Growth Miracles (and Disappointments) through the Lens of Structural Change

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November 2022

Outline

- Basic growth facts
- The conceptual framework
- Interpreting growth episodes using the framework
- Implications for future of growth

Background papers:

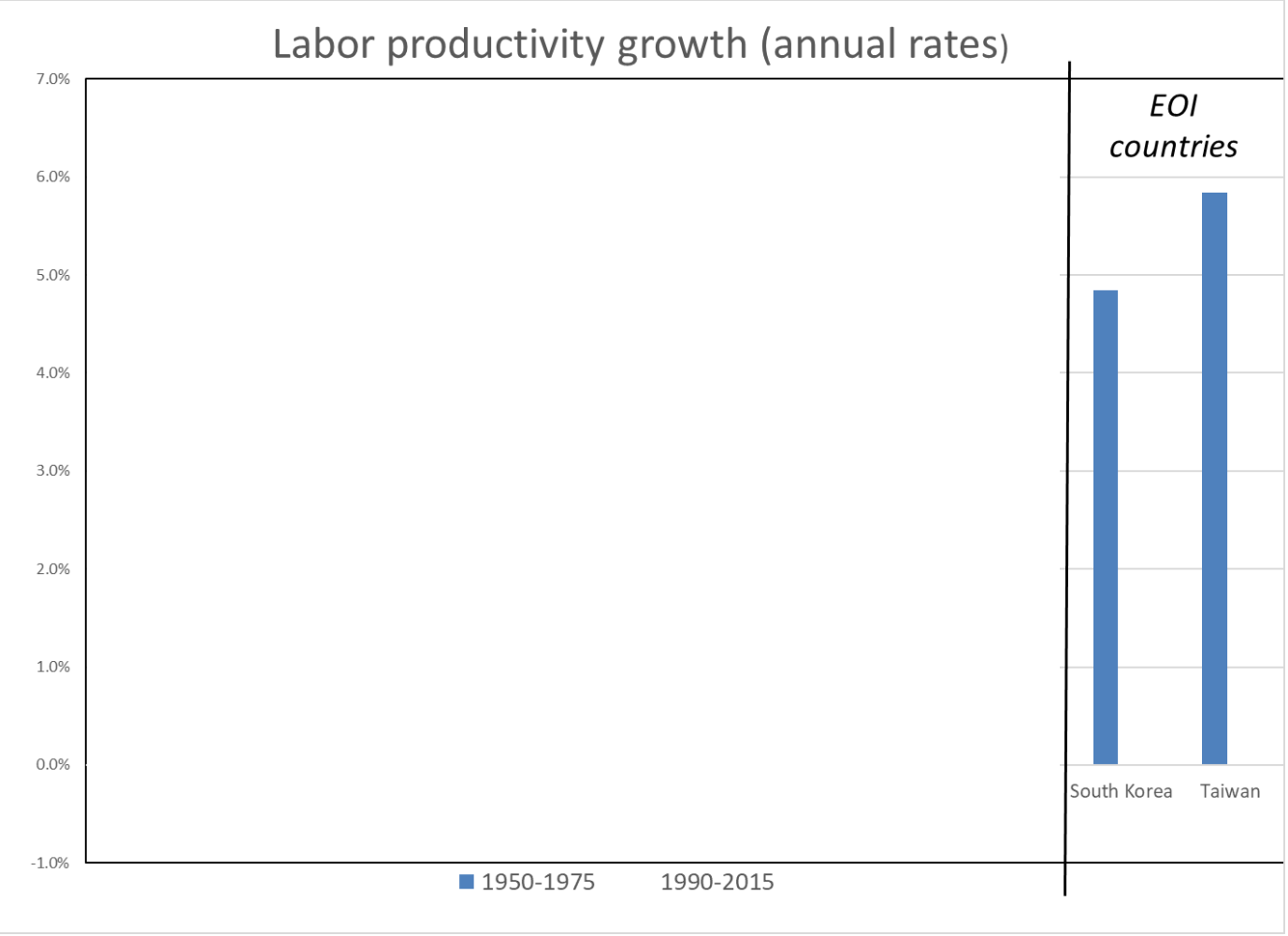
"Africa's Manufacturing Puzzle: Evidence from Tanzanian and Ethiopian Firms" (with Xinshen Diao, Mia Ellis, and Margaret McMillan), 2022.

"The Recent Growth Boom in Developing Economies: A Structural-Change Perspective" (with Xinshen Diao and Margaret McMillan), in Machiko Nissanke and José Antonio Ocampo, eds., The Palgrave Handbook of Development Economics: Critical Reflections on Globalization and Development, Palgrave Macmillan, 2019.

"Premature Deindustrialization," Journal of Economic Growth, 21(1), March 2016.

"The Past, Present, and Future of Economic Growth," in Franklin Allen and others, Towards a Better Global Economy: Policy Implications for Citizens Worldwide in the 21st Century, Oxford University Press, Oxford and New York, 2014.

