The misallocation of land and other factors of production in India

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Objectives

- Explore the extent of factor misallocation among districts in India
- Explore the productivity consequences of misallocation
- Explore the determinants of misallocation (policy and contextual)
- Make the methodological and empirical case for our approach

Why this matters

- Economic development is not only about higher productivity and factor accumulation, it is also about more efficient allocations of factors across firms
- The approach we develop allows us to assess the effects of 'frictions' on economic development

Two challenges

- Develop a new methodology
- Appropriate data
  - Establishment production function
  - Fine factor disaggregation
  - Enough districts
  - Enough periods
  - Enough establishments in each industry and district

  Use India's ASI and NSSO 1989-2010 (5 waves)

Existing approaches

- Restuccia and Rogerson (2008), Hsieh and Klenow (2009)
  - Assume a model of monopolitistic competition
  - An efficient factor allocation involves equalising the marginal revenue product of factors across firms
  - In turn, measured TFP (revenue) should be equalised
  - Idiosyncratic distortions will break this
  - Misallocation can be measured by the variance of measured TFP
  - Usual application: compute the variance of TFP in a country and perform some counterfactuals
  - Issues: limited output, need faith in the model, we don't know what drives misallocation

- Olley and Pakes (1996)
  - Production function: $Y_i = e^{\varphi_i} T_i^{\alpha} K_i^{\beta} L_i^{\gamma}$
  - Share-weighted average productivity: $\Phi_g = \sum_{i=1}^{n_g} s_i \varphi_i$
  - Unweighted average productivity: $\overline{\varphi}_g = \frac{1}{n_g} \sum_{i=1}^{n} \varphi_i$
  - Misallocation in a group (eg, an industry):
    $M_g = -(\Phi_g - \overline{\varphi}_g) = -n \operatorname{cov}_g(s_i, \varphi_i)$
    (Note the minus: more misallocation corresponds to a larger index)
  - Usual application: measure shares using output and look at an industry over time, comparison across industries, comparison across countries
  - Note OP and HK misallocation do not measure the same thing (extensive and intensive margins?)

Two observations

- The shares in the OP index need not be measured with output. They can also be measured using factor shares (employment, land and buildings, other fixed assets)
- Misallocation indices need not be computed at the country level for both OP and HK.
  They can be computed at the district level
  (total OP misallocation = sum of OP district misallocation + cross district misallocation)

Objectives (re-stated)

- Create a panel of Indian districts for: 1989, 1994, 2000, 2005, 2010
- Main variables: measures of OP misallocation for output and factors of production and HK misallocation for each year and district
- Convince you that these measures are not only noise
- Look at the determinants and implications of misallocation

Preview

- Step 1: Estimate establishment productivity
- Step 2: Compute misallocation
- Step 3: Determinants of misallocation
- Step 4: Does factor misallocation breed output misallocation?
- Step 5: Production implications of misallocation

Step 1: Estimate establishment productivity

- Needed to compute misallocation
- Issue: factor endogeneity
- Our preferred approach corrects for local demand/productivity shocks (Levinsohn-Petrin-Sivadasan)
- 22 industries in organised and unorganised sectors (with different factor shares)
- 5 cross-sections of data over 1989-2010 (same factor shares over time)
- Robustness checks: OLS TFP (with 2 or 3 factors, free returns to scale, forced constant returns)

Step 2: Compute misallocation

- For each district and each year of data
- Compute first misallocation by district-industry and then aggregate across industries by district using local weights: $M_d = \sum_{g \in d} s_g M_g$
- OP misallocation for output, value added, employment, land and buildings, other fixed assets, HK misallocation
- Do it for both sectors taken together and for the organised sector and the unorganised separately

