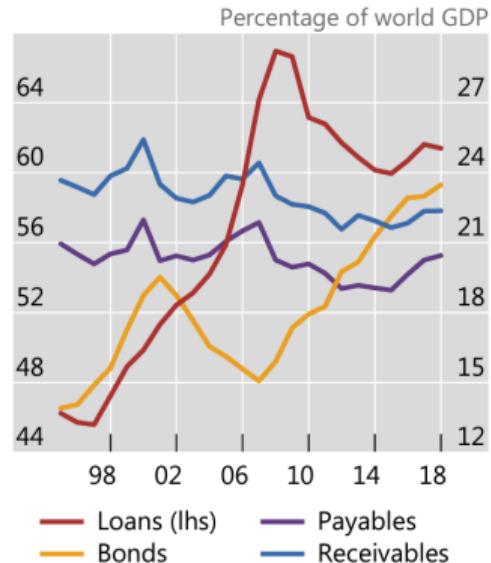
(b) High Credit Score

But all firms heavily rely on trade credit and factoring the receivables from trade credit

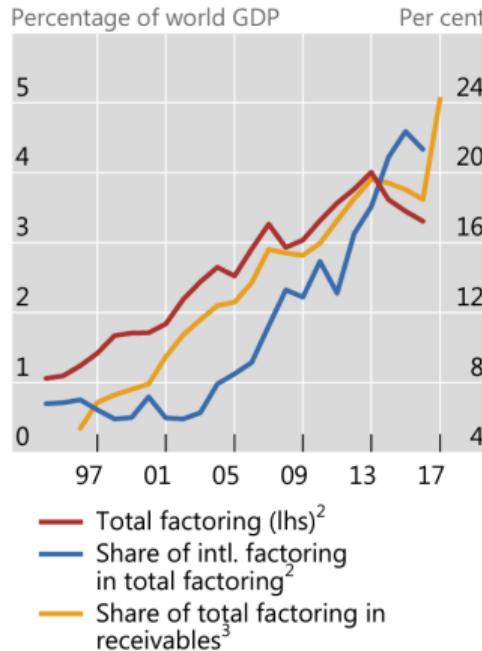
[Return to Overall Factoring Trend](#)

Trade Credit is Widely Used Worldwide, with Increasing Factoring Share

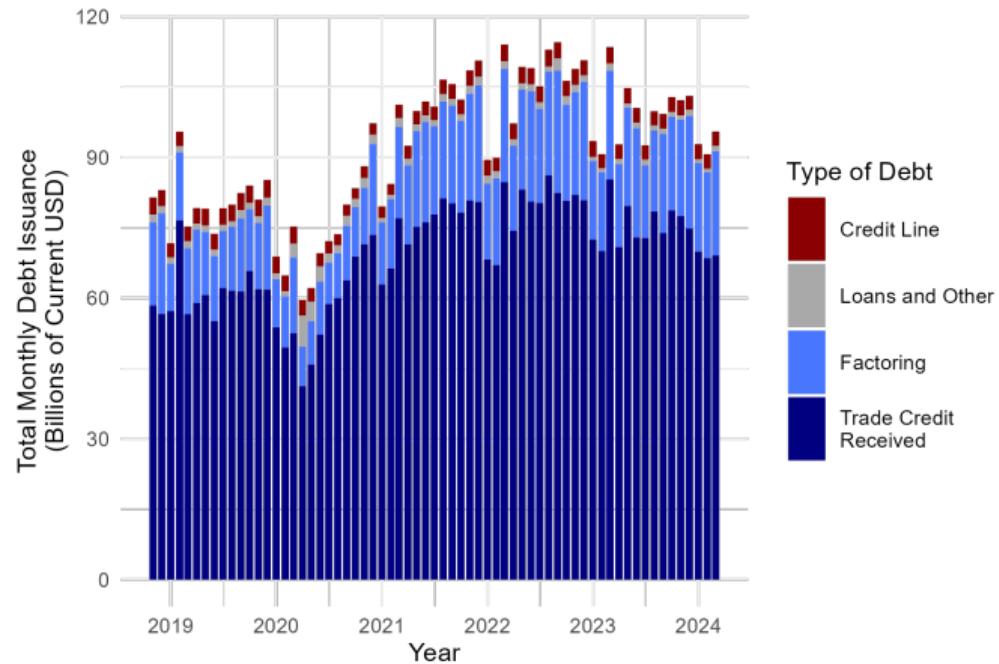
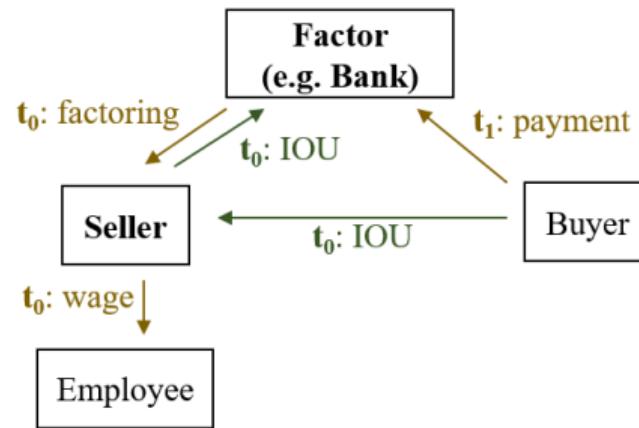
Trade credit, corporate loans and bonds¹



Evolution of factoring over time



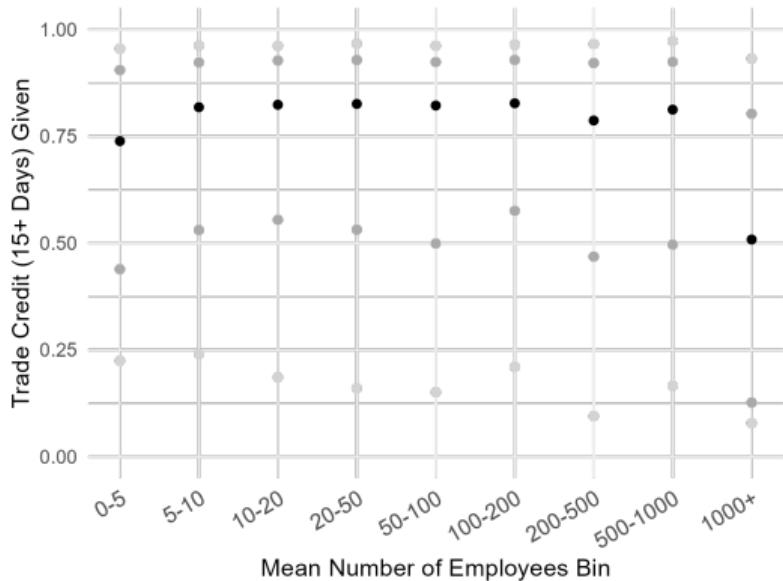
Factoring is the Sale of Accounts Receivable Arising from Trade Credit



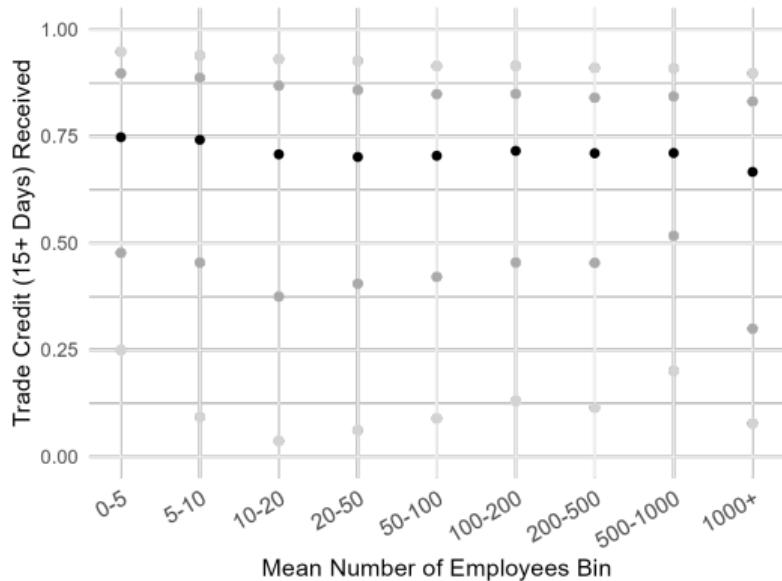
[Return](#)

Most Firms Across the Size Distribution Give and Receive Trade Credit

Dot Plot of Trade Credit (15+ Days) Given

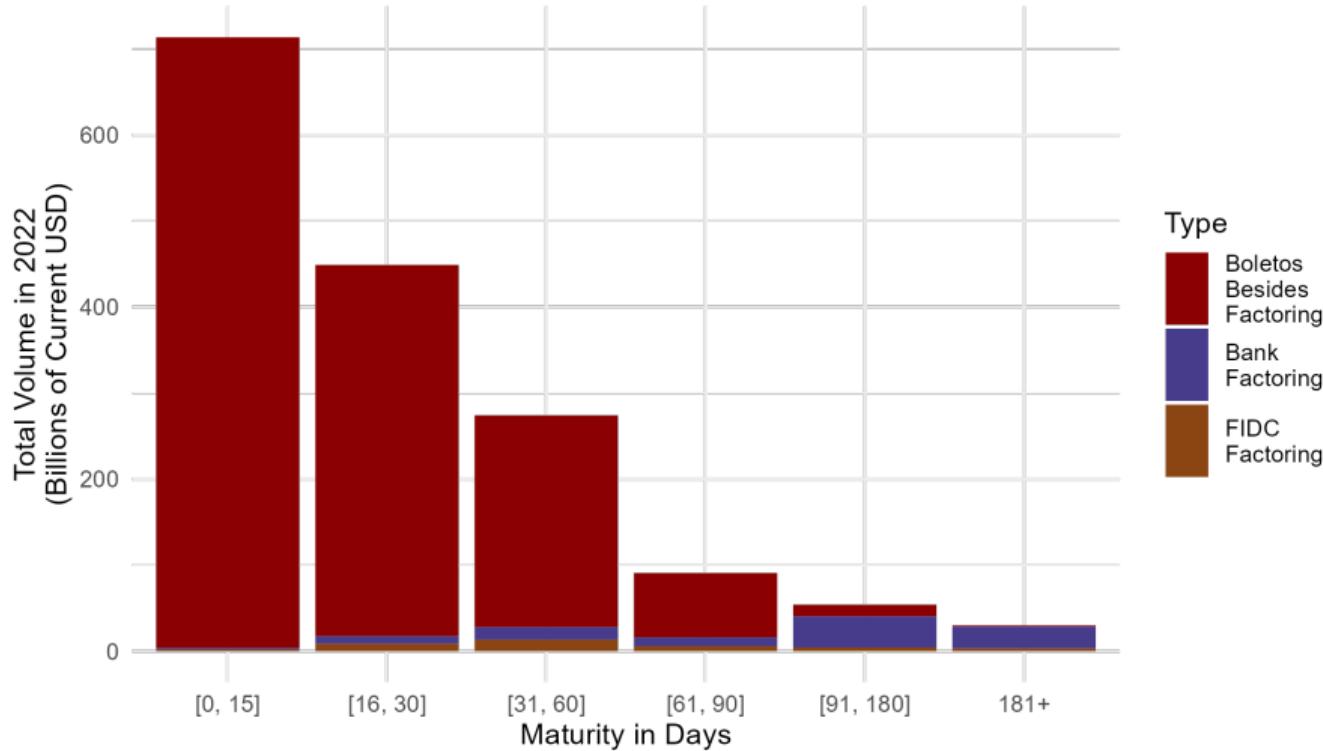


Dot Plot of Trade Credit (15+ Days) Received



Notes: These figures show the median (black), 25th and 75th percentiles (dark gray), and 10th and 90th percentiles (light gray) of the firm-level proportion of payments with maturity of 15+ days, aggregated by bin of firm-level employment.

