The Past, Present, and Likely Future of Structural Transformation

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A framework: combining growth theory, convergence and dualism

- Economic dualism is endemic
- Traditional activities
  - traditional agriculture; small, informal firms
- Modern activities
  - high productivity, exhibiting (unconditional) productivity convergence
  - too small to produce significant aggregate effects *(B)*
- Economy-wide productivity requires steady accumulation of "fundamentals," which is slow
  - human capital, institutions *(A)*
- Rapid growth possible nonetheless by expanding modern activities *(C)*

$$\hat{y} = \gamma(\ln y^*(\Theta) - \ln y) \quad (A)$$
$$+ \alpha_M \pi_M \beta(\ln y_M^* - \ln y_M) \quad (B)$$
$$+ (\pi_M - \pi_T) d\alpha_M \quad (C)$$

Standard convergence is augmented by two additional terms

- Which requires policies that overlap with, but are not same as, fundamentals

Manufacturing as special case

Why manufacturing is special:

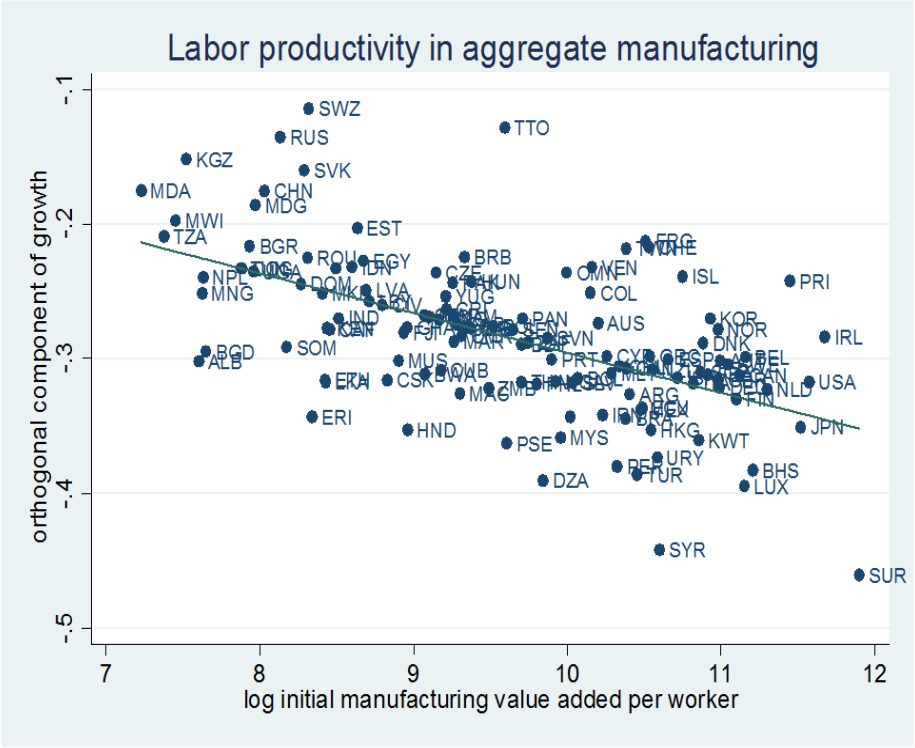
- Productivity dynamics
  - unconditional convergence
- Labor absorption
  - skills
- Tradability
  - can expand without turning terms of trade against itself

Specialization in narrow range of manufactures can be potent engine for growth

Narrower focus eases policy challenges of economy-wide reform

Productivity convergence in (formal) manufacturing appears quite general – regardless of period, region, sector, or aggregation





$\beta \approx 2.9\%$ (t-stat ≈ 7), implying a half-life for full convergence of 40-50 years!

Notes: Data are for the latest 10-year period available. On LHS chart, each dot represents a 2-digit manufacturing industry in a specific country; vertical axis represents growth rate of labor productivity (controlling for period, industry, and period×industry fixed effects).
Source: Rodrik (2013)

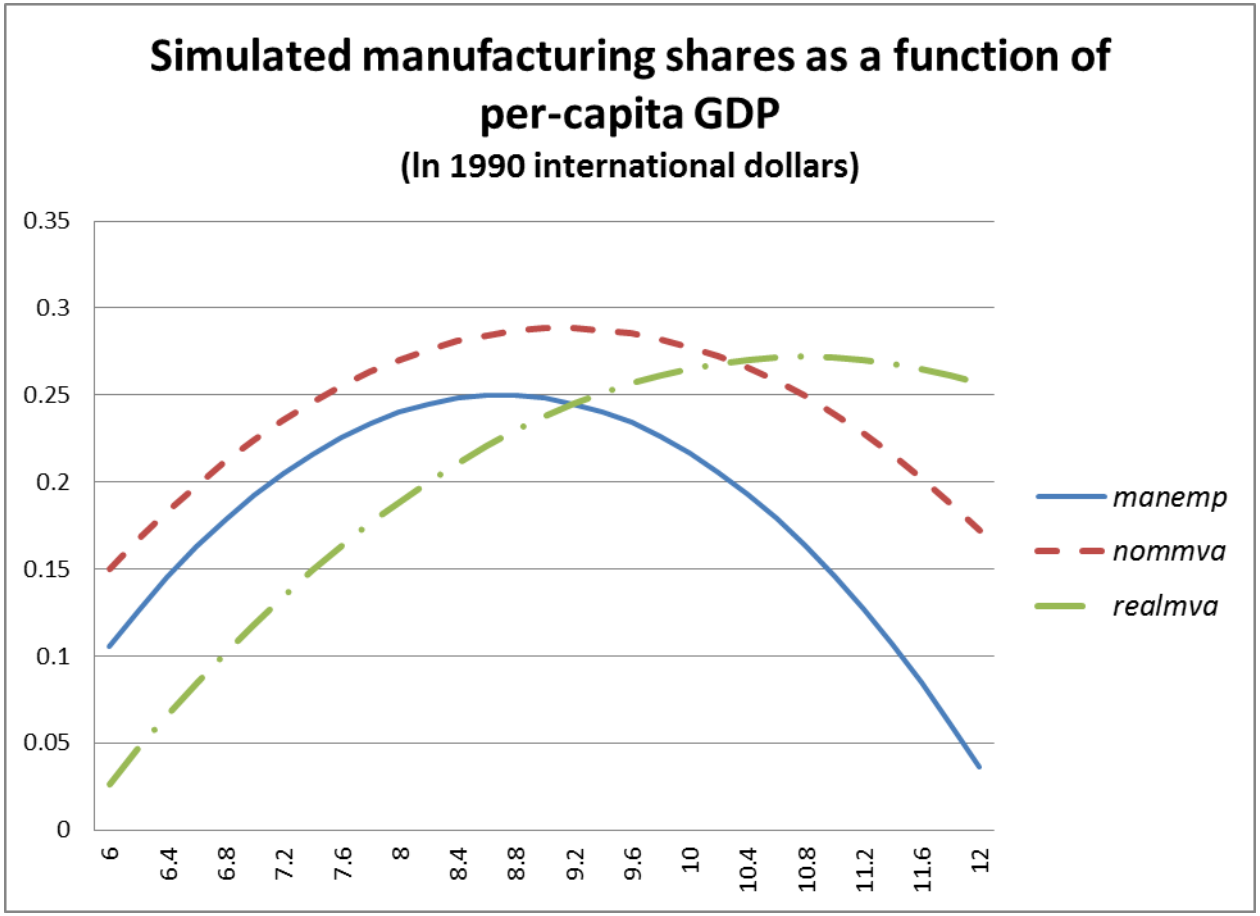
How did successful countries promote structural change?

- macro “fundamentals”
  - *reasonably* stable fiscal and monetary policies
  - *reasonably* business-friendly policy regimes
  - steady investment in human capital and institutions
    - but more important for sustaining growth past middle income than launching it
- pragmatic, opportunistic, often “unorthodox” government policies to promote domestic manufacturing industries
  - protection of home market, subsidization of exports, managed currencies, local-content rules, development banking, special investment zones, … with specific form varying across contexts
- a development-friendly global context
  - access to markets, capital and technologies of advanced countries
  - benign neglect towards industrial policies in developing countries

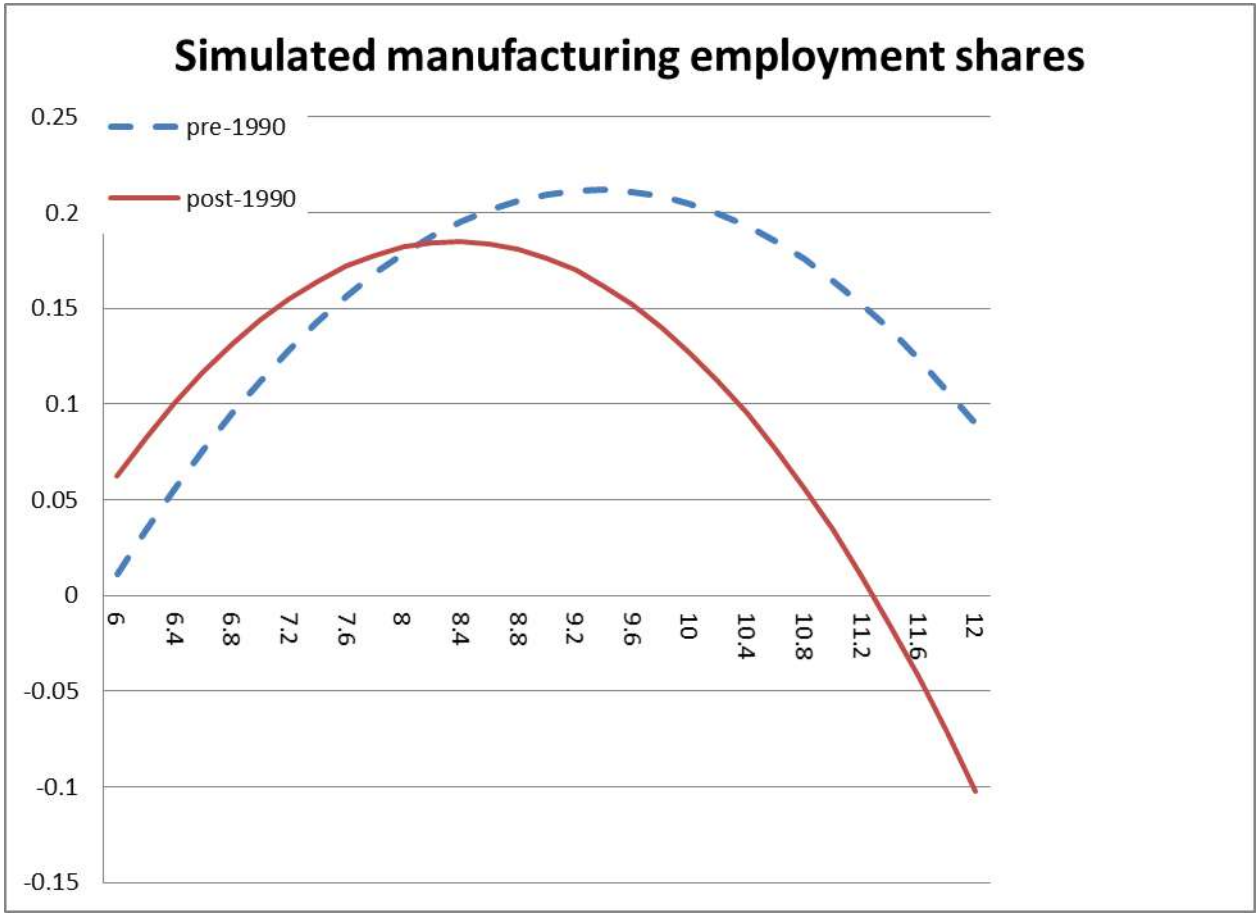
Why the past may no longer be a good guide

