

# The Impact of Input Trade Liberalization on Firms' Borrowings

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# Motivation

- Major **trade liberalization** wave in developing countries during the 1990s and early 2000s.
  - The simple average of all tariff rates in India ↓ from 71% in 1993/1994 to 35% 1997/1998 (WTO TPR, 1998).
- Foreign competition and access to imported inputs **positively** affect firm performance (Pavcnik, 2002; Amiti and Konings, 2007; Bas and Berthou, 2017; Fan et al., 2015) allowing firms to invest in **productivity enhancement** projects → costly.
- If firms require access to external finance to cover fixed costs of sourcing inputs and capital goods from abroad, input-trade liberalization ↑ firms' **demand for credit**.
- **Research question:** What is the impact of input trade liberalization on the borrowings of Indian firms ?

# This paper in a nutshell

- Novel evidence on the relationship between **exogenous changes in input tariffs** across industries over time and **within-firm changes in borrowings**.
- We use the prowess **Indian firm-level** data and **tariff data** from WITS.
- **Main result:** input trade liberalization **increases** borrowings for importers of inputs, no significant impact for non-importers.
- Our results are robust to **alternative specifications** that control for other reforms, and industry and firm characteristics.

# Roadmap

- ① Literature and Contribution
- ② Context and Data
- ③ Specification and Identification Strategy
- ④ Baseline Results
- ⑤ Alternative Explanations and Mechanisms
- ⑥ Conclusion

## Theoretical Literature

- The supply channel through access to foreign inputs (Kasahara and Lapham, 2013; Amiti and Davis, 2011; Kugler and Verhoogen, 2012).
- The foreign demand channel (Lileeva and Trefler, 2010; Bustos, 2011; Bas and Ledezma, 2015).
- Firms need external financing to pay for the fixed costs (Chaney, 2016; Manova, 2013; Peters and Schnitzer, 2015).

## Empirical Literature:

- Trade liberalization and firm performance in developing countries: Goldberg et al. (2010); Topalova and Khandelwal (2011); De Loecker et al. (2016); Bas and Berthou (2017).
- Technology, financial development and growth: Aghion et al. (2005); Maskus et al. (2012); Fafchamps and Schündeln (2013).
- International trade and financial constraints of heterogeneous firms: Manova (2008); Berman and Héricourt (2010); Greenaway et al. (2007); Bas and Berthou (2012).

Adding to the literature on heterogeneous firms, trade and access to finance:

- **Causal evidence** on the impact of input trade liberalization on firms' borrowings.
- **Complementarity** between trade liberalization and the financial health of the firm.

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# India's trade liberalization

- Post-independence development strategy: **inward-looking** and **dependent on government intervention**.
- Trade liberalization was among the reforms that took place in the "**Eighth five-year plan**" between 1992 and 1997 as a part of the IMF assistance program in 1991.
- Gradual tariff cuts were applied in **all sectors** at the same time that non-tariff barriers and licenses were removed.
- Industries with the highest tariffs received the highest cuts ([Goldberg et al., 2010](#)). Input tariffs
- Average input tariffs have decreased by **27%** from 1989 till 1997.
- Capital goods tariffs only slightly decreased by **10%** ([Bas and Berthou, 2017](#)).

**Firm-level data** from India compiled from the Prowess database by the Centre for Monitoring the Indian Economy (CMIE) from 1990 till 1997.

- Balance sheet data. Sample of 3,744 large and medium-sized firms, restricted to the **manufacturing sector**.

**Tariff data** from WITS database (World Bank) : India's effectively applied MFN import tariffs at the 3 digit industry level ISIC (rev 2).

- **The input tariff measure:** Weighted average:  $\tau_{st} = \sum_z \alpha_{zs} \tau_{zt}$

$\alpha_{zs}$  is the value share of inputs (*source: India's IO table in 1993*).