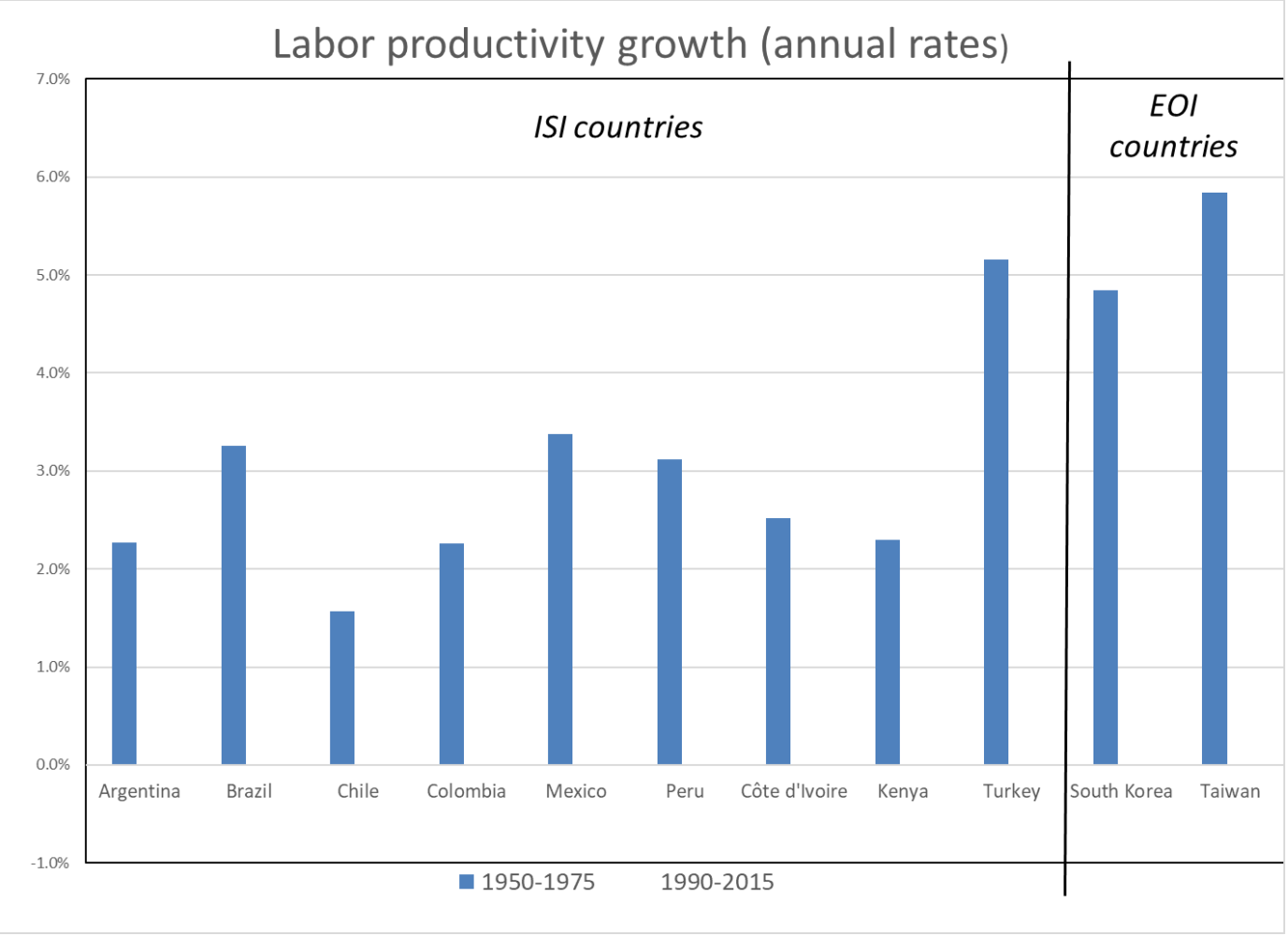
Growth miracles under EOI



Unprecedented rates of economic growth…

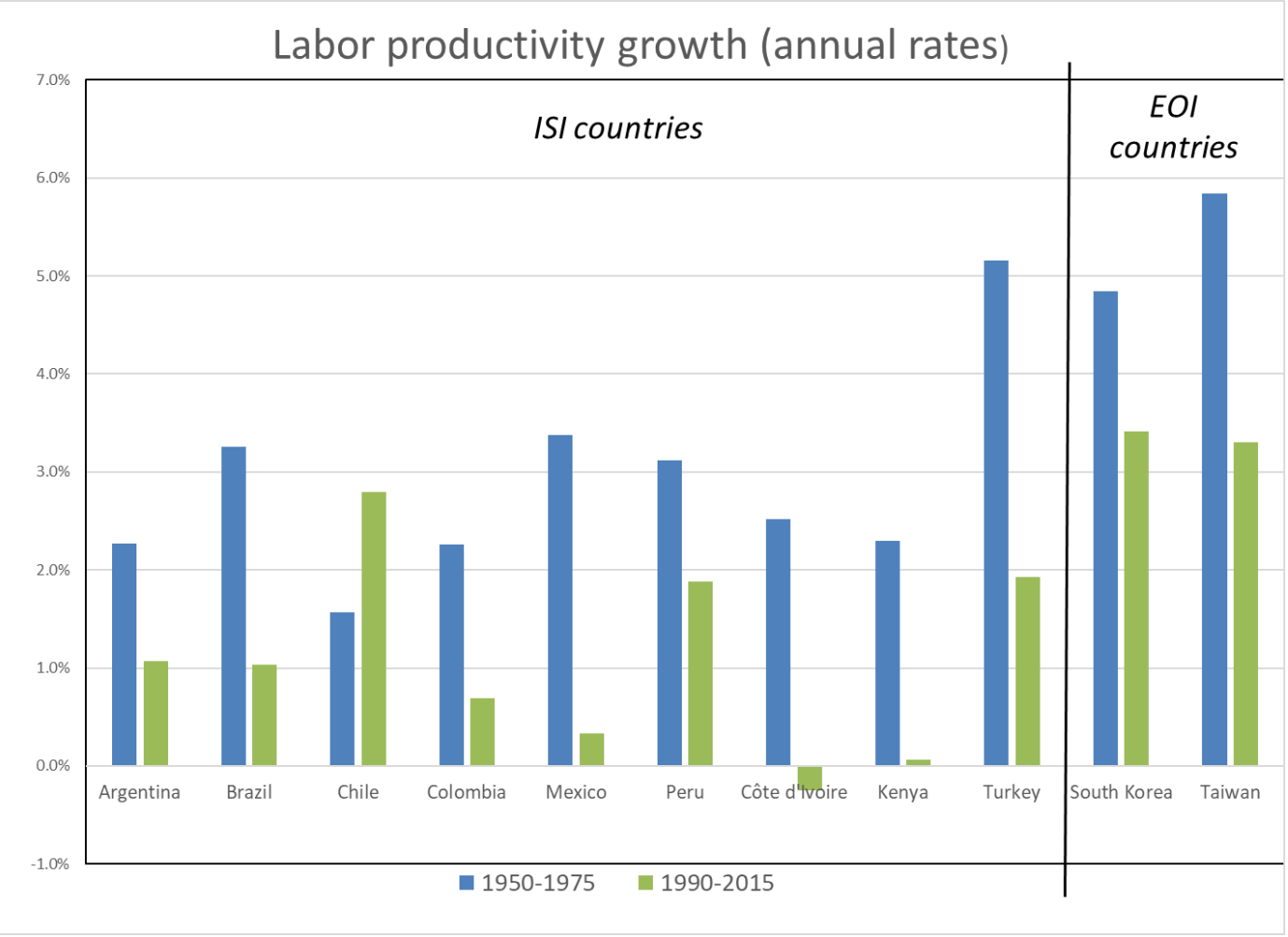
China post-1978 quite similar…

The (decent) performance under ISI



A lot better than conventional wisdom has it (though performance varied across countries) …

The disappointment of WC



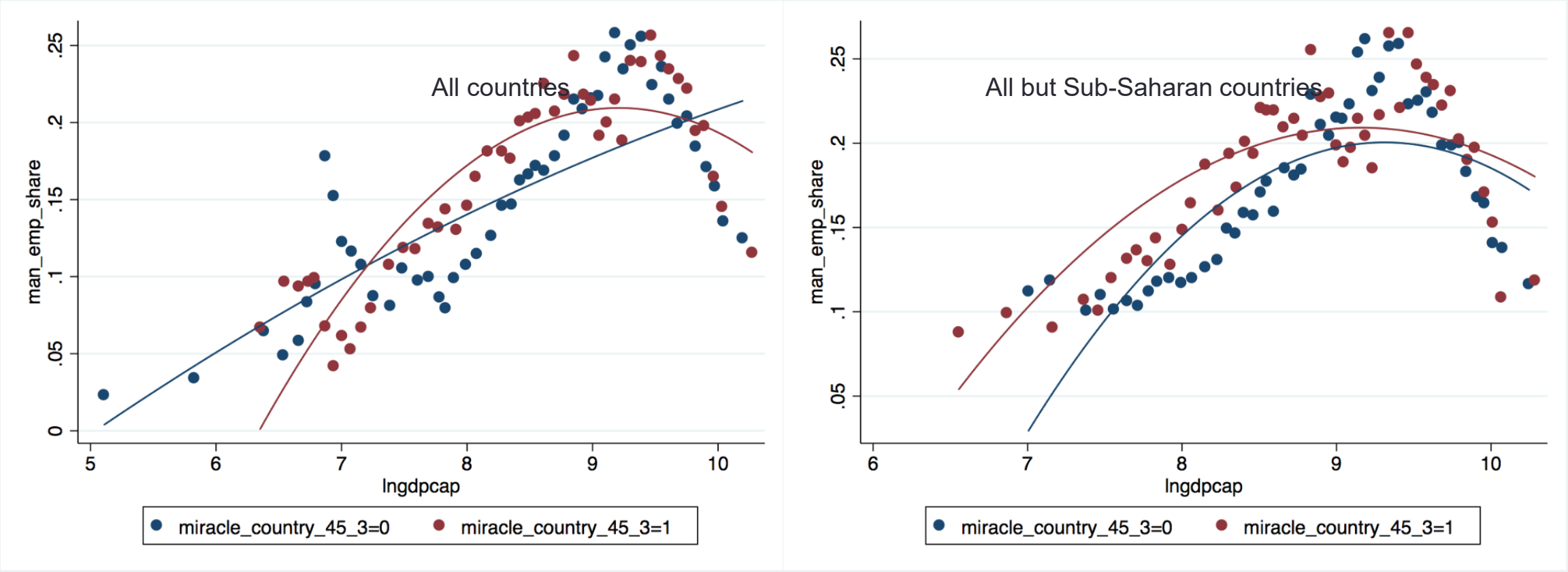
And, for the most part, certainly better than how the same countries have done recently

Recent (pre-pandemic) growth accelerations

Country	Initial year of growth acceleration (t)	growth in pre-accel'n period (t-6, t)	growth in post-accel'n period (t, t+6)	Differences in pre- & post-accel'n periods	Whether GDP pc in post-accel'n period >= max in pre-accel'n period	Growth after 7-years' growth acceleration (t+6, 2014)
	(1)	(2)	(3)	(4)	(5)	(6)
ETH	2000	1.13	3.71	2.59	Yes	7.95
GHA	1984	-5.23	2.02	7.25	Exceeded in 1999	2.85
KEN	2003	-0.34	2.08	2.42	Exceeded in 2004	3.04
MWI	2002	-1.51	3.60	5.11	Exceeded in 2006	0.35
NGA	2000	0.30	7.61	7.31	Yes	3.21
SEN	1995	-1.65	2.23	3.88	Exceeded in 1999	0.98
ZAF	2001	0.98	3.10	2.12	Yes	0.83
TZA	1998	0.67	3.50	2.83	Yes	3.13
ZMB	2000	0.64	3.77	3.13	Yes	4.60
IND	1983	1.52	3.59	2.07	Yes	4.93
ARG	1992	-0.54	2.80	3.34	Yes	2.98
BRA	2002	0.50	3.00	2.50	Yes	2.90
CHL	1988	2.66	6.25	3.59	Yes	3.02
COL	2001	-0.79	3.66	4.45	Exceeded in 2003/04	3.19
MEX	1996	-0.12	2.28	2.40	Exceeded in 1997/98	0.92
PER	2002	0.76	5.47	4.71	Yes	4.17
VEN	2001	-1.11	4.20	5.31	Exceeded in 2005/06	-0.18
BOL	2003	0.34	2.93	2.59	Yes	3.77
CRI	2002	2.59	4.76	2.17	Yes	3.23