Potential issues with district misallocation

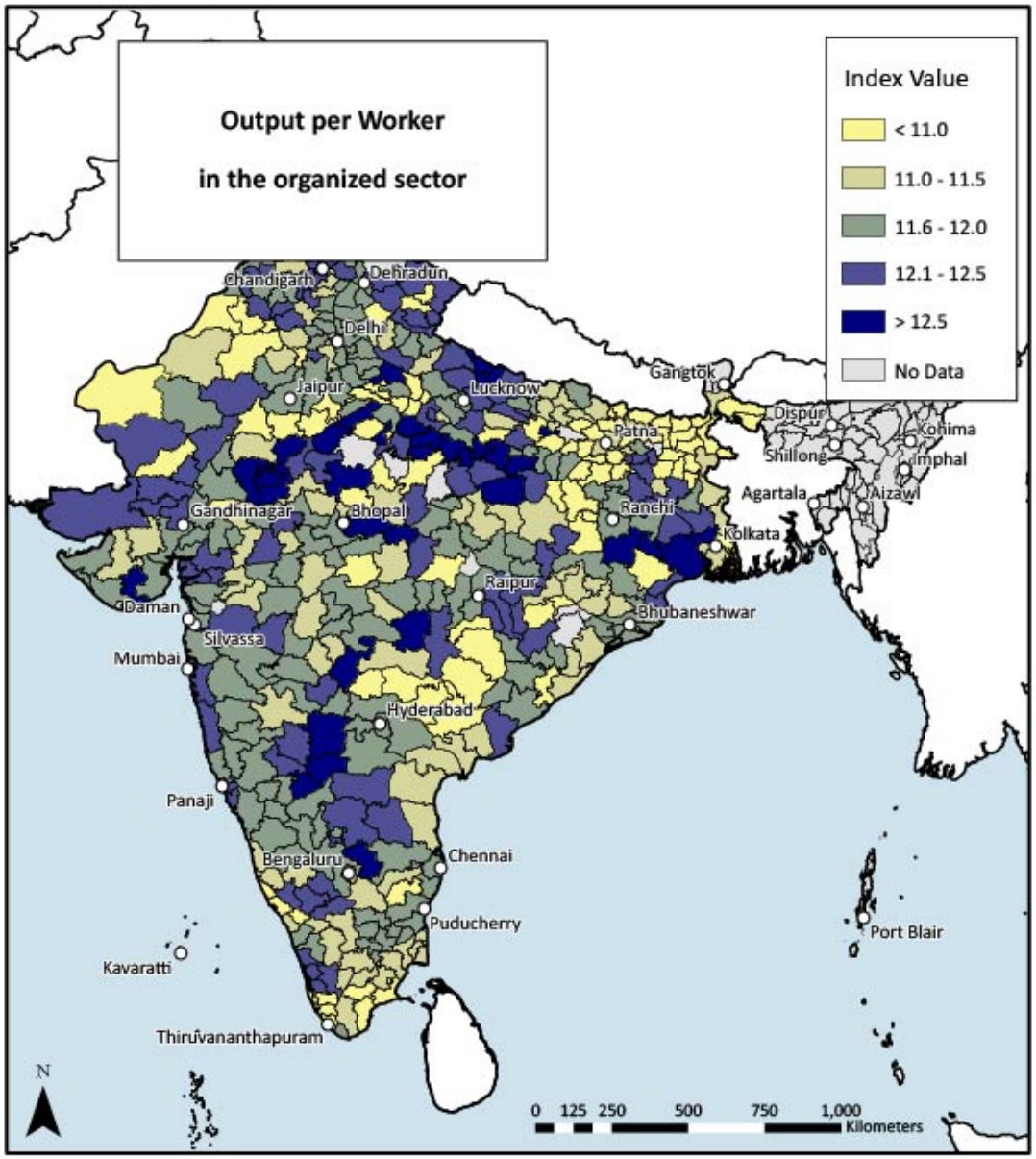
- Overestimated as TFP is estimated with noise
  Does not matter much provided the bias is constant
- Classical measurement error
  - TFP is estimated with noise
  - Sampling issues within each industry-district
  - Aggregation across industries

