

Effects of Land Misallocation on Capital Allocations in India

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Objectives

- Understand misallocation in factors and financial markets
- Explore the impact of Land and Building (L&B) misallocation on access to finance:
 - Overall
 - Young entrants
 - Gender dimension

What is Misallocation?

- Firm ranking by factor usage should reflect their relative productivity ranking and be perfectly correlated in optimum allocation.
- Duranton et al. compute Misallocation indices based on Olley-Pakes (1996)

$$M_g = -(\Phi_g - \bar{\varphi}_g) = -n \text{COV}_g(s_i, \varphi_i)$$

Why misallocation in L&B Important for Access to Finance?

- Access to finance is critical for entrepreneurship/growth/firm productivity/extent of formality
- Lack of collateral constrains access to external finance
- Land is the strongest form of collateral: highest shares of firms using this & the amount that can be lent against this
- Poor allocation in the collateral inputs is likely going to distort access to finance.

Duranton et al. Earlier results

Within Indian districts:

- Factor misallocation, esp. L&B, distorts output allocation: Unit SD of misallocation of land and buildings is associated with about 0.40 sd of valued added misallocation with a factor share of 0.13
- Misallocation is costly: Unit SD in factor misallocation represents 15% of output per worker
- Benefits of reducing misallocation in L&B: Unit SD improvement is as if land supply would increase by 5 times

Average Misallocation Metrics

	1989	1994	2000	2005	2010
A. Baseline misallocation metrics					
Organized sector					
Financial loans	-0.165	-0.111	-0.075	-0.094	0.054
Land and building	-0.124	-0.095	-0.068	-0.114	-0.027
Labor	-0.100	-0.081	-0.075	-0.086	-0.018
B. Misallocation metrics without the Industry Aggregation step					
Organized sector					
Financial loans	-0.260	-0.164	-0.099	-0.140	-0.013
Land and building	-0.215	-0.169	-0.113	-0.209	-0.092
Labor	-0.155	-0.091	-0.090	-0.163	-0.043
C. Misallocation metrics using OLS TFP					
Organized sector					
Financial loans	-0.114	-0.117	-0.024	-0.009	0.055
Land and building	-0.069	-0.111	-0.037	-0.070	-0.029
Labor	0.014	-0.016	0.004	-0.016	0.063

Misallocation Trends

- Misallocation in access to finance increased over time vis-à-vis land and buildings: Multiplicative effect?
- Gap between misallocation in output and access to external finance also widened
- Extent of misallocation in factors for combined manufacturing is lower than that in organized