Longer Maturity Receivables are More Likely to be Factored



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Annual means of trade credit and factoring:

	Mean Overall	Mean Small Firms	Mean Medium Firms	Mean Large Firms
<i>Panel A: Trade Credit Received</i>				
Volume (Million USD)	1.32	0.42	6.17	44.32
Maturity (Days)	30.36	33.99	29.67	28.22
<i>Panel B: Recourse Factoring</i>				
Volume (Million USD)	0.13	0.08	0.56	1.97
Interest Rate (%)	19.42	18.35	21.58	19.52
Maturity (Days)	121.19	138.49	95.77	105.06
<i>Panel C: Non-Recourse Factoring</i>				
Volume (Million USD)	0.15	0.01	0.50	9.12
Interest Rate (%)	13.04	15.54	12.50	13.07
Maturity (Days)	79.86	94.81	86.48	77.17

For the 627k firms with labor data, we observe an annual average of 1.7 billion trade credit contracts and 56.6 million factoring contracts

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Annual means of other working capital financing:

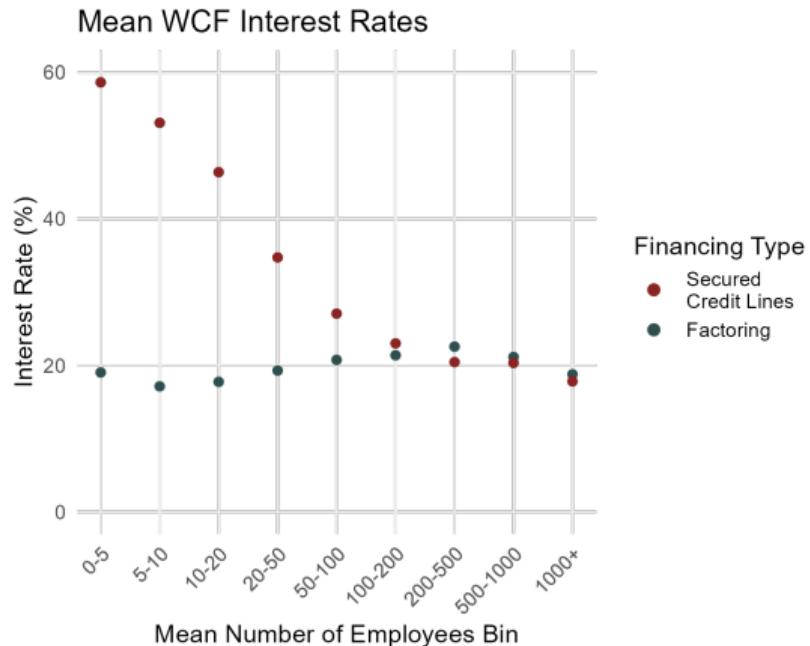
	Mean Overall	Mean Small Firms	Mean Medium Firms	Mean Large Firms
<i>Panel D: Secured Credit Lines</i>				
Volume (Million USD)	0.04	0.02	0.26	0.72
Interest Rate (%)	30.63	45.13	23.24	18.67
Maturity (Days)	66.10	57.22	72.86	69.14
<i>Panel E: Unsecured Credit Lines</i>				
Volume (Million USD)	0.02	0.01	0.07	0.17
Interest Rate (%)	332.07	356.74	316.49	206.32
Maturity (Days)	42.20	41.01	44.82	43.89
<i>Panel F: Other Short-Term Debt (Maturity under 1 year)</i>				
Volume (Million USD)	0.03	0.00	0.13	1.20
Interest Rate (%)	7.04	22.24	10.09	6.65
Maturity (Days)	187.61	181.17	176.71	188.82

For the 627k firms with labor data, we observe an annual average of 1.72 million uses of secured credit line, 7.64 million uses of unsecured credit line, and 3.57 million contracts of other short-term debt

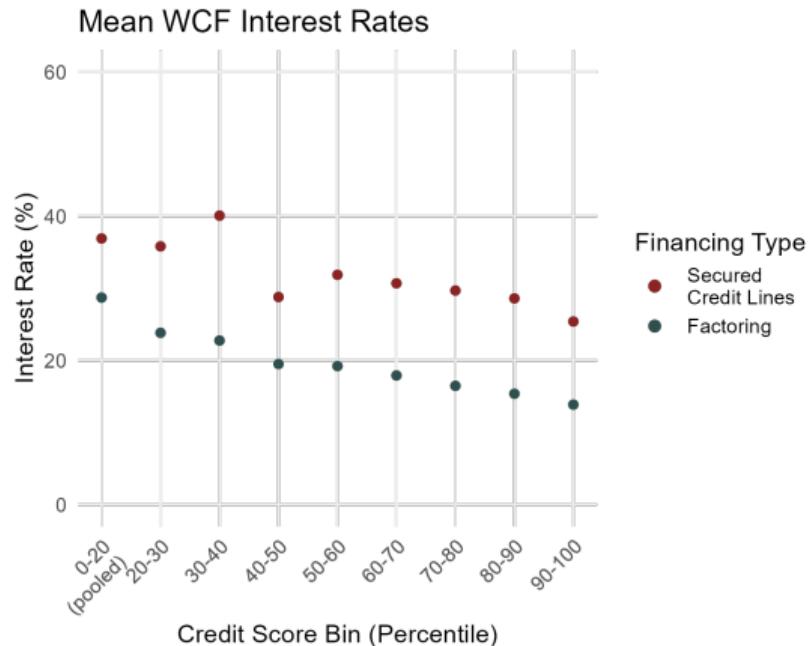
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Interest Rates for Factoring vs Secured Credit Lines

Interest rates over the distribution of firm size (left) and credit score (right)

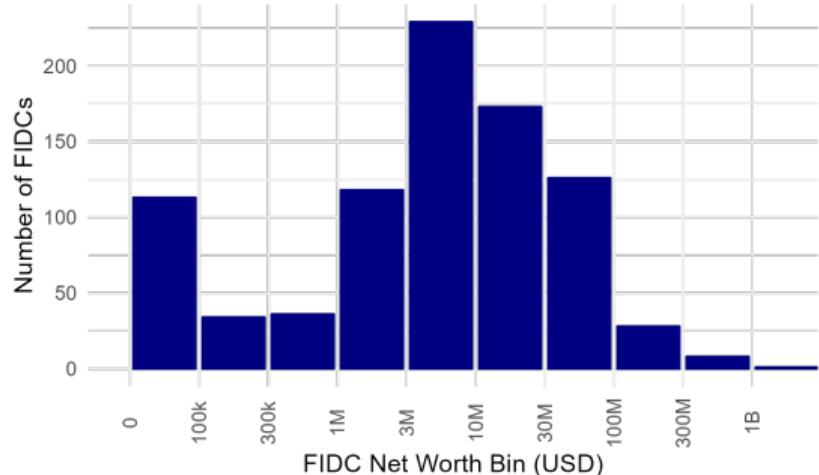


(a) by decile of firm size proxied by wage bill

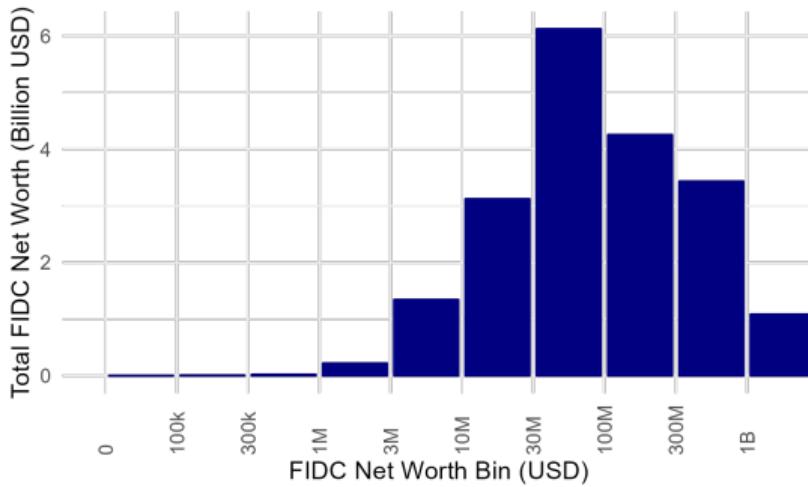


(b) by decile of firm credit score

Distribution of FIDC Net Asset Value (NAV)



(a) Number of FIDCs by NAV Bin



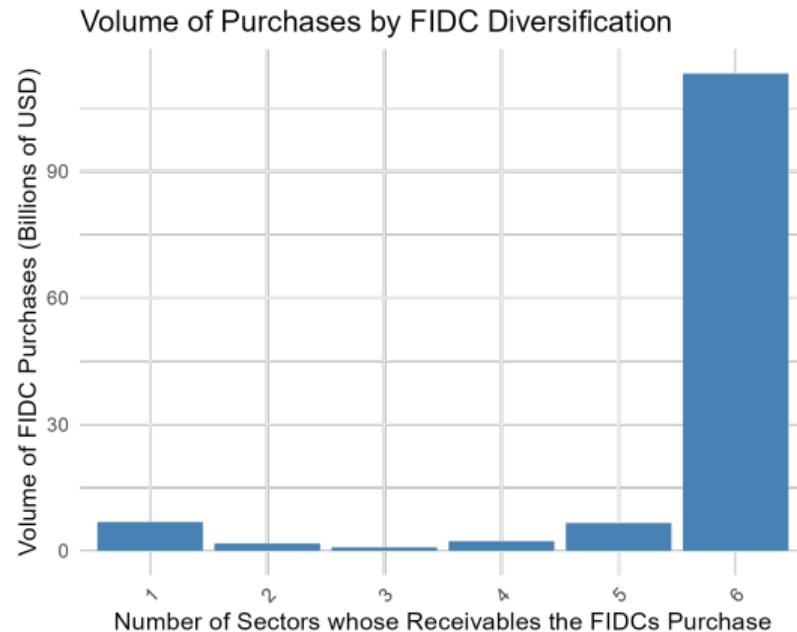
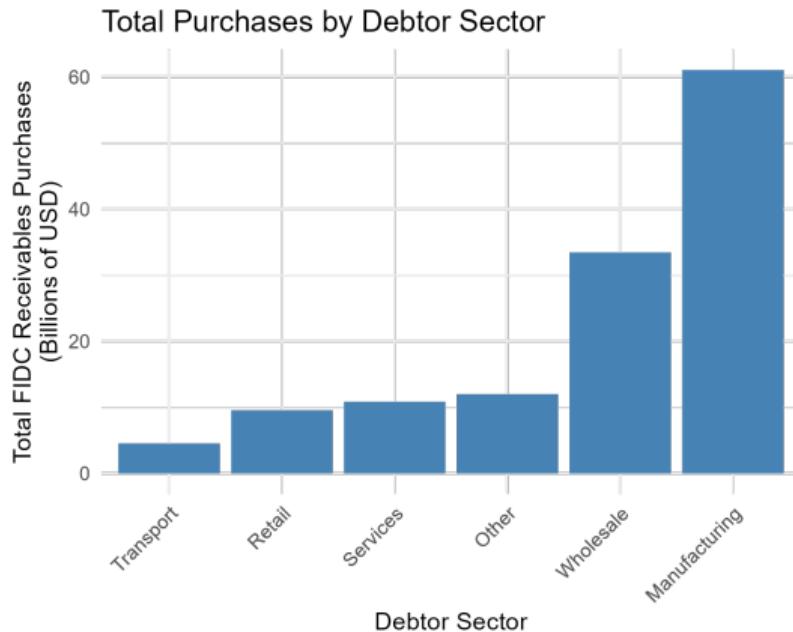
(b) Total FIDC NAV by NAV Bin

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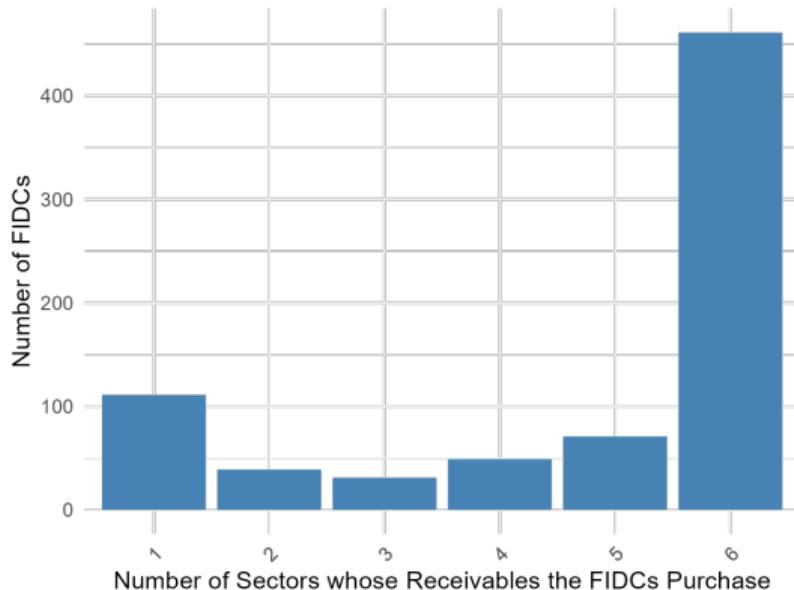
FIDC Portfolio Diversification



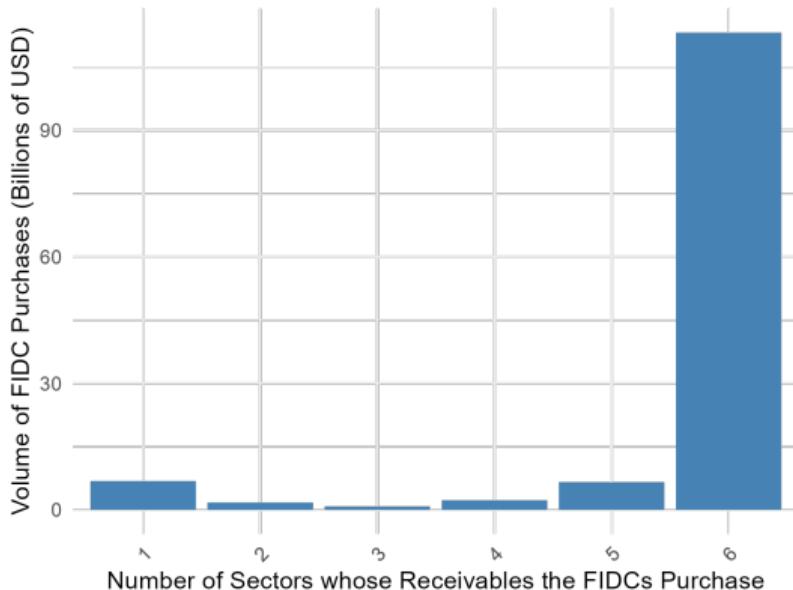
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FIDC Portfolio Diversification