- The uncertain prospects of industrialization
  - globalization and the division of labor
  - global demand patterns
  - technology and skill-intensity
- Recent evidence

The manufacturing curve



Employment: pre- and post-1990



Real MVA: pre- and post-1990

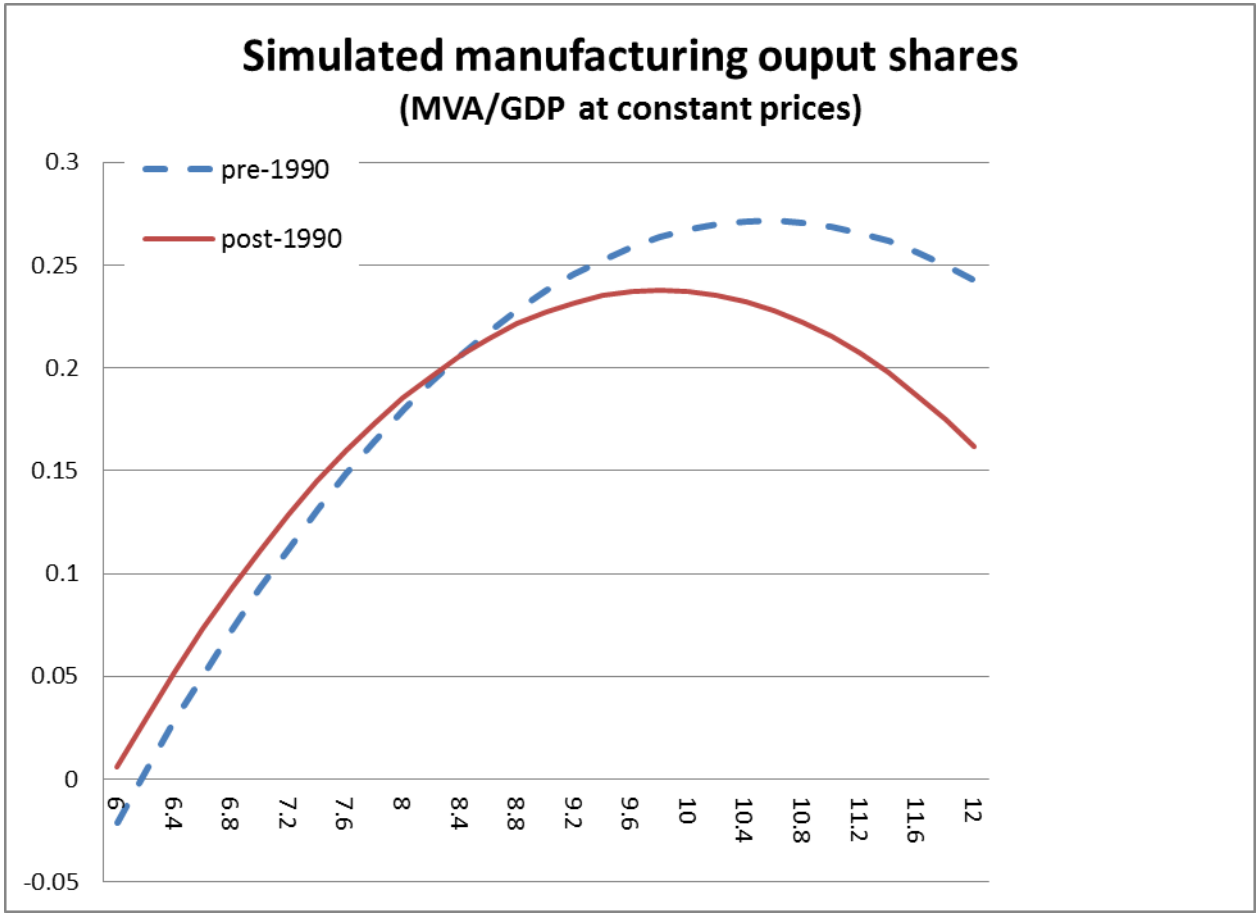


Table 3: Country groups, *manemp*

	all countries	*developed countries*	*Latin America*	*Asia*	*Sub-Saharan Africa*	*Sub-Saharan Africa (excl. Mauritius)*
ln population	**0.122***	**-0.652***	**0.191***	**0.789***	**0.199***	**0.178***
	(0.021)	(0.122)	(0.032)	(0.102)	(0.019)	(0.014)
ln population squared	**-0.001**	**0.017***	**-0.003***	**-0.025***	**-0.005***	**-0.004***
	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)	(0.000)
ln GDP per capita	**0.316***	**1.070***	**0.902***	**0.912***	**0.190***	**0.148***
	(0.026)	(0.088)	(0.071)	(0.071)	(0.024)	(0.018)
ln GDP per capita squared	**-0.018***	**-0.057***	**-0.052***	**-0.051***	**-0.014***	**-0.011***
	(0.002)	(0.005)	(0.004)	(0.004)	(0.002)	(0.001)
1960s	**-0.018***	**-0.004**	**-0.027***	**-0.003**	n.a.	n.a.
	(0.004)	(0.004)	(0.004)	(0.013)		
1970s	**-0.033***	**-0.021***	**-0.050***	**0.016**	**0.002**	**-0.003**
	(0.005)	(0.006)	(0.006)	(0.016)	(0.004)	(0.003)
1980s	**-0.054***	**-0.052***	**-0.079***	**0.022**	**0.004**	**-0.021***
	(0.006)	(0.007)	(0.008)	(0.019)	(0.007)	(0.005)
1990s	**-0.074***	**-0.072***	**-0.096***	**0.013**	**0.007**	**-0.033***
	(0.008)	(0.009)	(0.010)	(0.022)	(0.012)	(0.007)
2000s+	**-0.105***	**-0.096***	**-0.131***	**0.004**	**0.007**	**-0.035***
	(0.009)	(0.010)	(0.012)	(0.026)	(0.014)	(0.008)
country fixed effects	yes	yes	yes	yes	yes	yes
number of countries	42	10	9	11	11	10
number of observations	2,209	575	545	519	524	481

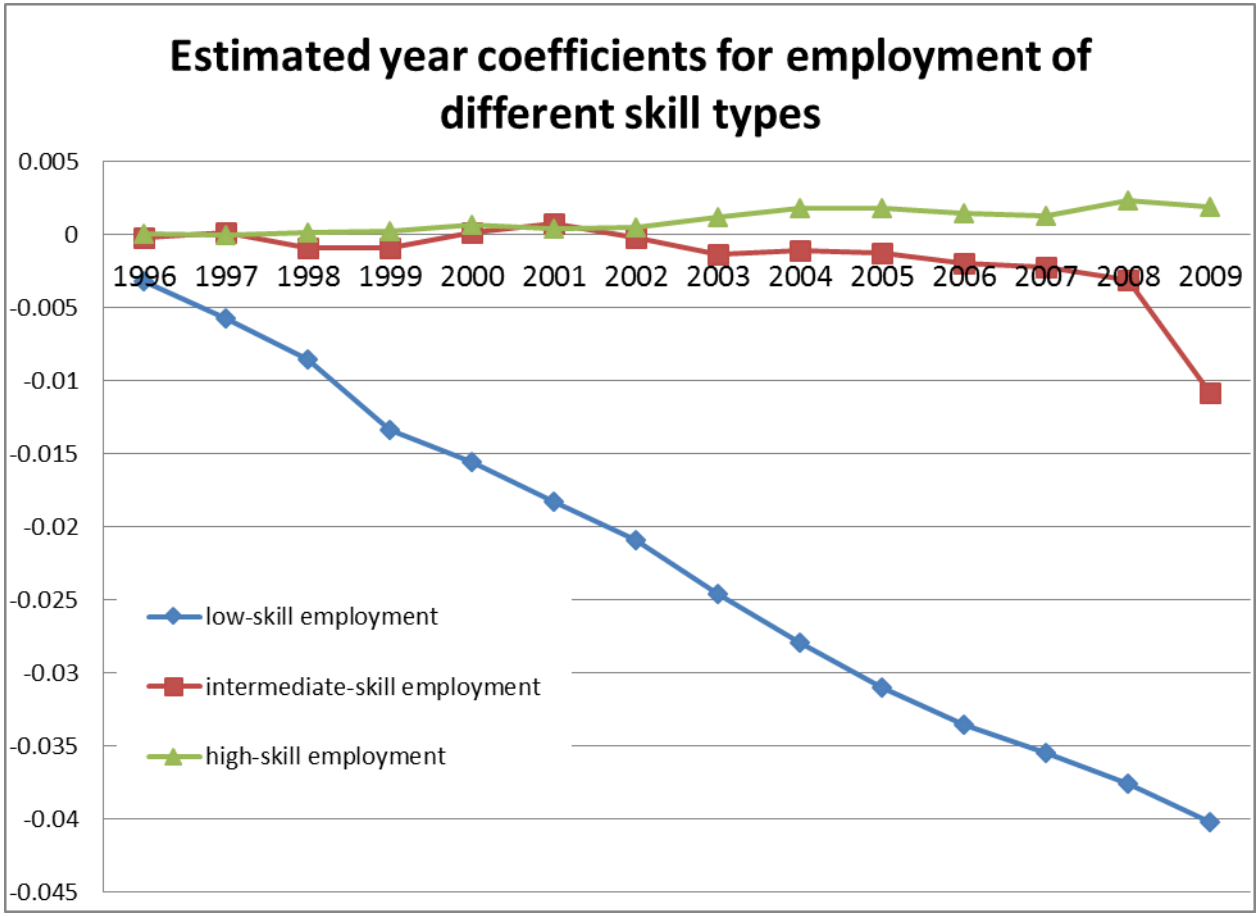
Robust standard errors are reported in parentheses.
Levels of statistitical signficance: *: 99%; **: 95%; ***: 90%.

