



STRUCTURAL CHANGE AND LABOR PRODUCTIVITY GROWTH IN AFRICA

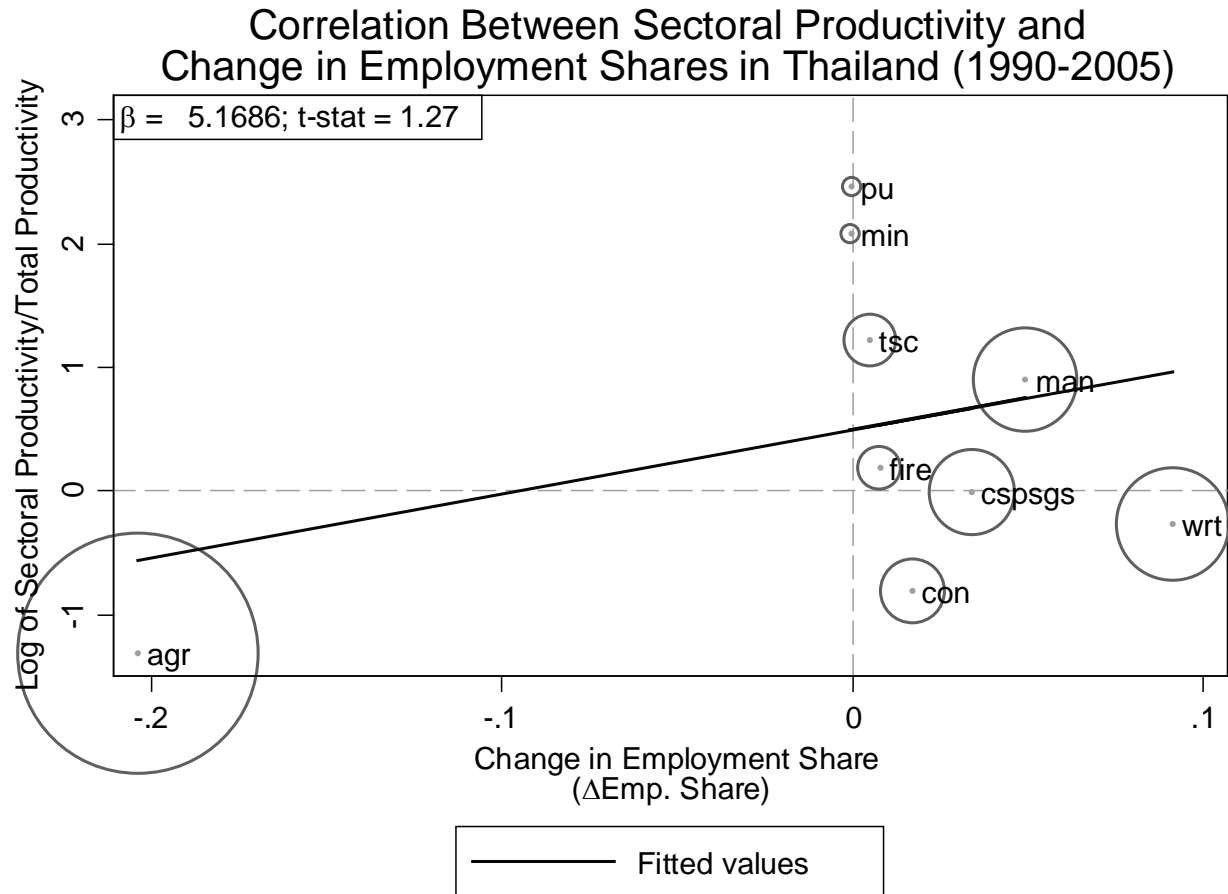
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(Based on joint work with Xinshen Diao and Dani Rodrik)

High growth is typically produced by:

- Rapid structural change, from low- to high-productivity industries
 - standard convergence theory does not produce very rapid growth
 - it has to be complemented with economic dualism to generate growth miracles
- Rapid industrialization
 - manufacturing is special because of
 - unconditional convergence
 - tradability
 - labor absorption capacity

