



The Cost Competitiveness of the Manufacturing Sector in China and India: An Industry and Regional Perspective

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Little evidence on direct comparisons of manufacturing competitiveness in China and India

- ◆ China and India are now among most competitive manufacturing nations in the world
- ◆ Impact of Indian manufacturing sector on global trade and value chain still considerably smaller than in China
- ◆ Little evidence on direct comparisons of trends in manufacturing competitiveness between India and China
 - ◆ Data issues within each country, particularly in China
 - ◆ Comparability of statistics between India and China
- ◆ Unit labor cost is proxy of cost competitiveness
 - ◆ Can be obtained without many problems (in contrast to TFP, etc.)
 - ◆ Has simpler meaning than composite competitiveness indexes



Dual focus on international and regional comparisons of unit labor costs in manufacturing

- ◆ International comparison of average labor compensation (ALC), average labor productivity (ALP) and unit labor cost (ULC)
 - ◆ India and China compared to Mexico, Korea, Hungary & Poland
 - ◆ 1990-2005, aggregate manufacturing and industry level
 - ◆ Based on ICOP methodology using industry level PPPs (UVRs)
- ◆ State & province level comparison within China & India
 - ◆ 30 states/provinces, 28 industries in each country
 - ◆ Two benchmark years: 1995 and 2004 for China; 1993/1994 and 2002/2003 for India
 - ◆ Comparison on basis of national currency
 - ◆ Panel analysis to study beta and sigma convergence



Main conclusions from the paper

- ◆ India and China are clearly most competitive on ULC compared to other emerging economies
- ◆ China shows decline in ULC level relative to India
- ◆ China shows rapid decline in unit labor cost as productivity grows faster than labor compensation
- ◆ India shows increase in unit labor cost as productivity increases stay behind labor compensation
- ◆ Strong catch-up trends in unit labor cost in China, with low productivity regions growing faster – less so in India
- ◆ Fall in variation of ULC levels among provinces in China – signaling alignment of ALP and ALC levels
- ◆ No clear results for systematic differences by industry



Unit labor cost as ratio of labor compensation over labor productivity

$$ALC_{ij} = LC_{ij} / E_{ij} \quad (1a) \quad \text{average labor compensation}$$

$$ALP_{ij} = GVA_{ij} / E_{ij} \quad (1b) \quad \text{average labor productivity}$$

$$ULC_{ij} = ALC_{ij} / ALP_{ij} \quad (1c) \quad \text{unit labor cost}$$

- ◆ Average labor compensation includes take-home pay plus payroll taxes and social payments by employer
- ◆ Average labor compensation is nominal measure (no deflator, no PPP)
- ◆ Average labor productivity is real measure (PPP converted for international comparison, but not for regional comparisons)



International comparison is function of differences in nominal ALC & ALP and ER/PPP

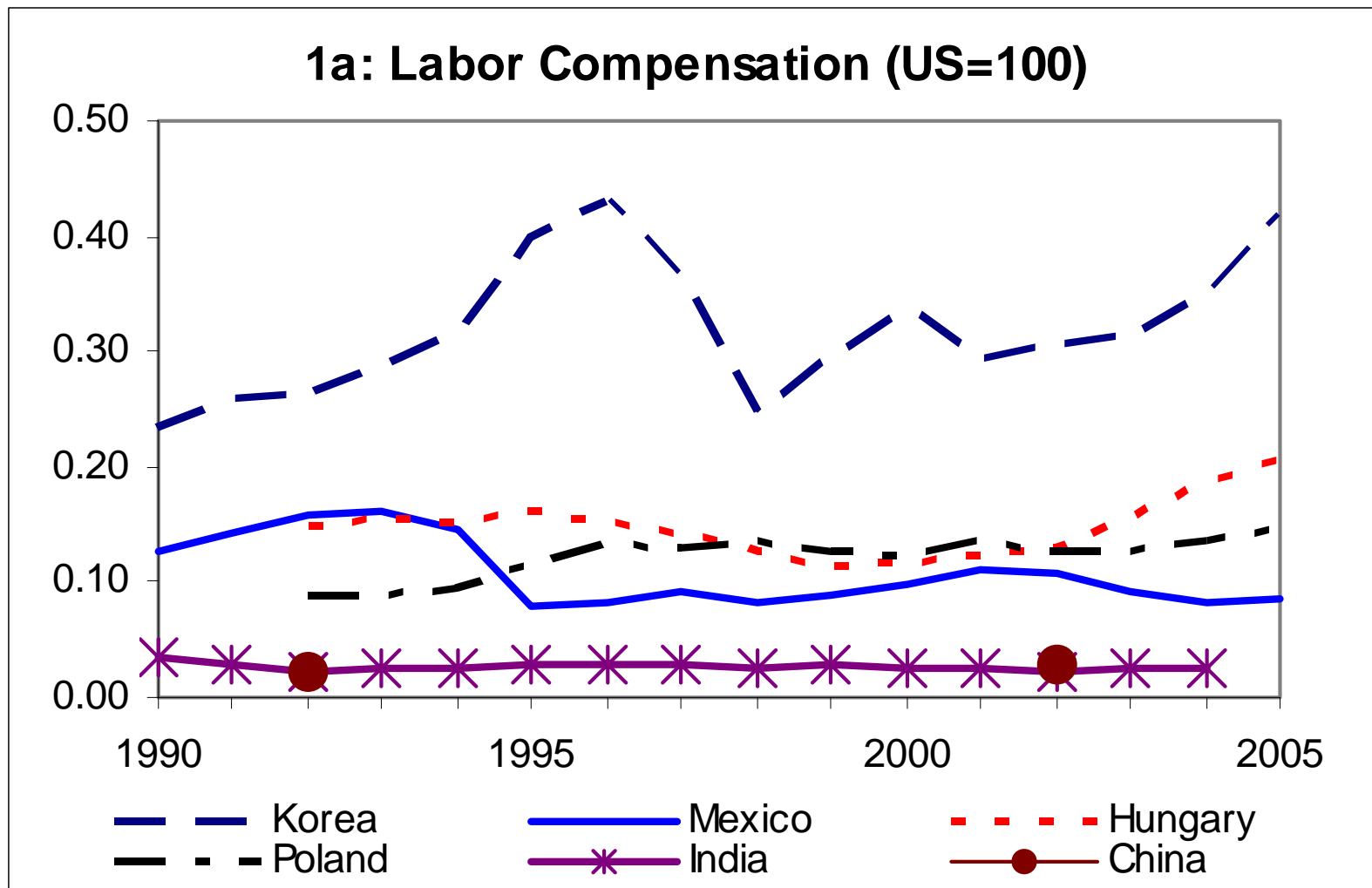
$$ULC^{AB} = \left[\frac{(ALC^A/ER^{AB})}{ALC^B} \right] \left[\frac{(ALP^A/PPP^{AB})}{ALP^B} \right]$$