Table 5: Country groups, *realmva*

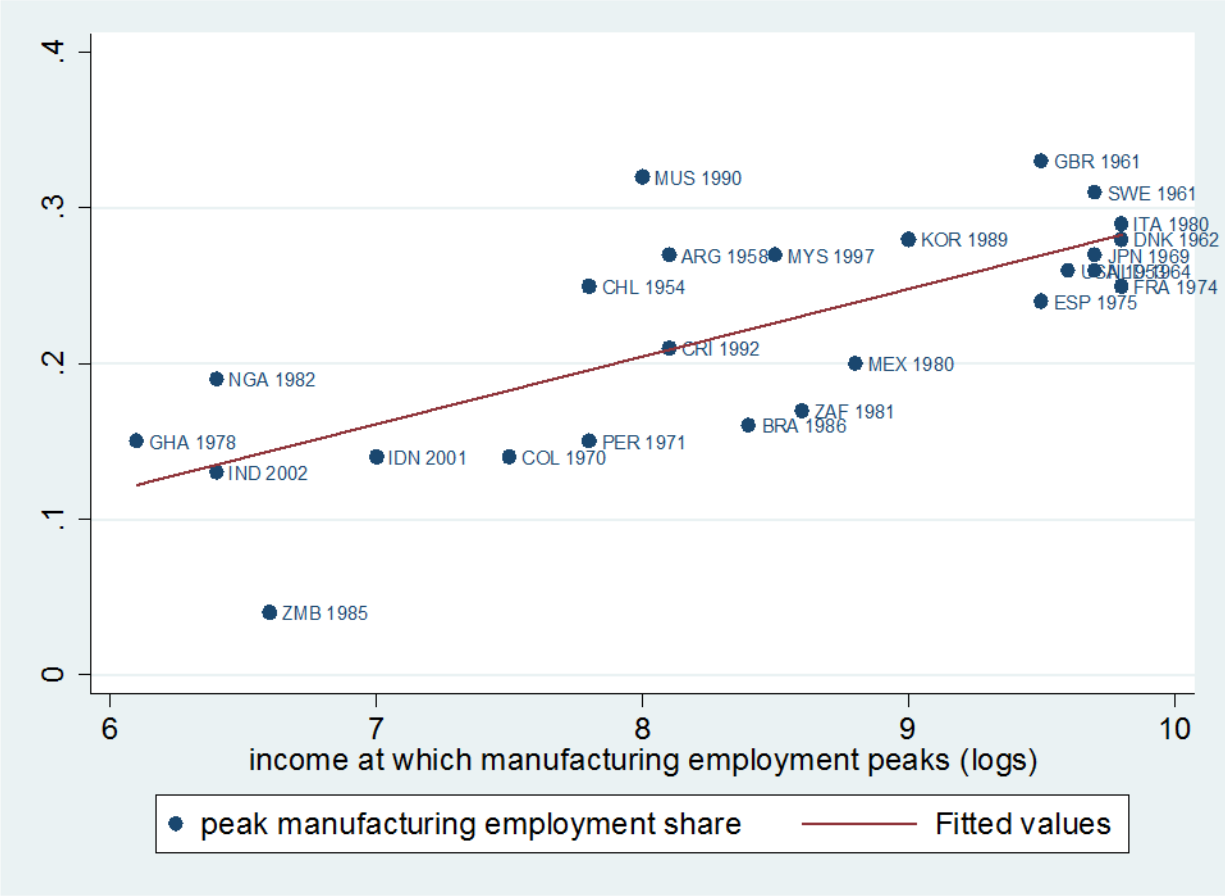
	all countries	*developed countries*	*Latin America*	*Asia*	*Sub-Saharan Afirca*	*Sub-Saharan Afirca (excl. Mauritius)*
ln population	-0.039	-4.564*	0.263*	0.251*	0.062**	0.053***
	(0.025)	(0.776)	(0.027)	(0.084)	(0.029)	(0.031)
ln population squared	0.003*	0.113*	-0.004*	-0.011*	-0.001	-0.000
	(0.001)	(0.019)	(0.001)	(0.003)	(0.001)	(0.001)
ln GDP per capita	0.262*	0.778*	-0.135**	0.737*	0.123*	0.106*
	(0.027)	(0.129)	(0.059)	(0.040)	(0.025)	(0.024)
ln GDP per capita squared	-0.012*	-0.036*	0.006***	-0.038*	-0.009*	-0.008*
	(0.002)	(0.008)	(0.003)	(0.003)	(0.002)	(0.002)
1960s	-0.028*	-0.021***	-0.011*	0.011***	n.a.	n.a.
	(0.007)	(0.011)	(0.004)	(0.006)		
1970s	-0.026*	0.007	-0.017*	0.027*	0.017*	0.012*
	(0.008)	(0.015)	(0.006)	(0.010)	(0.005)	(0.004)
1980s	-0.034*	0.006	-0.052*	0.034**	0.015**	-0.004
	(0.009)	(0.018)	(0.007)	(0.013)	(0.006)	(0.006)
1990s	-0.040*	0.013	-0.078*	0.041**	0.011	-0.022*
	(0.010)	(0.023)	(0.008)	(0.017)	(0.009)	(0.008)
2000s+	-0.059*	0.021	-0.101*	0.044**	-0.003	-0.042*
	(0.011)	(0.027)	(0.010)	(0.020)	(0.011)	(0.010)
country fixed effects	yes	yes	yes	yes	yes	yes
number of countries	42	10	9	11	11	10
number of observations	2,302	592	556	577	530	487

Robust standard errors are reported in parentheses.
Levels of statistitical signficance: *: 99%; **: 95%; ***: 90%.

Employment de-industrialization by skill type



Premature de-industrialization



Effects of trade, technology, and demand on measures of industrialization

A. “Closed” economy (with $\sigma < 1$)

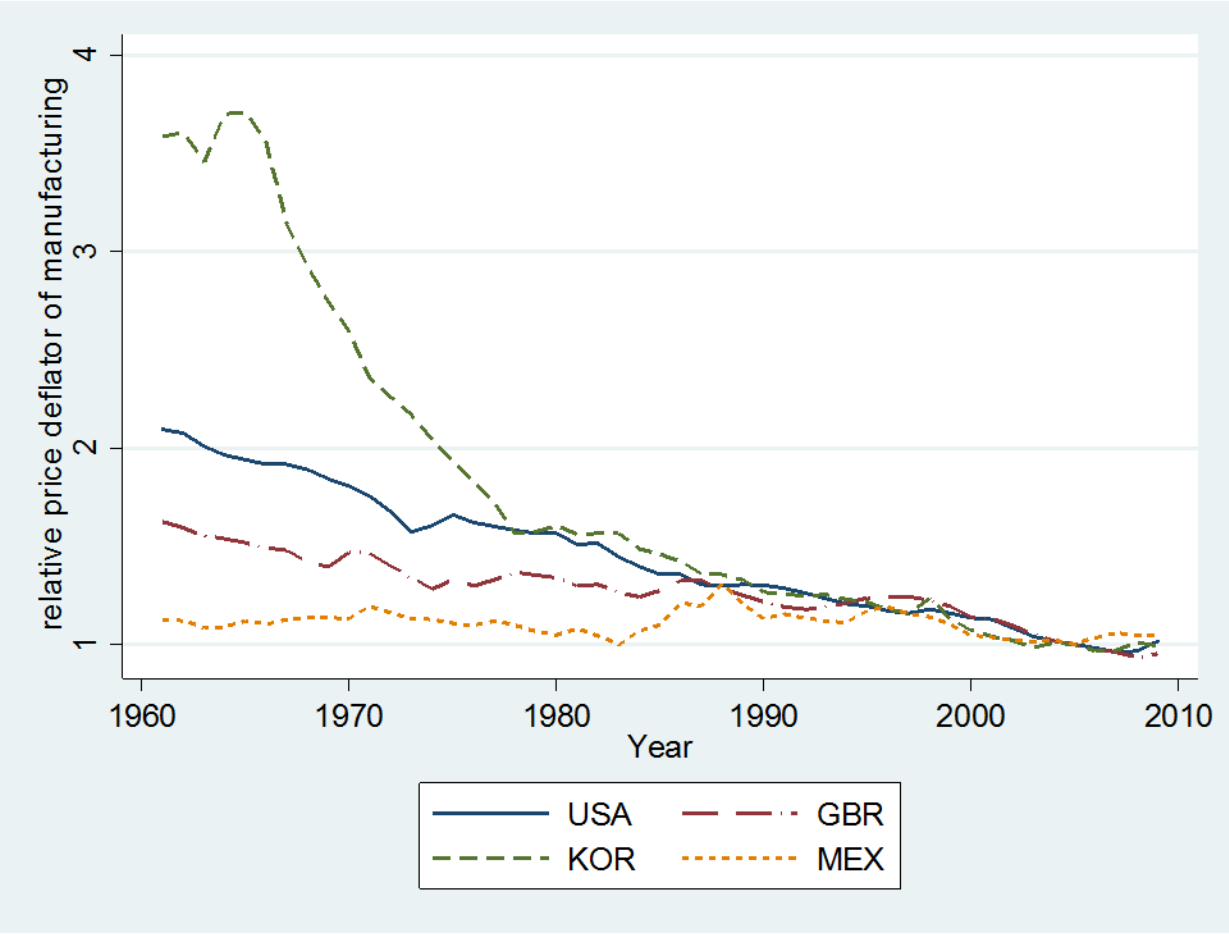
Effect on:	Technology shock: $\hat{\theta}_m - \hat{\theta}_n > 0$	Trade shock: $dx < 0$	Adverse domestic demand shock on manufacturing
manemp ($d\alpha$)	-	-	-
realmva ($d\alpha_q$)	+	-	-