Example: Thailand



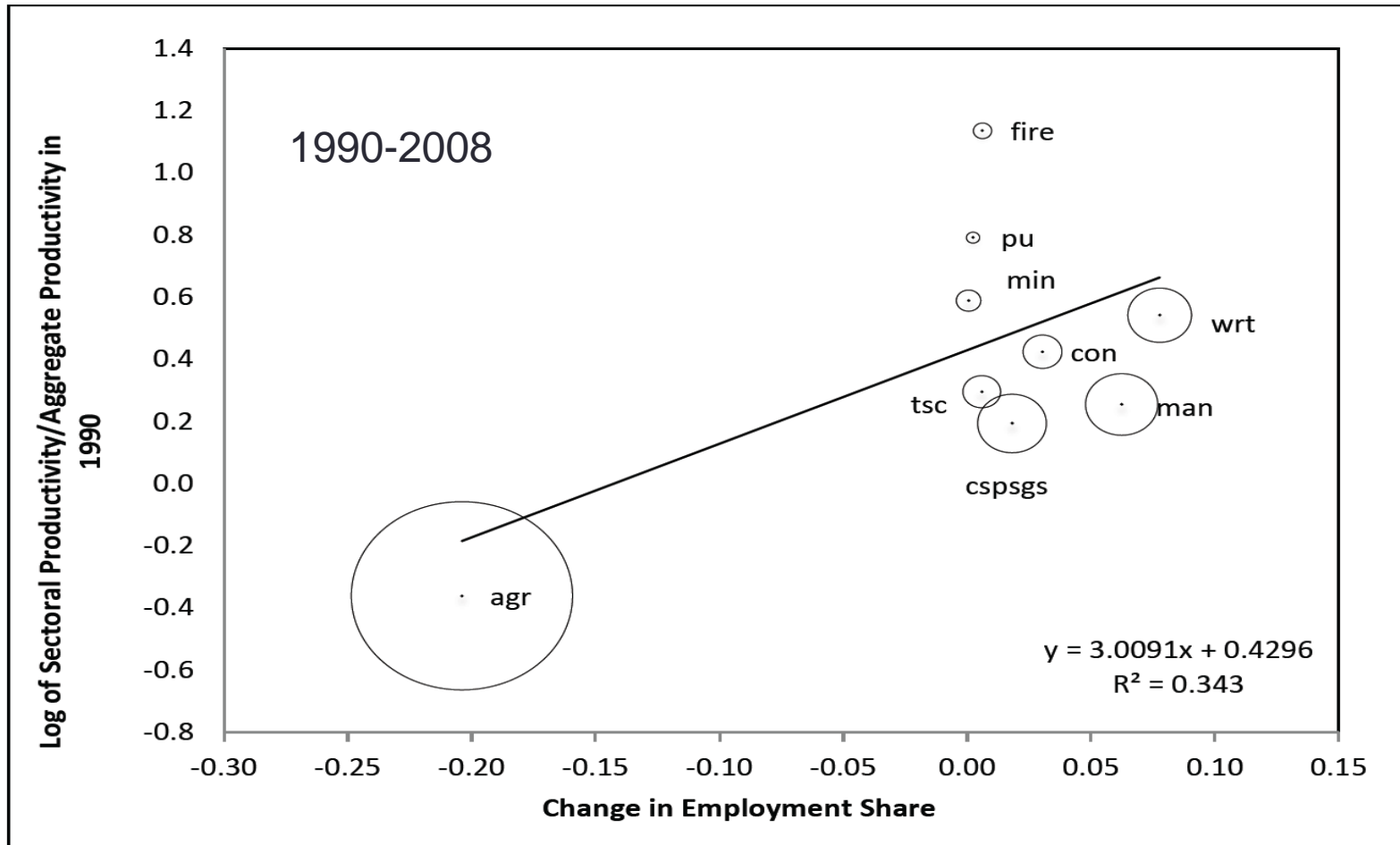
*Note: Size of circle represents employment share in 1990

**Note: β denotes coeff. of independent variable in regression equation:

$$\ln(p/P) = \alpha + \beta \Delta \text{Emp. Share}$$

Source: Authors' calculations with data from Timmer and de Vries (2009)

Example: Vietnam



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)

What about recent high-growth episodes?