$$\log (ULC^A - ULC^B) = \log (ALC^A/ER^{AB} - ALC^B) - \log (ALP^A/ER^{AB} - ALP^B) - \log (ER^{AB} - PPP^{AB})$$

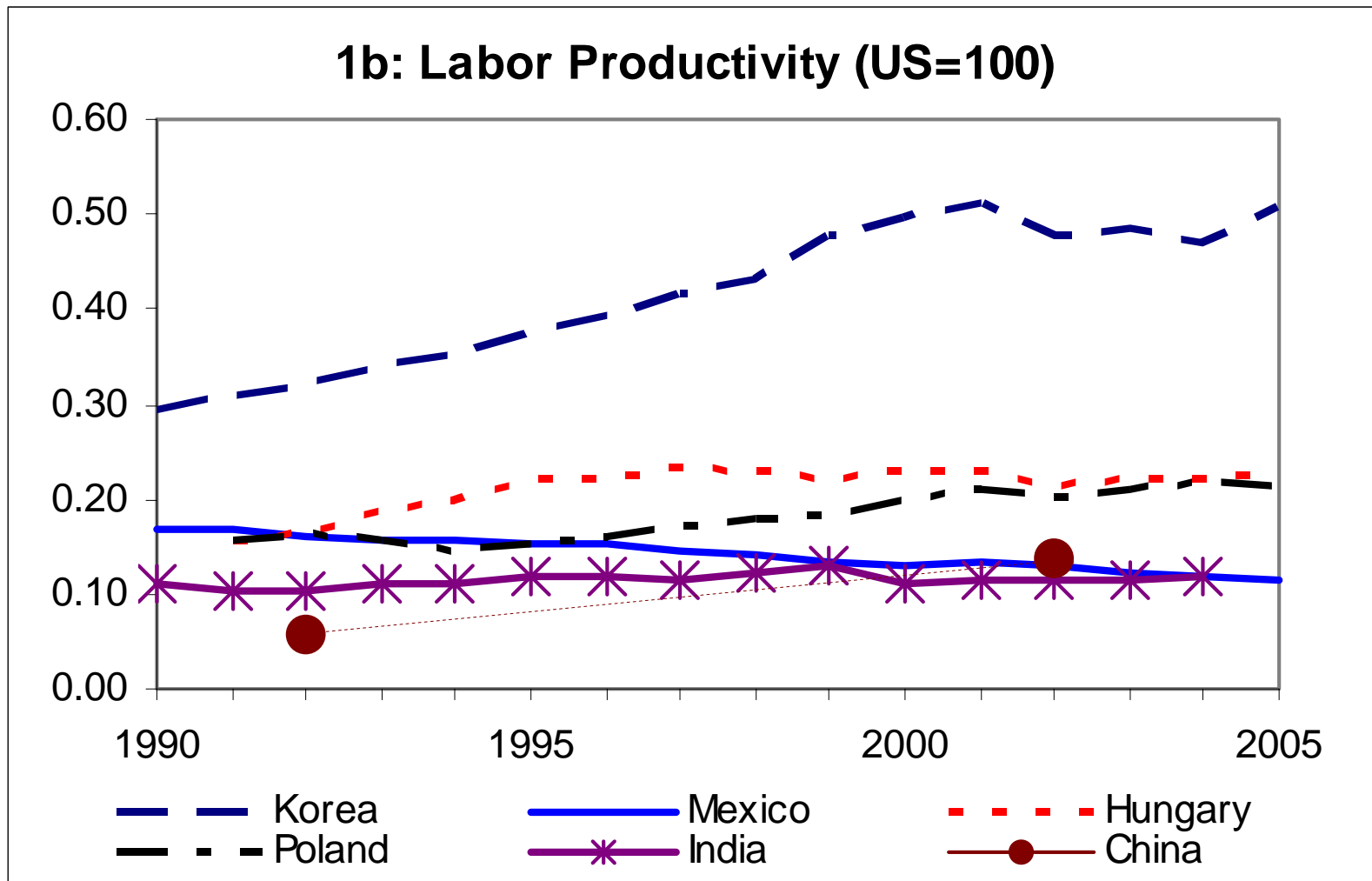
- ◆ PPP^{AB} is based on ICOP industry-specific PPPs
 - ◆ PPPs based on unit values for individual product items (UVRs)
 - ◆ China/US PPP comparison for 1995 by Szirmai, Ren & Bai (2005) – 188 matched product comparisons
 - ◆ India/Germany PPP for 2002 by Erumban (2007) - 258 matched product comparisons
 - ◆ Linking of India to US through Germany/USA ICOP comparison
 - ◆ Comparison to other ICOP comparisons for Mexico, Korea, Hungary and Poland