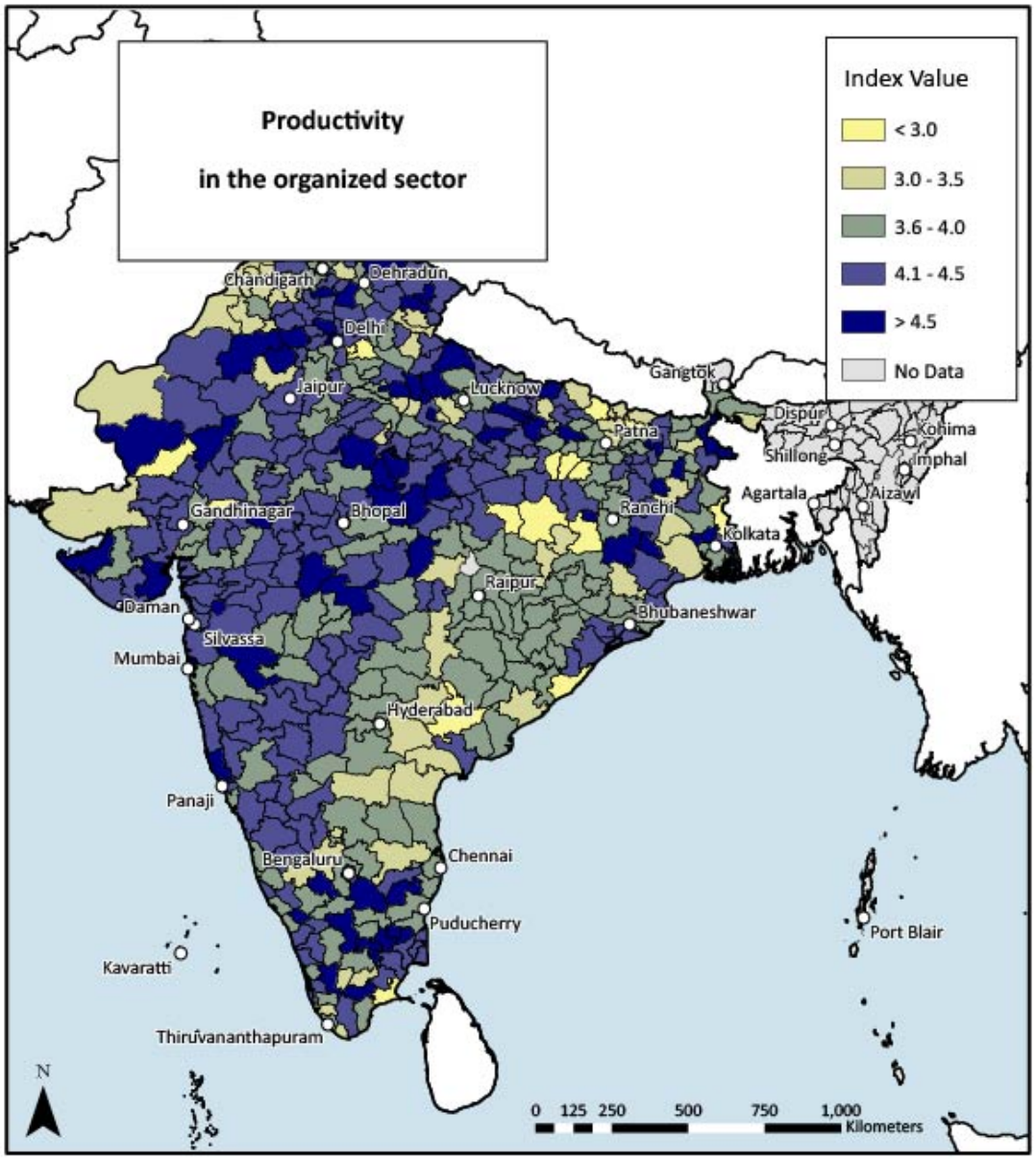
  $\Rightarrow$ The estimated coefficients on misallocation will likely be downward-biased.

  Partial solutions:
  - Consider only district-years with more 100 establishments or more
  - Consider alternate measures of misallocation

Alternate measures of misallocation

- Compute district misallocation directly with no industry aggregation
- Compute district misallocation directly with renormalised factors
- National industry weights instead of district industry weights
- Compute misallocation with alternative TFP measures
- Compute excess misallocation


Output per Worker
in the organized sector
Index Value
< 11.0
11.0 - 11.5
11.6 - 12.0
12.1 - 12.5
> 12.5
No Data
Chandigarh
Dehradun
Delhi
Jaipur
Lucknow
Gangtok
Dispur
Kohima
Shillong
Imphal
Patna
Agartala
Aizawl
Ranchi
Gandhinagar
Bhopal
Kolkata
Raipur
Daman
Bhubaneshwar
Silvassa
Mumbai
Hyderabad
Panaji
Chennai
Bengaluru
Puducherry
Port Blair
Kavaratti
Thiruvananthapuram
N
0 125 250 500 750 1,000
Kilometers


Productivity
in the organized sector
Index Value
< 3.0
3.0 - 3.5
3.6 - 4.0
4.1 - 4.5
> 4.5
No Data
Chandigarh
Dehradun
Delhi
Jaipur
Lucknow
Gangtok
Dispur
Kohima
Shillong
Imphal
Patna
Agartala
Aizawl
Gandhinagar
Bhopal
Ranchi
Kolkata
Raipur
Daman
Silvassa
Bhubaneshwar
Mumbai
Hyderabad
Panaji
Chennai
Bengaluru
Puducherry
Port Blair
Kavaratti
Thiruvananthapuram
N
0 125 250 500 750 1,000
Kilometers

