

# Firm Dynamics and Economic Development with Corruption and Financial Frictions

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## This paper

### Question:

- How does corruption affect economic development through firm dynamics?
- Focus on one type of corruption: bribery.

### Our approach:

- Document the difference in firm growth volatility across countries in the data.
- Examine correlation between bribery and firm-level outcomes in the data.
- A model of firm dynamics with bribery and financial frictions.

## Results

### Empirical finding

- (Orbis database) Firm growth is more volatile in poor countries.
- (Chinese Industrial Survey) High incidences of bribery are correlated with
  - Higher growth rate in capital, labor and output of firms.
  - Lower growth rate in labor productivity.
  - The correlation is stronger in sectors that rely more on external financing.

### A model of firm dynamics with bribery and financial frictions

- Idiosyncratic productivity shocks lead to entry & exit of entrepreneurs.
- Entrepreneurs need to save to grow out of financial frictions.
- Bribery protects incumbents by preventing entry of more productive entrepreneurs.
  - (-) lower aggregate productivity due to less entry.
  - (+) helps incumbent entrepreneurs grow out of financial constraint.
- The positive effect increases with firm growth volatility and financial frictions.

## Fact 1: higher firm growth volatility in poor countries

### Data

- Orbis database
- 40 countries (2011-2016)
- Public and private firms

### Definition of volatility

- s.d. of firm growth over time
- $Vol = \text{avg}(s.d._i(\Delta y_{i,t}))$

### Result

- Firm growth in revenue, asset, employment and labor productivity more volatile in poorer countries.

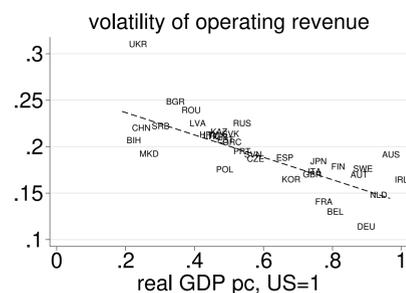


Figure 1: Cross-country difference in volatility

## Fact 2: bribery and firm-level outcomes

### Data on bribery

- Data from China Judgements Online.
- Number of bribery cases during the anti-corruption campaign (2014-17).

### Data on firm-level outcome

- Data: Annual Survey of Chinese Industrial Firms (1998-2007).

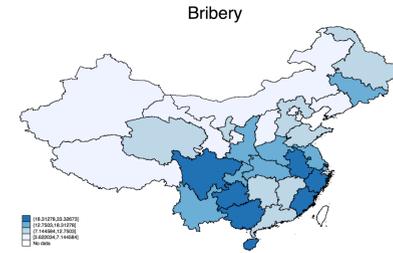


Figure 2: Number of Bribery cases per million people

### Findings

- Bribery associated w/ faster growth in output & inputs, slower growth in labor productivity.
- The correlation stronger in sectors with higher dependence on external financing (DEF).

	(1)	(2)	(3)	(4)	(5)	(6)
corruption (bribery)	-0.00208*** (0.000685)	0.102*** (0.0275)	0.139*** (0.0391)	-0.0830* (0.0482)	-0.00557 (0.0365)	-0.00404 (0.0360)
corruption X DEF above median					0.0735*** (0.0246)	0.0743*** (0.0247)
DEF above median					0.334 (0.643)	0.322 (0.638)
share of long-term debt		0.743 (0.602)	-3.050*** (0.704)	-0.785 (1.427)		0.749 (0.972)
leverage ratio		-0.0314 (0.0220)	0.0306 (0.0263)	0.110*** (0.0327)		0.0519 (0.0311)
Dependent variable	sales gr	employment gr	assets gr	lab. prod. gr	sales gr	sales gr
N	22861	22696	22695	22693	22698	22696
AR2	0.0845	0.245	0.167	0.147	0.151	0.151

## Model

- One final good, used for consumption and investment  $Y = (\int_0^1 y_i^{\frac{\rho-1}{\rho}} di)^{\frac{\rho}{\rho-1}}$ .
- A measure 1 of intermediate goods  $y_i = \epsilon k^{\alpha} 1^{1-\alpha}$ , where  $\epsilon$  is firms' idiosyncratic productivity.
- Unit cost of production is  $\frac{w}{1-\alpha} = \frac{(\bar{r}(a)+\delta)k}{\alpha}$ , where interest rate  $\bar{r}(a)$  decreases with wealth  $a$ .
- Each period, incumbent firm competes with an entrant.
- Winner produces and loser goes back to an entrant pool.

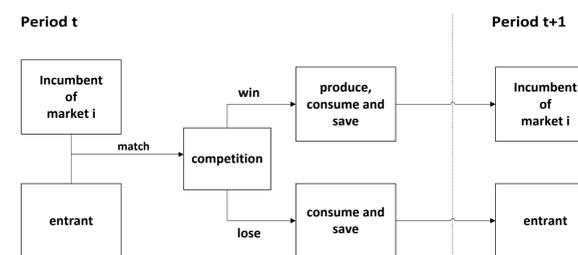


Figure 3: Timing

## Competition with and without corruption

- In each period, markets face an i.i.d. corruption shock  $x$ .
- In non-corruptible markets ( $x = 0$ ), the rule of game is Bertrand competition.
  - Entrants push out incumbents if they have lower unit cost.
- In corruptible markets ( $x = 1$ ), it is a bribery competition to win an operating permit.
  - The bribery game gives more advantage to wealthier firms.

Bertrand competition	Bribery
compete on $a$ and $\epsilon$	compete on $a$ only
more entry and exit	less entry and exit
high productivity due to firm entry	lower productivity
slower accumulation of wealth	faster accumulation of wealth
no loss from bribery	loss from bribery

Table 1: Bertrand competition v.s. bribery

## Quantitative analysis

- Compared with an economy w/o corruption, the one w/ corruption has 1) higher capital and output, 2) lower productivity and exit rate, and 3) higher concentration.

	w/o corruption	w/ corruption
firm turnover (exit rate)	17%	4%
output	1	1.038
capital stock	1	1.054
aggregate productivity	1	0.985
share of incumbent wealth in total wealth	75%	93%

Table 2: Comparison of steady states of the two economies

- In addition, the output gain is the highest with lower persistence in the productivity and more severe financial constraints.

	Benchmark	Higher persistence	Lower fina. fric.
		$\rho^{\epsilon} = 0.89$	$\rho^{\epsilon} = 0.95$
Output	3.75	1.34	-3.83
Capital stock	5.36	2.96	-3.90
Productivity	-1.52	-1.58	0.01

Table 3: Determinants of effects of corruption

## Conclusion

- We study impact of corruption on the aggregate economy through firm dynamics.
- We emphasize the trade-off between
  - productivity growth due to firm entry
  - asset accumulation of assets to overcome financial frictions
- Positive effects of corruption might dominate in developing countries.