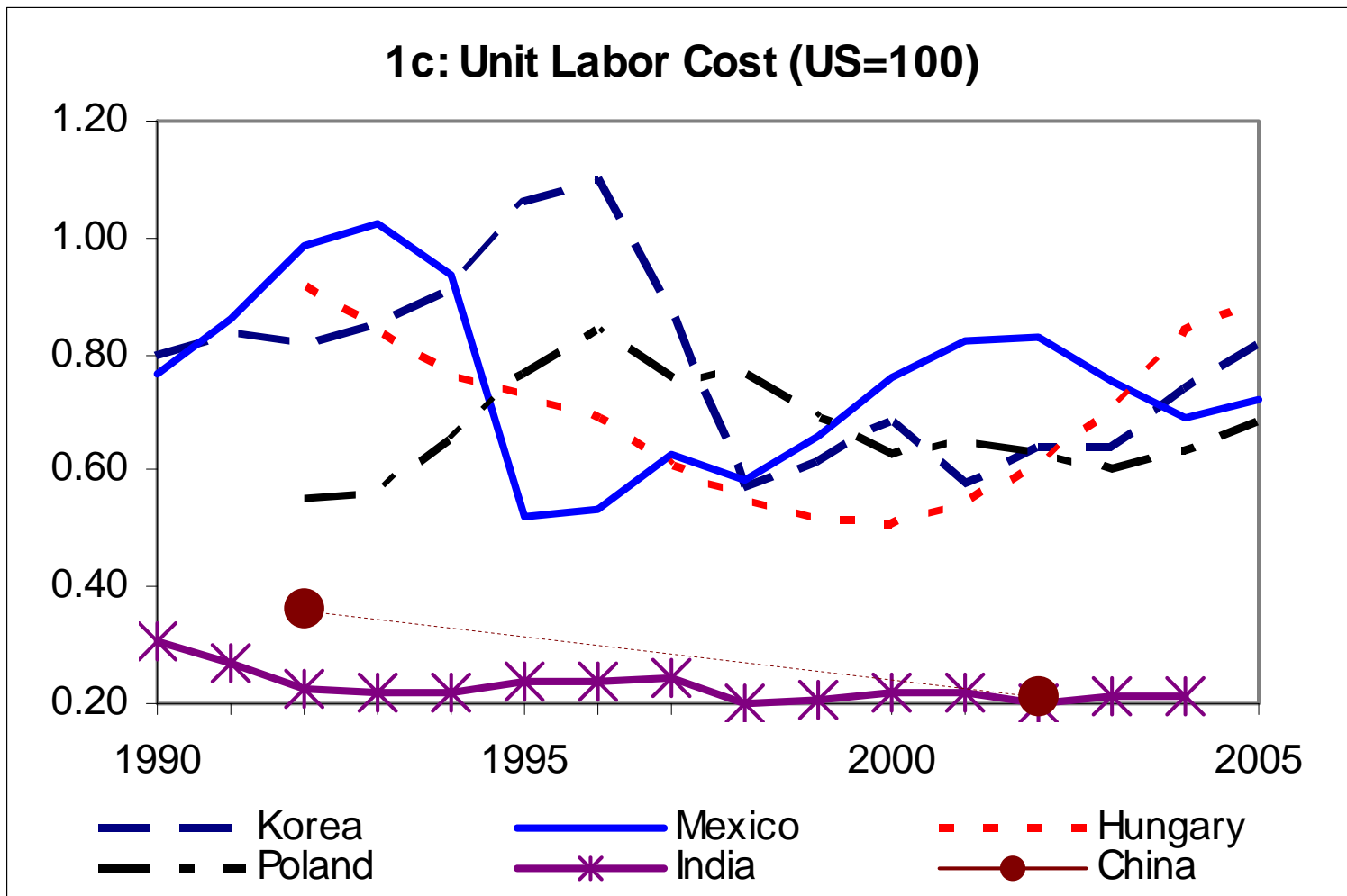
Low labor compensation in manufacturing industries is key competitive advantage for emerging economies



But wage gap relative to advanced countries is matched by productivity gap



Only when productivity gap is smaller than wage gap, unit labor cost advantage is maintained



Comparability of data sources between China and India

- ◆ Value added, employment and labor compensation from same census/survey source in each country
- ◆ China:
 - ◆ *1995 Third Industrial Census* covers firms at township level and above (administrative measure)
 - ◆ *2004 First Economic Census* covers firms at designated size and above (more than 5 million yuan in sales)
 - ◆ Covers roughly 70% of total manufacturing employment in 2004
- ◆ India:
 - ◆ *1993/94 and 2002/03 Annual Survey of Industries* covers factories with +10/20 employees, depending on power use
 - ◆ Covers less than 20% of manufacturing employment



If anything, China manufacturing is understated relative to Indian registered manufacturing