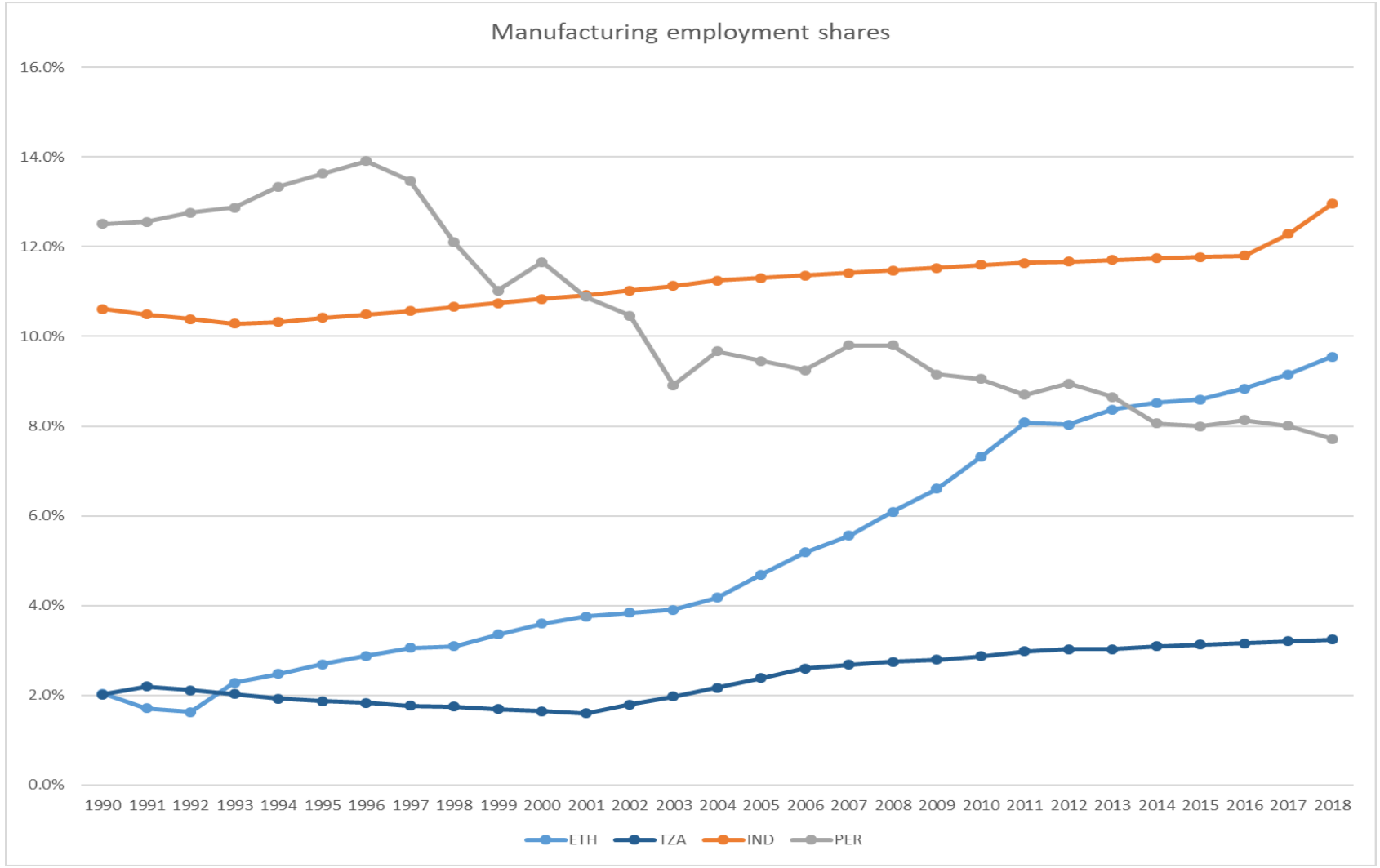
Source: Diao, McMillan, and Rodrik (2017)

Rapid growth is traditionally associated with rapid industrialization



Manufacturing employment shares during the course of economic growth (“miracle” countries in red; others in blue)

Recent growth booms were not driven by rapid industrialization



Growth puzzles: what we need to explain

- ISI vs EOI
  - East Asian growth miracles
  - the (surprisingly) good performance under ISI
- WC reforms
  - the tepid response to the reforms
- Pre-Covid (temporary) growth booms
  - (temporary) growth bursts despite lack of industrialization

The conceptual framework

- Three building blocks
  - conditional convergence: role of “fundamentals”
  - unconditional convergence in formal, modern sector (“manufacturing”)
  - structural dualism: persistent gaps in marginal productivities across modern/traditional divide

The theory of convergence

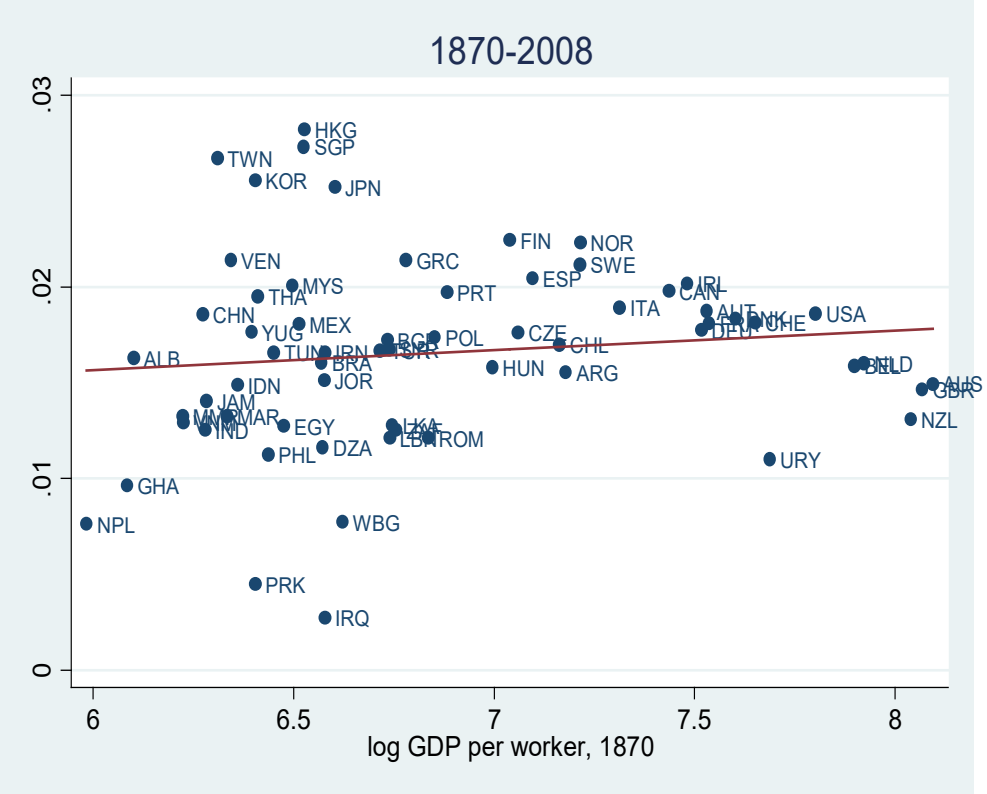
- Closed or open economy versions of neoclassical growth model suggest lower-income countries should grow more rapidly
  - higher savings and domestic capital accumulation, thanks to higher rate of return to *K*
  - capital flows from rich to poor nations
- This translates into a simple convergence story: the bigger the income gap (y^*/y_j), the more rapid the poor country's growth rate ($\hat{y}_j$)
- Or:

$$\hat{y}_j = \beta\left(\ln y^* - \ln y_j\right)$$

- Where β is the convergence rate.
- Implies a negative slope in a scatter plot of growth rates on initial incomes across countries