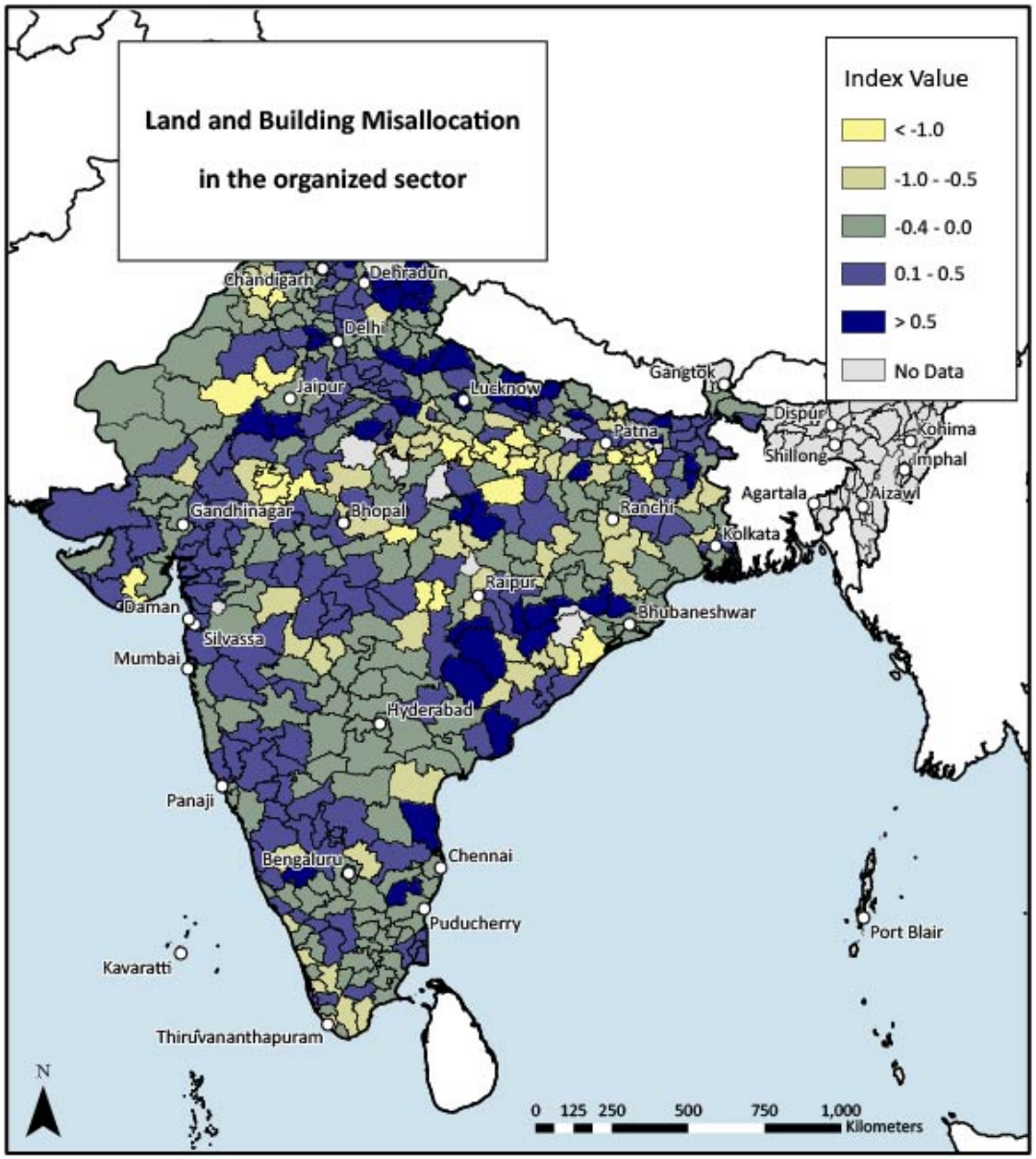

Land and Building Misallocation
in the organized sector
Index Value
< -1.0
-1.0 - -0.5
-0.4 - 0.0
0.1 - 0.5
> 0.5
No Data
Chandigarh
Deñradun
Delhi
Jaipur
Lucknow
Gangtok
Dispur
Kohima
Patna
Shillong
Imphal
Agartala
Aizawl
Gandhinagar
Bhopal
Ranchi
Kolkata
Raipur
Daman
Bhubaneshwar
Silvassa
Mumbai
Hyderabad
Panaji
Bengaluru
Chennai
Puducherry
Port Blair
Kavaratti
Thiruvananthapuram
N
0 125 250 500 750 1,000
Kilometers

Table 3: Misallocation indices across districts

Year	Output	Value-added	Labour	Buildings	Land	Other K
A. Mean for for the organised sector						
1989	-0.40	-0.50	-0.10	-0.15	-0.05	-0.16
1994	-0.34	-0.47	-0.08	-0.12	-0.01	-0.07
2000	-0.33	-0.49	-0.08	-0.09	-0.02	-0.11
2005	-0.32	-0.46	-0.09	-0.13	-0.08	-0.11
2010	-0.24	-0.40	-0.02	-0.05	0.02	-0.03
B. Standard deviation for the organised sector						
1989	0.38	0.44	0.29	0.38	0.37	0.55
1994	0.36	0.43	0.25	0.35	0.43	0.46
2000	0.39	0.42	0.27	0.39	0.44	0.45
2005	0.34	0.43	0.23	0.35	0.39	0.38
2010	0.37	0.43	0.28	0.38	0.41	0.46
C. Mean for for the unorganised sector						
1989	-0.60	-0.60	-0.01	-0.05		-0.02
1994	-0.53	-0.58	0.01	-0.06		-0.28
2000	-0.65	-0.60	-0.10	-0.13		-0.19
2005	-0.76	-0.71	-0.15	-0.13		-0.30
2010	-0.51	-0.49	-0.05	-0.08		-0.16
D. Standard deviation for the unorganised sector						
1989	0.30	0.27	0.09	0.18		0.26
1994	0.33	0.30	0.11	0.20		1.16
2000	0.34	0.30	0.12	0.18		0.32
2005	0.41	0.36	0.16	0.28		0.37
2010	0.26	0.25	0.11	0.16		0.32