Count of FIDCs by FIDC Diversification

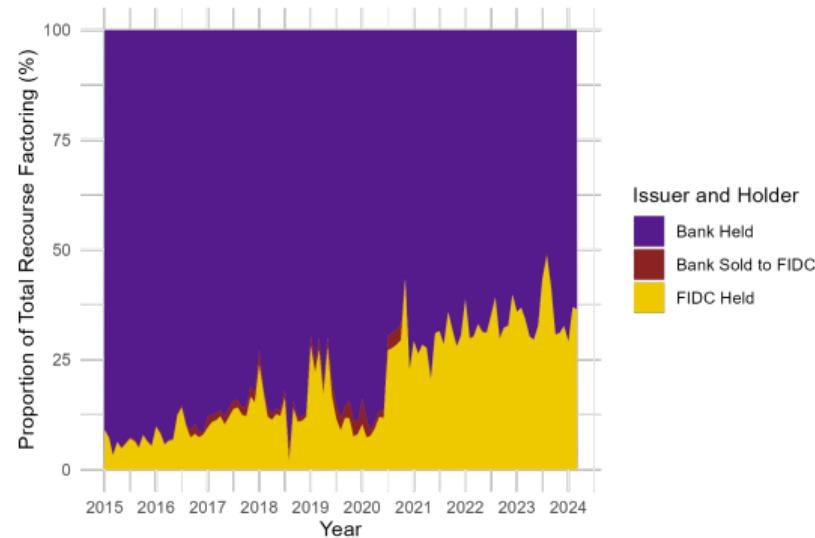


Volume of Purchases by FIDC Diversification

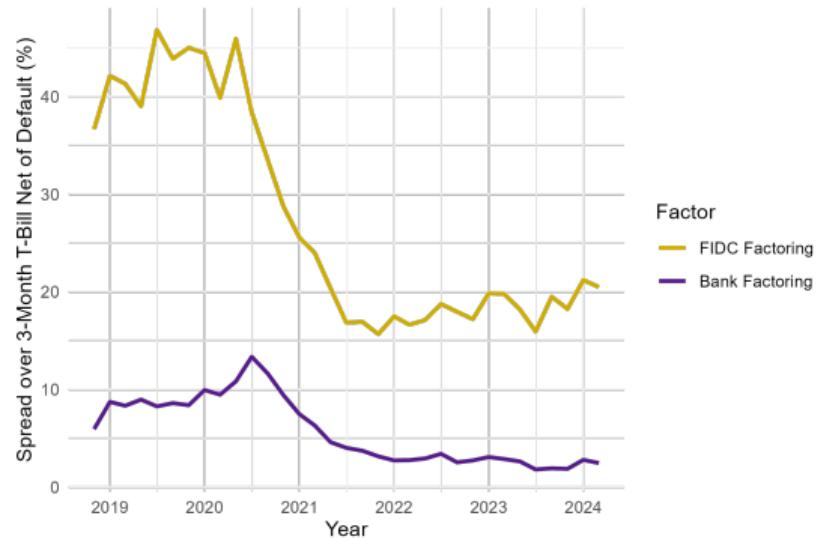


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FIDC Share of Factoring Increased as Spreads Decreased



(a) FIDC Share of Factoring



(b) Spreads

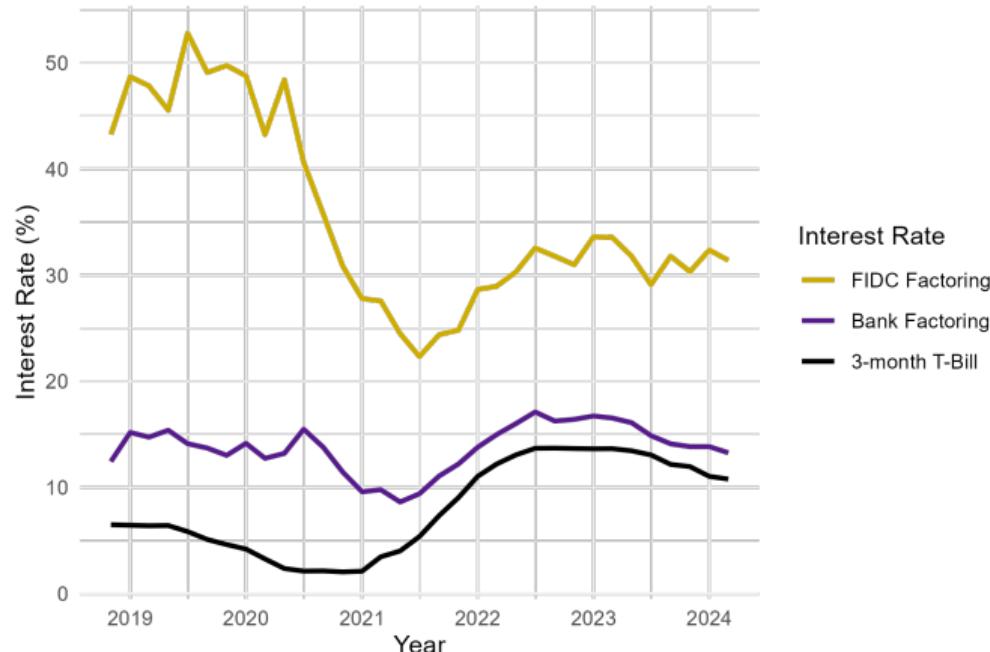
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Comparison of Interest Rates



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FIDC vs Bank Factoring Summary Statistics

	Banks			FIDCs		
	Mean Small Firms	Mean Medium Firms	Mean Large Firms	Mean Small Firms	Mean Medium Firms	Mean Large Firms
1	2	3	4	5	6	
Mean Issuance (Million USD / Year)	0.07	0.32	1.07	0.01	0.24	0.89
Mean Interest Rate (%)	15.09	13.73	11.11	34.68	31.91	29.59
Mean Maturity (Days)	155.22	121.25	134.27	54.64	62.20	70.05

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[Return to FIDC overview](#)

First Stage: Seller firm's factoring interest rate $r_{j,t}^{\text{Fac}}$ on normalized exposure $e_{j,t}$ to fund flows

$$r_{j,t}^{\text{Fac}} = \alpha_j + \alpha_t + \gamma_1 e_{j,t} + \varepsilon_{j,t}$$

First Stage		Decomposition	
IR Factoring Issuance (All)		IR Factoring Issuance (Funds)	IR Factoring Issuance (Banks)
	(1)	(2)	(3)
$e_{j,t}$	-0.1212*** (0.0127)	-0.1957*** (0.0172)	-0.0530*** (0.0068)
Num. Obs.	3,956,731	1,734,458	2,424,888
Num. Firms	322,087	251,391	123,581
Num. Months	65	65	65

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; · $p < 0.1$

Notes: These regressions use data from the Central Bank of Brazil. The dataset is at the firm by month level, with firm and month fixed effects, and *standard errors are clustered at the firm level and shown in parentheses*. **The first stage coefficient is in column 1.** This is equal to a receivables value weighted average of interest rates from fund issuance (column 2) and bank issuance (column 3), where factoring issuance is the purchase of receivables.

IV Regression, Weekly Wage and Log Hours Worked

	Log Wage (Hourly)	Log Employment (Hours Worked)	Log Employment (Hours Worked by New Hires)	Log Employment (Hours Worked by Existing Emp.)
$r_{j,t}^{\text{Fac}}$	0.0037 [·] (0.0020)	-0.0045* (0.0020)	-0.0135** (0.0045)	-0.0057** (0.0020)
Num. Obs.	2,543,608	2,554,459	1,124,594	2,526,986
Num. Firms	287,082	288,331	183,930	284,845
Num. Months	50	50	50	50

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; · $p < 0.1$

Notes: All regressions use data from the Central Bank of Brazil. All regressions use firm and month fixed effects, with standard errors clustered at the firm level. The predictor variable is the firm-level interest rate on factoring in percentage points. The instrumental variable is the expected change in receivables purchases driven by fund flows. The response variables come from restricted access month-level RAIS data. An employee is defined as new if the employee first began working at the firm in the given month.

IV Regression, Hours Worked Decomposition

	Hours Worked (New Hire, Perm.)	Hours Worked (Existing, Perm.)	Hours Worked (New Hire, Temp.)	Hours Worked (Existing, Temp.)
$r_{j,t}^{\text{Fac}}$	-436.3*** (96.4)	-41.8** (15.2)	157.3*** (32.2)	48.3597*** (11.2)
Num. Obs.	2,479,680	2,479,680	2,479,680	2,479,680
Num. Firms	288,112	288,112	288,112	288,112
Num. Months	50	50	50	50

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; · $p < 0.1$

Notes: All regressions use data from the Central Bank of Brazil. All regressions use firm and month fixed effects, with standard errors clustered at the firm level. The predictor variable is the firm-level interest rate on factoring in percentage points. The instrumental variable is the expected change in receivables purchases driven by fund flows. The response variables are **total labor hours per month per firm**, from restricted access month-level RAIS data. An employee is defined as new if the employee first began working at the firm in the given month.

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IV Regression, Employment Outcomes

$$y_{j,t} = \alpha_j + \alpha_t + \beta_1 \hat{r}_{j,t}^{\text{Fac}} + \varepsilon_{j,t}$$

	(1)	(2)	(3)	(4)
	Log Number of Employees (Total)	Log Number of Employees (New Hire)	Log Number of Employees (Permanent)	Log Number of Employees (Temporary)
$r_{j,t}^{\text{Fac}}$	-0.0047* (0.0021)	-0.0141** (0.0045)	-0.0114*** (0.0024)	0.0181** (0.0059)
Num. Obs.	2,556,738	1,126,587	2,548,410	608,088
Num. Firms	288,507	184,070	287,381	93,219
Num. Months	50	50	50	50

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; · $p < 0.1$

Notes: All regressions use data from the Central Bank of Brazil. All regressions use firm and month fixed effects, with standard errors clustered at the firm level. The predictor variable is the firm-level interest rate on factoring in percentage points. The instrumental variable is the expected change in receivables purchases driven by fund flows. The response variables come from restricted access month-level RAIS data. An employee is defined as new if the employee began working at the firm this month and not in the previous year.

IV Regression, Default Outcomes

$$y_{j,t} = \alpha_j + \alpha_t + \beta_1 \hat{r}_{j,t}^{\text{Fac}} + \varepsilon_{j,t}$$

	Default Rate Rec. Factoring (to Banks, %)	Default Rate Other (to Banks, %)	Default Rate Rec. Factoring (to FIDCs, %)	Default Rate Other (to FIDCs, %)
$r_{j,t}^{\text{Fac}}$	0.2772* (0.1174)	-0.1945 (0.2567)	1.6804** (0.5329)	0.0098 (0.0558)
Num. Obs.	2,739,575	2,739,575	1,435,934	1,435,934
Num. Firms	234,524	234,524	243,683	243,683
Num. Months	65	65	64	64

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; · $p < 0.1$

Notes: All regressions use data from the Central Bank of Brazil. All regressions use firm and month fixed effects, with standard errors clustered at the firm level. The predictor variable is the firm-level interest rate on factoring in percentage points. The instrumental variable is the expected change in receivables purchases driven by fund flows. The response variables are the default rates on recourse factoring and other debt issued by banks and FIDCs. The default rate is defined to be the percentage of debt that was not paid on its due date; note that this is lower than the percentage of debt that the creditor eventually collects. The issuance-weighted default rate for recourse factoring to banks is 0.40% and the issuance-weighted default rate for recourse factoring to FIDCs is 10.3%.

IV Regression, Trade Credit Outcomes

$$y_{j,t} = \alpha_j + \alpha_t + \beta_1 \hat{r}_{j,t}^{\text{Fac}} + \varepsilon_{j,t}$$

	Maturity Offer (Days)	Percentage Offer (%)	Log Value Offer	Maturity Receive (Days)	Percentage Receive (%)	Log Value Receive
$r_{j,t}^{\text{Fac}}$	-0.0354 (0.0996)	-0.3885** (0.1274)	-0.0591*** (0.0102)	0.6737*** (0.1358)	0.0272 (0.0379)	-0.0316*** (0.0061)
Num. Obs.	4,146,540	4,146,540	2,538,086	4,146,540	4,146,540	4,015,309
Num. Firms	511,896	511,896	203,995	511,896	511,896	469,959
Num. Months	65	65	65	65	65	65

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; · $p < 0.1$

Notes: All regressions use data from the Central Bank of Brazil. All regressions use firm and month fixed effects, with standard errors clustered at the firm level. The predictor variable is the firm-level interest rate on factoring in percentage points. The instrumental variable is the expected change in receivables purchases driven by fund flows. The response variables are the firm by month level mean maturity of trade credit, offered and received, as well as the share of receivables with at least 15 days maturity, the effective lower bound for factoring.

IV Regression, Summary of Debt Outcomes

	Log Debt Issuance All Debt	Log Debt Issuance Factoring	Log Debt Issuance Besides Factoring
$r_{j,t}^{\text{Fac}}$	-0.1548*** (0.0161)	-0.1617*** (0.0167)	-0.0241 (0.0204)
Num. Obs.	3,094,560	3,094,560	788,450
Num. Firms	420,586	420,586	124,513
Num. Months	65	65	65

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; · $p < 0.1$

Notes: All regressions use data from the Central Bank of Brazil. All regressions use firm and month fixed effects, with standard errors clustered at the firm level. The predictor variable is the firm-level interest rate on factoring in percentage points. The instrumental variable is the expected change in receivables purchases driven by fund flows. Note that 72.5% of all debt issuance has maturity under 1 year, and 49.9% of all debt issuance is factoring.

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IV Regression, Debt Outcomes

	(1)	(2)	(3)	(4)	(5)
	Log Debt Issuance (Debt Under 1 Year)	Log Debt Issuance (Debt Over 1 Year)	Log Debt Issuance Factoring All Issuance	Log Debt Issuance Credit Line (Unsecured)	Log Debt Issuance Credit Line (Secured)
$r_{j,t}^{\text{Fac}}$	-0.1627*** (0.0174)	0.0163 (0.0259)	-0.1692*** (0.0180)	0.0167 (0.0170)	-0.0319 (0.0654)
Num. Obs.	4,146,540	508,179	4,146,540	829,816	410,208
Num. Firms	511,896	130,522	511,896	123,370	57,997
Num. Months	65	65	65	65	65

Notes: All regressions use data from the Central Bank of Brazil. All regressions use firm and month fixed effects, with standard errors clustered at the firm level. The predictor variable is the firm-level interest rate on factoring in percentage points. The instrumental variable is the expected change in receivables purchases driven by fund flows. The response variables are log debt issuance by category of debt.