Effects of trade, technology, and demand on measures of industrialization

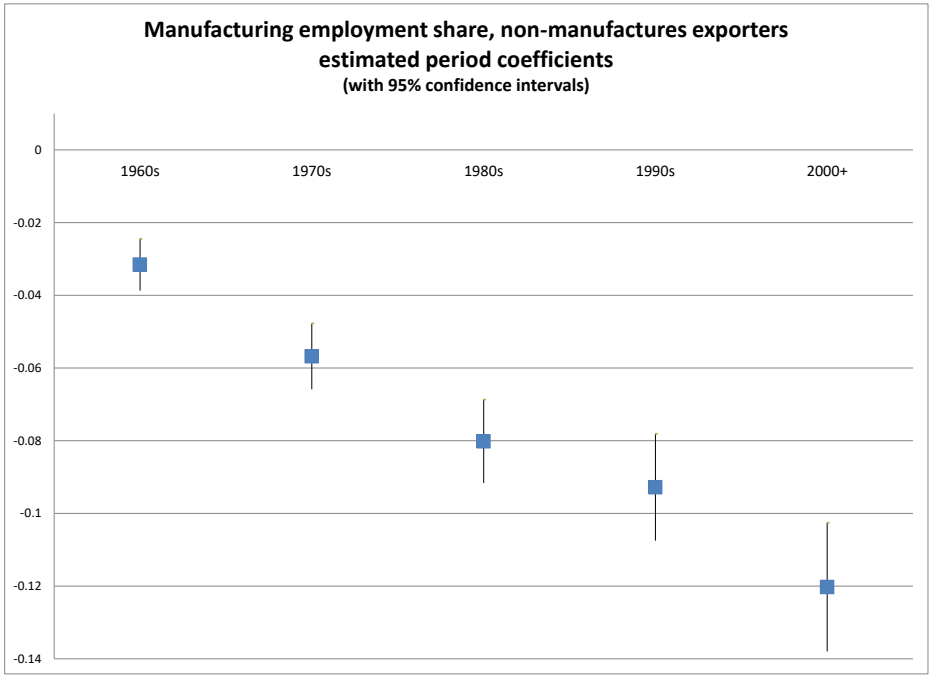
B. Small open economy

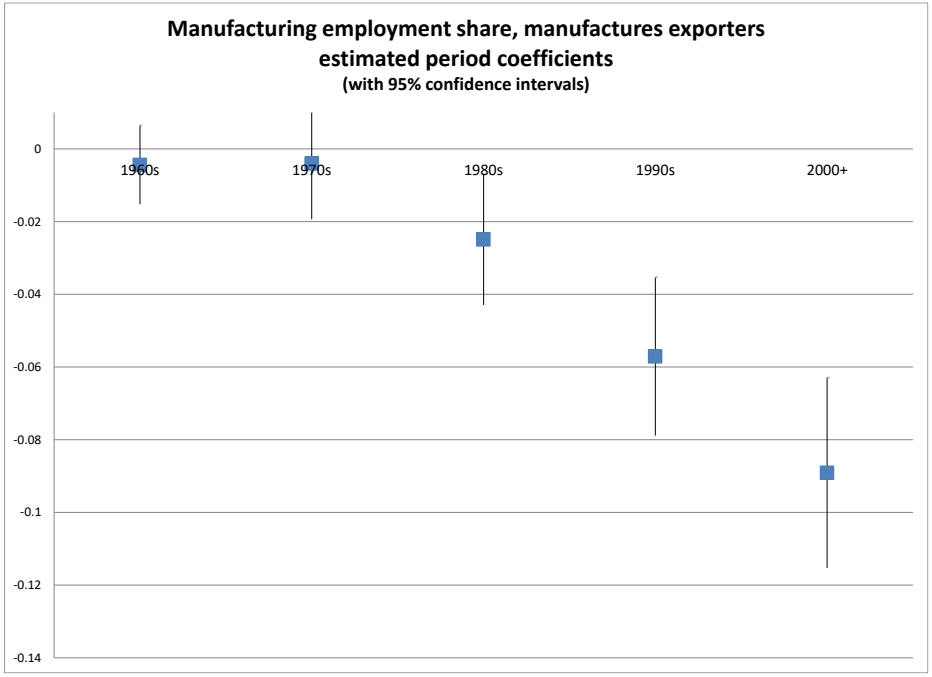
Effect on:	Technology shock: $\hat{\theta}_m - \hat{\theta}_n > 0$	External price shock: $\hat{p}_m < 0$	Adverse domestic demand shock on manufacturing
manemp ($d\alpha$)	+	-	0
realmva ($d\alpha_q$)	+	-	0

Relative price of manufacturing

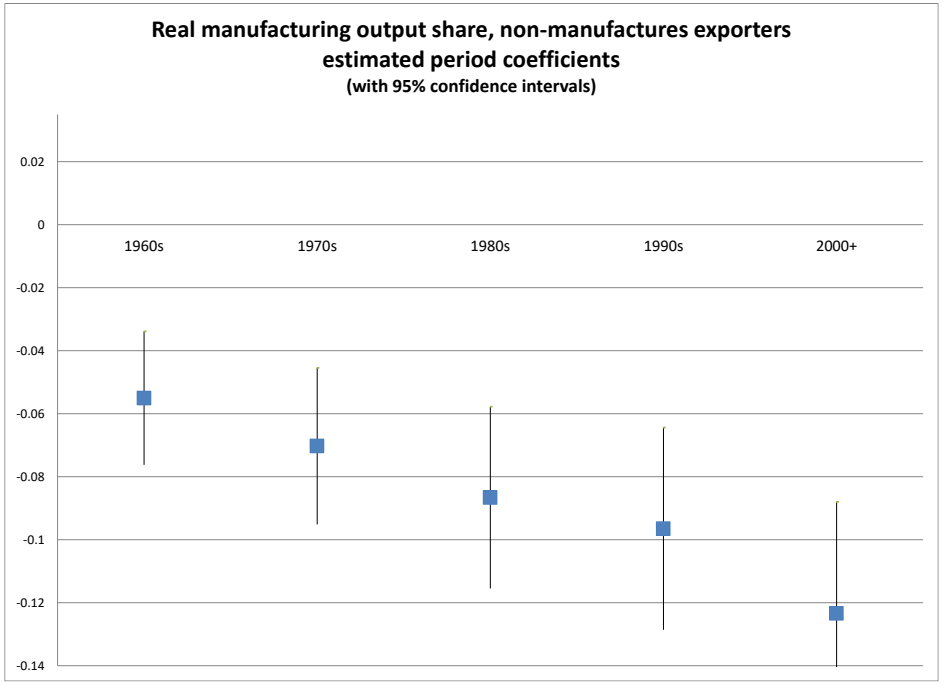


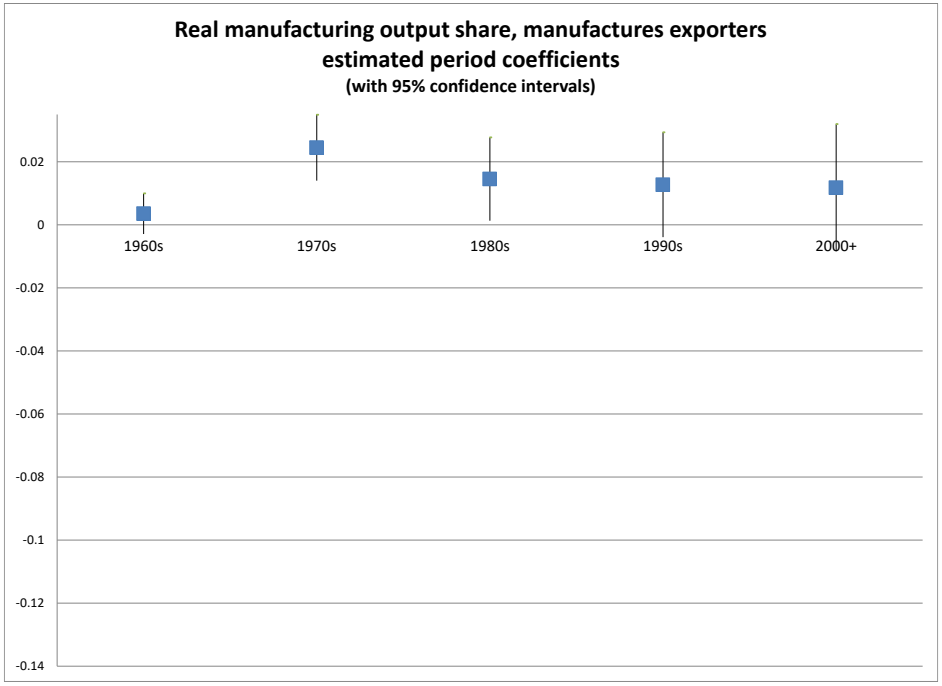
Employment: manufactures and non-manufactures exporters





Real MVA: manufactures and non-manufactures exporters





Global value chains facilitate entry to manufacturing but diminish returns from it

The Ratio of Value-Added to Gross Exports for the Top 20 Exporting Countries

	WIOD 2008	*WIOD Change 1995–2008*	*Johnson–Noguera Change 1970–2008*
Germany	0.69	−0.10	−0.16
United States	0.78	−0.05	−0.14
China	0.75	−0.09	−0.20
Japan	0.80	−0.12	−0.09
United Kingdom	0.78	−0.01	−0.04
France	0.71	−0.08	−0.13
Italy	0.73	−0.07	−0.12
Netherlands	0.62	−0.06	−0.11
Canada	0.76	0.02	−0.11
South Korea	0.58	−0.18	−0.18
Russia	0.92	0.00	
Belgium	0.53	−0.07	−0.15
Spain	0.69	−0.09	−0.17
Taiwan	0.51	−0.16	
Mexico	0.70	−0.03	−0.21
India	0.78	−0.12	−0.20
Sweden	0.66	−0.08	−0.13
Australia	0.84	−0.04	−0.06
Brazil	0.86	−0.05	−0.10
Austria	0.65	−0.10	−0.17
Minimum	0.51	−0.18	−0.21
Median	0.72	−0.08	−0.14
Maximum	0.92	0.02	−0.04

Sources: World Input-Output Database (WIOD) and author's calculations, Johnson and Noguera (2014).
Notes: The column "WIOD 2008" is the ratio of value-added exports to gross exports for each country in 2008 from the World Input-Output Database. The column "WIOD change 1995–2008" is the change in this ratio from 1995 to 2008. The column "Johnson–Noguera change 1970–2008" is the change in the ratio of value-added exports to gross exports for each country from 1970 to 2008, from Johnson and Noguera (2014). Blank entries in that column reflect missing data. Exporting countries are ordered top to bottom by total gross exports in 2008.