Step 3: The determinants of misallocation

- A first check on misallocation indices
- Evaluate the effect of policies and local (contextual) characteristics
- Three policies
  - Repeal of ULCRA
  - Land and labour reforms 1985-1997 (Besley and Burgess, Aghion, Burgess, Redding, and Zilibotti)
  - Delicencing, FDI liberalisation, tariff reductions (Aghion, Burgess, Redding, and Zilibotti)
  - Stamp duty changes

The repeal of ULCRA

- 1976: Enactment of the Urban Land Ceiling and Regulation Act to limit the concentration of urban land
- Imposed strong restrictions on owning and renting land
- Generally perceived as a severe constraint on the operation of land and property markets
- Applied only to large cities in 17 states and 3 UTs
- Repealed by the Federal government in 1999
- Effective in a majority of the states and UTs by 2003
- We look at the 2000-2010 changes
- Impose many controls for confounding factors

Table 7: Changes in misallocation following the repeal of ULCRA, 2000-2010

Dependent variable --			Combined	
Change in misallocation for:	value added	value added	land&build	land&build
Explanatory variables:				
Dependent variable initial level	-0.704+++	-0.706+++	-0.696+++	-0.705+++
	(0.089)	(0.086)	(0.118)	(0.114)
ULCRA repeal	-0.127+	-0.136++	-0.059+	-0.057+
	(0.059)	(0.059)	(0.030)	(0.028)
Controls	Basic	Extended	Basic	Extended
Observations	252	252	252	252
Adjusted R-squared	0.481	0.477	0.382	0.378

Land and labour reforms, 1985-1997

- Data from Besley and Burgess (2000) and (2004) and Aghion et al (2008)
- Reforms aimed at providing greater worker protection and widening access to land
- Regress changes in misallocation 1989-2000 on labour/land reforms 1985-1997 at the state-industry level
- Pro-labour reforms strongly increased misallocation
- Some effects of land reforms $\Rightarrow$ less misallocation
- Robust to industry fixed effects, introducing state-level controls, etc
- Consistent with the conclusions of Besley and Burgess

FDI liberalisation, tariff changes, and delicensing, 1985-1997

- Data Aghion et al (2008)
- Reforms aimed at liberalising the economy in the early 1990s, industry specific reforms
- Regress changes in misallocation 1989-2000 on reforms 1985-1997 at the state-industry level
- Large effects of delicensing $\Rightarrow$ less misallocation
- FDI liberalisation $\Rightarrow$ less misallocation
- Small effects of tariff reduction $\Rightarrow$ more misallocation (?)
- Robust to state effects, etc

Stamp duty

- Historically high taxes on property transactions in India
- Imposed at the state level: ranges from 5 to above 20% during our study period
- Generally perceived as a severe constraint on the operation of land and property markets
- Main worry: stamp duty may be correlated with other factors affecting misallocation
- Regress levels of misallocation on levels of stamp duty with state fixed effects and a broad variety of controls
- Check results using long differences

Table 9: Misallocation and stamp duty, 1989-2003

Dependent variable --	Combined			
Index of misallocation for:	value added	value added	land&build	land&build
Explanatory variables:				
Stamp duty	0.078+++	0.071++	0.054+++	0.050+++
	(0.022)	(0.025)	(0.012)	(0.014)
Controls	1	2	1	2
State fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
Observations	889	776	889	776
Adjusted R-squared	0.136	0.117	0.146	0.151

- Good evidence from the repeal of ULCRA
- Large effects: the decline in misallocation implies +3.7% output per worker (as per our other results below)
- Evidence also from labour and land reforms
- Also a strong link between 1989 misallocation and 1977 unionisation rate
- Evidence from delicensing and FDI liberalisation
- Wrong sign on tariff
- Evidence from stamp duty
- Analysis of local characteristics points at correlates of development and infrastructure

Step 4: Does factor misallocation breed output misallocation?