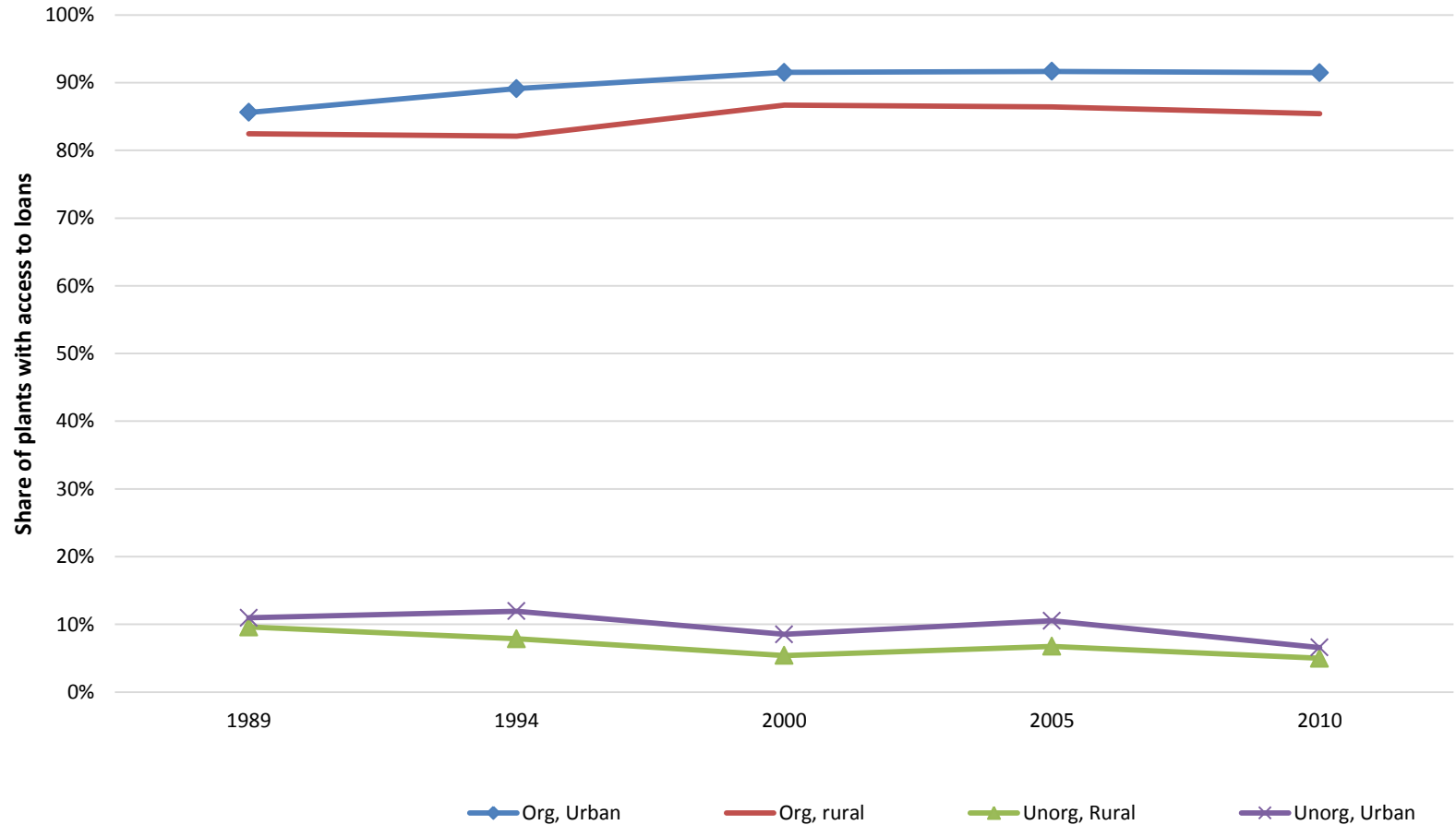
Measuring Access to Finance

- Log total value of loans: district-industry level
- Intensity of loans: Total loans per total output at district-industry level
- Misallocation in Access to Finance, à la Duranton et al.
- Sum of absolute or squared deviations between the actual loan levels of plants and their expected levels
- Share of local loans accounted for by young entrants