IV Regression, Interest Rate Outcomes

	IR (Debt Under 1 Year)	IR (Debt Over 1 Year)	IR Credit Line (Unsecured)	IR Credit Line (Secured)	IR (Loans Over 1 Year)
$r_{j,t}^{\text{Fac}}$	1.5021*** (0.2217)	-2.0535* (0.9247)	6.9139** (2.2363)	-3.5990 (3.9875)	-0.0787 (0.1800)
Num. Obs.	4,146,540	508,179	829,816	410,208	438,844
Num. Firms	511,896	130,522	123,370	57,997	123,553
Num. Months	65	65	65	65	65

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; · $p < 0.1$

Notes: All regressions use data from the Central Bank of Brazil. All regressions use firm and month fixed effects, with standard errors clustered at the firm level. The predictor variable is the firm-level interest rate on factoring in percentage points. The instrumental variable is the expected change in receivables purchases driven by fund flows. The response variables are the interest rates by category of debt. Column 1 is the subset with maturity of up to 365 days. Columns 2 and 3 are unsecured and secured credit lines, where issuance is defined as any drawdown of the credit line, not a change in the credit limit. Column 4 is loans with maturity of over 365 days.

$$y_{j,t-1} = \alpha_j + \alpha_t + \beta_{\text{pre}} e_{j,t} + \varepsilon_{j,t},$$

Table: Pre-Trend Falsification Test: Regressions of Lagged Outcomes on Current Flows

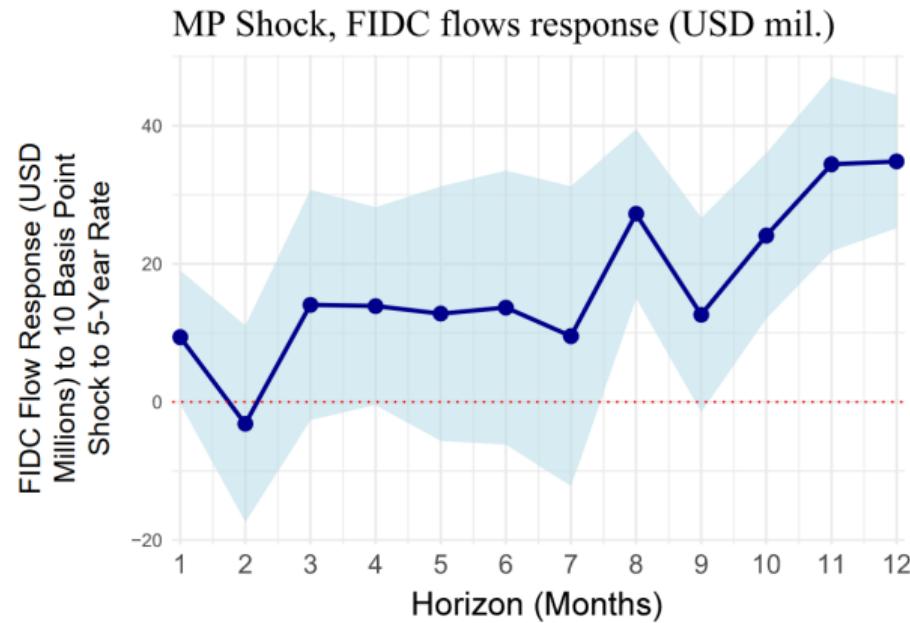
	(1) Factoring Interest Rate	(2) Log Revenue	(3) Log Expenditure	(4) Log Temporary Labor	(5) Log Permanent Labor
$e_{j,t}^{\text{Fac}}$	-0.501 (1.287)	0.074 (0.089)	0.052 (0.061)	-0.056 (0.095)	0.033 (0.040)

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; · $p < 0.1$

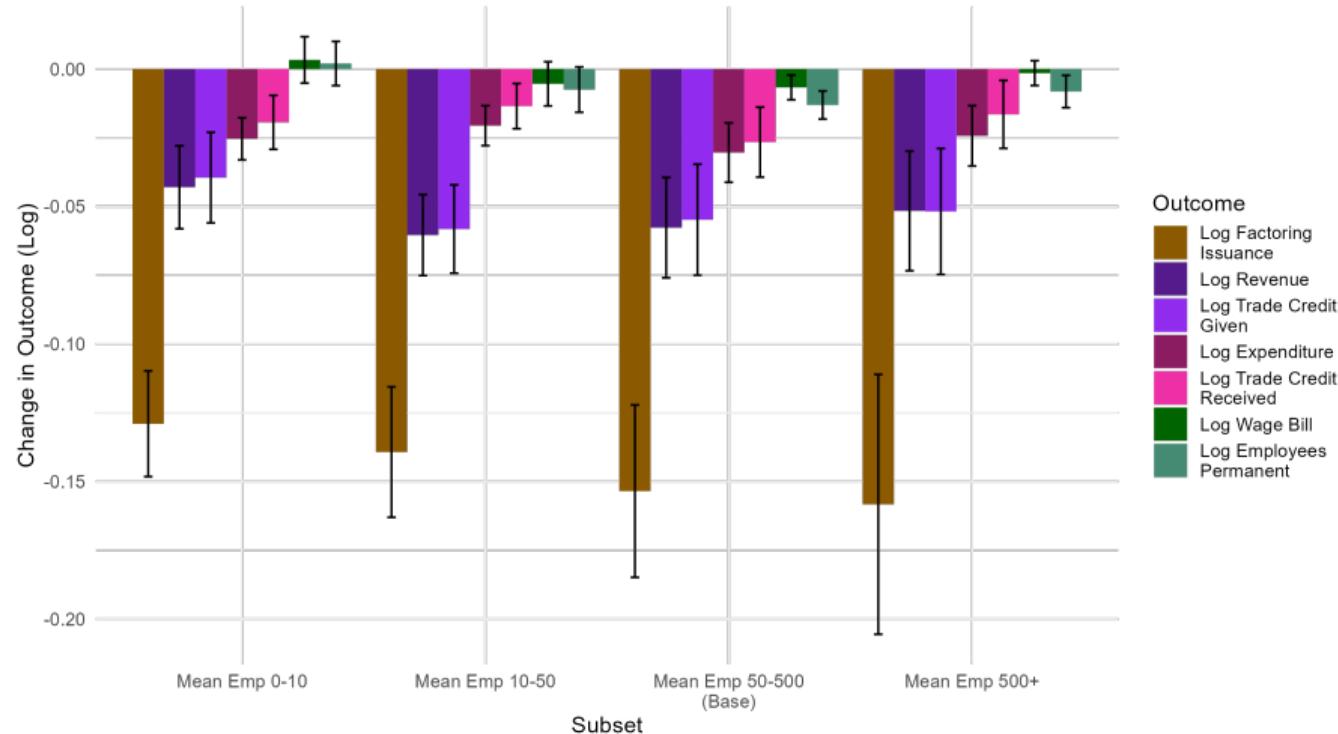
Notes: These regressions use data from the Central Bank of Brazil. The dataset is at the firm by month level. Standard errors are clustered at the firm level and shown in parentheses. Each column is a separate regression with a different outcome variable. Column (1) corresponds to the first stage, while columns (2) through (5) correspond to the reduced form. All results are shown in log points for readability.

FIDCs' monetary policy exposure is similar to money market funds, dissimilar to most other funds

Monetary tightening is associated with increased inflows into FIDCs, whose assets' short maturities allows for immediate pass-through