- Useful first check on the misallocation data
- Also interesting
- Typical regression:
  $M^Y_{d,t} = a_0 + a_1 M^L_{d,t} + a_2 M^T_{d,t} + a_3 M^K_{d,t} + b_t + \delta_d + \epsilon_{d,t}$
- Simple OLS, with state effects, with district effects

Output misallocation and factor misallocation, 1989-2010

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sector:	Combined sample				Organised sector		Unorganised sector	
Dependent variable: district misallocation for value added								
Explanatory variable: misallocation for,								
Employment	0.44^a	0.36^a	0.35^a	0.31^a	0.46^a	0.41^a	0.81^a	0.77^a
	(0.040)	(0.046)	(0.048)	(0.060)	(0.075)	(0.086)	(0.080)	(0.096)
Land/buildings		0.62^a	0.62^a	0.57^a	0.34^a	0.33^a	0.29^a	0.26^a
		(0.043)	(0.044)	(0.048)	(0.053)	(0.062)	(0.055)	(0.063)
Other assets		0.018	0.016	0.017	0.11^b	0.091^c	0.21^a	0.19^a
		(0.019)	(0.018)	(0.017)	(0.048)	(0.052)	(0.034)	(0.036)
All assets	0.54^a							
	(0.031)							
Fixed effects	N	N	state	district	N	district	N	district
Observations	1,576	1,576	1,576	1,576	1,526	1,526	1,573	1,573
R-squared	0.65	0.62	0.63	0.74	0.40	0.65	0.43	0.60

Notes: OLS regressions with year effects in all columns. Clustered standard errors (by district) in parentheses. *a*, *b*, *c*: significant at 1%, 5%, 10%.

Output misallocation and factor misallocation, 1989-2010 for alternative measures of misallocation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Misallocation:	A	A	B	C	D	E	F	G
Dependent variable: district misallocation for value added in the combined sample								
Explanatory variable: misallocation for,								
Employment	0.37[a]	0.41[a]	0.49[a]	0.33[a]	0.44[a]	0.40[a]	0.40[a]	0.39[a]
	(0.050)	(0.068)	(0.064)	(0.037)	(0.064)	(0.068)	(0.060)	(0.058)
Land/buildings	0.44[a]	0.42[a]	0.70[a]	0.56[a]	0.42[a]	0.33[a]	0.38[a]	0.44[a]
	(0.063)	(0.071)	(0.094)	(0.042)	(0.072)	(0.057)	(0.058)	(0.057)
Other assets	0.095	0.063	0.16[b]	0.027	0.087	0.14[a]	0.18[a]	0.18[a]
	(0.065)	(0.073)	(0.073)	(0.020)	(0.077)	(0.045)	(0.045)	(0.044)
District effects	N	Y	Y	Y	Y	Y	Y	Y
Observations	1,576	1,576	1,576	1,576	1,576	1,576	1,576	1,576
R-squared	0.68	0.79	0.89	0.87	0.80	0.78	0.79	0.82

Notes: OLS regressions with year effects in all columns. Clustered standard errors (by district) in parentheses. *a*, *b*, *c*: significant at 1%, 5%, 10%. Misallocation indices are computed as follow. Direct district aggregation in columns 1 and 2. Direct district aggregation taking out national industry allocation weight by local shares in column 3. National industry shares in column 4. Direct district aggregation with factors re-weighted by their production function coefficients in column 5. Misallocation computed from OLS productivity estimates with a constant return constraint in column 6, from OLS productivity estimates with three factors in column 7, and from OLS productivity estimates with two factors in column 8.

- All forms of misallocation matter
- Land and building misallocation is of particular importance
- Employment misallocation is also important, other fixed assets less so
- 1 sd of misallocation of land and buildings is associated with 0.62 sd of valued added misallocation with a factor share of 0.13
- Same results with districts FE and alternative measures of misallocation
- Same results for owners and renters

- Some algebra shows that $M_d^Y = \alpha M_d^T + \beta M_d^K + \gamma M_d^L$
- Hence regressing output misallocation of factor misallocation allows us to recover the "true" shares of factor
- In our results, the sum of the factor share coefficients is close to 1
- Our results suggest a share of 40-60% for land and around 40% for labour
- This is possible if the availability of land and buildings drives the use of other factors or if land is a key collateral
- Work in progress: estimation from counterfactual distributions of factors to bolster identification

Step 5: Does factor misallocation lower output per worker?