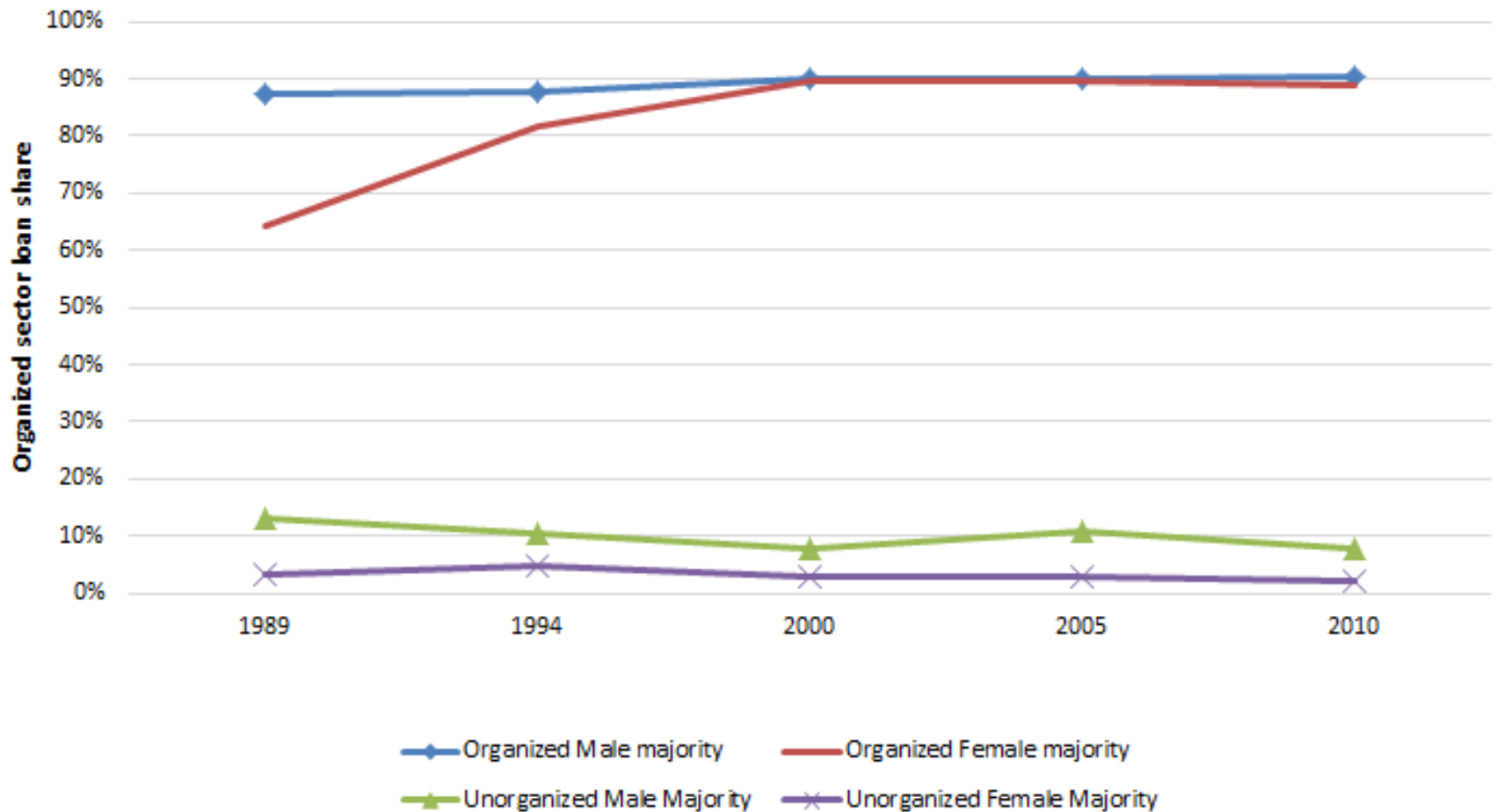
Access to Finance for Indian Manufacturing

- ~88% of plants in organized sector and only 8% in the unorganized sector have access to loans
- Share with external loans is increasing in the organized but declining in the unorganized sector
- Large urban-rural disparities: rural locations lagging behind
- Large regional disparities in access to finance: leading Vs lagging states

Access to Finance: Across Sectors



Access to Finance: Gender Dimension



Methodology: Impact of factor Misallocation

- Evaluate the effect of misallocation on access to finance

$$Y_d = \beta_0 + \sum_f \beta_f M_{d,f} + \eta_{dk} + \eta_{sy} + \eta_{ky} + e$$