Heterogeneity By Firm Type: Interaction with Firm Size



Maturity

Trade Credit

Sector

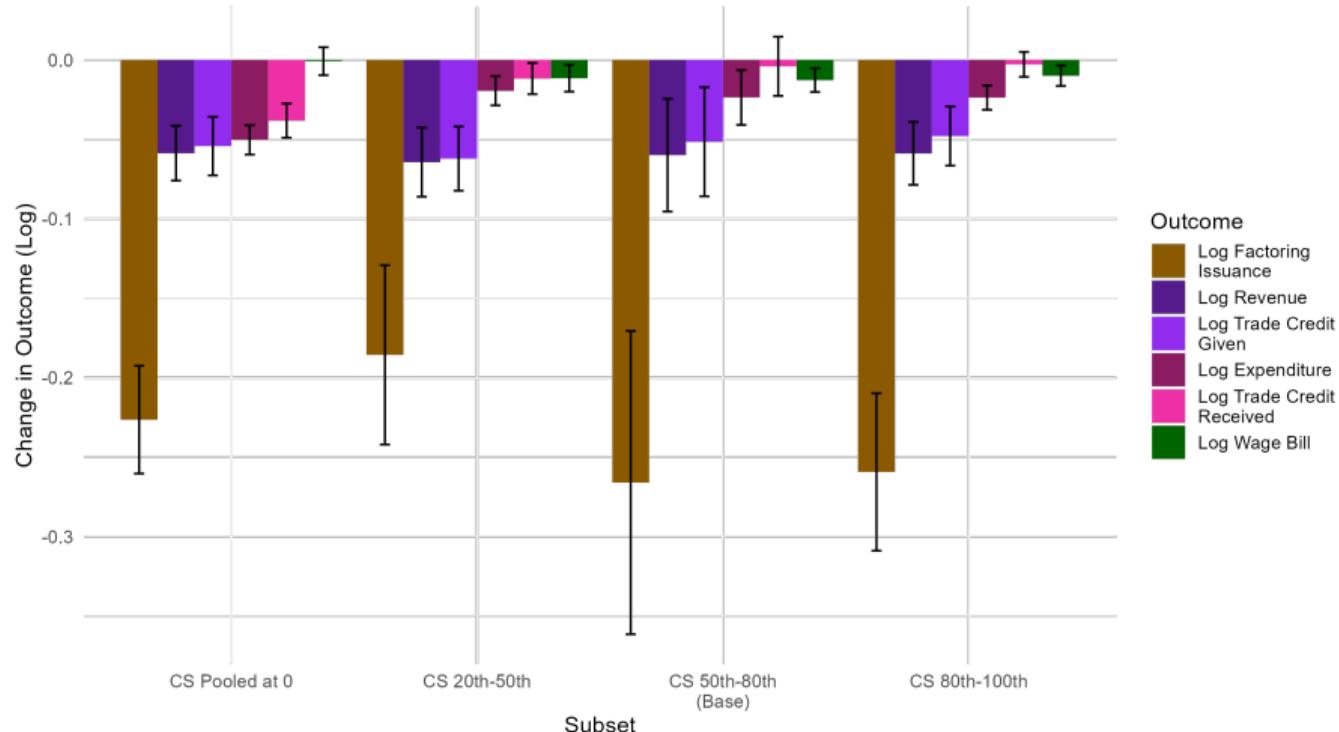
Credit Score

HHI

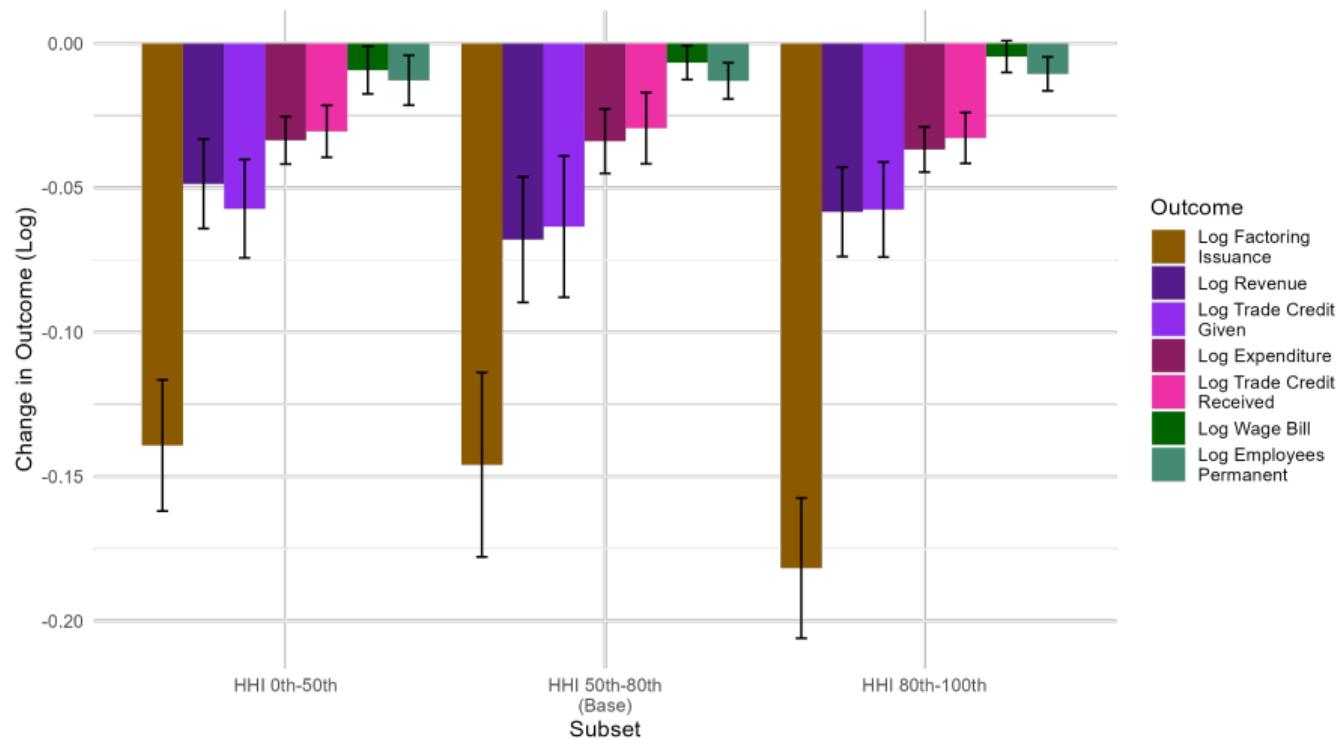
Bilateral HHI

Buyer Risk

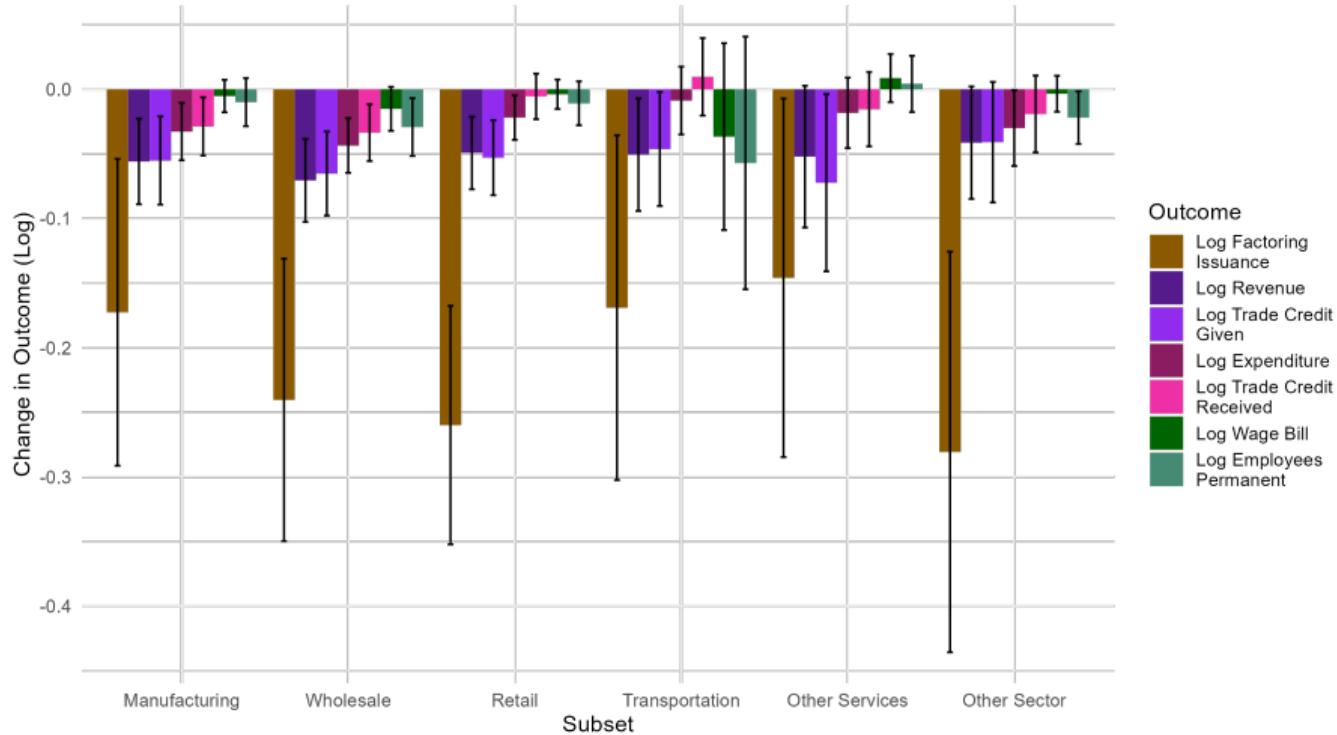
By Firm Type: Interaction with Credit Score



By Firm Type: Interaction with HHI



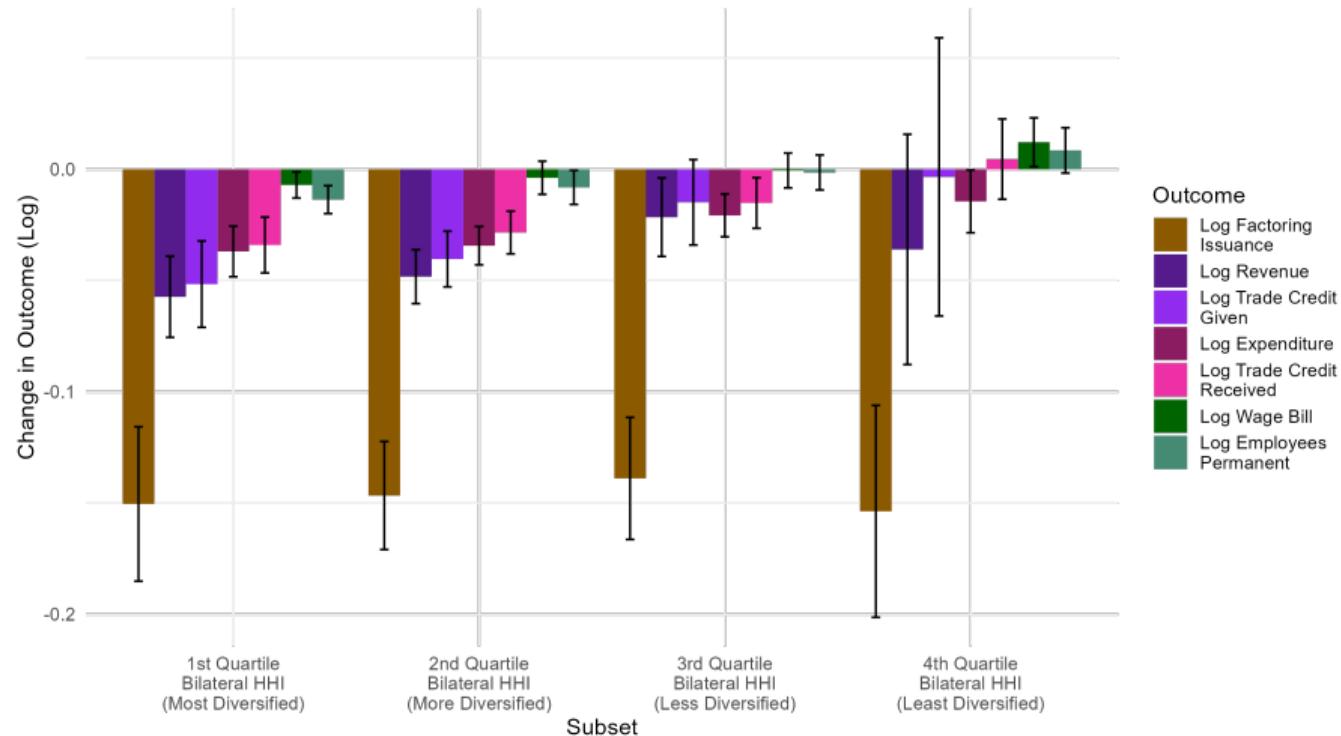
By Firm Type: Interaction with Sector



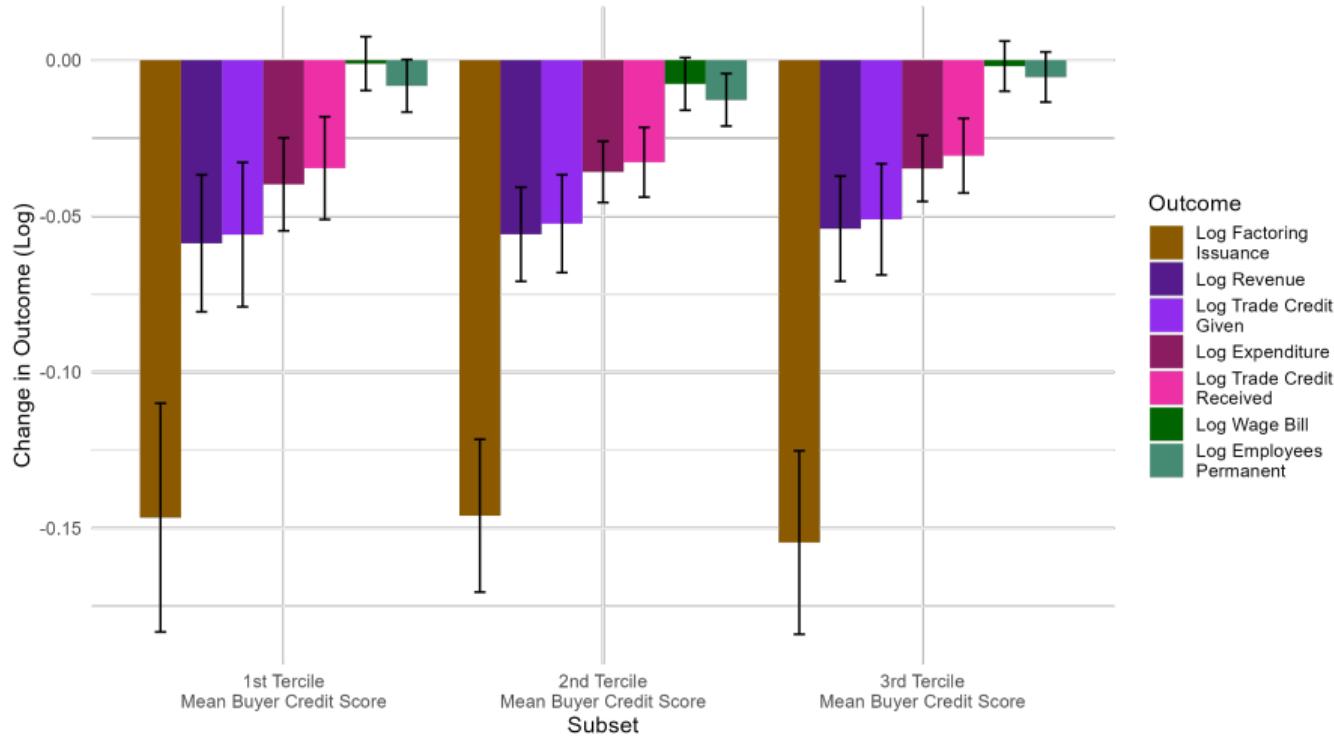
Maturity

Return

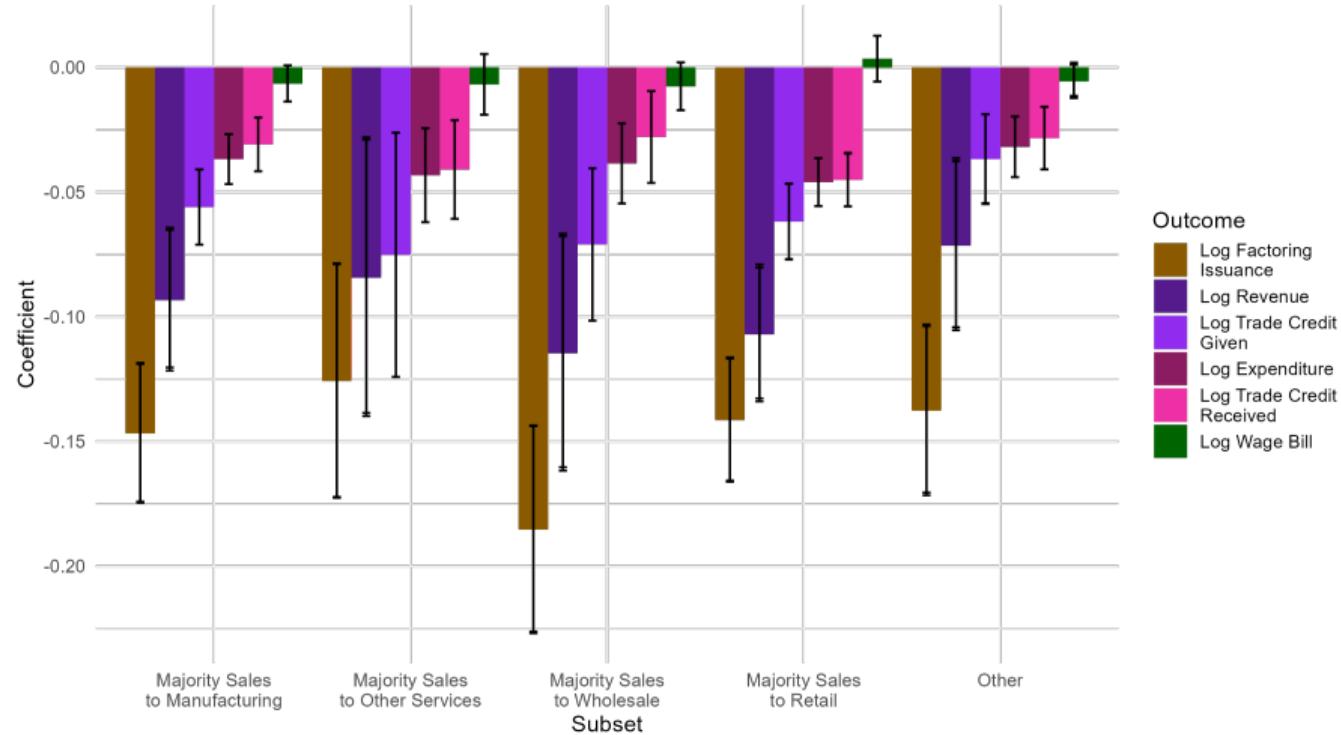
By Firms' Buyer Portfolio: Interaction with Bilateral HHI