First some definitions

High growth episode:

- (1) $g_{t,t+n} \geq 3.5 \text{ ppa}$ — *growth is rapid;*
- (2) $\Delta g_t = g_{t,t+n} - g_{t-n,t} \geq 2.0 \text{ ppa}$ — *growth accelerates;*
- (3) $y_{t+n} \geq \max\{y_i\}, i \leq t$ — *post-growth output exceeds pre-episode peak;*

where the relevant time horizon is seven years (i.e., $n = 6$).

What about recent high-growth episodes?

First some definitions

Structural change and within terms:

$$\Delta y^t = \sum_i \theta_i^{t-k} \Delta y_i^t + \sum_i y_i^t \Delta \theta_i^t \quad (2)$$

within

Structural
change

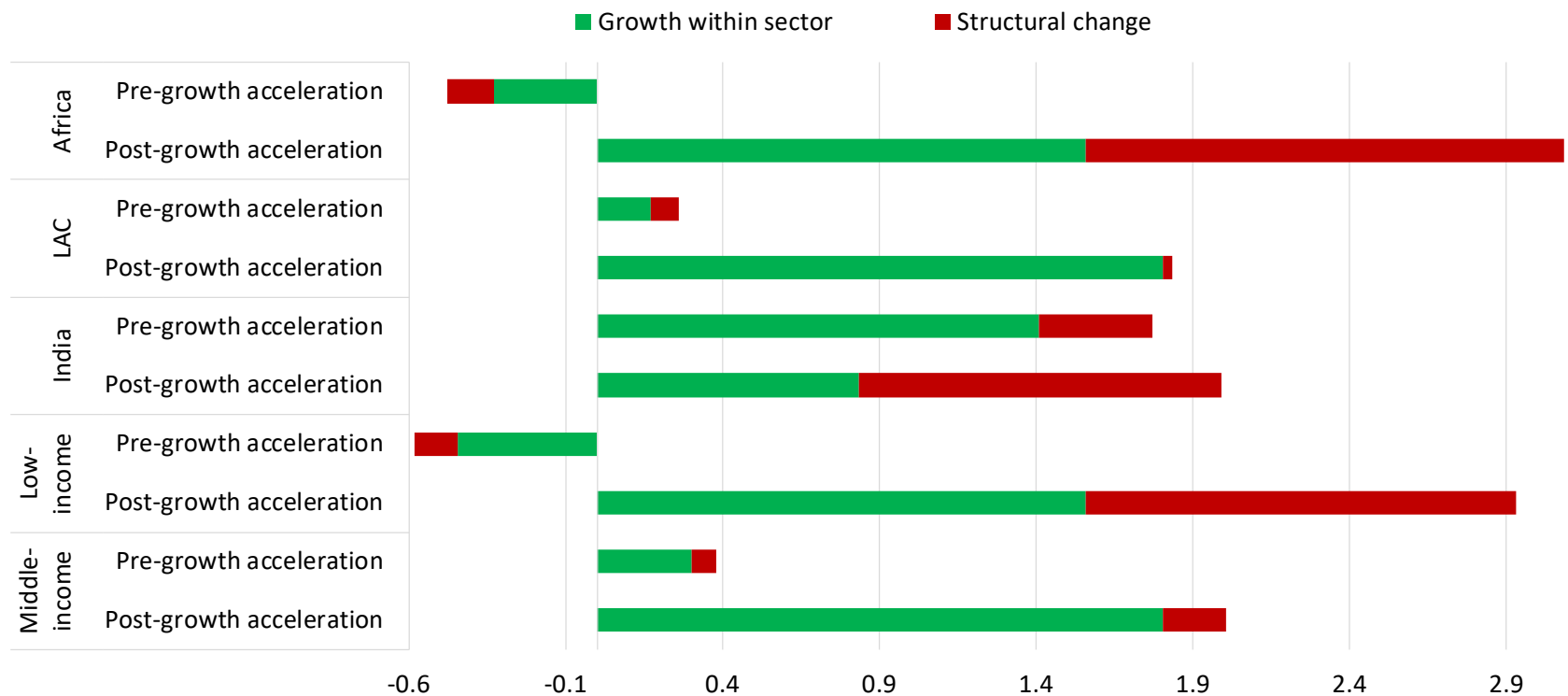
where y^t and y_i^t refer to economywide and sectoral labor productivity levels, respectively, and θ_i^t is the share of employment in sector i . The Δ operator denotes change in productivity or employment shares between $t-k$ and t .