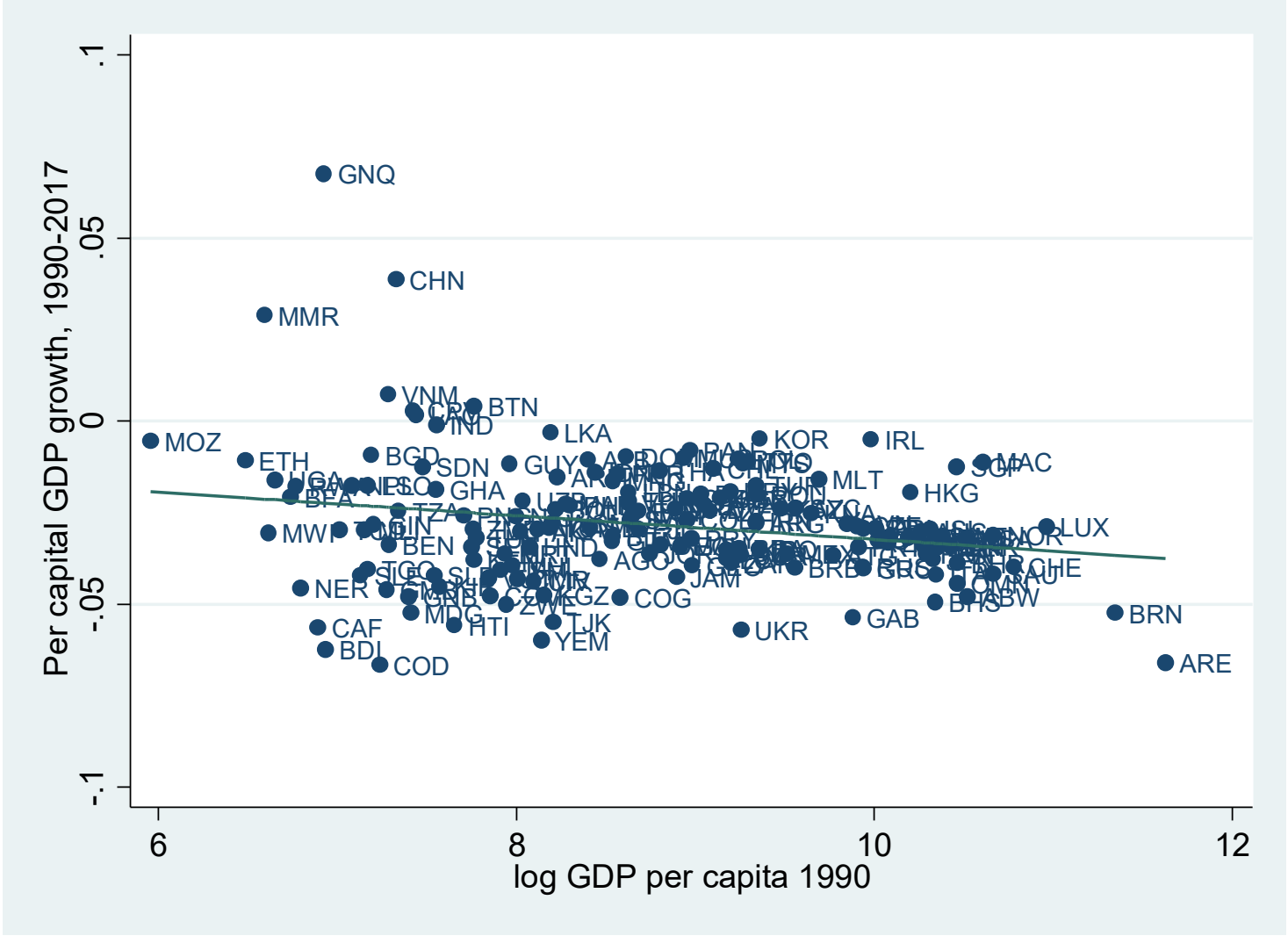
Convergence to the frontier?

No evidence in the data of (unconditional) convergence $\hat{y}_j = \beta\left(\ln y^* - \ln y_j\right)$



Notes: For RHS chart, variable on the vertical axis is growth of GDP per worker over four separate decades (1965-1975, 1975-1985, 1985-1995, 1995-2005), controlling for decadal fixed effects.
Source: Rodrik (2013), using data from Maddison (2010) and PWT 7.0 (2011).

Some (but very slow) convergence more recently, pre-pandemic



$\beta \approx$ -0.3%, implying it takes more than two centuries to close half of the income gap

From unconditional to conditional convergence

- Previous story assumed rich and poor countries differ only in their levels of (capital) accumulation
- What if they also differ in their potential (long-run) income levels, due to differences in either proximate (e.g., *h*) or deep determinants (institutional quality, geography)
- Long-run income level: $y_j^* = A(\Theta_j)F(k_j, \Theta_j)$,

  where Θ_j is a vector of conditioning variables (factors that determine long-run potential income level other than capital-labor ratio)
- Conditional convergence equation:

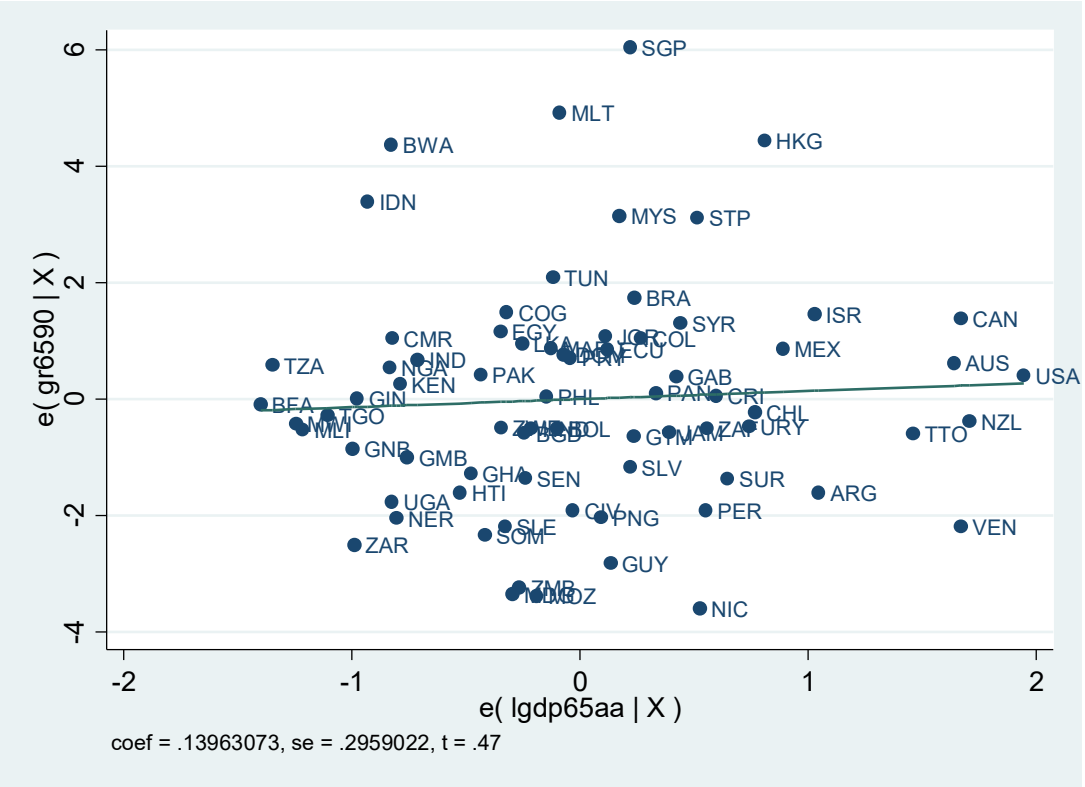
$$\hat{y}_j = \beta(\ln y^* - \ln y_j) + \Upsilon\Theta_j$$

- We expect β<0 conditional on ("holding constant") other determinants

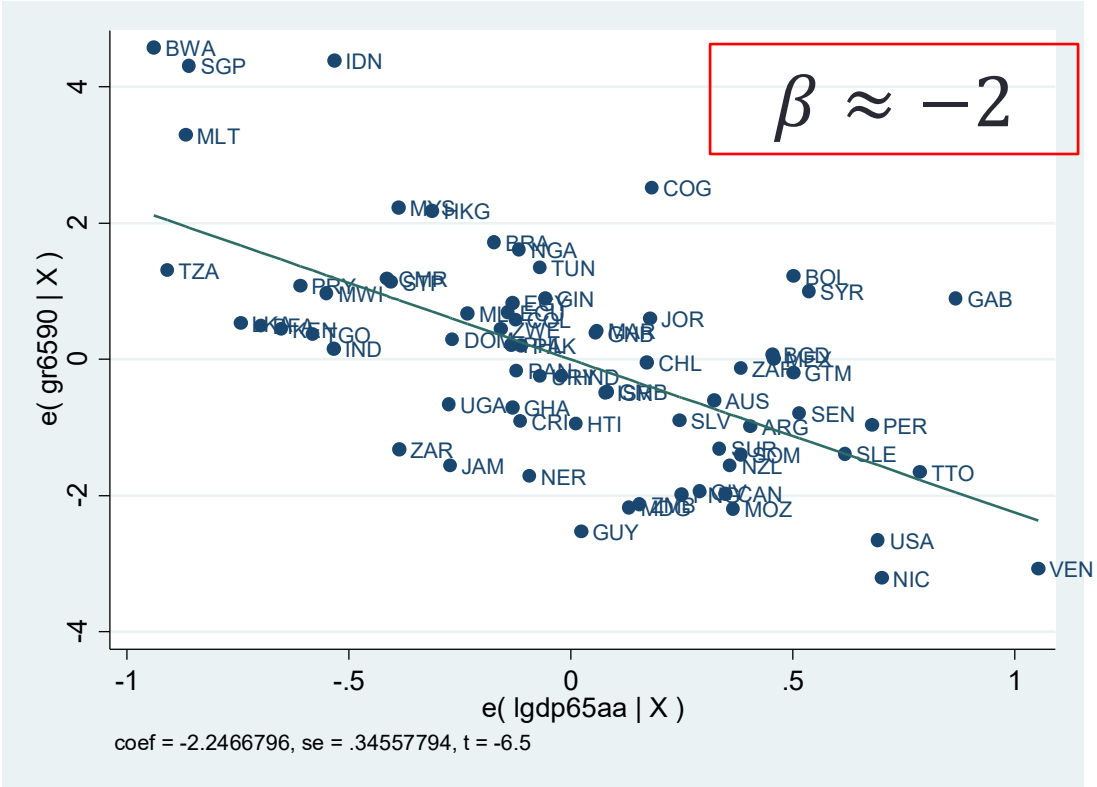
Unconditional and conditional convergence charts

