GROWTH MIRACLES (AND DISAPPOINTMENTS) THROUGH THE LENS OF STRUCTURAL CHANGE

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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.


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

<table>
<thead>
<tr>
<th>Country</th>
<th>Initial year of growth acceleration (t)</th>
<th>Growth in pre-accel’n period (t-6, t)</th>
<th>Growth in post-accel’n period (t, t+6)</th>
<th>Differences in pre- &amp; post-accel’n periods</th>
<th>Whether GDP pc in post-accel’n period &gt;= max in pre-accel’n period</th>
<th>Growth after 7-years’ growth acceleration (t+6, 2014)</th>
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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:
  $$\hat{y}_j = \beta (\ln y^* - \ln y_j)$$
- Where $\beta$ 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 \( \hat{y}_j = \beta (\ln y^* - \ln y_j) \)

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 $\Theta_j$ is a vector of conditioning variables (factors that determine long-run potential income level other than capital-labor ratio)
• Conditional convergence equation:
  \[ \hat{y}_j = \beta \left( \ln y^* - \ln y_j \right) + \gamma \Theta_j \]
• We expect $\beta < 0$ 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)

\( \beta \approx -2 \)
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

\[ \hat{y}_j = \beta (\ln y^* - \ln y_j) \]

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

\[ \hat{y}_{j,manuf} = \beta (\ln y^*_{manuf} - \ln y_{j,manuf}) \]
Productivity convergence in (formal) manufacturing appears to be unconditional and quite general (regardless of period, region, sector, or aggregation)

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 ($\alpha$) less than 5%
• Traditional sector ($T$) subject to conditional convergence
  • bulk of economy initially
• Labor productivity in $M$ ($\pi_M$) is a multiple of labor productivity in $T$ ($\pi_T$)
• 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

A. Accumulation of fundamentals, \( \Theta \) (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 \((d\alpha_M >> 0)\)

\( \gamma \): conditional convergence rate
\( \beta \): unconditional convergence rate in manufacturing
\( \Theta \): “fundamentals”
\( \alpha_M \): employment share in manufacturing
\( \pi_M, \pi_T \): labor productivity in modern and traditional sectors, respectively
Some illustrative simulations

Assumes rapid industrialization ($d\alpha = 0.01$ per year) and large initial productivity gap ($\pi_M - \pi_T = 4$)
Interpreting different periods of growth: ISI

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

Standard convergence is augmented by two additional terms

\( \gamma \): conditional convergence rate  
\( \beta \): unconditional convergence rate in manufacturing  
\( \Theta \): “fundamentals”  
\( \alpha_M \): employment share in manufacturing  
\( \pi_M, \pi_T \): labor productivity in modern and traditional sectors, respectively

A. Accumulation of fundamentals, \( \Theta \) (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 \((d\alpha_M \gg 0)\)
Interpreting different periods of growth: EOI

\[
\hat{y} = \gamma (\ln y^*(\theta) - \ln y) + \alpha_M \pi_M \beta (\ln y^*_M - \ln y_M) + (\pi_M - \pi_T) d\alpha_M
\]

Standard convergence is augmented by two additional terms

A. Accumulation of fundamentals, \(\theta\) (human capital, institutions, etc.) \(\text{OK}\)
   • slow, but essential for long-run
B. Unconditional convergence in modern sector \(\text{yes}\)
   • rapid, but quantitatively minor at early stages of development
C. Structural change from traditional to modern sector \(\text{very rapid}\)
   • 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

A. Accumulation of fundamentals, \( \Theta \) (human capital, institutions, etc.)  
   • slow, but essential for long-run  
   strong

B. Unconditional convergence in modern sector  
   • rapid, but quantitatively minor at early stages of development  
   yes, but shrinking  
   formal manufacturing

C. Structural change from traditional to modern sector  
   • drives rapid growth early on if industrialization is rapid \((d\alpha_M >> 0)\)  
   weak or negative

\( \gamma \): conditional convergence rate  
\( \beta \): unconditional convergence rate in manufacturing  
\( \Theta \): “fundamentals”  
\( \alpha_M \): employment share in manufacturing  
\( \pi_M, \pi_T \): labor productivity in modern and traditional sectors, respectively
Interpreting different periods of growth: recent (pre-Covid) growth

\[
\hat{y} = \gamma (\ln y^*(\Theta) - \ln y) + \alpha_M \pi_M \beta (\ln y^*_M - \ln y_M) + (\pi_M - \pi_T) d\alpha_M
\]

(A) \quad \gamma: \text{conditional convergence rate}

(B) \quad \beta: \text{unconditional convergence rate in manufacturing}

(C) \quad \theta: \text{“fundamentals”}

\[\alpha_M: \text{employment share in manufacturing}\]

\[\pi_M, \pi_T: \text{labor productivity in modern and traditional sectors, respectively}\]

Standard convergence is augmented by two additional terms

A. Accumulation of fundamentals, \(\theta\) (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 \((d\alpha_M \gg 0)\)

weak and service-led

yes but productivity differential smaller and declining
Patterns of structural change: East Asia and advanced countries

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Patterns of structural change: low-income countries today

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<td>organized</td>
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</table>

- Arrows indicate the movement from informal to organized sectors.
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

<table>
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<th>output per worker (percent a year)</th>
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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

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

Contribution to growth of:
- within-sector labor productivity growth
- structural change

\( y_i = \) labor productivity in sector \( i \)

\( \theta_i = \) employment-weight of sector \( i \)

Source: Pages et al., 2010.

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


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

- Investment demand → Direct effect on productivity → Standard conditional convergence
- Increased demand for services → Induced structural change → Growth through structural change
- Lagging productivity in expanding services

Source: Diao et al. (2019)
Interpreting different periods of growth: recent (pre-Covid) growth

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

Standard convergence is augmented by two additional terms

A. Accumulation of fundamentals, \( \theta \) (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 \( (d\alpha_M >> 0) \)

\( \gamma \): conditional convergence rate
\( \beta \): unconditional convergence rate in manufacturing
\( \theta \): “fundamentals”
\( \alpha_M \): employment share in manufacturing
\( \pi_M, \pi_T \): labor productivity in modern and traditional sectors, respectively

weak and service-led

yes but productivity
differential small and declining
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