- Our most fundamental question
- Typical regression:
  $Y_{d,t} = a_0 + a_1 M^L_{d,t} + a_2 M^T_{d,t} + a_3 M^K_{g,t} + b_t + \delta_d + \epsilon_{d,t}$
- Simple OLS, with state effects, with district effects
- No other control variables to be included

Value added per worker and misallocation, 1989-2010

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sector:	Combined sample				Organised sector		Unorganised sector	
Dependent variable: log value added per worker								
Explanatory variable: misallocation for,								
Value added	-0.74^a							
	(0.082)							
Employment		-0.39^a	-0.32^b	-0.19^c	-0.28^a	-0.19^b	-1.82^a	-1.00^a
		(0.13)	(0.14)	(0.10)	(0.10)	(0.096)	(0.24)	(0.25)
Land/buildings			-0.61^a	-0.53^a	-0.47^a	-0.30^a	0.082	-0.21^c
			(0.089)	(0.085)	(0.090)	(0.089)	(0.12)	(0.11)
Other assets			-0.024	-0.021	0.12^b	0.044	-0.50^a	-0.42^a
			(0.024)	(0.018)	(0.060)	(0.075)	(0.084)	(0.089)
All assets		-0.55^a						
		(0.068)						
District effects	N	N	N	Y	N	Y	N	Y
Observations	1,576	1,576	1,576	1,576	1,526	1,526	1,573	1,573
R-squared	0.20	0.22	0.20	0.70	0.13	0.67	0.48	0.76

Notes: OLS regressions with year effects in all columns. Clustered standard errors (by district) in parentheses. *a*, *b*, *c*: significant at 1%, 5%, 10%.

Value added per worker and misallocation, 1989-2010 for alternative measures of misallocation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Misallocation:	A	A	B	C	D	E	F	G
Dependent variable: Dependent variable: log value added per worker in the combined sample								
Explanatory variable: TFP or misallocation for,								
Employment	-0.27^{b}	-0.22^{c}	0.022	-0.59^{a}	-0.12	-0.35^{a}	0.091	0.039
	(0.13)	(0.11)	(0.042)	(0.17)	(0.10)	(0.087)	(0.073)	(0.068)
Land/buildings	-0.52^{a}	-0.46^{a}	-0.12^{b}	-0.79^{a}	-0.38^{a}	-0.47^{a}	-0.39^{a}	-0.38^{a}
	(0.079)	(0.076)	(0.053)	(0.18)	(0.074)	(0.078)	(0.073)	(0.067)
Other assets	-0.025	-0.075^{c}	0.011	-0.066	-0.058	0.00092	-0.10^{c}	-0.0071
	(0.045)	(0.043)	(0.036)	(0.053)	(0.041)	(0.054)	(0.057)	(0.050)
District effects	N	Y	Y	Y	Y	Y	Y	Y
Observations	1,576	1,576	1,576	1,576	1,576	1,576	1,576	1,576
R-squared	0.30	0.76	0.67	0.71	0.72	0.76	0.71	0.70

Notes: OLS regressions with year effects in all columns. Clustered standard errors (by district) in parentheses. *a*, *b*, *c*: significant at 1%, 5%, 10%. Misallocation indices are computed as follow. Direct district aggregation in columns 1 and 2. Direct district aggregation taking out national industry allocation weight by local shares in column 3. National industry shares in column 4. Direct district aggregation with factors re-weighted by their production function coefficients in column 5. Misallocation computed from OLS productivity estimates with a constant return constraint in column 6, from OLS productivity estimates with three factors in column 7, and from OLS productivity estimates with two factors in column 8.

Value added per worker and misallocation, 1989-2010 for alternative specifications

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable: log value added per worker								
Explanatory variable: misallocation for,								
Productivity (HK)	-1.74^a	-0.73^a	-0.82^a	-0.31	-1.29^a	-0.47^b	-0.58^a	-0.17
	(0.19)	(0.23)	(0.23)	(0.40)	(0.17)	(0.22)	(0.21)	(0.38)
Employment					-0.23	-0.12	-0.17	0.028
					(0.14)	(0.14)	(0.15)	(0.21)
Land/buildings					-0.52^a	-0.50^a	-0.55^a	-0.55^a
					(0.088)	(0.10)	(0.099)	(0.16)
Other assets					-0.012	-0.020	-0.021	-0.038
					(0.021)	(0.018)	(0.017)	(0.023)
Other controls:								
TFP			0.44^a	0.22			0.71^a	0.61^b
			(0.16)	(0.22)			(0.16)	(0.24)
District effects	N	Y	Y	Y	N	Y	Y	Y
Observations	1,229	1,229	1,229	635	1,229	1,229	1,229	635
R-squared	0.15	0.67	0.67	0.75	0.24	0.70	0.72	0.78

Notes: OLS regressions with year effects in all columns. Clustered standard errors (by district) in parentheses. *a*, *b*, *c*: significant at 1%, 5%, 10%. Only districts with more than 300 plants in columns 4 and 8.