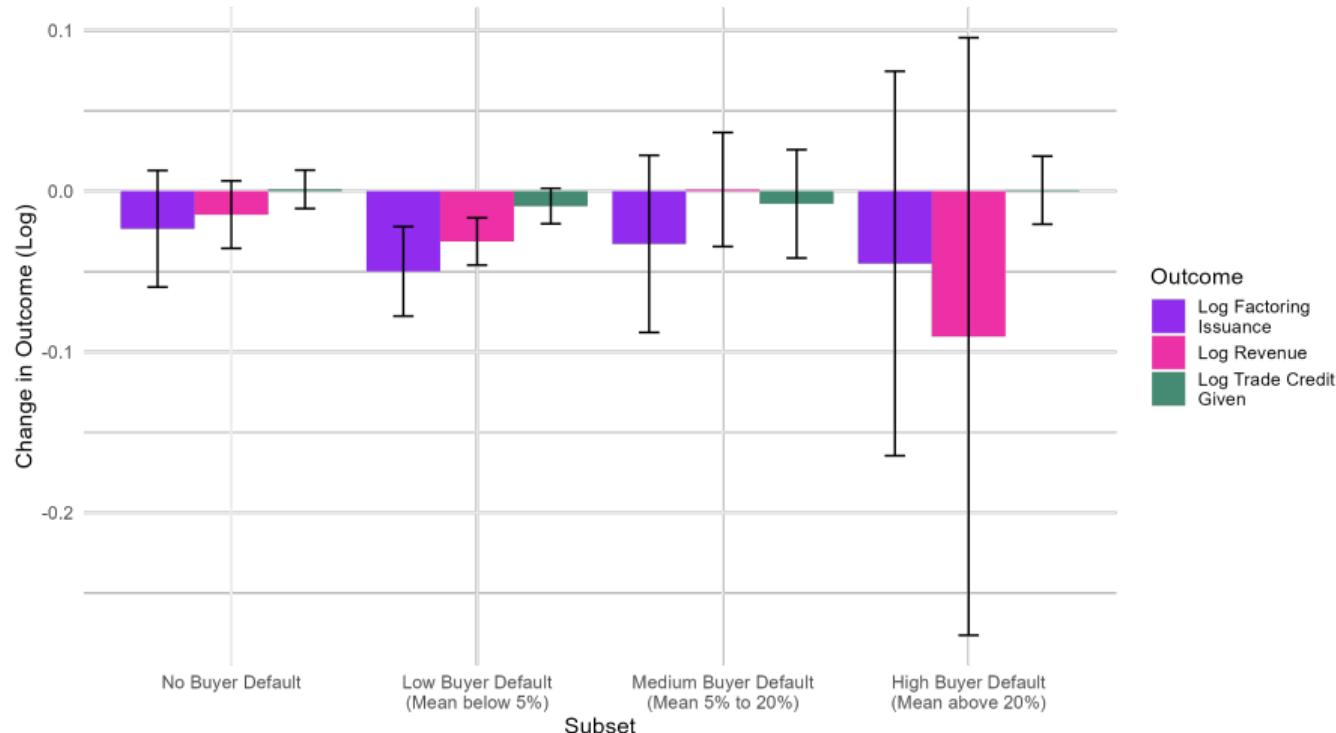
By Firms' Buyer Portfolio: Interaction with Buyer Credit Score



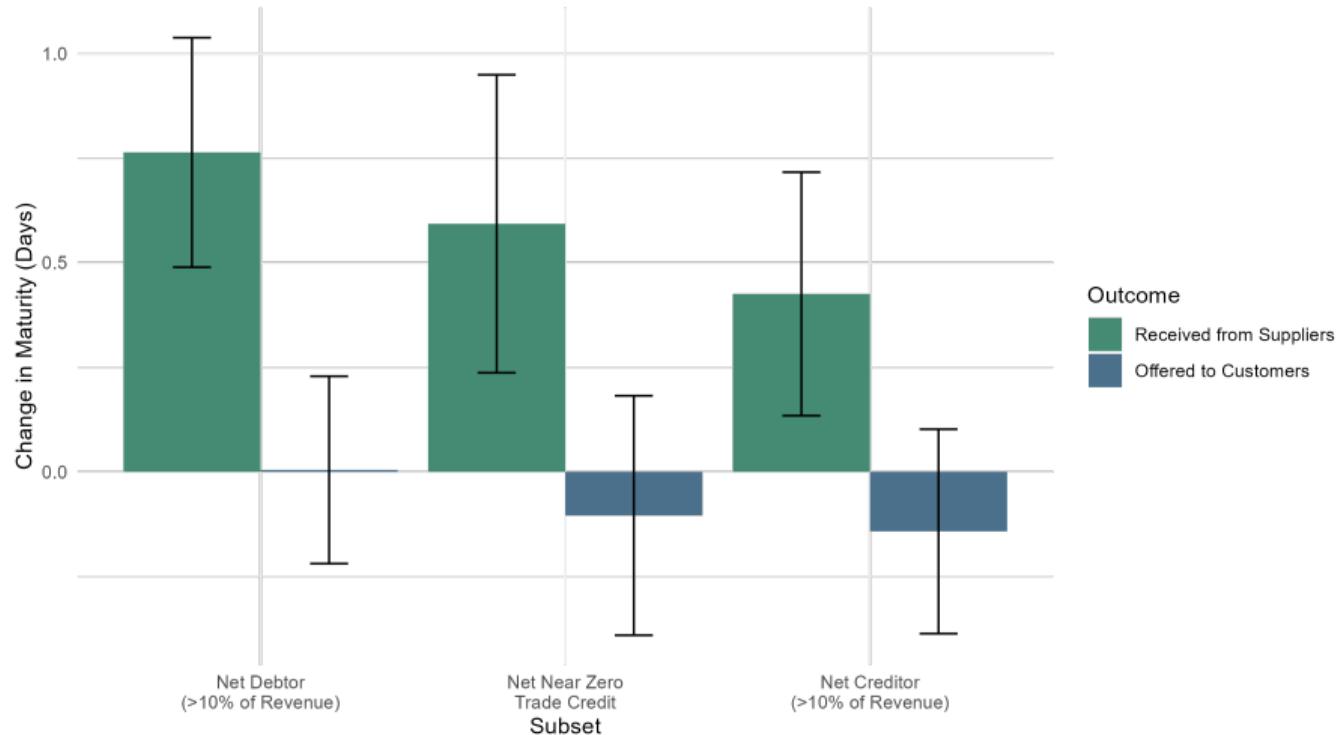
By Firms' Buyer Portfolio: Interaction with Main Buyer Sector



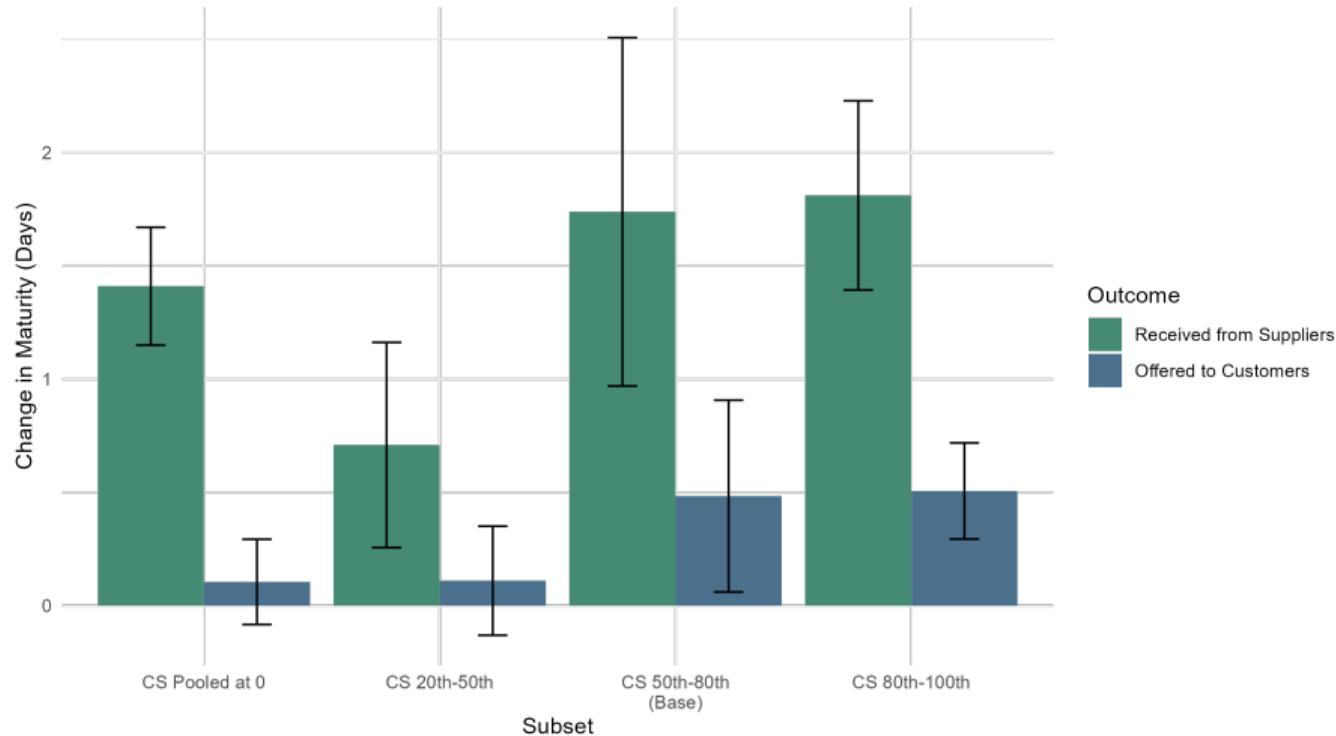
By Firms' Buyer Portfolio: Interaction with Weighted Mean Buyer Default Rate



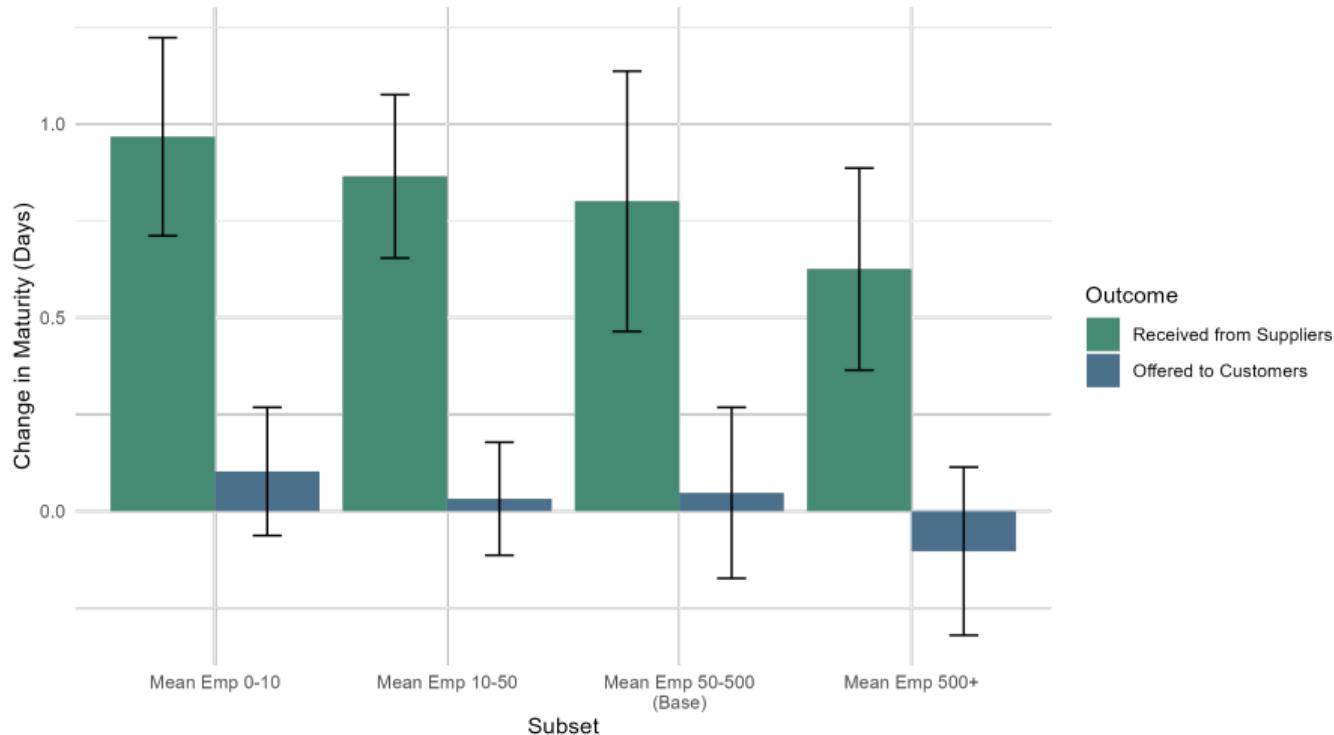
By Firm Type: Interaction with Trade Credit Position



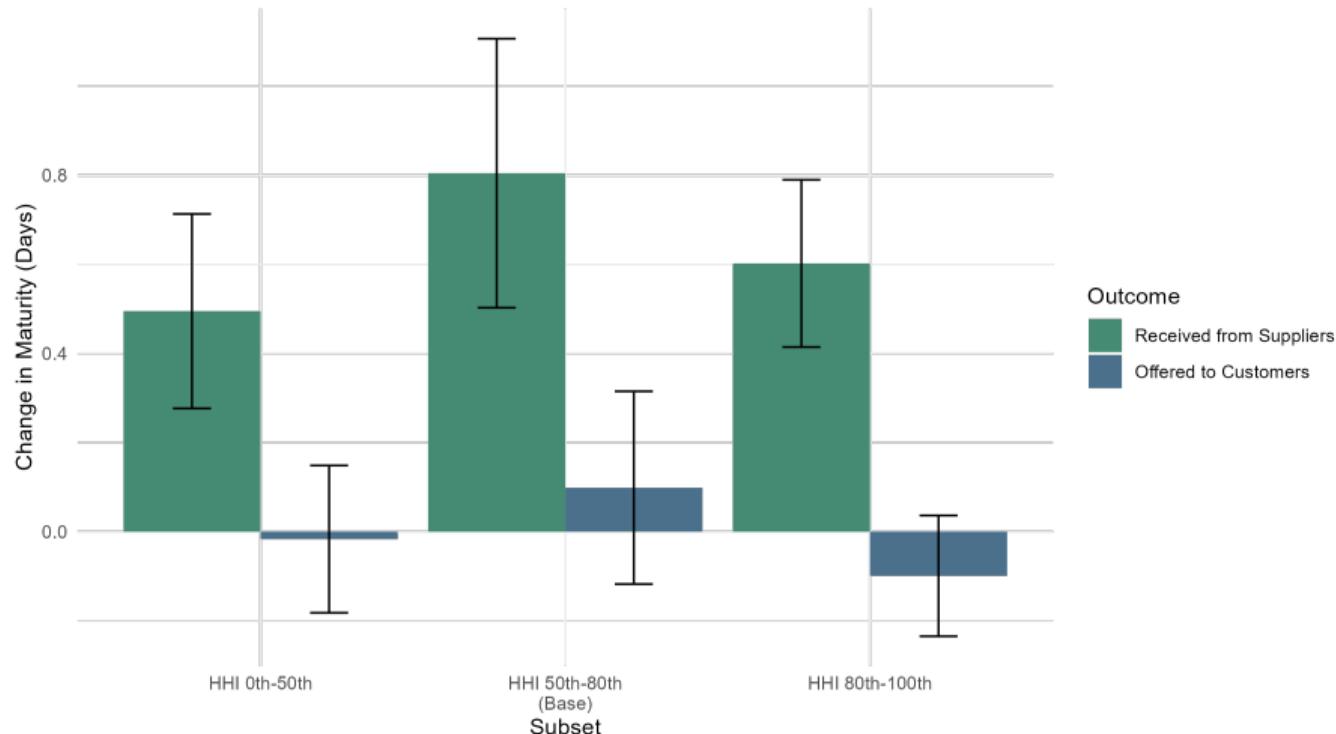
By Firm Type: Interaction with Credit Score