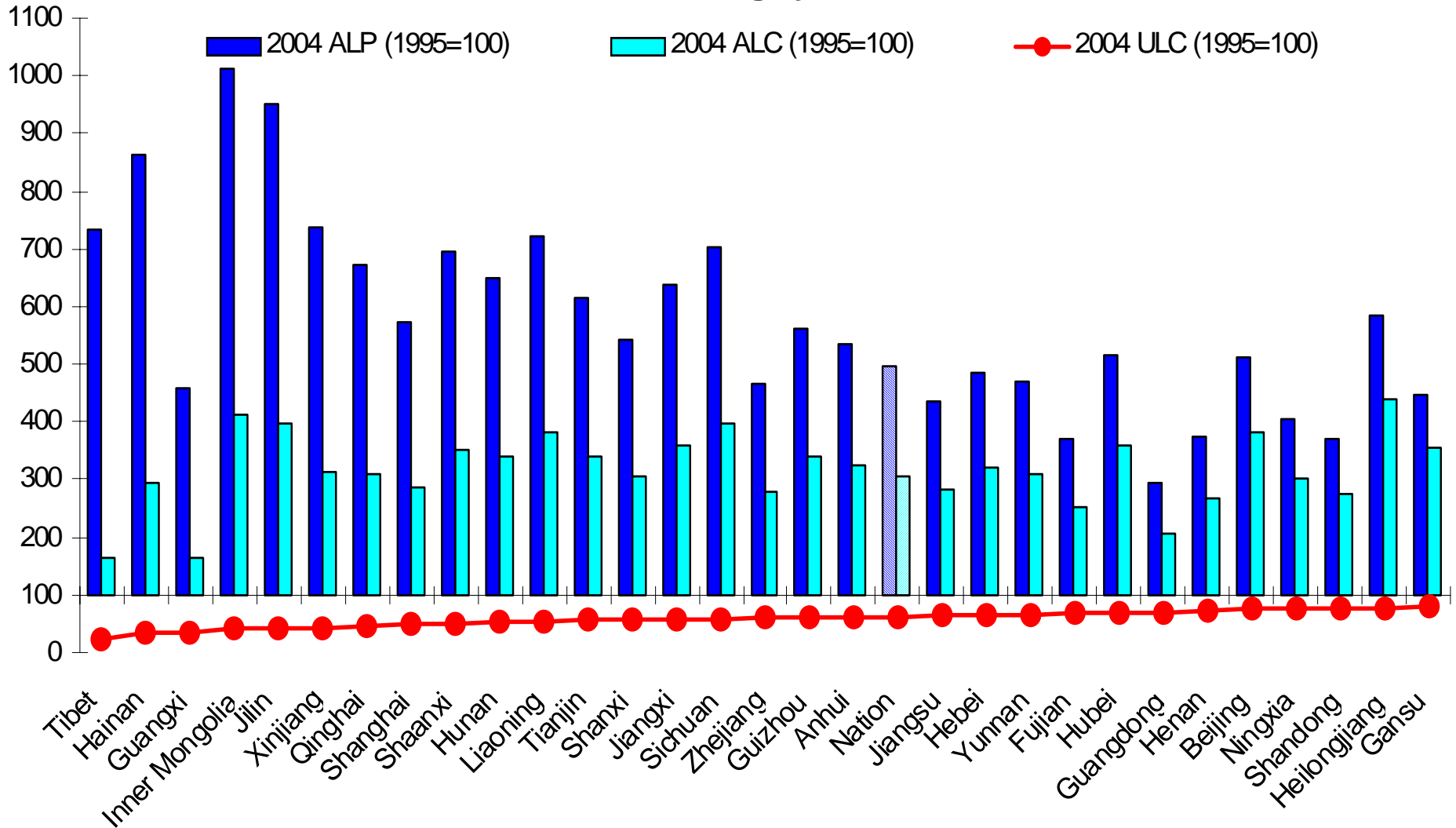
Size Distribution, China and India: A Comparison

Interval	China		India	
	Designated size and above		Registered Manufacturing	
	<i>% firms</i>	<i>% employment</i>	<i>% factories</i>	<i>% employment</i>
0-49	25.0	3.3	76.8	20.5
50-99	26.2	8.2	10.7	11.7
100-199	23.0	14.2	6.1	12.8
200-499	17.3	23.3	4.0	17.2
500-999	5.3	15.9	1.5	12.2
1000-1999	2.0	12.2	0.6	8.4
2000-4999	0.9	12.1	0.3	8.3
5000 and above	0.2	10.8	0.1	9.0