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# Specification and Identification Strategy

$$\ln B_{ist} = \beta_1 \tau_{l,s,t-1} + \beta_2 \text{Importer}_{is,t-1} + \beta_3 \tau_{l,s,t-1} \times \text{Importer}_{ist-1} + Z'_{st-1} \Gamma + X'_{it-1} \Omega + \gamma_i + \delta_t + \epsilon_{ist}$$

- $B_{ist}$ : **total borrowings** of firm  $i$ , producing in 3-digit industry  $s$  in year  $t$ .
- $\tau_{l,s,t-1}$ : **input tariffs** of industry  $s$  in year  $t-1$ .
- $\text{Importer}_{ist-1}$ : **dummy** indicating whether a firm is an importer of inputs.
- $Z_{s,t-1}$ : output tariffs (foreign competition) and Herfindhal index (domestic competition).
- $X_{it-1}$ : age and capital intensity.
- $\gamma_i$  and  $\delta_t$  are firm and year FE.

# The exogeneity of the tariff variations

- Topalova and Khandelwal (2011) and Goldberg et al. (2010):
  - The **surprise** element of the 1991 crisis and the reforms that took place.
  - Tariff cuts **were not targeted** towards specific industries and were not the result of **lobbying**. [Table 1](#) [Table 2](#)
  - The "Ninth five-year plan" tariff reduction was **not uniform** → **potential endogeneity** of trade protection → analysis is restricted to 1990-1997.

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# Baseline Results

The impact of input-trade liberalization on firms' borrowings

Dependent variable	logarithm of borrowings of firm $i$ in sector $s$ in year $t$					
	(1)	(2)	(3)	(4)	(5)	(6)
Input tariffs( $s,t-1$ )	-0.057 (0.138)	-0.015 (0.135)	0.035 (0.131)	0.045 (0.124)	0.041 (0.124)	
Importer ( $i,t-1$ )	0.162*** (0.037)	0.164*** (0.037)	0.169*** (0.037)	0.165*** (0.038)	0.165*** (0.038)	0.173*** (0.039)
Input tariffs( $s,t-1$ ) x Importer ( $i,t-1$ )	-0.164** (0.071)	-0.170** (0.072)	-0.196*** (0.071)	-0.206*** (0.070)	-0.206*** (0.070)	-0.223*** (0.073)
Output tariffs( $s,t-1$ )		-0.243*** (0.083)	-0.240*** (0.082)	-0.178** (0.076)	-0.179** (0.076)	
Age( $i,t-1$ )			0.282*** (0.045)	0.408*** (0.042)	0.409*** (0.042)	0.403*** (0.041)
Capital intensity( $i,t-1$ )				0.193*** (0.012)	0.193*** (0.012)	0.186*** (0.012)
Herfindhal index( $s,t-1$ )					0.065 (0.074)	
Firm FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	NO
Industry-year FE	NO	NO	NO	NO	NO	YES
Observations	13,899	13,899	13,899	13,899	13,899	13,876
R-squared	0.926	0.926	0.926	0.930	0.930	0.934

Initial importer status

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# Alternative Explanations and Mechanisms

## Alternative Explanations [Results Table](#)

- The foreign demand
- Other reforms
- Excluding foreign firms and state-owned firms

## Mechanisms

- Financial development and external dependence [Results Table](#)
- Input and Capital goods tariffs reduction [Results Table](#)
- Other mechanisms [Results Table](#)

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# Conclusion

- This paper investigates the **micro-economic effects of input-trade liberalization** on firms' demand of external finance.
- **Hypothesis:** firms require access to external financial resources to pay the fixed cost of technology upgrading and sourcing foreign inputs from abroad.
- **Results:** firms sourcing inputs from abroad and producing in industries that have experienced greater input tariff cuts experienced an increase in borrowing, compared to non-importers.
- Our results are **robust** to alternative specifications that control for other reforms, and industry and firm characteristics.

Thank you !