Total Loans

Panel estimation with district-industry, state-year and industry-year FE

	Baseline estimation	Using district covariates instead of FE	Dropping weights	Using state-industry-year FE	Adding employment control	Using balanced panel	Misallocation without industry aggregation step	Misallocation using OLS TFP metric
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Using land and labor misallocation in organized sector								
Land misallocation index	-0.083 (0.053)	-0.063 (0.045)	-0.081+ (0.049)	-0.081 (0.057)	-0.053+ (0.028)	-0.066 (0.073)	-0.062 (0.052)	-0.071 (0.049)
Labor misallocation index	0.113+ (0.067)	0.051 (0.053)	0.109+ (0.058)	0.108 (0.077)	0.047+ (0.026)	0.076 (0.104)	0.161++ (0.064)	0.189+++ (0.062)
Log employment in district-industry-year					1.055+++ (0.020)			
Observations	14053	14053	14053	14053	14053	6439	14053	14053
Adjusted R-squared	0.629	0.314	0.631	0.629	0.817	0.611	0.629	0.630
B. Using land and labor misallocation in total manufacturing sector								
Land misallocation index	0.013 (0.056)	-0.041 (0.054)	0.007 (0.055)	0.005 (0.063)	-0.058+ (0.033)	-0.041 (0.070)	-0.051 (0.054)	-0.013 (0.058)
Labor misallocation index	-0.045 (0.070)	-0.069 (0.059)	-0.054 (0.067)	-0.039 (0.078)	0.014 (0.031)	0.032 (0.081)	0.240+++ (0.070)	0.244+++ (0.063)
Log employment in district-industry-year					1.057+++ (0.020)			
Observations	14053	14053	14053	14053	14053	6439	14053	14053
Adjusted R-squared	0.628	0.314	0.630	0.628	0.817	0.610	0.631	0.632

Loan Intensity

Panel estimation with district-industry, state-year and industry-year FE

	Baseline estimation	Using district covariates instead of FE	Dropping weights	Using state-industry-year FE	Adding employment control	Using balanced panel	Misallocation without industry aggregation step	Misallocation using OLS TFP metric
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Using land and labor misallocation in organized sector								
Land misallocation index	-0.014 (0.026)	0.005 (0.022)	-0.012 (0.027)	-0.012 (0.027)	-0.016 (0.026)	0.014 (0.028)	0.027 (0.029)	0.029 (0.028)
Labor misallocation index	0.028 (0.028)	0.012 (0.022)	0.028 (0.029)	0.022 (0.031)	0.034 (0.027)	0.008 (0.029)	0.035 (0.031)	0.028 (0.030)
Log employment in district-industry-year					-0.090+++ (0.020)			
Observations	14053	14053	14053	14053	14053	6439	14053	14053
Adjusted R-squared	0.274	0.061	0.291	0.274	0.280	0.232	0.275	0.275
B. Using land and labor misallocation in total manufacturing sector								
Land misallocation index	-0.005 (0.031)	-0.004 (0.022)	0.005 (0.032)	-0.006 (0.031)	0.001 (0.031)	-0.025 (0.029)	0.014 (0.035)	0.029 (0.030)
Labor misallocation index	0.032 (0.029)	0.044++ (0.020)	0.032 (0.030)	0.034 (0.029)	0.027 (0.028)	0.063++ (0.026)	0.049 (0.036)	0.027 (0.030)
Log employment in district-industry-year					-0.089+++ (0.020)			
Observations	14053	14053	14053	14053	14053	6439	14053	14053
Adjusted R-squared	0.274	0.062	0.291	0.274	0.279	0.233	0.275	0.275