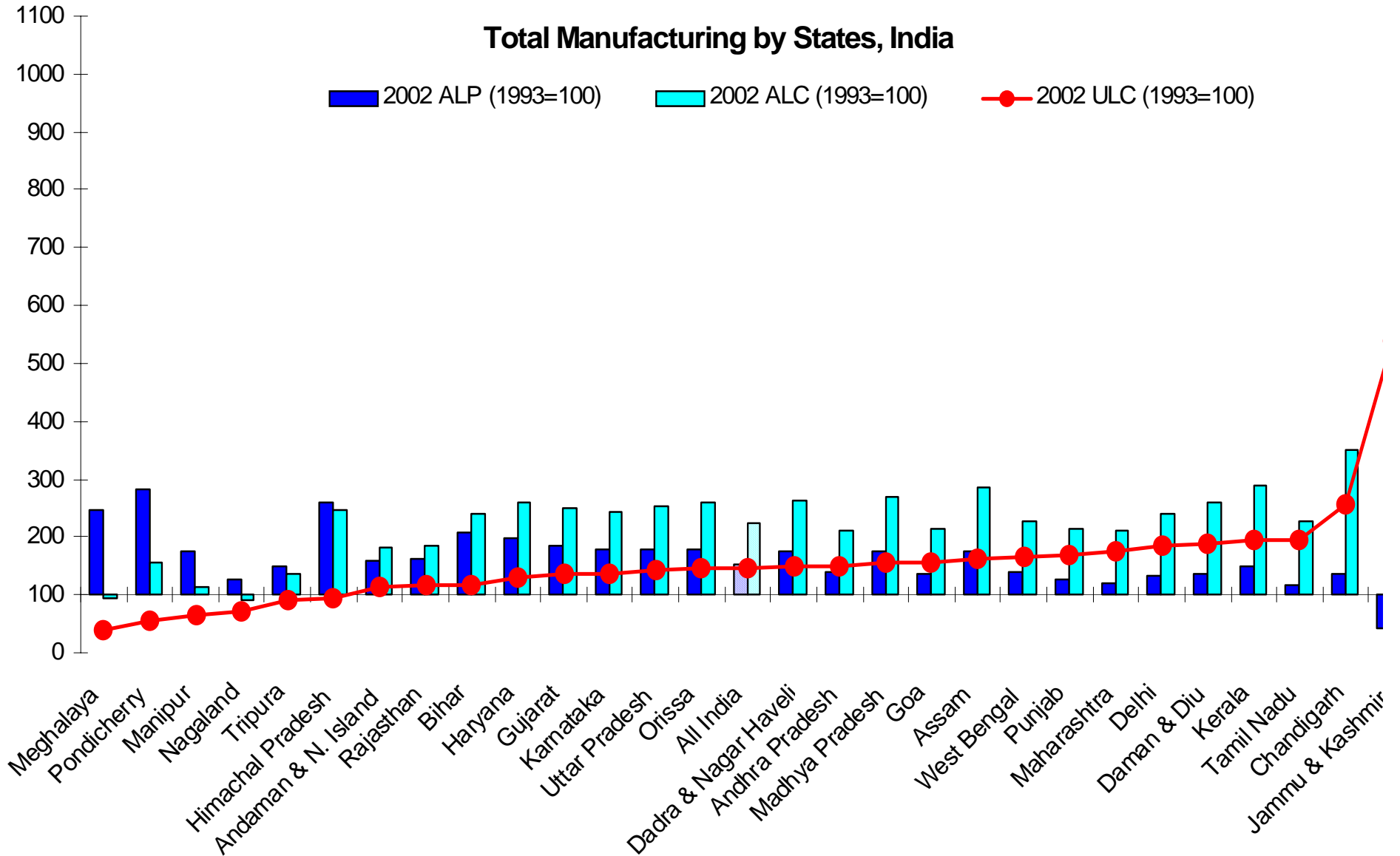


All provinces in China show significant decline in ULC as ALP growth is faster than ALC growth

Total Manufacturing by Province—China



Most states in India show a rise in ULC as ALP growth falls behind ALC growth



Clear Signs of Catch-Up of Backward Regions in China

	Bohai	SouthEast	NorthEast	Central	SouthWest	NorthWest	All Nation
<i><u>Average Labor Compensation (ALC)</u></i>							
Index 2004 over 1995	302	250	398	320	316	337	305
1995 level to All Nation=100	96	129	81	80	96	87	100
<i><u>Average Labor Productivity (ALP)</u></i>							
Index 2004 over 1995	439	395	747	505	599	634	495
1995 level to All Nation=100	112	132	67	82	91	69	100
<i><u>Unit Labor Cost (ULC)</u></i>							
Index 2004 over 1995	69	63	53	63	53	53	62
1995 level to All Nation=100	85	98	120	98	106	125	100

Note: excl. Tibet



No clear catch-up trends in India

	North	East	Central	West	South	All-India
<u>Average Labor Compensation (ALC)</u>						
Index 2002 over 1993	239	233	259	214	229	225
1993 level to All Nation=100	87	122	95	126	77	100
<u>Average Labor Productivity (ALP)</u>						
Index 2002 over 1993	157	166	176	144	140	153
1993 level to All Nation=100	95	85	99	142	75	100
<u>Unit Labor Cost (ULC)</u>						
Index 2002 over 1993	152	140	147	149	164	148
1993 level to All Nation=100	92	143	95	89	103	100

Note: excl. Northeast



Difference in Province/State Catch-Up (beta-convergence) between China and India confirmed

Beta Convergence, OLS Regression Results: China & India

	China By Province			India by Main State		
	ALC	ALP	ULC	ALC	ALP	ULC
Log Initial ALC	-0.618*** (0.147)			-0.104 (0.098)		
Log Initial ALP		-0.427*** (0.142)			21.808 (29.576)	
Log Initial ULC			-0.696*** (0.211)			-20.344 (24.653)
Constant	6.488*** (1.258)	5.845*** (1.364)	-1.282*** (0.211)	1.967* (1.037)	-91.634 (200.918)	127.046 (86.617)
Industry/Province Dummies	No	No	No	No	No	No
Observations	30	30	30	16	16	16
R-squared	0.57	0.27	0.44	0.07	0.05	0.03