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# Stylized Facts

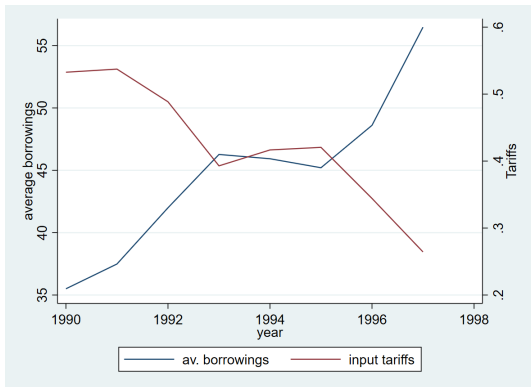
## Average borrowings and input tariffs per year by sector



Source: Prowess data and WITS

# Stylized Facts

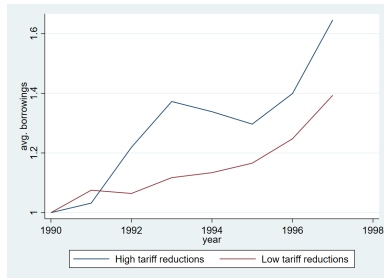
Figure 1: Average borrowings and input tariffs per year



Source: Prowess data and WITS.

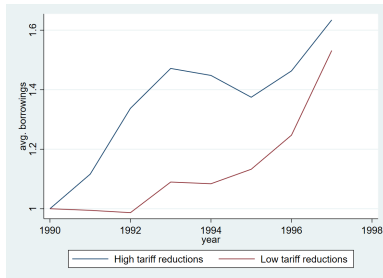
# Stylized Facts

Figure 2: Average borrowings per year by variation in **input** tariffs



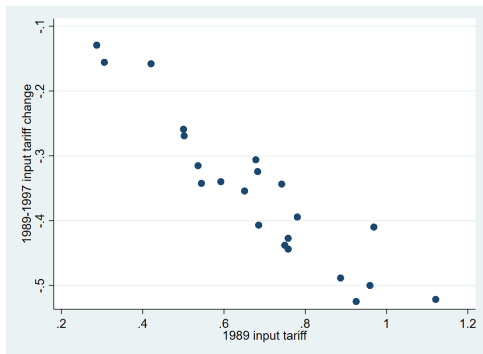
Source: Prowess data and WITS.

Figure 3: Average borrowings per year by variation in **output** tariffs



Source: Prowess data and WITS.

# 1989 input tariffs and subsequent declines by industry



Source: WITS.

# Input Tariff Reductions (1990-1997) and Industrial Characteristics in 1990

Dependent variable	$\Delta$ Input tariffs between 1990 and 1997					
	(1)	(2)	(3)	(4)	(5)	(6)
Borrowings(s,1990)	0.006 (0.006)					
Sales(s,1990)		0.007 (0.006)				
Capital share(s,1990)			0.006 (0.006)			
Wage(s,1990)				0.007 (0.006)		
Imp.K goods(s,1990)					0.011 (0.007)	
Imp.inputs(s,1990)						0.004 (0.004)
<i>N</i>	47	47	47	47	47	47

*Notes:* Robust standard errors in parentheses. All industry level variables are expressed in logarithms. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

# Initial Firm Characteristics 1990 and Input Tariff Changes Between 1990-1997

Dependent variable	(1) ln(borrow)	(2) Importer of K	(3) Imports of K/sales	(4) K intensity	(5) TFP
$\Delta$ input tariffs(s,97-90)	1.966 (1.286)	0.005 (0.450)	-0.003 (0.108)	0.630 (0.585)	-0.229 (0.391)
<i>N</i>	669	676	676	676	676

*Notes:* OLS standard errors in parentheses. Imports of capital goods and capital intensity are expressed in logarithm. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Back

# Initial importer status

VARIABLES	(1) Ln(borrow)	(2) Ln(borrow)	(3) Ln(borrow)
Input tariffs(s,t-1) x Importer(i,90)	-0.497** (0.196)	-0.506*** (0.184)	-0.547*** (0.182)
Capital intensity(t-1)		0.300*** (0.021)	0.303*** (0.021)
Age(t-1)			0.271*** (0.068)
Firm FE	YES	YES	YES
Industry-year FE	YES	YES	YES
Observations	6,142	6,142	6,142
R-squared	0.924	0.930	0.931

Notes: Clustered standard errors at the 3 digit industry year level in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