(growth rates over 1965-1990)

Unconditional



Conditional (controlling for life expectancy, institutional quality, latitude)



Taking structural dualism into account: how “modern” sectors are different

- Unconditional convergence is not the norm for economy in aggregate
- But there is one part of the economy, where it seems to be the norm: formal manufacturing activities
- Remember (unconditional) convergence equation

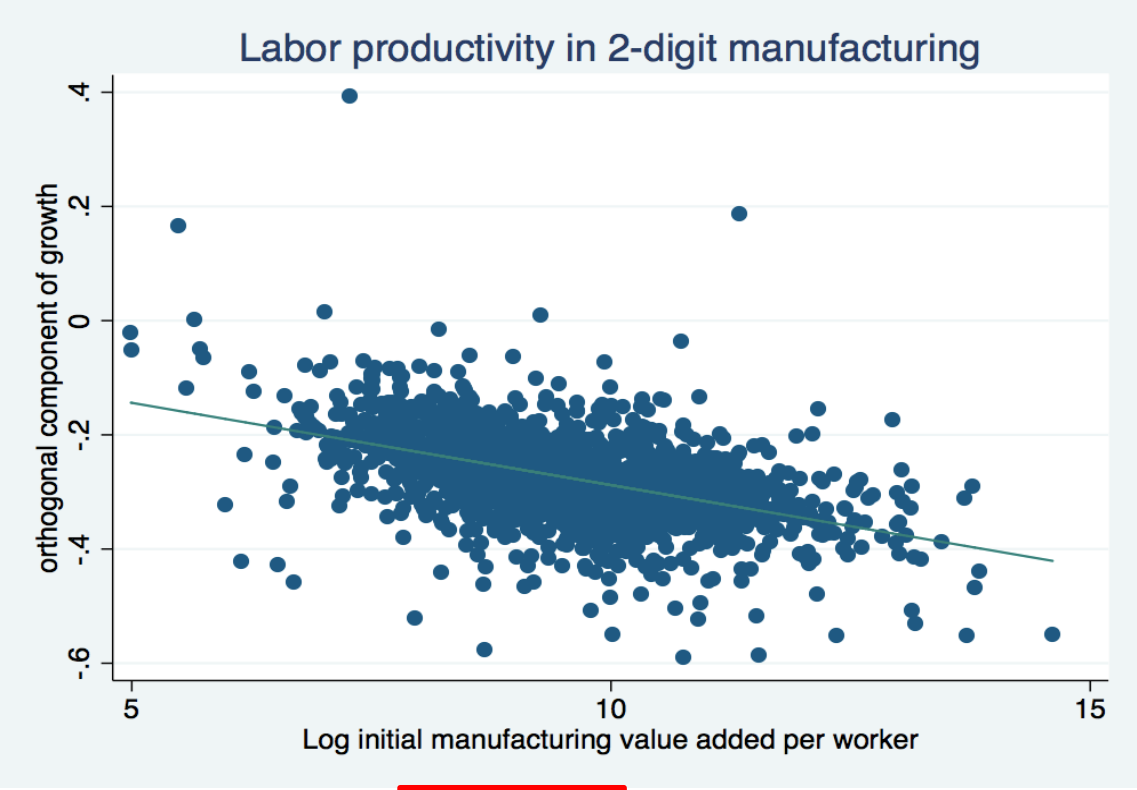
$$\hat{y}_j = \beta\left(\ln y^* - \ln y_j\right)$$

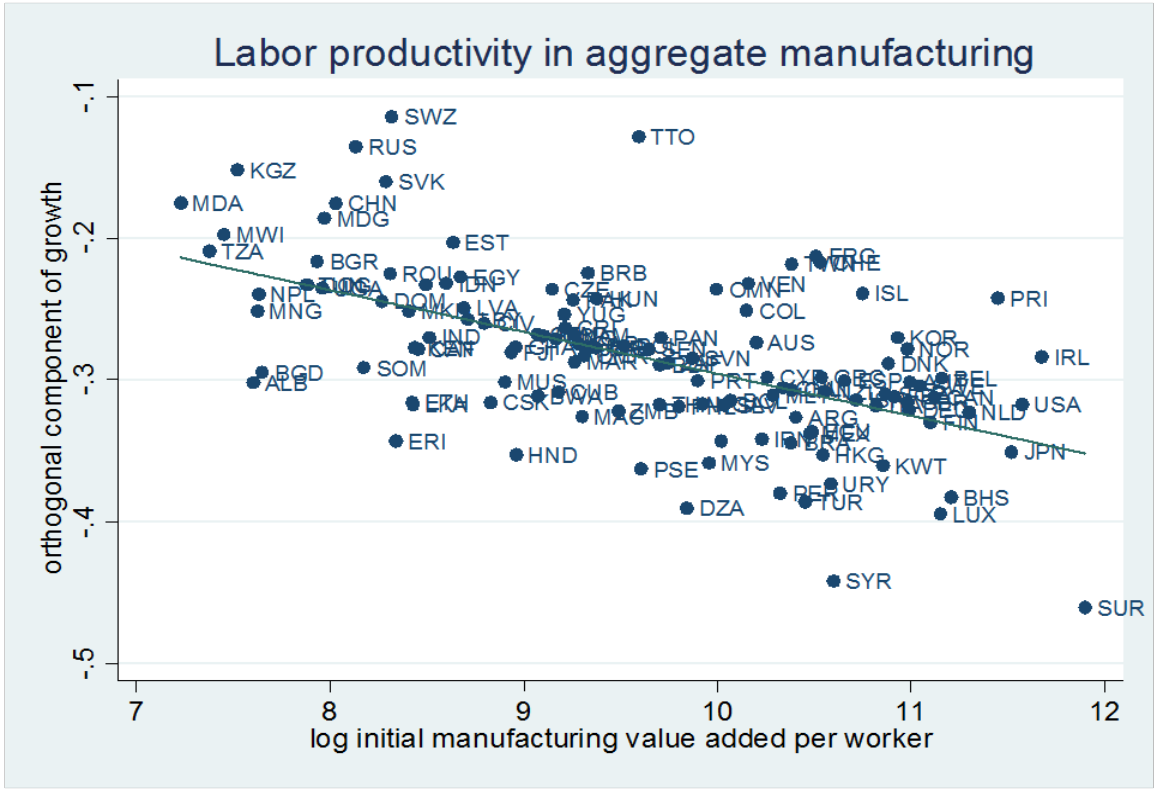
- We will apply it to manufacturing (sub)sectors alone

$$\hat{y}_{j,manuf} = \beta\left(\ln y^*_{manuf} - \ln y_{j,manuf}\right)$$

Productivity convergence in (formal) manufacturing appears to be unconditional and quite general

(regardless of period, region, sector, or aggregation)





$\beta \approx -3\%$ (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 (2014)

Why manufacturing industries have been special

1. Productivity dynamics in modern manufacturing
   - unconditional convergence
2. Labor absorption capacity
   - intensive in low-skill labor (traditionally)
3. Tradability
   - can expand without turning terms of trade against itself

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

Narrower focus also eases policy challenges of economy-wide reform

Butting the pieces together: growth under structural dualism

- Modern sector (*M)* subject to unconditional convergence
  - very small initially, with total employment share (α) less than 5%
- Traditional sector (*T*) subject to conditional convergence
  - bulk of economy initially
- Labor productivity in *M* (π_M) is a multiple of labor productivity in *T* (π_T)
- This produces a model with three channels of growth