Countries with recent high-growth episodes

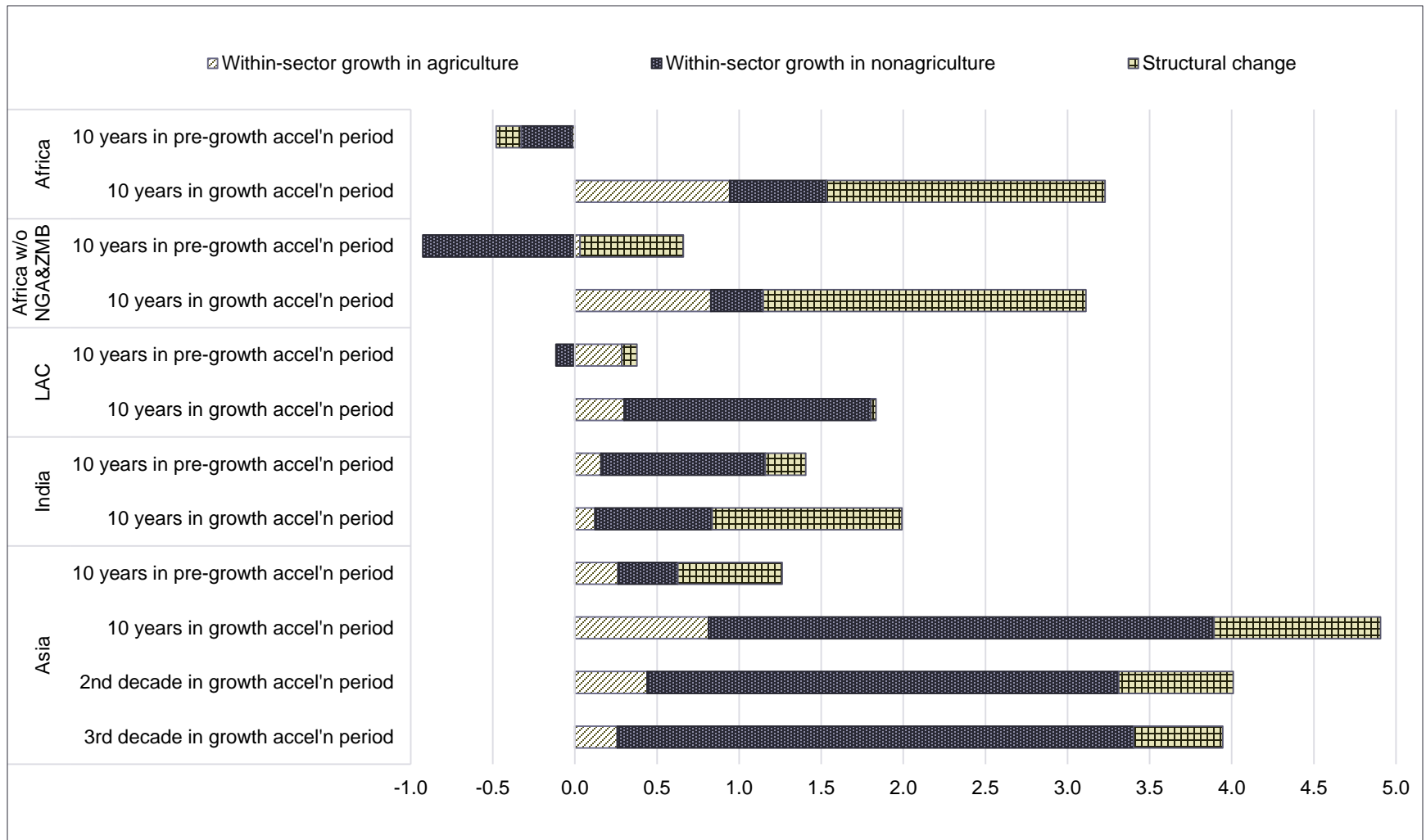
Country	Initial year of growth acceleration (t)	growth in pre-accel'n period (t-6, t)	growth in post-accel'n period (t, t+6)	Differences in pre- & post-accel'n periods (4)	Whether GDP pc in post-accel'n period >= max in pre-accel'n period (5)	Growth after 7-years' growth acceleration (t+6, 2014) (6)
	(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