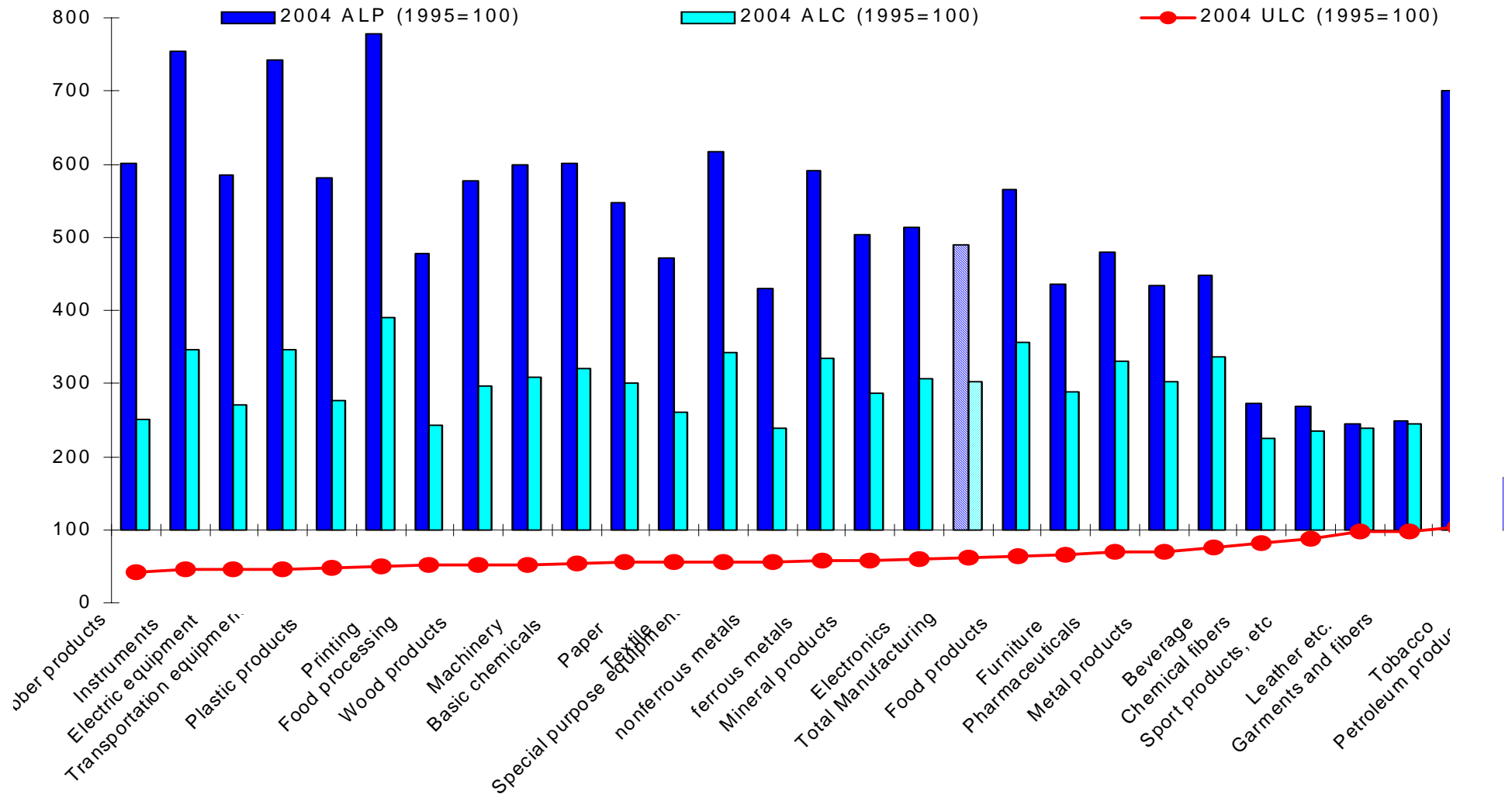
Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