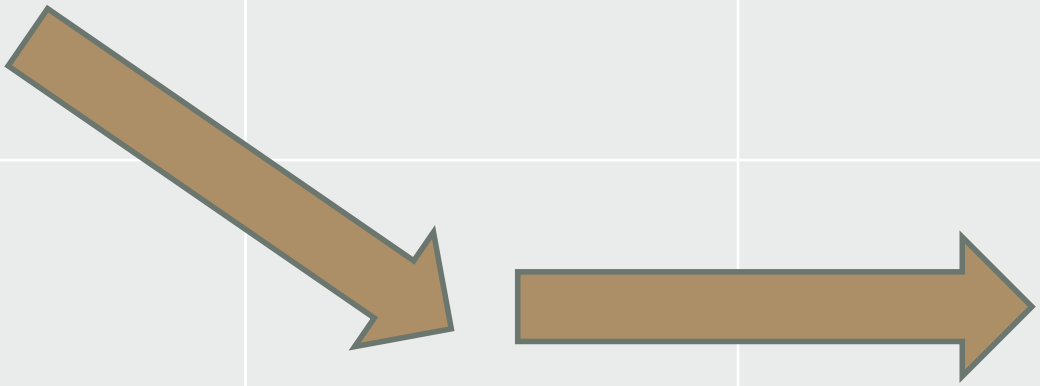
Source: Johnson (2014)

Patterns of structural change

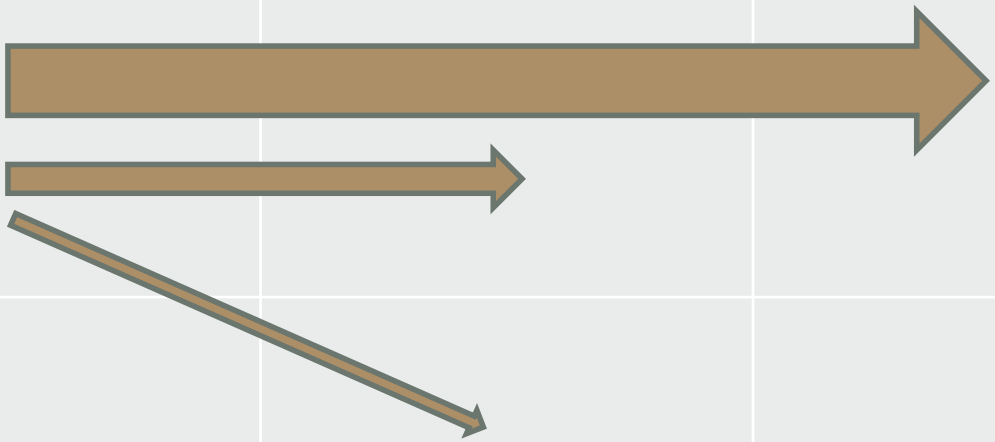
	agriculture	manufacturing	services
informal			
organized			

Patterns of structural change: East Asia and advanced countries

	agriculture	manufacturing	services
informal			
organized			



Patterns of structural change: low-income countries today

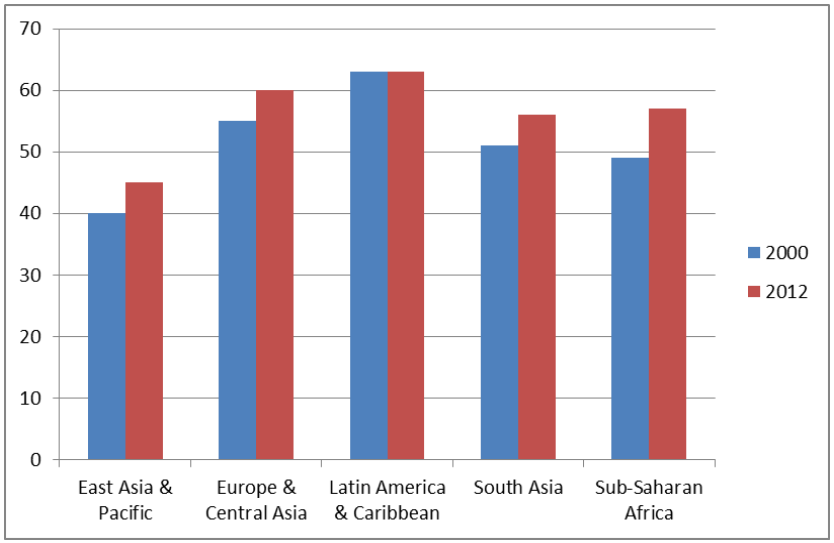
	agriculture	manufacturing	services
informal			
organized			

Intermediate conclusions

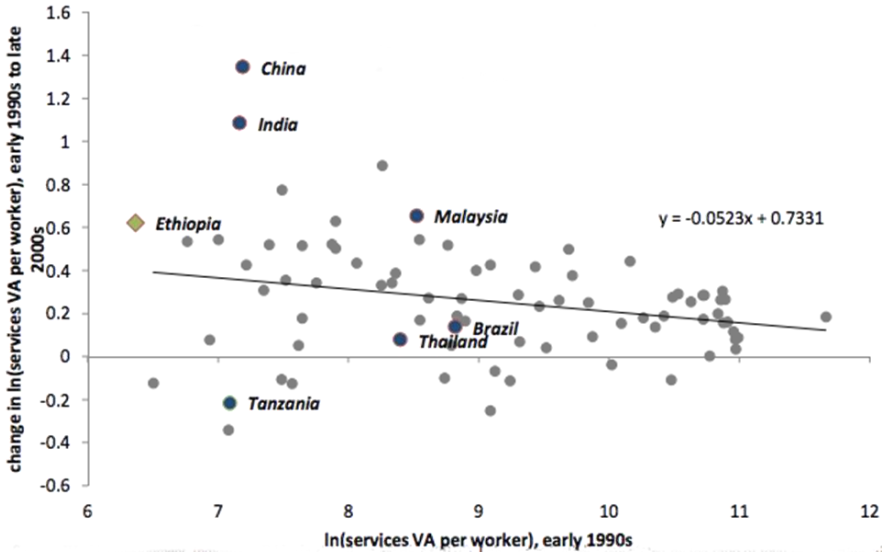
- Promoting (re)industrialization will be difficult -- like swimming against the tide
- Alternative priorities:
  - raise productivity in services and reduce share of small, informal firms
  - this is one and the same challenge, since low productivity in services in large part result of long tail of unproductive firms
- What kind of IP, if at all, for services?

Is the rise of services really bad for growth?

Services (%of GDP)



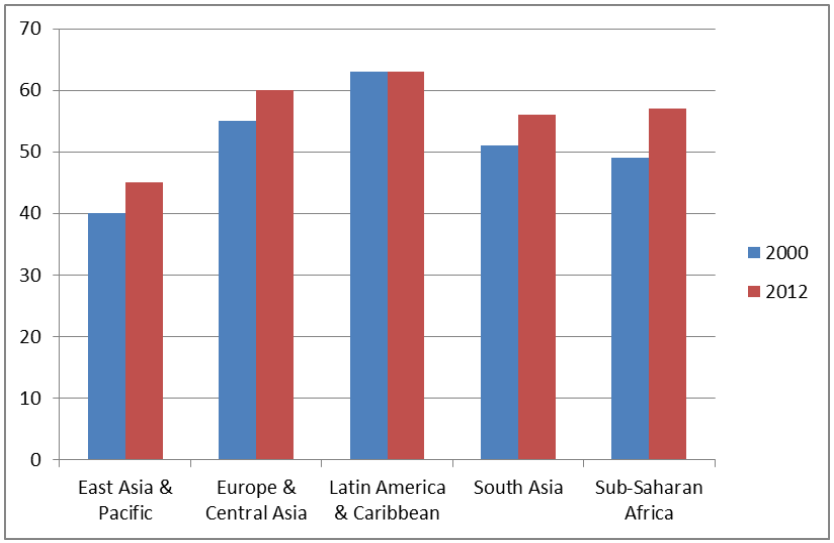
Unconditional convergence in services (post-1990)



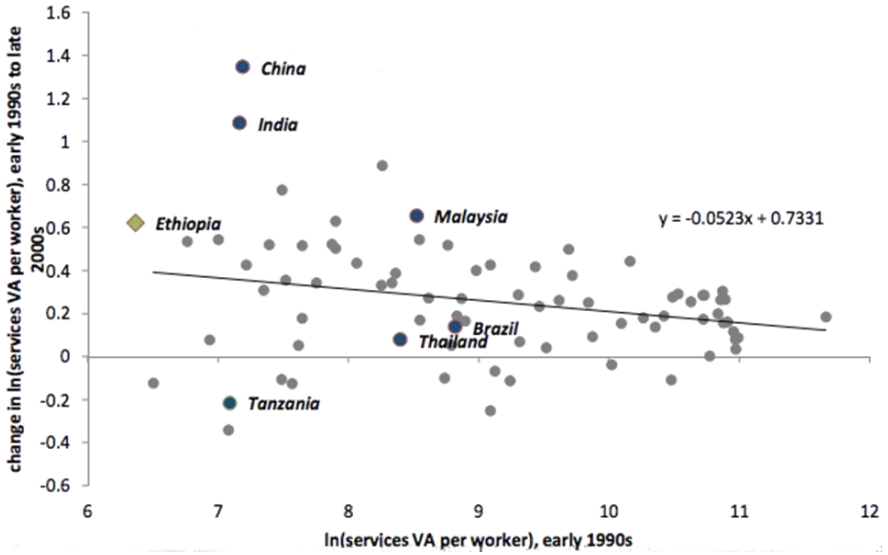
Source: Ghani and O'Connell (2104)

Is the rise of services really bad for growth?

Services (%of GDP)



Unconditional convergence in services (post-1990)

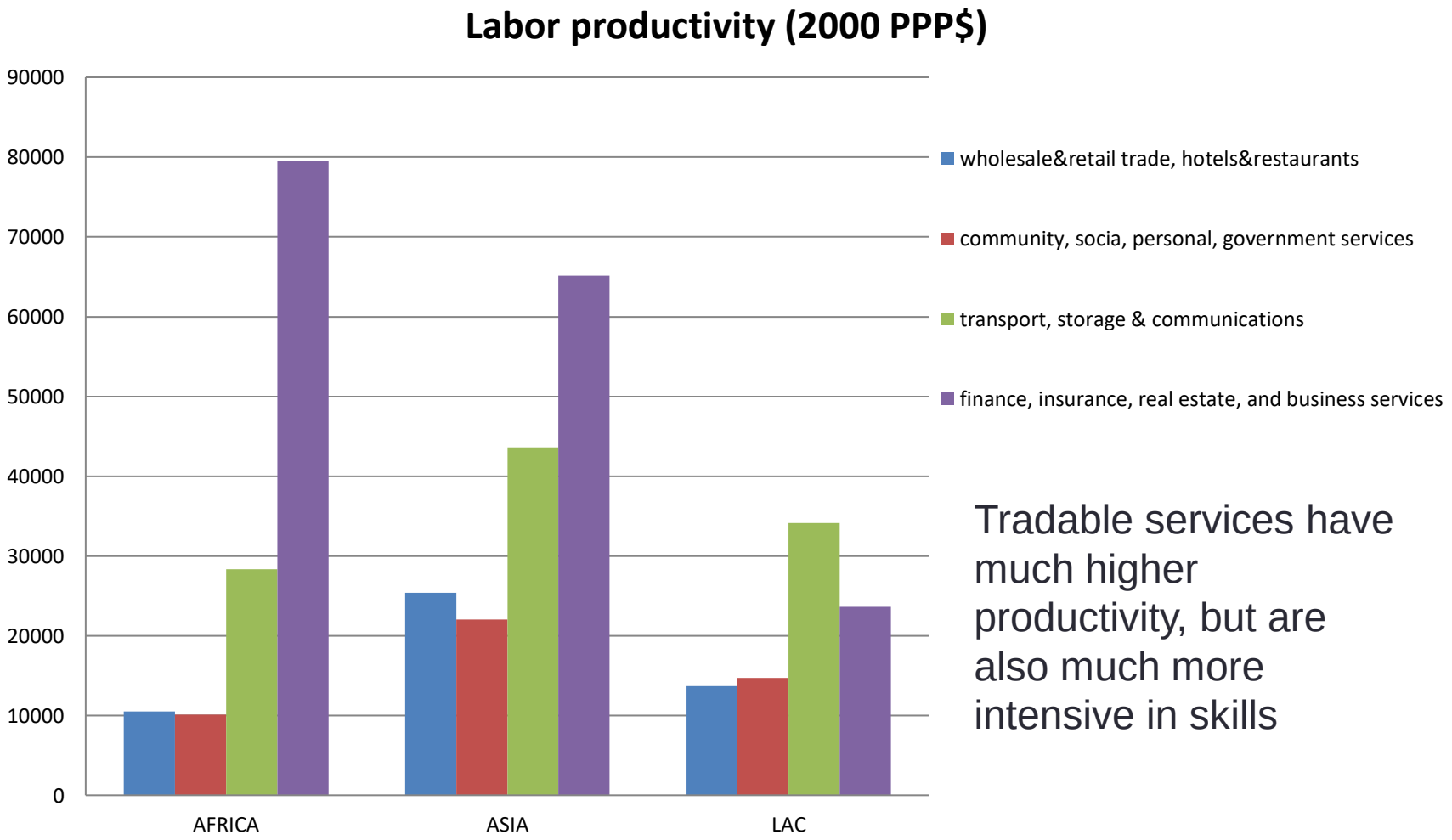


Source: Ghani and O'Connell (2104)