Misallocation in Loans

Panel estimation with district-industry, state-year and industry-year FE								
	Baseline estimation	Using district covariates instead of FE	Dropping weights	Using state-industry-year FE	Adding employment control	Using balanced panel	Misallocation without industry aggregation step	Misallocation using OLS TFP metric
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Using land and labor misallocation in organized sector								
Land misallocation index	0.389+++ (0.049)	0.376+++ (0.036)	0.371+++ (0.049)	0.389+++ (0.051)	0.389+++ (0.049)	0.451+++ (0.048)	0.476+++ (0.053)	0.476+++ (0.051)
Labor misallocation index	0.266+++ (0.065)	0.265+++ (0.050)	0.288+++ (0.064)	0.266+++ (0.067)	0.266+++ (0.065)	0.229+++ (0.068)	0.298+++ (0.053)	0.304+++ (0.052)
Log employment in district-industry-year					-0.004 (0.014)			
Observations	14839	14839	14839	14839	14839	6546	14839	14839
Adjusted R-squared	0.429	0.410	0.444	0.429	0.429	0.437	0.542	0.546
B. Using land and labor misallocation in total manufacturing sector								
Land misallocation index	0.293+++ (0.064)	0.247+++ (0.044)	0.290+++ (0.064)	0.294+++ (0.065)	0.293+++ (0.064)	0.344+++ (0.068)	0.398+++ (0.074)	0.417+++ (0.063)
Labor misallocation index	-0.057 (0.059)	-0.055 (0.039)	-0.053 (0.059)	-0.060 (0.061)	-0.057 (0.059)	-0.050 (0.064)	0.126+ (0.069)	0.102 (0.062)
Log employment in district-industry-year					0.001 (0.015)			
Observations	14839	14839	14839	14839	14839	6546	14839	14839
Adjusted R-squared	0.217	0.171	0.234	0.217	0.217	0.215	0.344	0.375

Absolute Deviation

Panel estimation with district-industry, state-year and industry-year FE									
Baseline estimation	Using district covariates instead of FE	Dropping weights	Using state-industry-year FE	Adding employment control	Using balanced panel	Misallocation without industry aggregation step	Misallocation using OLS TFP metric	Using average deviation	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
A. Using land and labor misallocation in organized sector									
Land misallocation index	0.038++ (0.019)	0.036++ (0.015)	0.036+ (0.019)	0.037+ (0.020)	0.045+++ (0.016)	0.041+ (0.024)	0.055++ (0.022)	0.049++ (0.022)	0.037++ (0.018)
Labor misallocation index	-0.013 (0.021)	-0.041++ (0.017)	-0.012 (0.020)	-0.011 (0.021)	-0.029+ (0.017)	-0.024 (0.027)	-0.001 (0.024)	0.010 (0.024)	-0.019 (0.020)
Log employment in district-industry-year					0.224+++ (0.011)				
Observations	14839	14839	14839	14839	14839	6546	14839	14839	14839
Adjusted R-squared	0.259	0.097	0.270	0.259	0.318	0.224	0.259	0.259	0.147
B. Using land and labor misallocation in total manufacturing sector									
Land misallocation index	0.049++ (0.025)	0.044++ (0.019)	0.047+ (0.024)	0.045+ (0.026)	0.034 (0.022)	0.057++ (0.027)	0.062++ (0.024)	0.044+ (0.023)	0.032 (0.026)
Labor misallocation index	-0.034 (0.023)	-0.057+++ (0.018)	-0.039+ (0.023)	-0.032 (0.024)	-0.021 (0.019)	-0.024 (0.025)	0.025 (0.025)	0.051++ (0.023)	-0.020 (0.021)
Log employment in district-industry-year					0.223+++ (0.011)				
Observations	14839	14839	14839	14839	14839	6546	14839	14839	14839
Adjusted R-squared	0.259	0.098	0.270	0.259	0.317	0.225	0.261	0.262	0.146