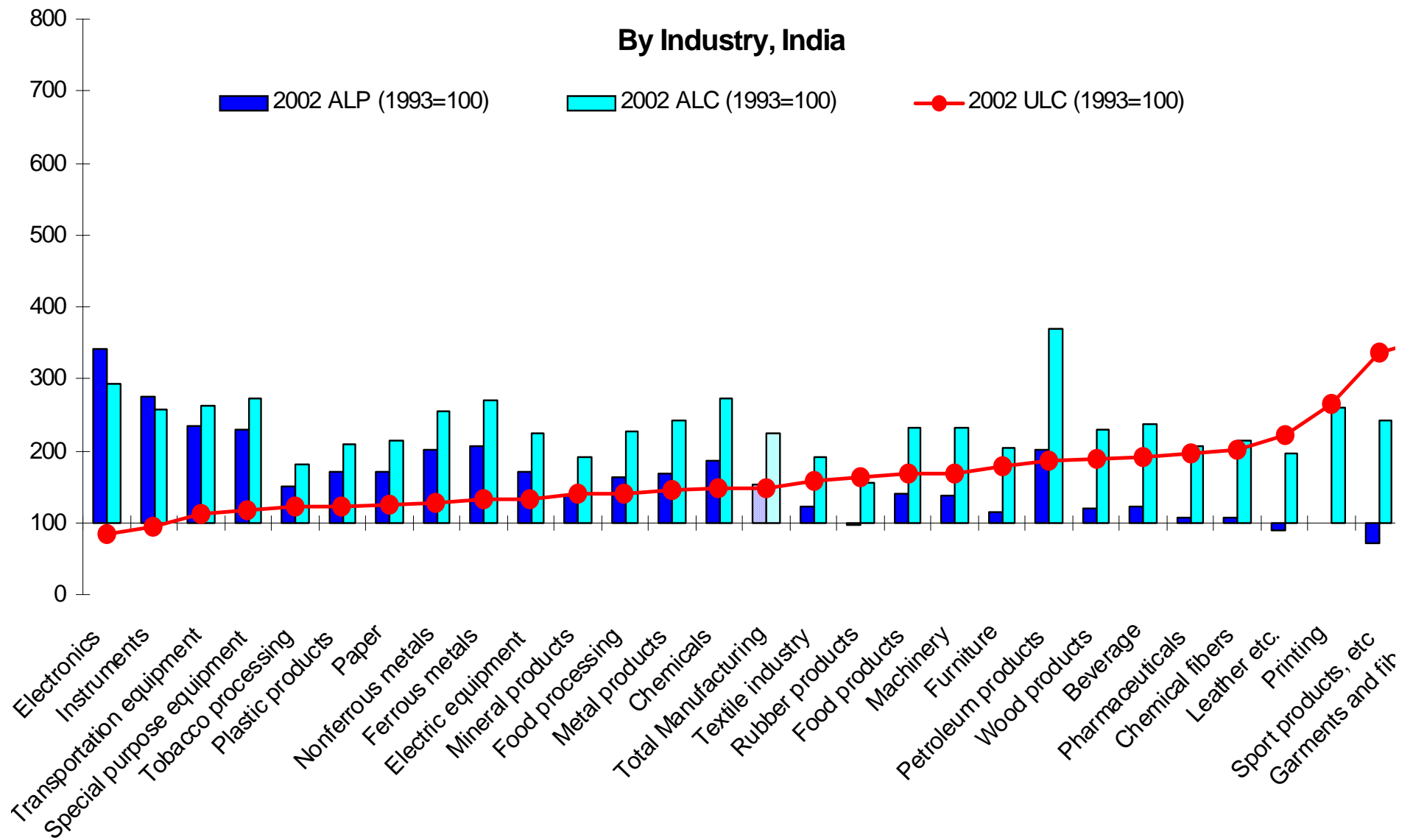


Capital intensive industries show larger declines in ULC than labor intensive industries in China

Nation by Industry--China



In India high-tech industries also gain more than average



On province/state * industry both China and India show significant catch-up results

Beta Convergence, OLS Regression Results: China & India, in the basis of panel

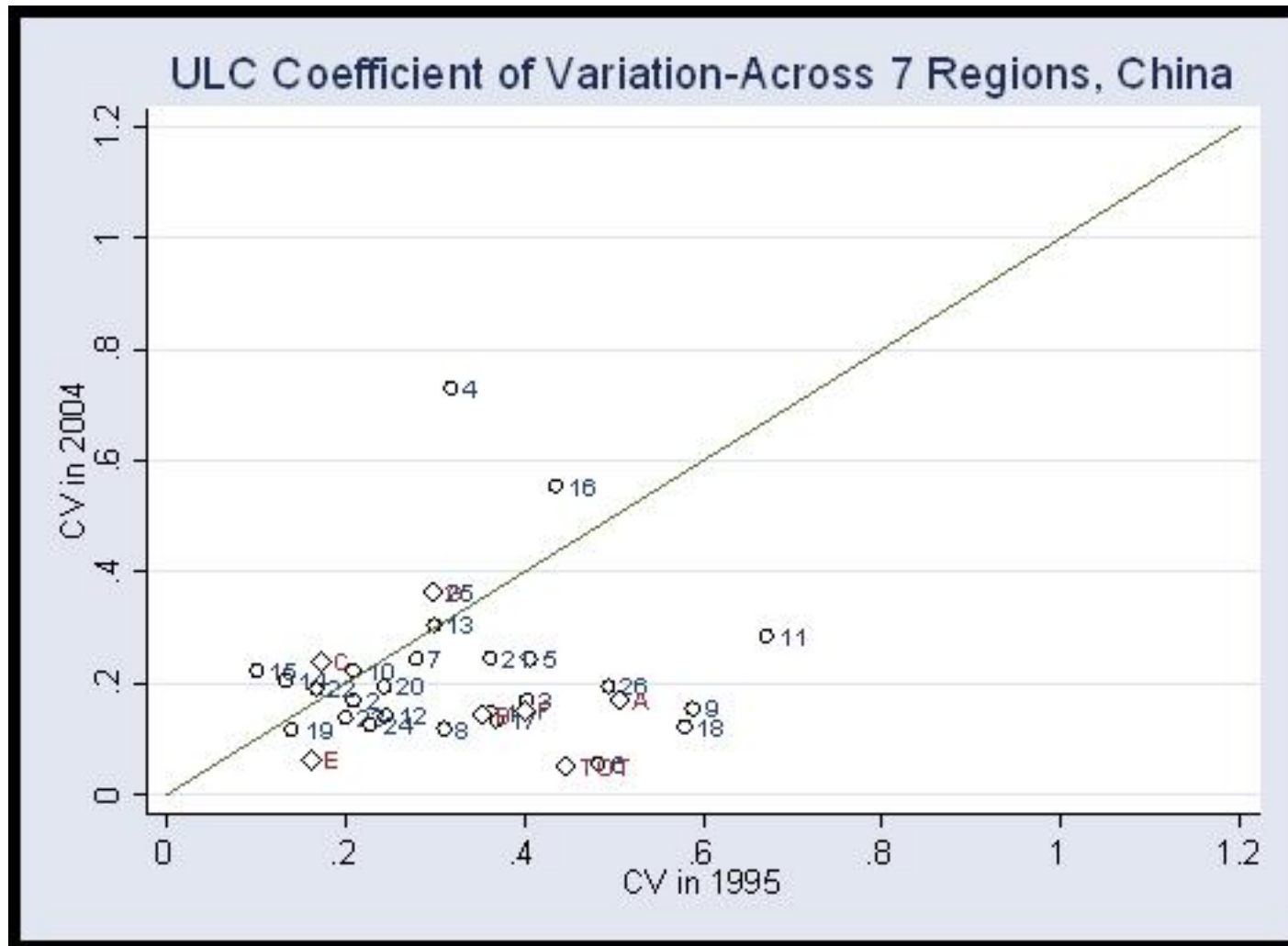
	China By Province & Industry			India by Main State & Industry		
	ALC	ALP	ULC	ALC	ALP	ULC
Log Initial ALC	-0.848*** (0.055)			-0.304*** (0.061)		
Log Initial ALP		-0.808*** (0.071)			-0.489*** (0.061)	
Log Initial ULC			-0.819*** (0.054)			-0.609*** (0.054)
Constant	8.649*** (0.475)	9.752*** (0.636)	-1.508*** (0.094)	3.800*** (0.603)	3.675*** (0.440)	2.344*** (0.206)
Industry/Province Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	805	796	794	412	412	412
R-squared	0.70	0.64	0.67	0.31	0.39	0.48