Why services are not like manufactures

- High-productivity (tradable) segments of services cannot absorb as much labor
  - since they are typically skill-intensive
  - FIRE, business services
- Low productivity (non-tradable) services cannot act as growth poles
  - since they cannot expand without turning their terms of trade against themselves
  - continued expansion in one segment relies on expansion on others
  - limited gains from sectoral “winners”
  - back to slow accumulating fundamentals (rather than IP)

Dualism in services: across sectors



Tradable services have much higher productivity, but are also much more intensive in skills

Dualism in services: within sectors (I)

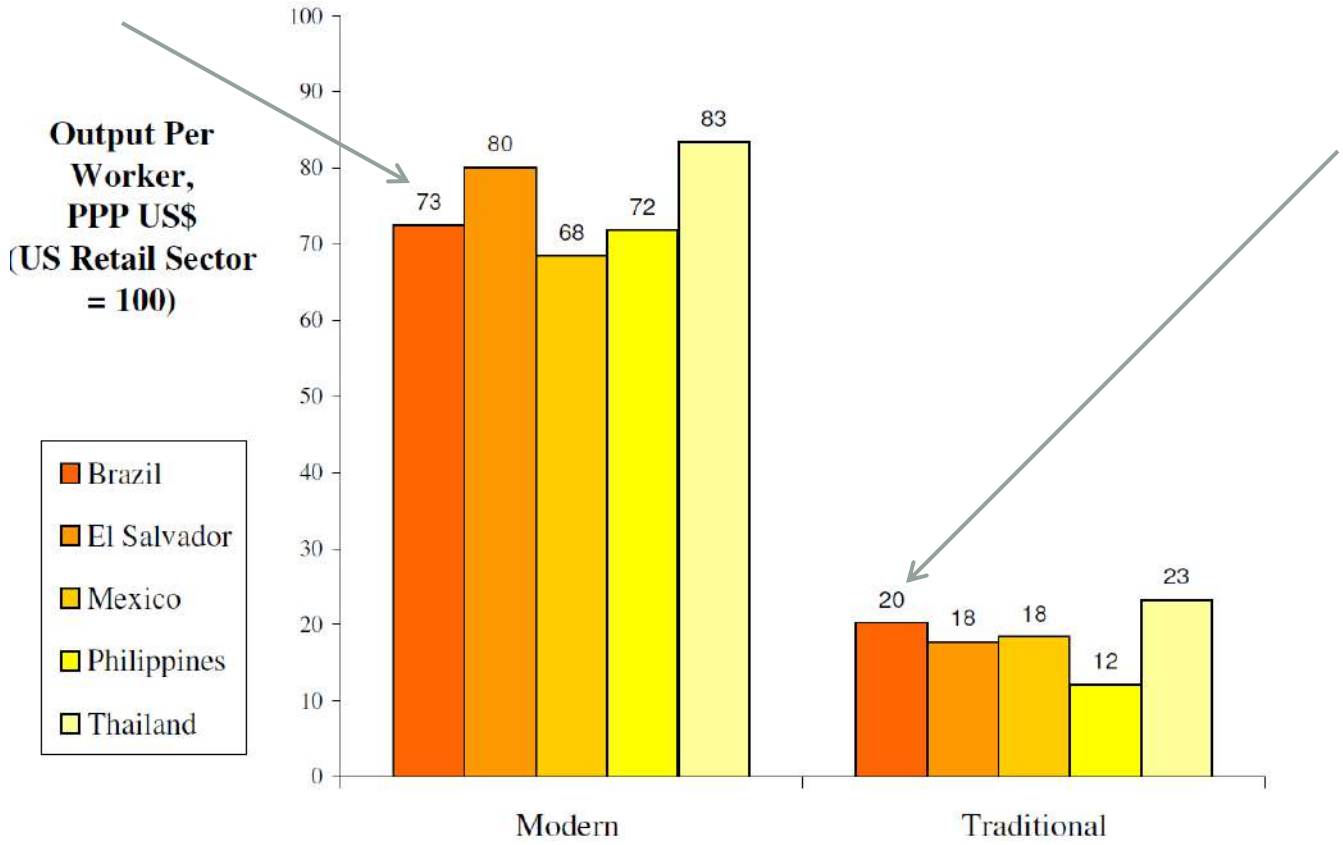
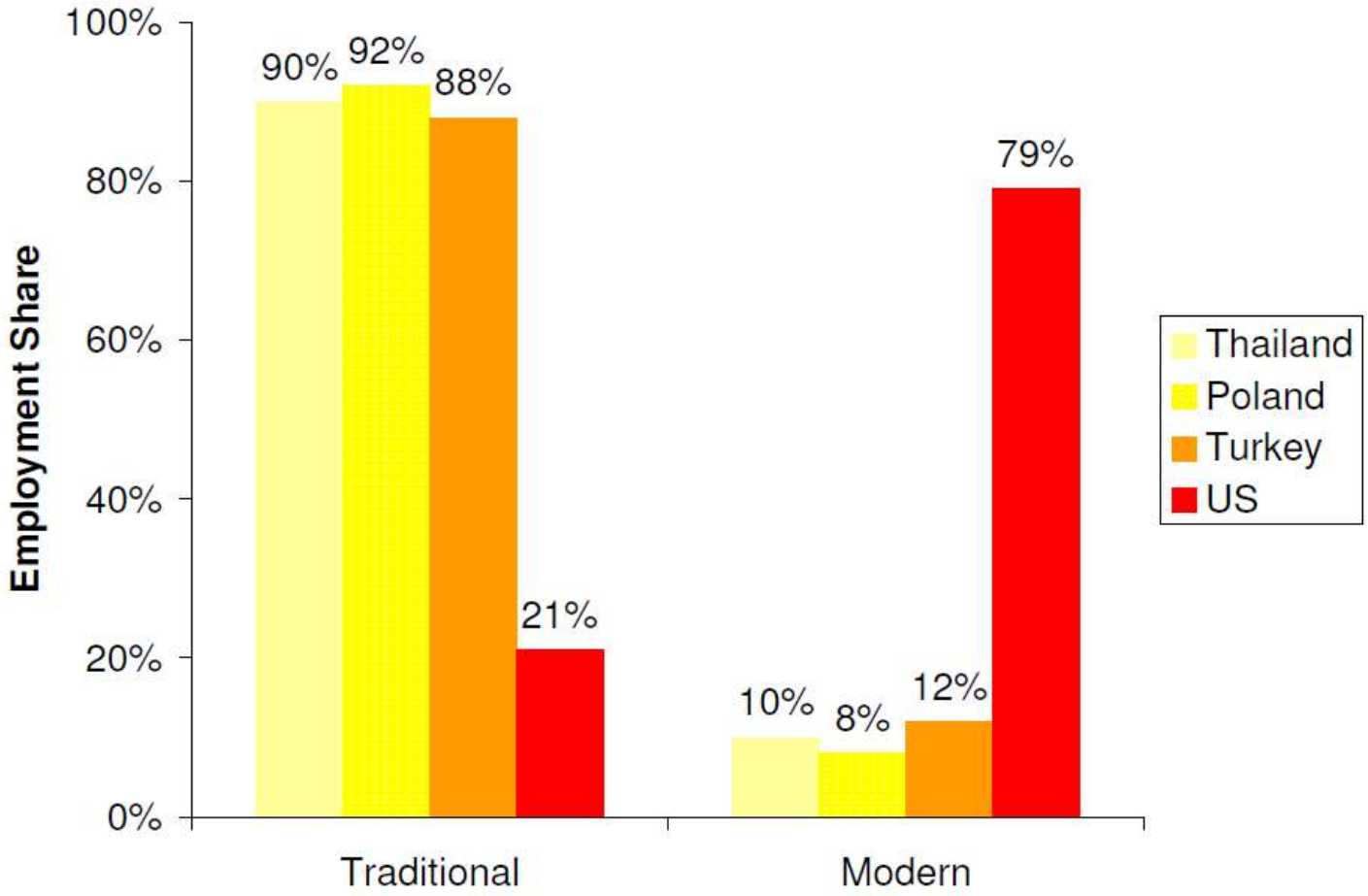


Figure 2: Labor Productivity in Modern and Traditional Stores

Source: McKinsey country studies, via Lagakos (2007)

Dualism in services: within sectors (II)



Source: McKinsey country studies, via Lagakos (2007)