Value added per worker and misallocation, 1989-2010 for specifications by sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sector:			Combined sample				Organised	Unorg.
Dependent variable: log value added per worker								
Explanatory variable: misallocation for,								
Employment			-0.42[a]	-0.32[a]	-0.35[a]	-0.25[a]	-0.32[a]	0.10
(organised)			(0.12)	(0.098)	(0.10)	(0.088)	(0.095)	(0.071)
Employment			-0.37	0.0038	-0.13	-0.032	-0.10	-1.09[a]
(unorganised)			(0.23)	(0.22)	(0.17)	(0.17)	(0.17)	(0.22)
Land/buildings			-0.64[a]	-0.39[a]	-0.43[a]	-0.31[a]	-0.32[a]	-0.00083
(organised)			(0.099)	(0.095)	(0.071)	(0.076)	(0.081)	(0.062)
Land/buildings			0.037	-0.0055	-0.12	-0.065	-0.024	-0.0094
(unorganised)			(0.13)	(0.12)	(0.10)	(0.10)	(0.12)	(0.088)
Other assets			0.031	-0.049	-0.018	-0.070	-0.066	-0.070[c]
(organised)			(0.073)	(0.068)	(0.059)	(0.058)	(0.063)	(0.042)
Other assets			-0.40[a]	-0.12	-0.31[a]	-0.15[b]	-0.14[c]	-0.33[a]
(unorganised)			(0.088)	(0.078)	(0.075)	(0.071)	(0.073)	(0.064)
Other controls:								
Share unorganised	-3.01[a]	-2.35[a]			-3.38[a]	-2.52[a]	-2.26[a]	0.28[b]
	(0.10)	(0.15)			(0.13)	(0.20)	(0.22)	(0.12)
Fixed effects	N	Y	N	Y	N	Y	N	Y
Observations	1,573	1,573	1,523	1,523	1,523	1,523	1,523	1,523
R-squared	0.49	0.77	0.16	0.69	0.50	0.78	0.73	0.79

Notes: OLS regressions with year effects in all columns. Clustered standard errors (by district) in parentheses. *a*, *b*, *c*: significant at 1%, 5%, 10%.

Share of the unorganised sector and misallocation, 1989-2010

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sector:				Combined sample			Organised	Unorg.
Dependent variable: share of the unorganised sector in value added								
Explanatory variable: misallocation for,								
Productivity (HK)	0.32[a]	0.15[a]	0.16[a]					0.11[b]
	(0.040)	(0.049)	(0.052)					(0.048)
Employment (combined)				0.093[a]	0.043[b]	0.61[a]		0.045[b]
				(0.021)	(0.017)	(0.15)		(0.023)
Employment (organised)							0.028	
							(0.019)	
Employment (unorganised)							-0.014	
							(0.045)	
Land/buildings (combined)				0.11[a]	0.089[a]	0.52[a]		0.086[a]
				(0.014)	(0.017)	(0.14)		(0.019)
Land/buildings (organised)							0.035[c]	
							(0.018)	
Land/buildings (unorganised)							-0.024	
							(0.024)	
Other assets (combined)				0.0028	0.0025	0.016		0.0019
				(0.0033)	(0.0031)	(0.018)		(0.0036)
Other assets (organised)							-0.0083	
							(0.014)	
Other assets (unorganised)							-0.011	
							(0.016)	
Other controls:								
TFP			-0.0069					-0.051
			(0.040)					(0.040)
Fixed effects	N	Y	Y	N	Y	Y	Y	Y
Observations	1,226	1,226	1,226	1,573	1,573	1,573	1,523	1,226
R-squared	0.17	0.60	0.60	0.19	0.62	0.70	0.57	0.63

Notes: OLS regressions with year effects in all columns. Clustered standard errors (by district) in parentheses. *a*, *b*, *c*: significant at 1%, 5%, 10%.

- Again, importance of land and building misallocation
- Works both within sectors and through the importance of the unorganised sector
- 1 sd of misallocation of land and buildings is associated with -24% of output per worker
- 1 sd of misallocation of all factors is associated with -19% of output per worker in the organised sector, -32% in the unorganised sector, and -28% in the combined sample
- Moving from the bottom to the top factor misallocation decile $\Rightarrow$ 20th to 50th decile of output per worker

- Strong effect of HK misallocation on output per worker (except when only large districts are considered)
- Larger than their theory counterfactuals
- 1 sd deviation improvement in misallocation of land and buildings has the same effect as a fivefold increase in the supply of this factor

Output effects of land and building misallocation robust to:

- Use of district fixed effects
- Exact specification
- Focusing only on renters or only on owners
- Exact misallocation metric and productivity estimation
- Threshold number of observations

Work in progress

- Simulation of these effects for counterfactual distributions
- Use of misallocation lags
- Within vs. between misallocation

Conclusion

- Extremely poor factor allocation in India
- But a lot of variation across districts
- Large effects of factor misallocation on output misallocation
- Large effects of factor misallocation on output per worker
- Misallocation of land and buildings plays a uniquely important role
- Policies can have a large effects on misallocation