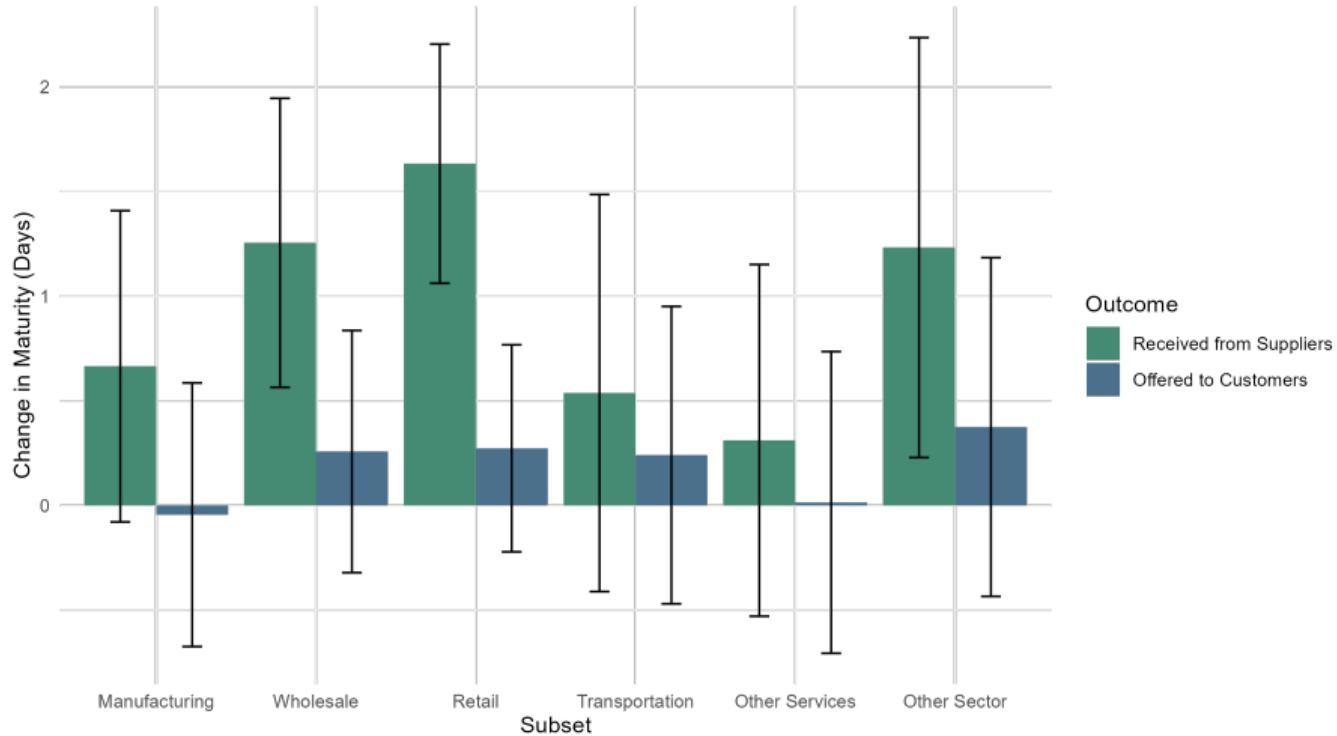
By Firm Type: Interaction with Firm Size



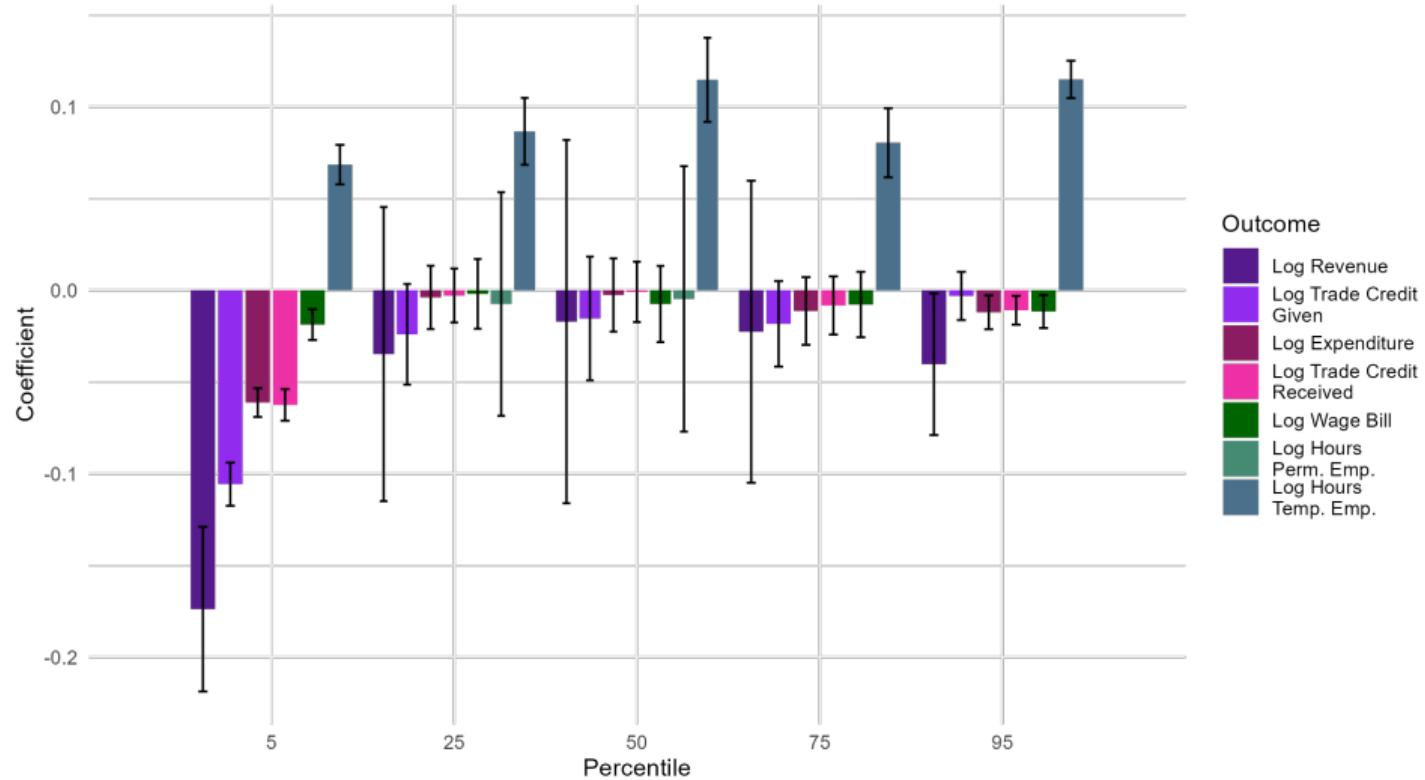
By Firm Type: Interaction with HHI



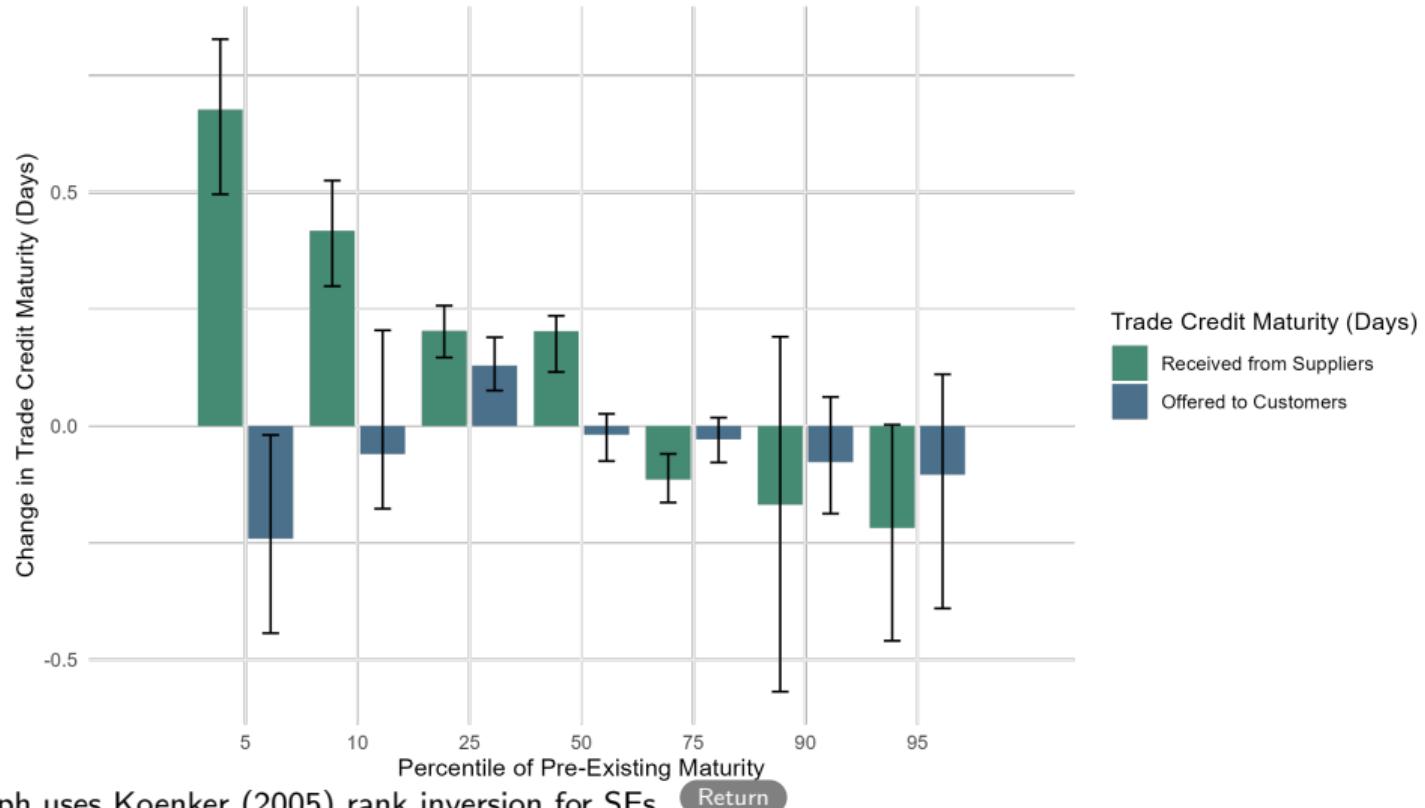
By Firm Type: Interaction with Sector



Quantile Regression



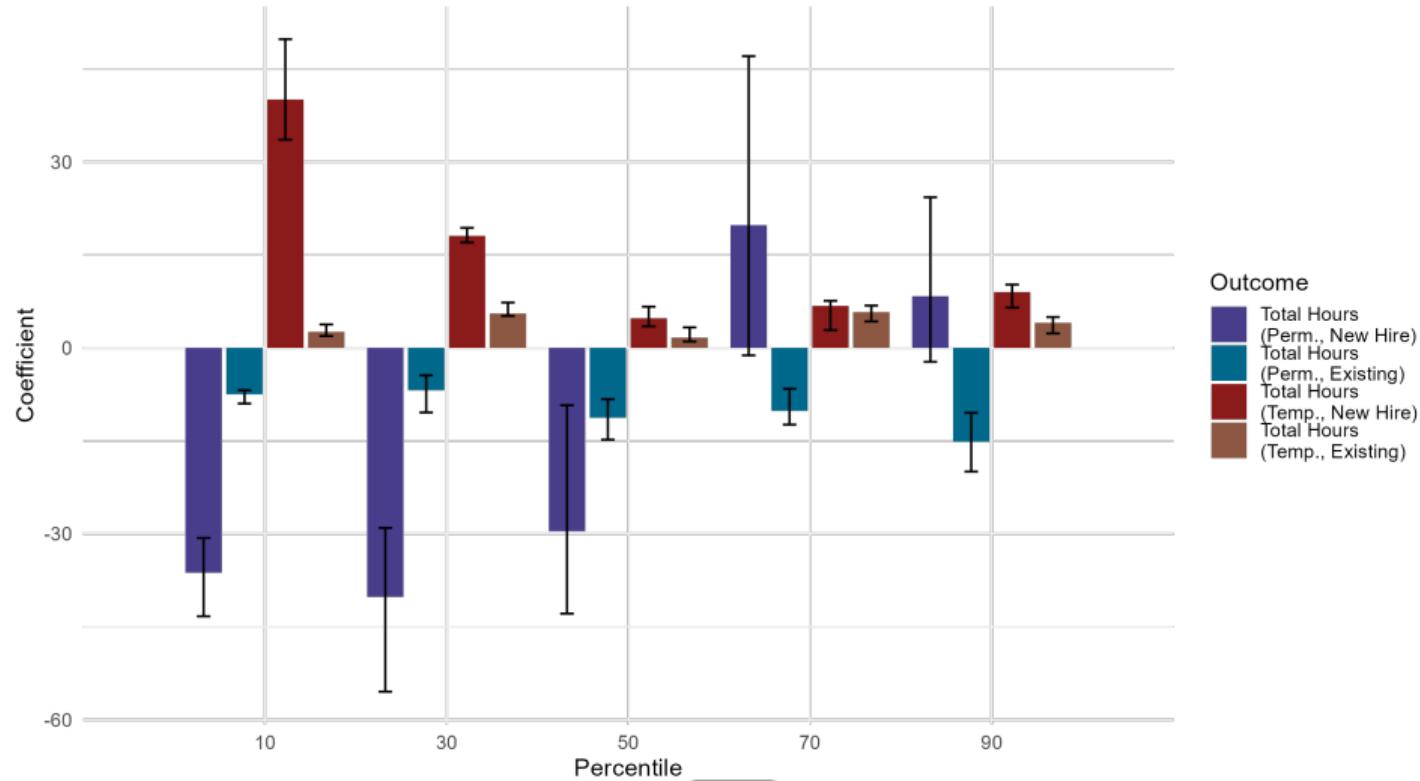
Quantile Regression: Maturity Outcomes



This graph uses Koenker (2005) rank inversion for SEs.