The three mechanisms of economic growth

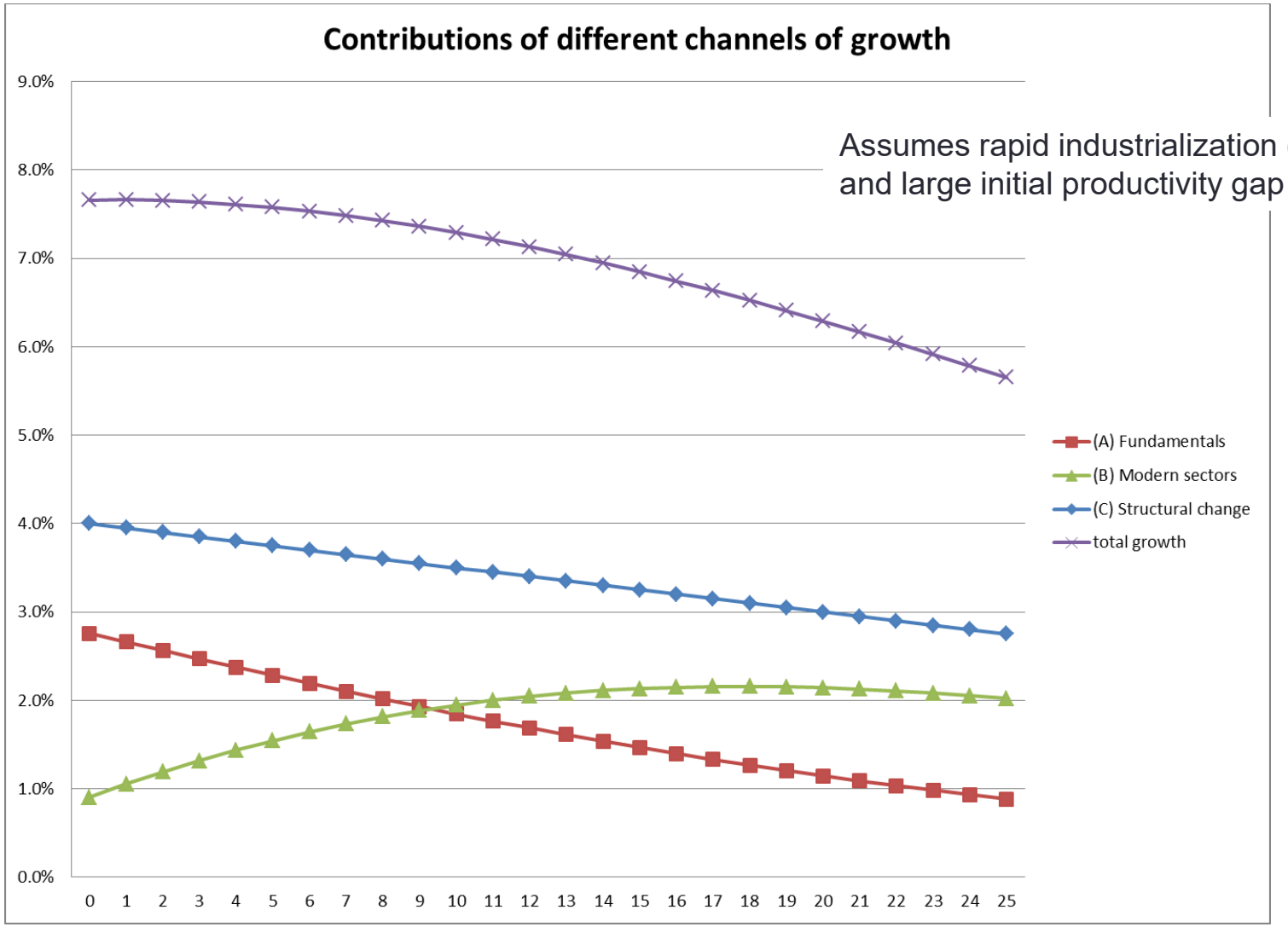
$$\hat{y} = \gamma(\ln y^*(\Theta) - \ln y) \quad (A)$$
$$+ \alpha_M \pi_M \beta(\ln y_M^* - \ln y_M) \quad (B)$$
$$+ (\pi_M - \pi_T) d\alpha_M \quad (C)$$

Standard convergence is augmented by two additional terms

γ: conditional convergence rate
β: unconditional convergence rate in manufacturing
Θ: "fundamentals"
α_M: employment share in manufacturing
π_M, π_T : labor productivity in modern and traditional sectors, respectively

A. Accumulation of fundamentals, Θ (human capital, institutions, etc.)
   - slow, but essential for long-run
B. Unconditional convergence in modern sector
   - rapid, but quantitatively minor at early stages of development
C. Structural change from traditional to modern sector
   - drives rapid growth early on if industrialization is rapid ($d\alpha_M >> 0$)

Some illustrative simulations



Assumes rapid industrialization (dα = 0.01 per year) and large initial productivity gap ((π_M - π_T) = 4)

Interpreting different periods of growth: ISI

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

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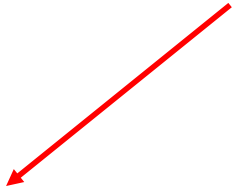
A. Accumulation of fundamentals, Θ (human capital, institutions, etc.) weak
   - slow, but essential for long-run
B. Unconditional convergence in modern sector yes
   - rapid, but quantitatively minor at early stages of development
C. Structural change from traditional to modern sector considerable
   - drives rapid growth early on if industrialization is rapid ($d\alpha_M$ >> 0)



Interpreting different periods of growth: EOI

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

Standard convergence is augmented by two additional terms

γ: conditional convergence rate
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Θ: "fundamentals"
α_M: employment share in manufacturing
π_M, π_T : labor productivity in modern and traditional sectors, respectively

A. Accumulation of fundamentals, Θ (human capital, institutions, etc.) OK
   - slow, but essential for long-run
B. Unconditional convergence in modern sector yes
   - rapid, but quantitatively minor at early stages of development
C. Structural change from traditional to modern sector very rapid
   - drives rapid growth early on if industrialization is rapid ($d\alpha_M$ >> 0)

Interpreting different periods of growth: Washington Consensus

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

Standard convergence is augmented by two additional terms

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α_M: employment share in manufacturing
π_M, π_T : labor productivity in modern and traditional sectors, respectively

A. Accumulation of fundamentals, Θ (human capital, institutions, etc.) strong
   - slow, but essential for long-run
B. Unconditional convergence in modern sector yes, but shrinking formal manufacturing
   - rapid, but quantitatively minor at early stages of development
C. Structural change from traditional to modern sector weak or negative
   - drives rapid growth early on if industrialization is rapid ($d\alpha_M$ >> 0)

Interpreting different periods of growth: recent (pre-Covid) growth

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

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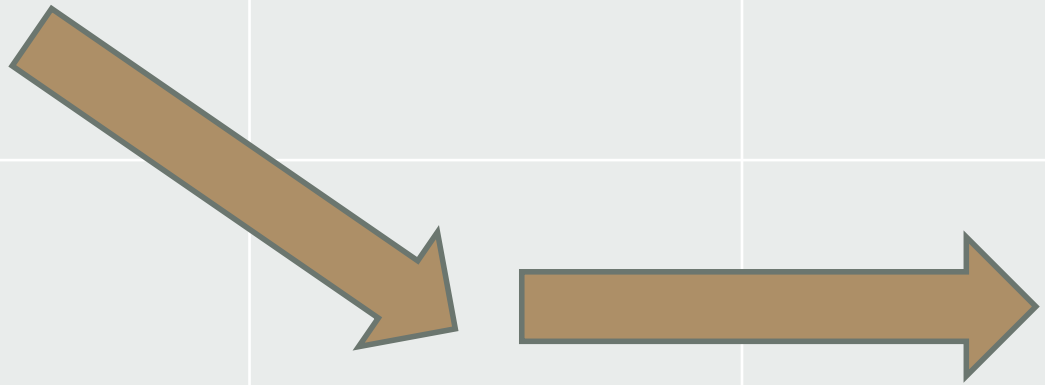
   - drives rapid growth early on if industrialization is rapid ($d\alpha_M$ >> 0)

weak and service-led

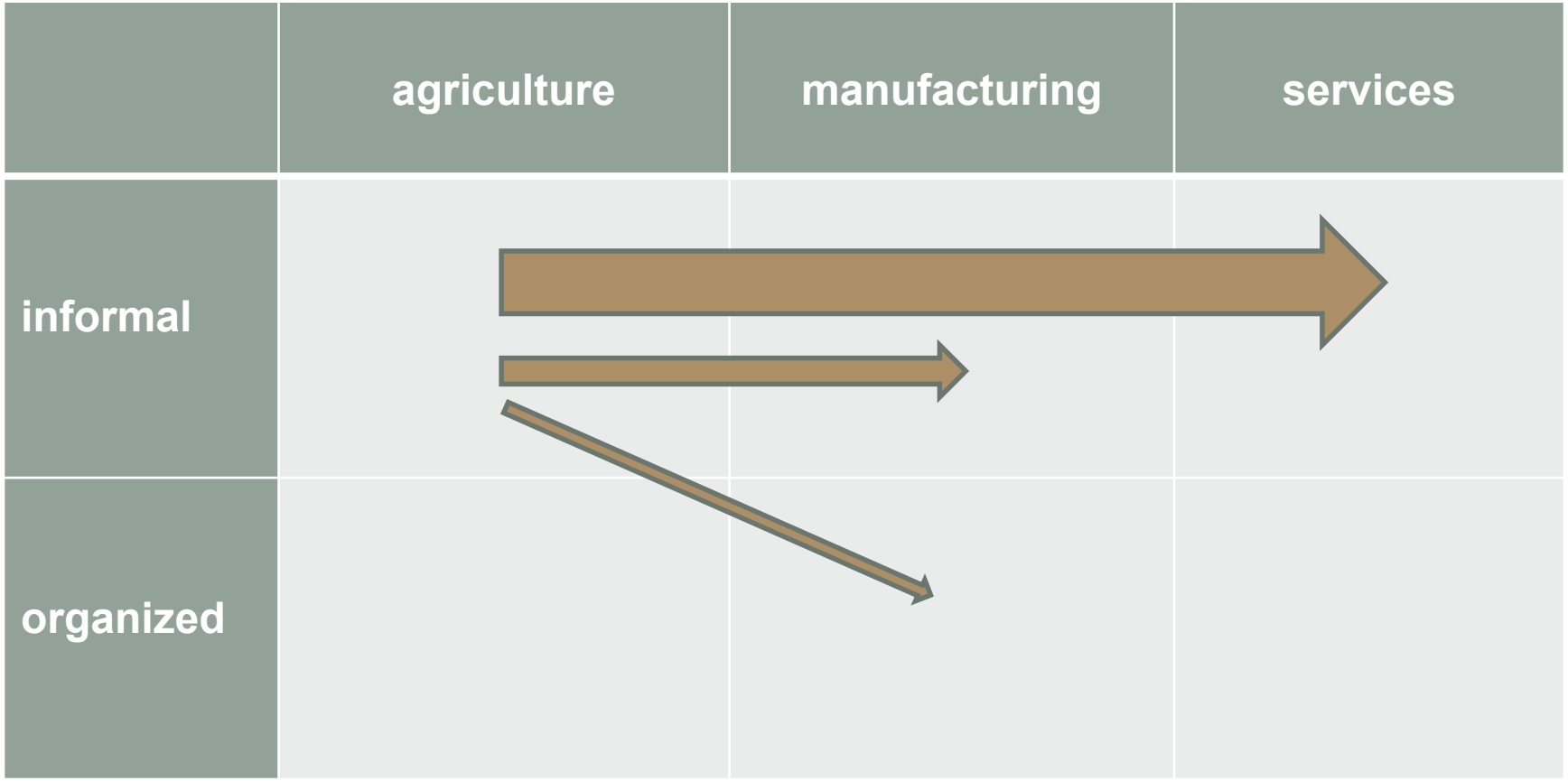
yes but productivity differential smaller and declining