Policies to address within-sector dualism

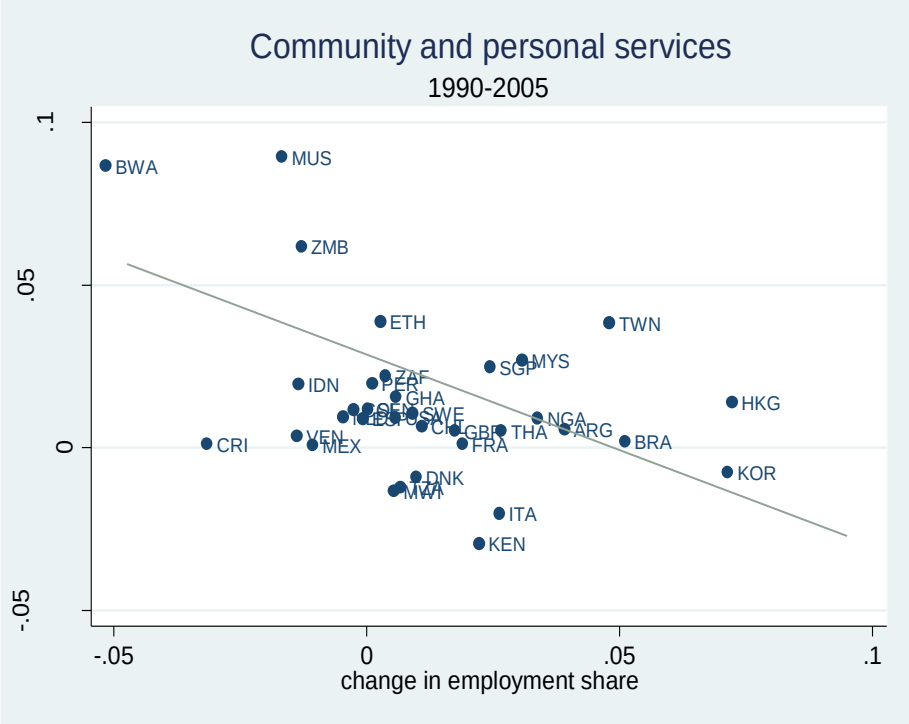
- A strategic choice:
  - Help small firms grow?
    - MGI: “Prescribing many of the measures that are needed to improve productivity in traditional enterprises is straightforward…”
  - Or support modern/large firms’ expansion?
    - With fixed costs of adopting new technologies, there are too many small firms
    - Informal firms are inherently unproductive; successful firms start large (LaPorta and Shleifer 2014)
- Deregulate?
  - allow entry (including FDI) and remove costly licensing/certification/regulatory requirements
  - but usual trade-off between competition and Schumpeterian rents
- Enforce formality?
  - by leveling the playing field in taxation, employment, social security policies
  - relieves competition for formal firms: is this good or bad?

A thorny problem: the employment-productivity trade-off in services

- Large part of the problem in services (e.g. retail trade) is preponderance of small, low-productivity firms that absorb excess supply of labor
- Where do people employed in small firms go?

Not many examples of productivity growth and employment expansion in services





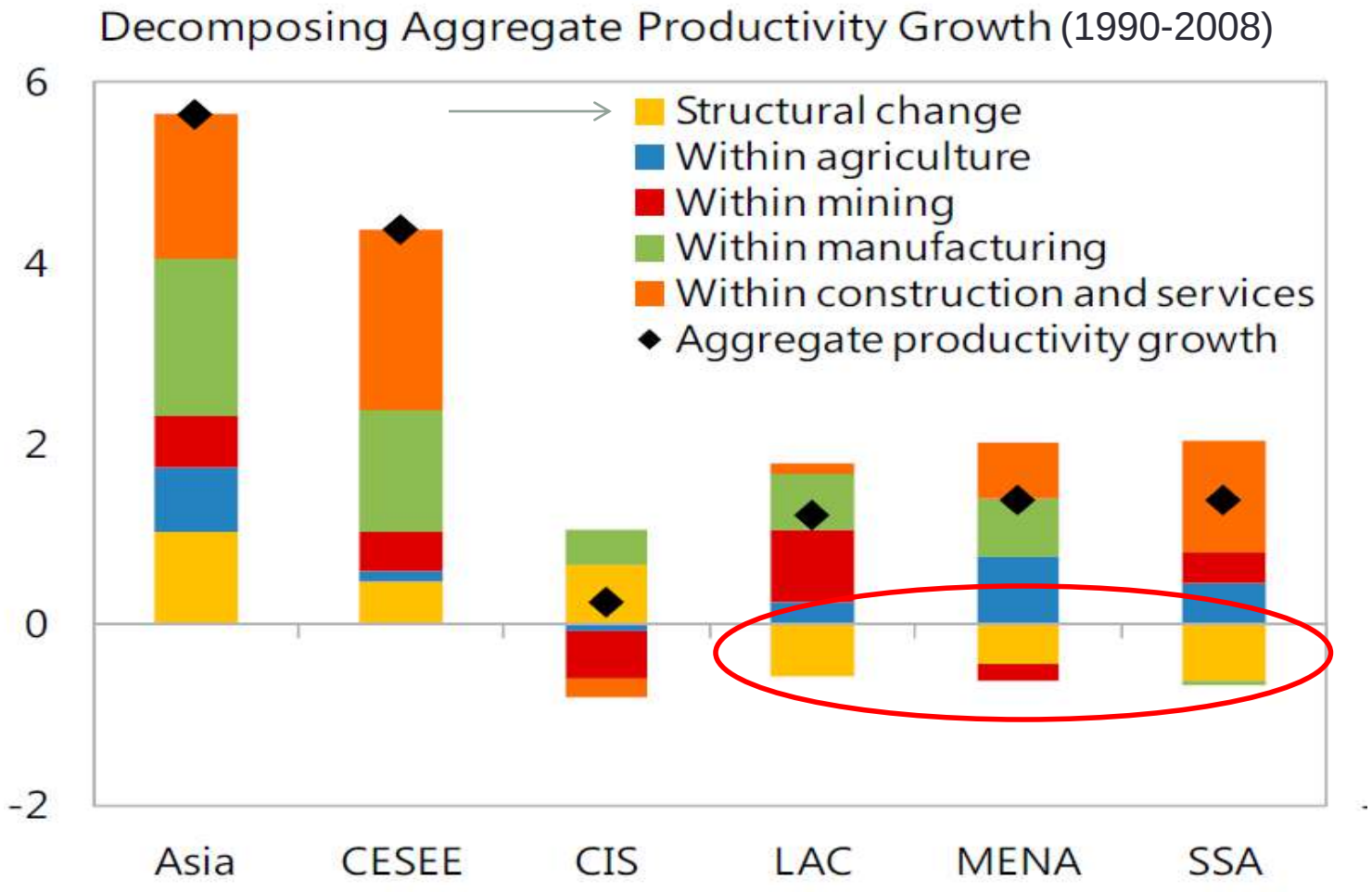
Service sectors that have best productivity performance typically shed labor; labor absorbing sectors typically have worst productivity performance.

Source: Author's calculations from GGDC data.

How did manufacturing avoid this problem?

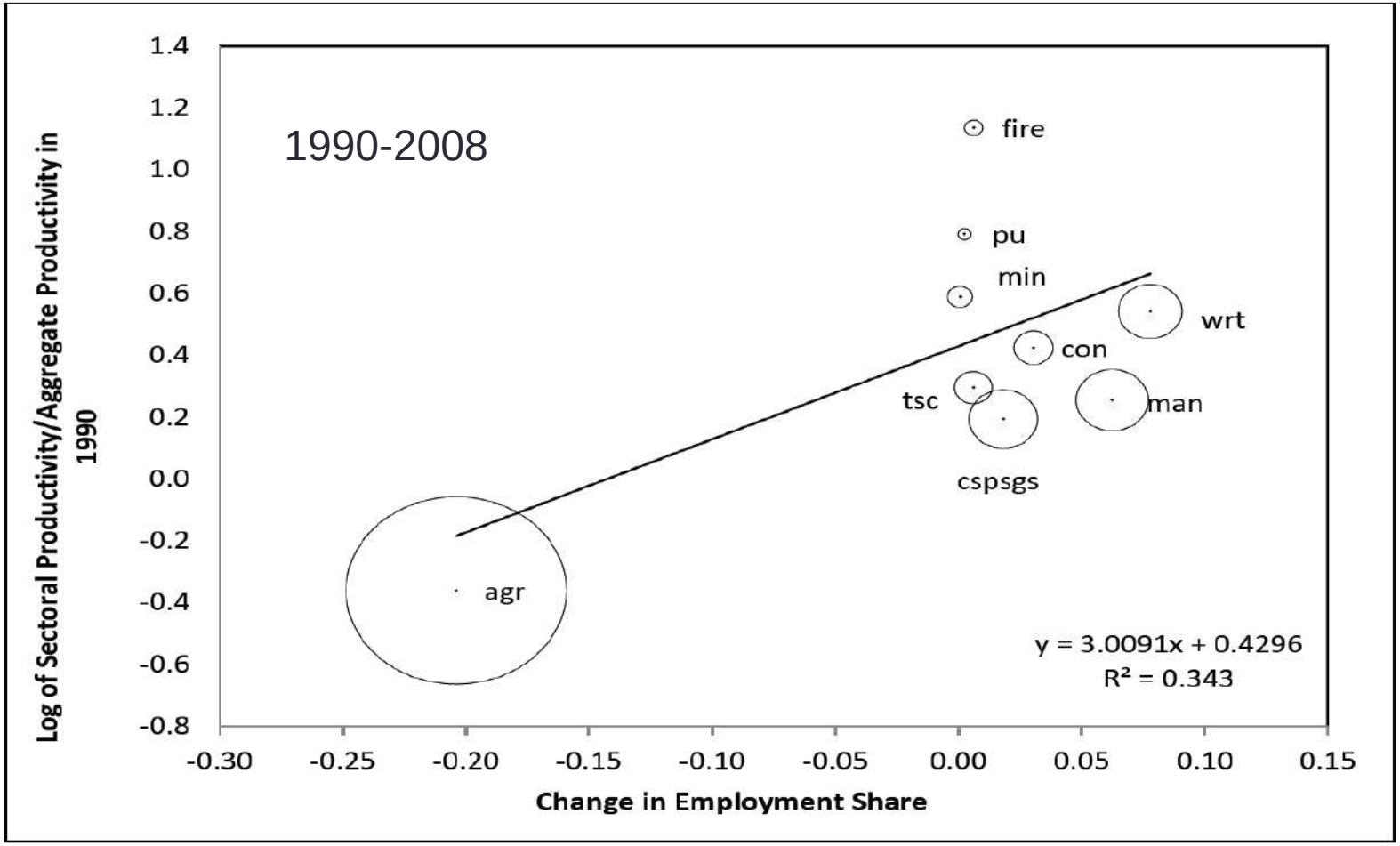
- Key is tradability
- Higher-than-average productivity growth in a tradable sector of (small) open economy translates into greater output
  - and possibly higher employment even if productivity growth is driven by labor-replacing technology
- In non-tradable sectors, the output-boosting effect is attenuated by decline in relative price (and profitability)

The drag on growth from adverse structural change



Source: Dabla-Norris et al. (2014)

