

Presentation of two preliminary research ideas

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Idea 1: Background

Model where firms face collateral constraints (Midrigan Xu (2014), Moll (2012) and others

$$D_t \leq \theta K_t, \theta \in (0, 1)$$

Let $a_t = K_t - D_t$ denote firm's asset:

Then, collateral constraint can be rewritten as:

$$-D_t \geq -\theta K_t$$

$$K_t - D_t \geq K_t - \theta K_t$$

$$a_t \geq K_t(1 - \theta)$$

$$K_t \leq \frac{1}{1 - \theta} a_t$$

Implication of this constraint in standard profit max problems:

Technology:

$$\begin{aligned} Y &= f(A_K K, A_L L) \\ &= A_K f(K, (A_L/A_K)L) \\ &= A f(K, \tilde{A}_L L) \end{aligned}$$

FOC:

$$\frac{MP_K}{MP_L} = \frac{r + \delta + \mu(a)}{w}$$

Different technologies:

① Cobb-Douglas:

$$\frac{r + \delta + \mu(a)}{w} = \frac{\alpha}{1 - \alpha} \frac{L}{K}$$

② CES:

$$\frac{r + \delta + \mu(a)}{w} = \frac{\alpha}{1 - \alpha} \left(\frac{L}{K} \right)^{1/\sigma} \frac{1}{\tilde{A}_L^{(\sigma-1)/\sigma}}$$

Some preliminary evidence (Enterprise Survey - India)

Table: Collateral constraint and education of workers

	Unconstrained mean	constrained mean
Average years of education	9.545587	9.09687
Observations	2753	671

Table: Collateral constraint and training

	Unconstrained mean	constrained mean
Firm has formal training program	1.543046	1.524112
Observations	3624	788

Some preliminary evidence (Enterprise Survey - India)

Table: Collateral constraint and proportion of training towards skilled labor

	Unconstrained mean	constrained mean
proportion of formal training towards skilled labor	.5309755	.5095277
Observations	832	192

Table: Collateral constraint and labor share

	Unconstrained mean	constrained mean
labor_share	.17071	.1971271
Observations	2753	671

Next step: get more serious evidence (ASI)

- 1 Do a Hsieh and Klenow (2009) exercise to get an estimate of relative productivity of labor and the wedge on capital
- 2 Test if the wedge on capital is correlated to some underlying collateral constraint
- 3 Test if there is a correlation between the wedge on capital/collateral constraint and \tilde{A}_L

How to know if a firm is constrained:

- Get θ from Enterprise Survey
- Define "Debt capacity" (Rampini and Viswanathan 2010): $\theta K_t - D_t$ as a rough measure for the collateral constraint.

Idea 2: Background

Aggregating production functions with discrete input choices (i.e. fossil fuels)

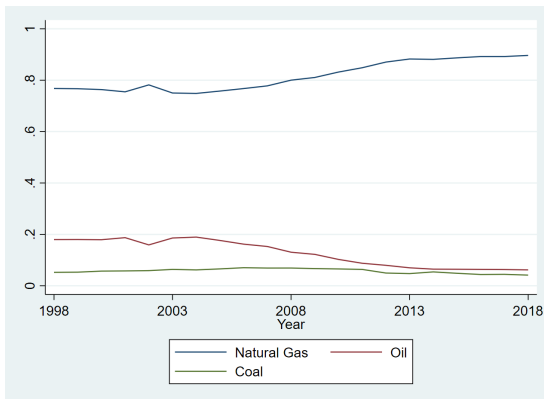


Figure: Aggregates fuel shares

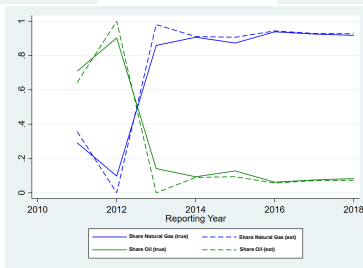
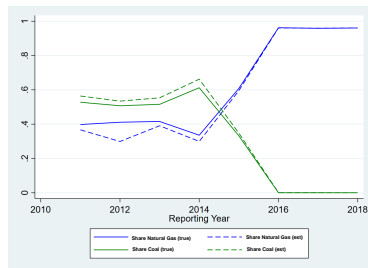
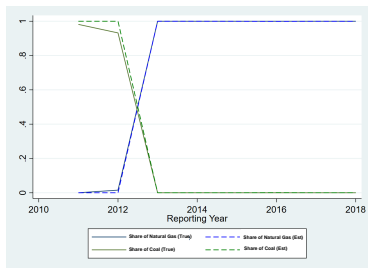


Figure: True fuel shares for selected firms

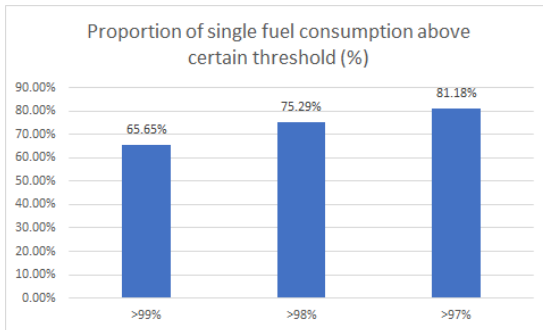


Figure: Proportion of single fuel consumption