Robust standard errors in parentheses

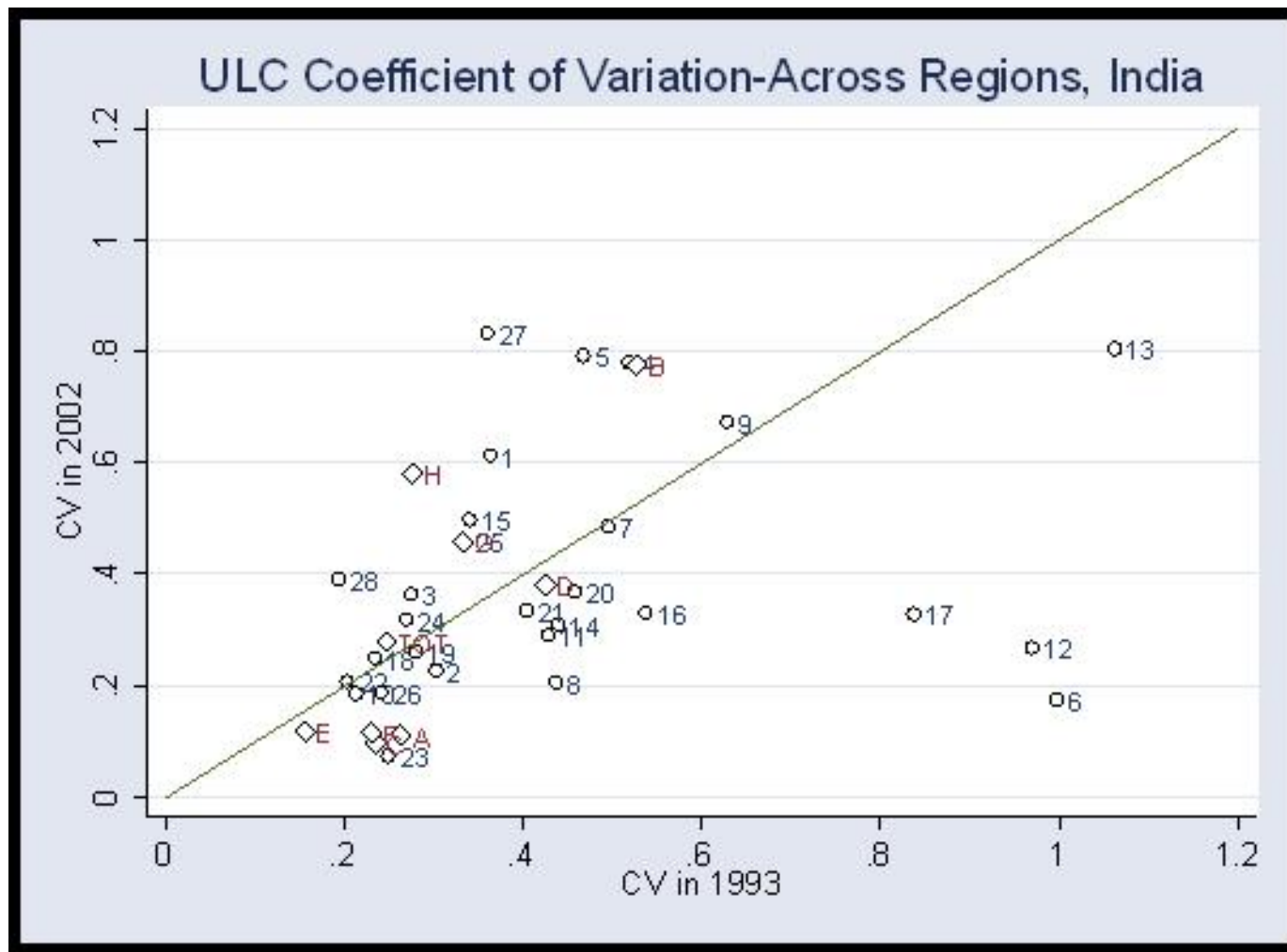
* significant at 10%; ** significant at 5%; *** significant at 1%



Most industries in China show convergence of ULC levels between 1995 and 2004



In India the convergence picture is more varied



Implications

- ◆ The sigma convergence (decline in CV's) of ULC indicated a greater aligning of ALP and ALC levels in China compared to India
- ◆ Capital intensive industries show greater tendency towards rapid declines in ULC
- ◆ But capital and skill intensive industries are less likely to show rapid convergence across provinces and states
- ◆ There is scope for neo-classical convergence forces as well as new economic geography divergence forces
- ◆ ... perhaps sequential and different by industry
- ◆ Future research agenda should focus on sorting out these forces