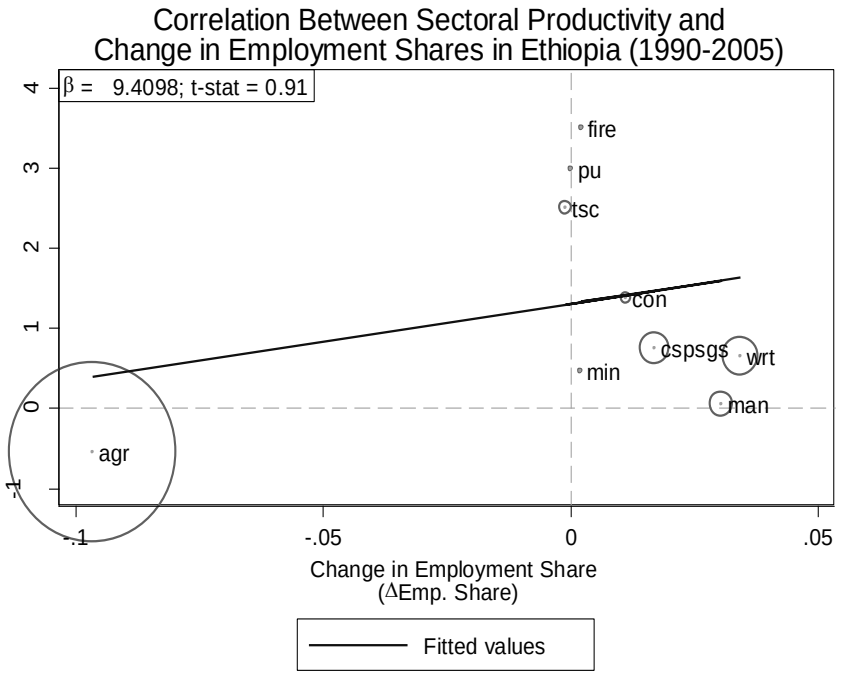
Structural change in Vietnam versus…



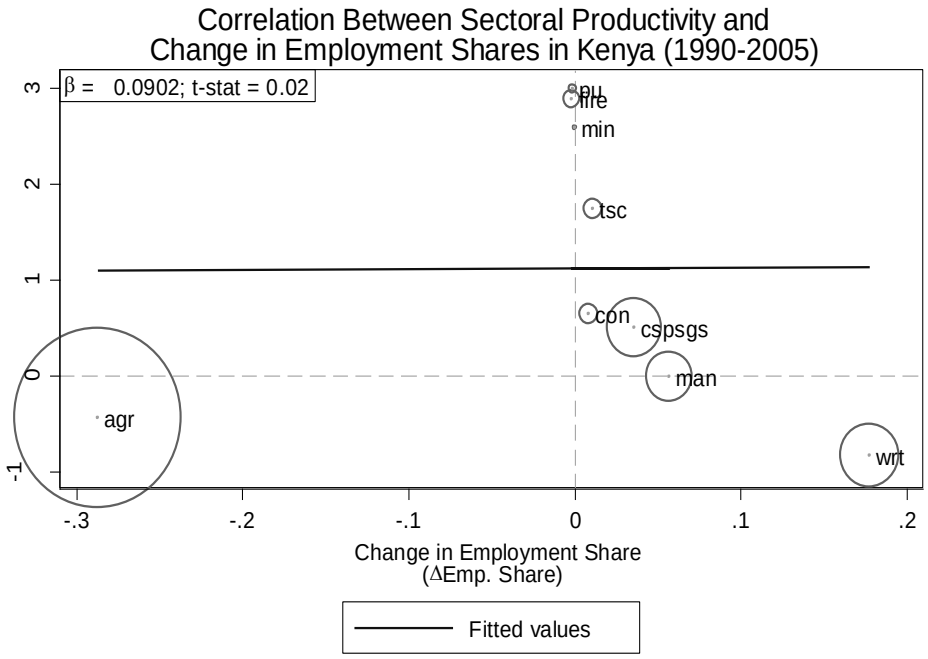
Notes: Authors' calculations based on data from the GSO. The bubble sizes indicate the share of total employment in 1990. For sector abbreviations refer to Table A.1.

Source: McCaig and Pavcnik (2013)

… Africa



*Note: Size of circle represents employment share in 1990
**Note: β denotes coeff. of independent variable in regression equation:
ln(p/P) =α + βΔEmp. Share
Source: Authors' calculations with data from National Bank of Ethiopia and Ethiopia's Ministry of Finance



*Note: Size of circle represents employment share in 1990
**Note: β denotes coeff. of independent variable in regression equation:
ln(p/P) =α + βΔEmp. Share
Source: Authors' calculations with data from Kenya National Bureau of Statistics, Central Bureau of Statistics, UN National Accounts Statistics and ILO's KILM

Source: McMillan and Rodrik (2008)

The African example: (lack of) industrialization

Table 2. GDP, employment, and relative productivity levels across countries and sectors, 1960 -2010

	Value added				Employment				Relative productivity levels			
	1960	1975	1990	2010	1960	1975	1990	2010	1960	1975	1990	2010
Agriculture	**37.6**	**29.2**	**24.9**	**22.4**	**72.7**	**66.0**	**61.6**	**49.8**	**0.5**	**0.4**	**0.4**	**0.4**
Industry	**24.3**	**30.0**	**32.6**	**27.8**	**9.3**	**13.1**	**14.3**	**13.4**	**4.4**	**3.7**	**3.5**	**2.6**
Mining	8.1	6.2	11.2	8.9	1.7	1.5	1.5	0.9	15.7	22.4	23.3	19.5
Manufacturing	9.2	14.7	14.0	10.1	4.7	7.8	8.9	8.3	2.5	2.8	2.4	1.6
Other industry	7.1	9.2	7.3	8.9	3.0	3.8	3.9	4.2	8.5	5.8	5.3	2.9
Services	**38.1**	**40.7**	**42.6**	**49.8**	**18.0**	**20.9**	**24.1**	**36.8**	**2.7**	**2.5**	**2.4**	**1.6**
Market services	24.5	25.5	28.1	34.0	8.8	10.3	12.9	23.5	4.5	3.4	3.0	1.8
Distribution services	*21.5*	*20.8*	*22.7*	*25.4*	*8.2*	*9.5*	*11.4*	*20.1*	*4.6*	*3.2*	*2.7*	*1.5*
Fin. and bus. ser.	*3.0*	*4.7*	*5.4*	*8.6*	*0.6*	*0.8*	*1.5*	*3.4*	*6.1*	*8.9*	*10.4*	*8.1*
Non-market services	13.6	15.2	14.4	15.8	9.2	10.6	11.2	13.3	1.8	1.7	1.8	1.3
Government services	*10.5*	*11.7*	*11.5*	*12.2*	*4.2*	*5.0*	*6.4*	*8.7*	*2.8*	*2.5*	*2.5*	*1.7*
Other services	*3.1*	*3.5*	*2.9*	*3.5*	*5.4*	*6.1*	*5.3*	*5.4*	*0.9*	*0.9*	*1.0*	*1.0*
Total economy	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**1.0**	**1.0**	**1.0**	**1.0**

Source: de Vries, Timmer, and de Vries (2013)

Informality dominates in African manufacturing

Manufacturing employment shares, GGDC and UNIDO datasets, 1990

(percent)

	year	UNIDO	GGDC	ratio
BWA	2008	3.6	6.4	56%
ETH	2008	0.3	5.3	6%
GHA	2003	1.0	11.2	9%
KEN	2007	1.5	12.9	12%
MUS	2008	16.3	21.5	76%
MWI	2008	0.7	4.3	16%
NGA	1996	1.4	6.6	21%
SEN	2002	0.5	8.9	6%
TZA	2007	0.5	2.3	22%
ZAF	2008	7.0	13.1	53%
ZMB	1994	1.5	2.9	52%

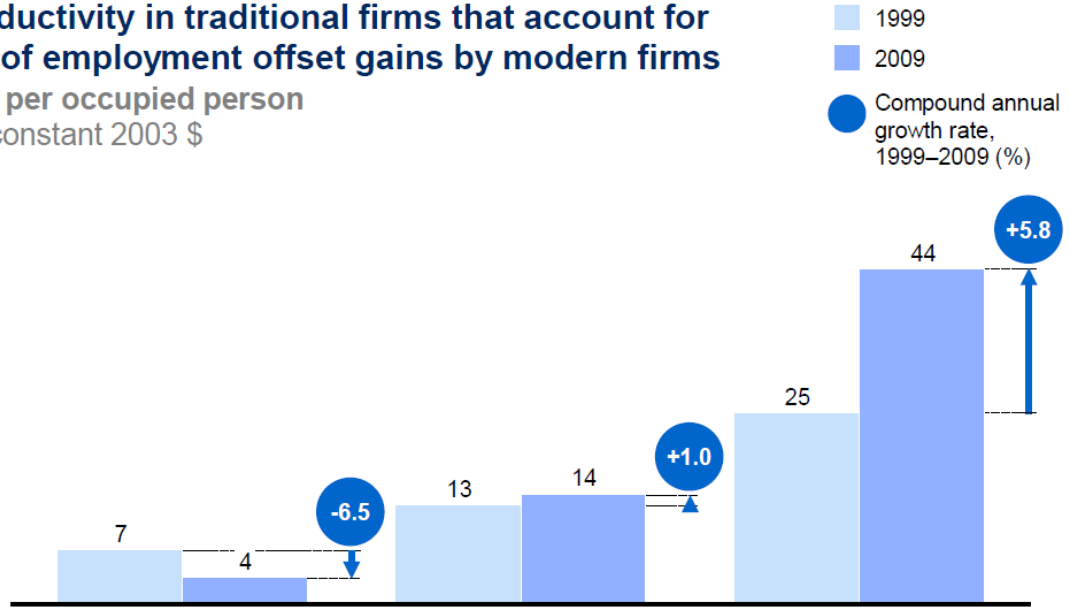
Difference in coverage between two data sets: GGDC (which covers informal employment) and UNIDO (which is mostly formal, registered firms)

Mexico: productivity growth by firm size

Exhibit E2

Falling productivity in traditional firms that account for 42 percent of employment offset gains by modern firms

Value added per occupied person
$ thousand, constant 2003 $



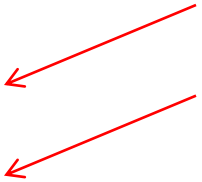
Number of employees	≤10	11–500	>500
Share of employment, 2009 %	42	38	20
Share of employment, 1999 %	39	41	20

SOURCE: *Censos Económicos 1999*, *Censos Económicos 2009*, Instituto Nacional de Estadística y Geografía; McKinsey Global Institute analysis

Source: McKinsey Global Institute (2014)

Alternative paths to high growth?

$$\begin{aligned} \hat{y} \quad &= \gamma(\ln y^*(\Theta) - \ln y) && (A) \\ &+ \alpha_M \pi_M \beta(\ln y_M^* - \ln y_M) && (B) \\ &+ (\pi_M - \pi_T) d\alpha_M && (C) \end{aligned}$$



1. Enhance growth payoff of investments in capabilities?
2. Expand range of industries with “escalator” properties?

So baseline

- Growth in emerging markets have been unsustainably high in last decade, and will come down by a couple of points
- Convergence will continue, but not as rapidly, and in large part because of low growth in advanced economies
- As domestic rather than global trends drive growth, significant heterogeneity in long-term performance across developing countries is likely