# Alternative explanations

Dependent variable	logarithm of borrowings of firm $i$ in sector $s$ in year $t$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<b>Excluding firms:</b>							
	Foreign demand		Other reforms		Foreign		State	
Input tariffs( $s,t-1$ )	0.019 (0.127)		-0.035 (0.116)		0.184* (0.106)		0.048 (0.127)	
Importer ( $i,t-1$ )	0.142*** (0.037)	0.151*** (0.038)	0.152*** (0.038)	0.164*** (0.039)	0.205*** (0.035)	0.210*** (0.036)	0.170*** (0.038)	0.177*** (0.039)
Input tariffs( $s,t-1$ ) x Importer ( $i,t-1$ )	-0.173** (0.069)	-0.196*** (0.072)	-0.180** (0.070)	-0.204*** (0.073)	-0.284*** (0.070)	-0.293*** (0.073)	-0.220*** (0.072)	-0.236*** (0.076)
Output tariffs( $s,t-1$ )	-0.169** (0.078)		-0.130* (0.078)		-0.137* (0.075)		-0.176** (0.077)	
Export tariffs( $s,t-1$ )	-0.028 (0.088)							
Exporter( $i,t-1$ )	0.107*** (0.017)	0.110*** (0.016)						
Export tariffs( $s,t-1$ ) x Exporter( $i,t-1$ )	-0.226** (0.111)	-0.243** (0.106)						
Age( $i,t-1$ )	0.394*** (0.042)	0.385*** (0.042)	0.422*** (0.044)	0.410*** (0.044)	0.448*** (0.042)	0.441*** (0.041)	0.417*** (0.042)	0.410*** (0.042)
Capital intensity( $i,t-1$ )	0.196*** (0.012)	0.189*** (0.012)	0.190*** (0.013)	0.184*** (0.013)	0.186*** (0.012)	0.180*** (0.013)	0.193*** (0.012)	0.187*** (0.013)
Herfindhal index( $s,t-1$ )	0.039 (0.078)		0.047 (0.072)		0.081 (0.070)	-0.007 (0.088)	0.024 (0.072)	
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	NO	NO	NO	YES	NO	YES	NO
Industry-year FE	NO	YES	NO	YES	NO	YES	NO	YES
Region-year FE	NO	NO	YES	YES	NO	NO	NO	NO
Observations	13,669	13,653	13,638	13,614	12,537	12,519	13,497	13,474
R-squared	0.931	0.934	0.933	0.936	0.934	0.938	0.925	0.929



# Possible Mechanisms I

Financial development and external dependence

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	High Fin. Dev (state)	Low Fin. Dev (state)	Low Fin. Dev (state)	Low ext. dep. (industry)	Low ext. dep. (industry)	High ext. dep. (industry)	High ext. dep. (industry)	High ext. dep. (industry)
	ln(borrow)	ln(borrow)	ln(borrow)	ln(borrow)	ln(borrow)	ln(borrow)	ln(borrow)	ln(borrow)
Input tariffs(s,t-1)	-0.150 (0.160)		0.260 (0.169)		0.057 (0.135)		-0.089 (0.298)	
Importer (i,t-1)	0.163*** (0.051)	0.170*** (0.053)	0.152*** (0.048)	0.141*** (0.052)	0.206*** (0.048)	0.211*** (0.050)	0.112** (0.055)	0.124** (0.057)
Input tariffs(s,t-1) x Importer (i,t-1)	-0.203** (0.087)	-0.225** (0.092)	-0.171 (0.109)	-0.186 (0.115)	-0.312*** (0.091)	-0.300*** (0.099)	-0.068 (0.097)	-0.118 (0.103)
Output tariffs(s,t-1)	-0.229** (0.092)		-0.076 (0.086)		-0.191* (0.111)		-0.120 (0.124)	
Age(i,t-1)	0.423*** (0.058)	0.387*** (0.055)	0.373*** (0.064)	0.474*** (0.071)	0.415*** (0.055)	0.422*** (0.061)	0.412*** (0.065)	0.383*** (0.062)
Capital intensity(i,t-1)	0.197*** (0.015)	0.189*** (0.015)	0.194*** (0.019)	0.196*** (0.020)	0.208*** (0.017)	0.205*** (0.017)	0.180*** (0.017)	0.166*** (0.016)
Herfindhal index(s,t-1)	0.020 (0.086)		0.113 (0.141)		0.055 (0.100)		0.037 (0.104)	
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	NO	YES	NO	YES	NO	YES	NO
Industry-year FE	NO	YES	NO	YES	NO	YES	NO	YES
Observations	8,941	8,915	4,741	4,713	7,423	7,397	6,208	6,194
R-squared	0.932	0.937	0.927	0.934	0.937	0.939	0.919	0.925