Patterns of structural change: East Asia and advanced countries

	agriculture	manufacturing	services
informal			
organized			



Patterns of structural change: low-income countries today



No more growth miracles?

- Evidence of premature de-industrialization, result of:
  - globalization: manufactures concentrated in fewer countries with strong comparative advantage
  - shifts in global demand: away from goods and into services
  - technological change: manufacturing increasingly skill-intensive

Why services are not like modern manufacturing

- Two types of services

1. High-productivity (tradable) segments of services cannot absorb as much labor
   - since they are typically skill-intensive
   - FIRE, business services
2. 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 & slow convergence

Bottom line

- Industrialization-based growth miracles are unlikely to be repeated in the future
- Recent rapid growth in developing countries has been demand-led, and impressive structural change in low-income countries is partially misleading
- Not clear that recent growth patterns were sustainable, even in the absence of COVID-19
- Future growth will need to be services driven
  - lower ceiling on attainable growth rates
  - more focus on inclusion, since “trickle-down” will be much less effective
- Addressing productivity bottlenecks in (mostly non-tradable) services a key priority

Additional slides

Import-substituting industrialization (ISI) model

- Most developing and newly independent countries followed ISI strategies in early decades after WW II
- Driven by policy makers' skepticism about markets and international trade (and sympathy towards Soviet-style planning)
  - e.g., Prebisch-Singer thesis on terms-of-trade of natural resource exporting countries
- Policies: high and haphazard levels of import protection, overvalued currencies (maintained through exchange controls), state ownership, complicated fiscal regimes of taxation and subsidies,…
- A disaster?

Sources of growth in different regions

Region and period	*Growth in output (percent a year)*	*output per worker (percent a year)*	*Physical capital per worker*[b]	*Education per worker*[c]	*Total factor productivity*[d]
Latin America (22)					
1960–70	5.5	2.8	0.8	0.3	1.6
1970–80	6.0	2.7	1.2	0.3	1.1
1980–90	1.1	–1.8	0.0	0.5	–2.3
1990–2000	3.3	0.9	0.2	0.3	0.4
1960–2000	4.0	1.1	0.6	0.4	0.2
South Asia (4)					
1960–70	4.2	2.2	1.2	0.3	0.7
1970–80	3.0	0.7	0.6	0.3	–0.2
1980–90	5.8	3.7	1.0	0.4	2.2
1990–2000	5.3	2.8	1.2	0.4	1.2
1960–2000	4.6	2.3	1.0	0.3	1.0
Africa (19)					
1960–70	5.2	2.8	0.7	0.2	1.9
1970–80	3.6	1.0	1.3	0.1	–0.3
1980–90	1.7	–1.1	–0.1	0.4	–1.4
1990–2000	2.3	–0.2	–0.1	0.4	–0.5
1960–2000	3.2	0.6	0.5	0.3	–0.1
Middle East (9)					
1960–70	6.4	4.5	1.5	0.3	2.6
1970–80	4.4	1.9	2.1	0.5	–0.6
1980–90	4.0	1.1	0.6	0.5	0.1
1990–2000	3.6	0.8	0.3	0.5	0.0
1960–2000	4.6	2.1	1.1	0.4	0.5
East Asia except China (7)					
1960–70	6.4	3.7	1.7	0.4	1.5
1970–80	7.6	4.3	2.7	0.6	0.9
1980–90	7.2	4.4	2.4	0.6	1.3
1990–2000	5.7	3.4	2.3	0.5	0.5
1960–2000	6.7	3.9	2.3	0.5	1.0

Source: Bosworth and Collins (2003)

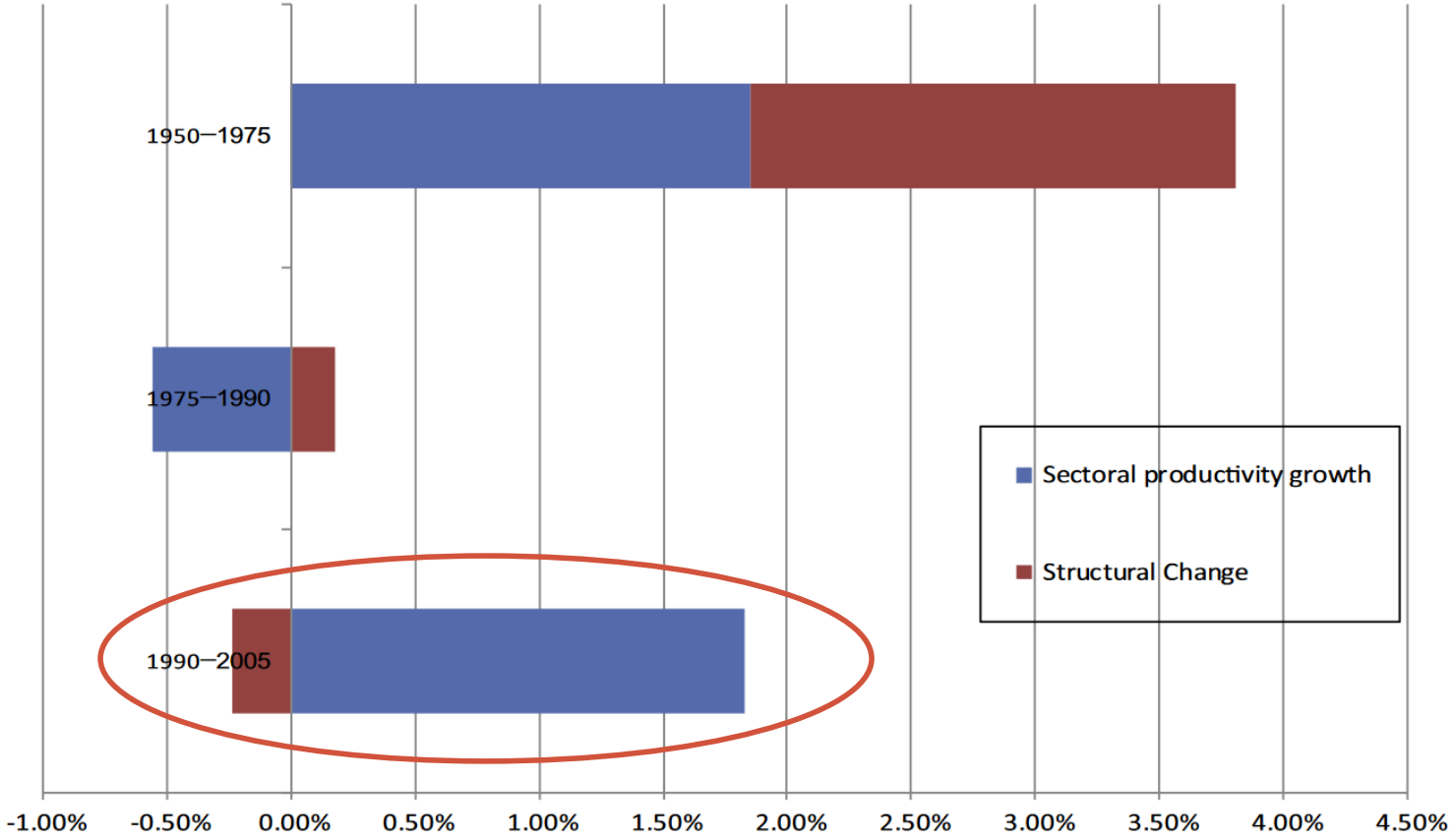
The great advantage of export-oriented industrialization (EOI)

Remember why manufacturing industries are special:

1. Productivity dynamics in modern manufacturing
   - unconditional convergence
2. Labor absorption capacity
   - intensive in low-skill labor (traditionally)
3. Tradability
   - can expand without turning terms of trade against itself

- Plus, need to keep up with productive frontier in world markets

Puzzle resolved: rise and fall of structural change in Latin America



Source: Pages et al., 2010.