Return

Quantile Regression: Hours Worked Outcomes



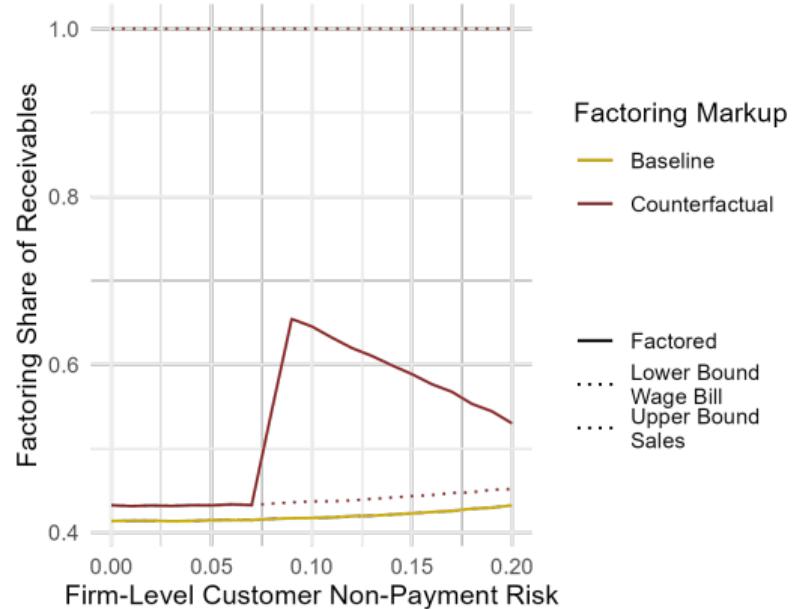
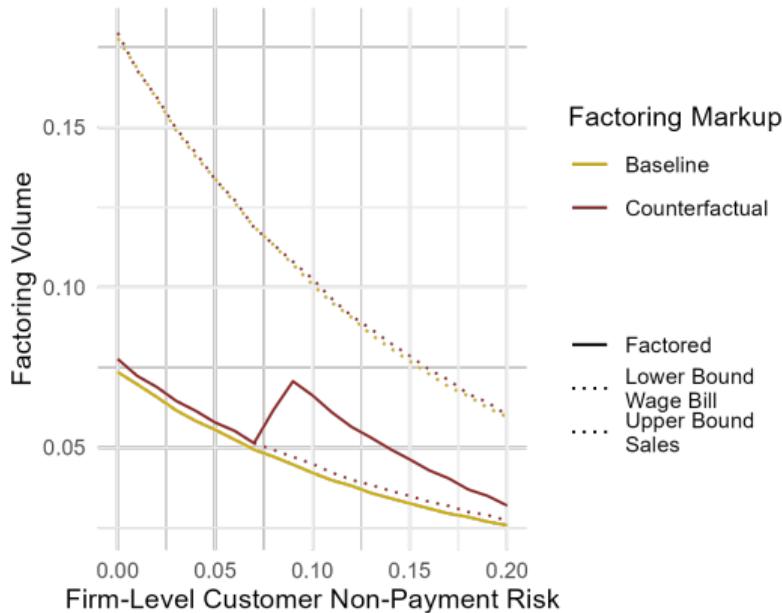
This graph uses Koenker (2005) rank inversion for SEs. [Return](#)

Model Intuition: Cash Flow Volatility

Cash flow volatility mismatch:

- Firms' cash outflows have a rigid component due to labor contracts and labor law
- Firms' cash inflows are more volatile, both due to timing of sales and timing of payment conditional on sales, as well as whether buyers fulfill payment
 - Factoring removes the payment dimension of cash inflow volatility
- Perfectly predictable cash inflows would lead firms to hire exclusively on long-term contracts, due to productivity gain from employee experience
- Volatility in cash inflows drives demand for temporary labor and factoring
- Decreasing factoring costs leads to
 - Less volatility (substitution) of production across time
 - More permanent employment and higher long-run productivity

Model Results: Factoring Share

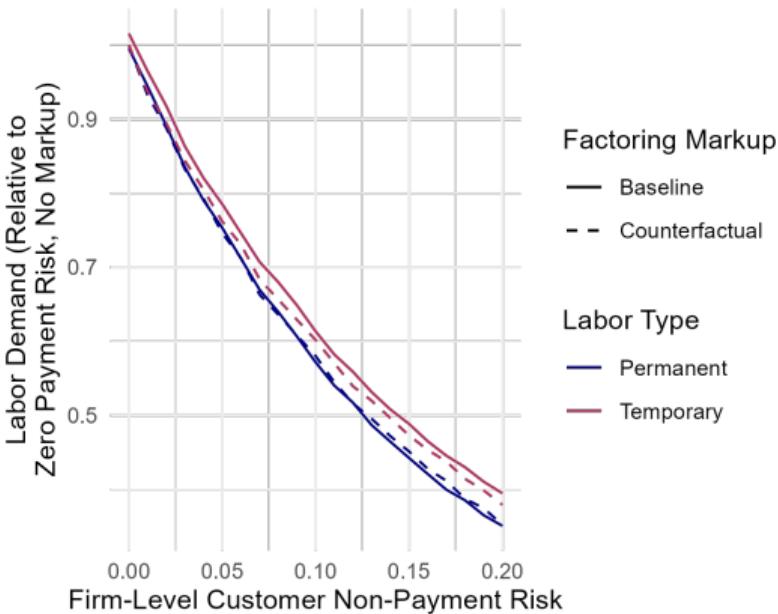
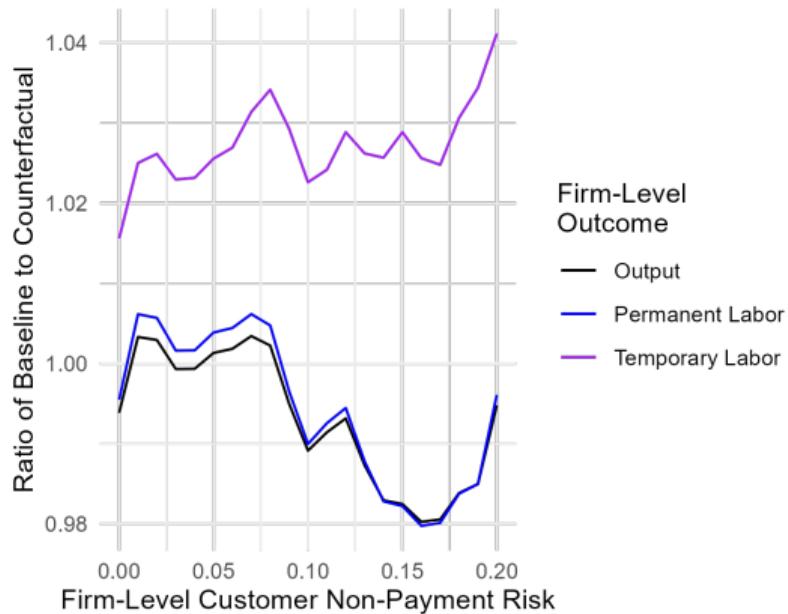


[Return to model results](#)

Model Results: Heterogeneity

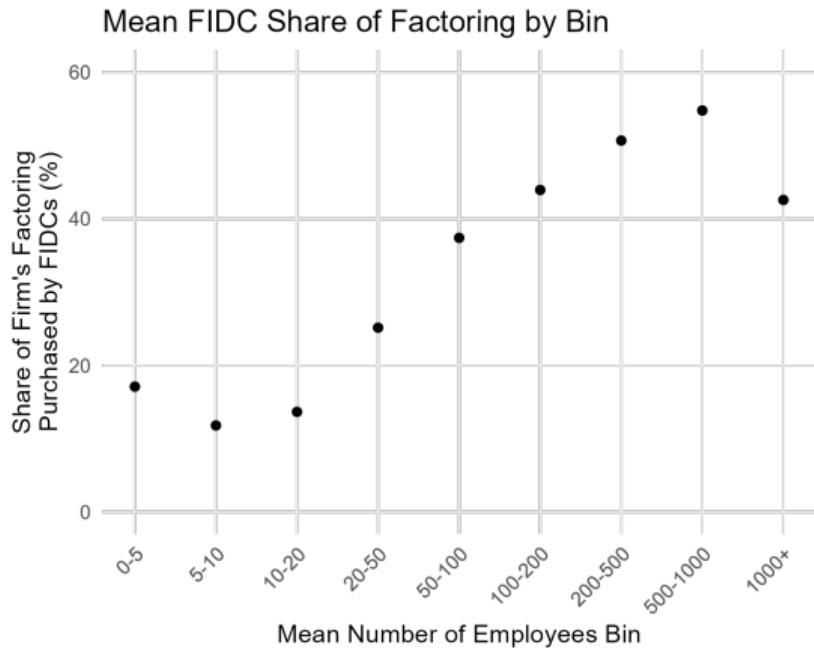
On the left is the ratio of outcomes between baseline markup = 1.13 and counterfactual markup = 1

On the right are permanent and temporary labor between baseline and counterfactual

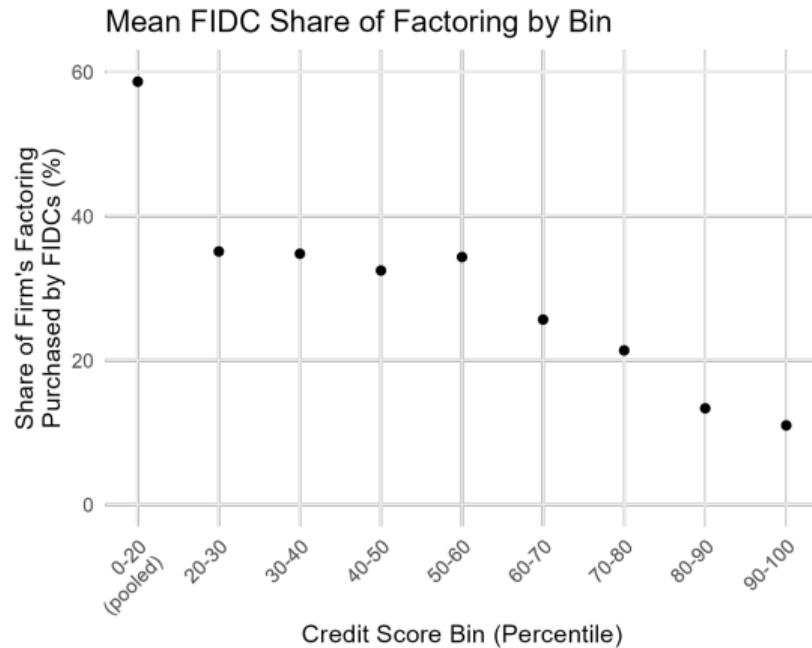


FIDCs' Receivables Acquisition

FIDCs tend to purchase receivables from *larger* firms (left) with *low credit score* (right)



(a) FIDC Share by Number of Employees



(b) FIDC Share by Credit Score

IV Regression, Main Outcomes

$$y_{j,t} = \alpha_j + \alpha_t + \beta_1 \hat{r}_{j,t}^{\text{Fac}} + \varepsilon_{j,t}$$

	(1)	(2)	(3)	(4)	(5)
	Log Revenue	Log Expenditure	Log Wage Bill	Log Hours (Permanent)	Log Hours (Temporary)
$r_{j,t}^{\text{Fac}}$	-0.0614*** (0.0093)	-0.0357*** (0.0056)	-0.0056* (0.0023)	-0.0110*** (0.0023)	0.0212*** (0.0064)
Num. Obs.	2,668,026	4,076,721	2,543,940	2,545,958	607,036
Num. Firms	217,956	476,418	287,108	287,201	93,156
Num. Months	65	65	50	50	50

Notes: All regressions use data from the Central Bank of Brazil. All regressions use firm and month fixed effects, with standard errors clustered at the firm level in parentheses. The predictor variable is the firm-level interest rate on factoring in percentage points, instrumented by the expected change in receivables purchases driven by fund flows. The response variables are the log revenue proxied by payment inflows, log intermediate input expenditure proxied by payment outflows to firms, log wage bill, log labor demand for permanent workers, and log labor demand for temporary workers