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# Possible Mechanisms III

## Input and capital goods tariffs reductions

Dependent variable	logarithm of borrowings of firm $i$ in sector $s$ in year $t$				
	(1)	(2)	(3)	(4)	(5)
Input tariffs no $K(s,t-1)$	-0.011 (0.142)	0.036 (0.136)	0.056 (0.131)	0.053 (0.131)	
Importer( $i,t-1$ )	0.111*** (0.036)	0.114*** (0.036)	0.125*** (0.036)	0.125*** (0.036)	0.147*** (0.037)
Input tariffs no $K(s,t-1)$ x Importer( $i,t-1$ )	-0.196*** (0.075)	-0.223*** (0.074)	-0.240*** (0.071)	-0.240*** (0.071)	-0.288*** (0.075)
K goods tariffs( $s,t-1$ )	0.200 (0.155)	0.219 (0.151)	0.181 (0.147)	0.177 (0.147)	
Importer $K(i,t-1)$	0.172*** (0.017)	0.175*** (0.017)	0.143*** (0.016)	0.142*** (0.016)	0.141*** (0.016)
K goods tariffs( $s,t-1$ ) x Importer $K(i,t-1)$	-0.189** (0.076)	-0.201*** (0.075)	-0.169** (0.074)	-0.169** (0.074)	-0.174** (0.074)
Output tariffs( $s,t-1$ )	-0.220*** (0.078)	-0.218*** (0.078)	-0.163** (0.073)	-0.164** (0.073)	
Age( $i,t-1$ )		0.290*** (0.043)	0.408*** (0.041)	0.408*** (0.041)	0.407*** (0.041)
Capital intensity( $i,t-1$ )			0.183*** (0.012)	0.183*** (0.012)	0.178*** (0.012)
Herfindhal index( $s,t-1$ )				0.049 (0.071)	
Firm FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	NO
Industry-year FE	NO	NO	NO	NO	YES
Observations	13,899	13,899	13,899	13,899	13,876
R-squared	0.927	0.928	0.931	0.931	0.935

# Possible Mechanisms IV

## Other Mechanisms

	(1)	(2)	(3)
	Ln(sales)	Ln(sales)	K importer status
Input tariffs no K(s,t-1)	0.149 (0.142)		-0.152** (0.068)
Importer(i,t-1)	0.170*** (0.040)	0.159*** (0.039)	
Input tariffs no K(s,t-1) x Importer(i,t-1)	-0.207*** (0.077)	-0.172** (0.074)	
K goods tariffs(s,t-1)	0.062 (0.189)		-0.170** (0.082)
Importer K(i,t-1)	0.083*** (0.013)	0.084*** (0.013)	
K goods tariffs(s,t-1) x Importer K(i,t-1)	-0.075 (0.064)	-0.178*** (0.062)	
Output tariffs(s,t-1)	0.060 (0.081)		-0.053 (0.053)
Age(i,t-1)	0.382*** (0.046)	0.415*** (0.046)	-0.004 (0.031)
Capital intensity(i,t-1)	-0.048*** (0.013)	-0.045*** (0.013)	0.013** (0.006)
Herfindhal index(s,t-1)	0.097 (0.078)		0.045 (0.056)
Firm FE	YES	YES	YES
Year FE	YES	NO	YES
Industry-year FE	NO	YES	NO
Observations	13,899	13,876	13,899
R-squared	0.949	0.953	0.624