Figure 8. *Productivity decomposition for Latin America, 1950–2005.*

$$\Delta Y_t = \sum_{i=n} \theta_{i,t-k} \Delta y_{i,t} + \sum_{i=n} y_{i,t} \Delta \theta_{i,t}$$

Contribution to growth of:

within-sector labor productivity growth

structural change

y_i= labor productivity in sector *i*

θ_i= employment-weight of sector *i*

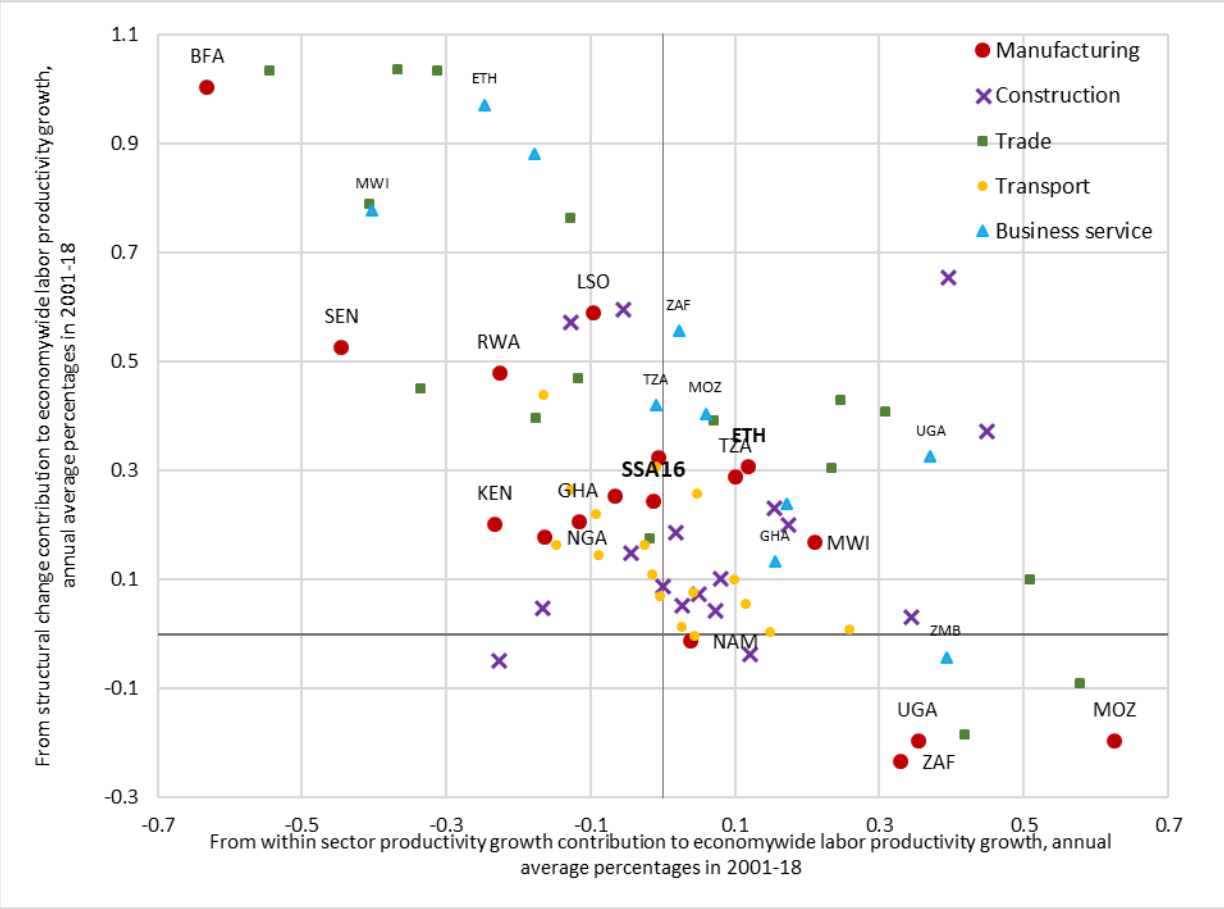
Was ISI necessarily doomed?

- Mismanaged commodity booms of the 1970s
- Mismanaged fiscal/macro policies, creating debt crises in early 1980s
  - micro versus macroeconomic policies
  - the first determine relative prices/profitability and hence structure of economy; the latter determine the relationship between expenditures and income in aggregate

Characteristics of recent growth experiences

- Not based on industrialization
- Typically domestic demand-led
  - ETH, IND
- Raises (labor) productivity through capital deepening and induced structural change
- But:
  - diminishing returns to demand-led structural change

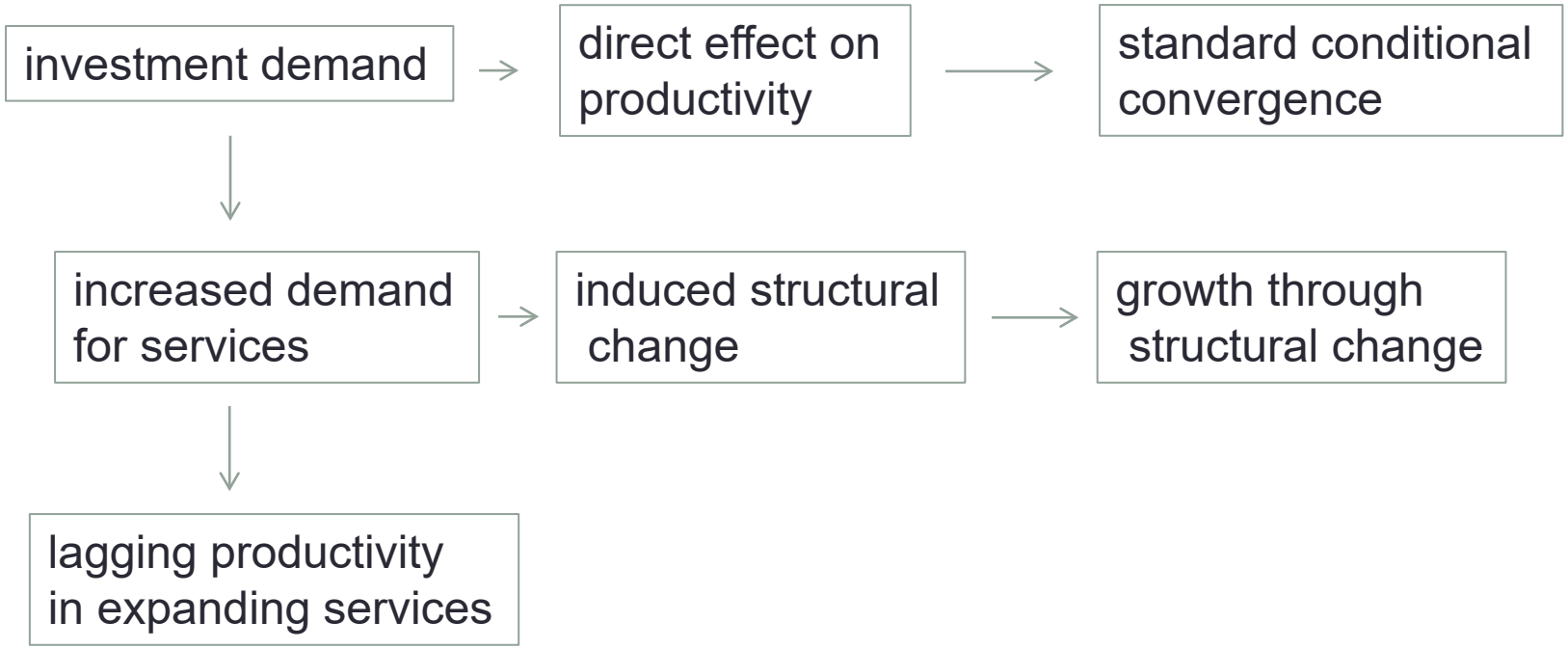
Negative correlation between contributions of structural change and within-modern sector productivity growth in recent growth



Source: Diao et al. (2022) based on the Economic Transformation Database, 2021.

Notes: There are 16 African countries in the figure, and they are Burkina Faso (BFA), Cameroon (CMR), Ethiopia (ETH), Ghana (GHA), Kenya (KEN), Lesotho (LSO), Mozambique (MOZ), Malawi (MWI), Namibia (NAM), Nigeria (NGA), Rwanda (RWA), Senegal (SEN), Tanzania (TZA), Uganda (UGA), South Africa (ZAF), and Zambia (ZMB).

The demand-led growth model



Source: Diao et al. (2019)

Interpreting different periods of growth: recent (pre-Covid) growth

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