Squared Absolute Deviation

Panel estimation with district-industry, state-year and industry-year FE

	Baseline estimation	Using district covariates instead of FE	Dropping weights	Using state-industry-year FE	Adding employment control	Using balanced panel	Misallocation without industry aggregation step	Misallocation using OLS TFP metric	Using average deviation
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
A. Using land and labor misallocation in organized sector									
Land misallocation index	0.034++ (0.017)	0.023++ (0.011)	0.031+ (0.016)	0.032+ (0.019)	0.036++ (0.017)	0.034 (0.022)	0.049++ (0.019)	0.045++ (0.019)	0.025 (0.017)
Labor misallocation index	-0.021 (0.019)	-0.029++ (0.013)	-0.018 (0.018)	-0.019 (0.022)	-0.027 (0.019)	-0.047++ (0.023)	-0.021 (0.022)	-0.017 (0.022)	-0.011 (0.020)
Log employment in district-industry-year					0.080+++ (0.012)				
Observations	14839	14839	14839	14839	14839	6546	14839	14839	14839
Adjusted R-squared	0.099	0.036	0.108	0.099	0.106	0.132	0.099	0.099	0.090
B. Using land and labor misallocation in total manufacturing sector									
Land misallocation index	0.041+ (0.024)	0.037++ (0.015)	0.039 (0.024)	0.040 (0.026)	0.036 (0.024)	0.049+ (0.025)	0.051++ (0.023)	0.036+ (0.022)	0.026 (0.026)
Labor misallocation index	-0.034+ (0.020)	-0.037+++ (0.013)	-0.037+ (0.020)	-0.033 (0.022)	-0.030 (0.020)	-0.023 (0.021)	-0.011 (0.021)	0.016 (0.022)	-0.016 (0.020)
Log employment in district-industry-year					0.079+++ (0.012)				
Observations	14839	14839	14839	14839	14839	6546	14839	14839	14839
Adjusted R-squared	0.099	0.036	0.108	0.099	0.106	0.132	0.099	0.099	0.090

Results for Organized Sector

Misallocation of L&B:

- Not significantly related to the intensity of loans
- A positive and significant relationship with misallocation in access to finance in the organized sector
- do not observe evidence that start-up funding is dampened due to misallocation

Estimation concerns:

- Omitted Variables: Fixed effects perhaps rule this out
- Reverse Causality: Misallocation in financial markets driving land market distortions
 - Liquidating high value land assets in events of shocks to resolve financing problems
 - Without access to finance, use of L&B may be inefficient
- Possible Instrument: Misallocation in the Unorganized sector
 - Indian financing markets appear mostly distinct, whereas land markets do not (95% of loans but 45% of L&B assets)
 - Exclusion restriction: Increase in L&B misallocation in informal sector impacts loan markets for organized sector firms through overall misallocation L&B (possibly true due to small loan shares)

IV Estimations

	Baseline OLS estimation with district-industry, state- year, and industry- year FE	FD OLS estimation with state-year and industry-year FE	FD IV estimation with state-year and industry-year FE	Column 3 with log employment change control	Column 3 with log employment change control and extra IV lags	Column 3 using average deviations
	(1)	(2)	(3)	(4)	(5)	(6)
A. Absolute deviations in expected and actual loans						
Land misallocation index	0.049++ (0.025)	0.047++ (0.024)	0.129 (0.111)	0.159+ (0.093)	0.146++ (0.058)	0.141 (0.091)
Labor misallocation index	-0.034 (0.023)	-0.037 (0.024)	-0.126 (0.124)	-0.089 (0.106)	-0.060 (0.065)	-0.042 (0.100)
Log employment in district-industry-year				0.221+++ (0.013)	0.222+++ (0.012)	
Observations	14852	8525	8525	8525	8525	8525
Overid test p-value					0.823	
B. Squared deviations in expected and actual loans						
Land misallocation index	0.041+ (0.024)	0.036 (0.025)	0.229++ (0.105)	0.239++ (0.103)	0.169++ (0.068)	0.205++ (0.097)
Labor misallocation index	-0.034 (0.020)	-0.032 (0.022)	-0.141 (0.105)	-0.129 (0.105)	-0.045 (0.069)	-0.112 (0.096)
Log employment in district-industry-year				0.072+++ (0.015)	0.074+++ (0.015)	
Observations	14852	8525	8525	8525	8525	8525
Overid test p-value					0.492	

Conclusions

- Large disparities in access by sector, region, gender
- Misallocation of L&B is positively and significantly associated with access to financial loans for manufacturing firms
- Misallocation in labor inputs does not significantly impact the allocative efficiency of financial loans in the organized sector