On the one hand, rapid growth enhancing structural change in low income countries

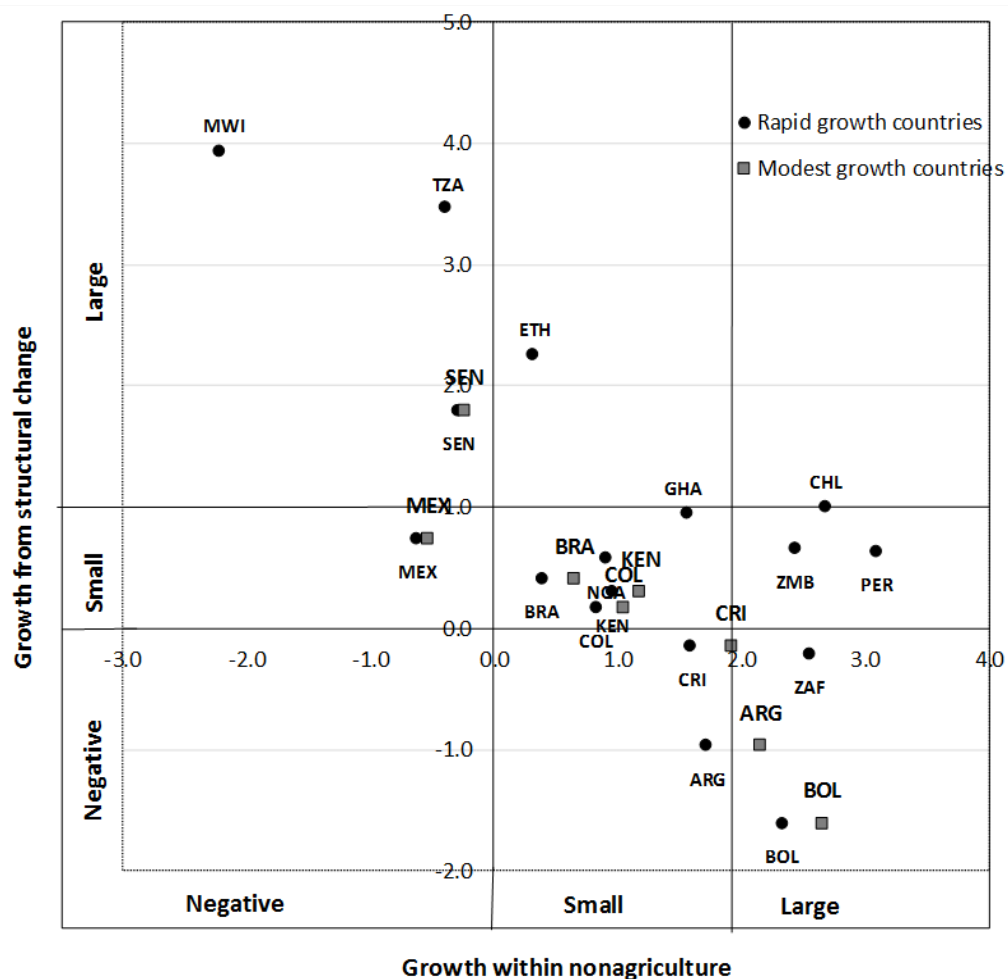
Labor Productivity Growth within Sectors and due to Structural Change, in Pre- and Post-Growth Accelerations (Annual Growth Rates, Percentages)



On the other hand, limited within sector productivity growth in low income countries



Relationship between structural change and productivity growth within modern sectors



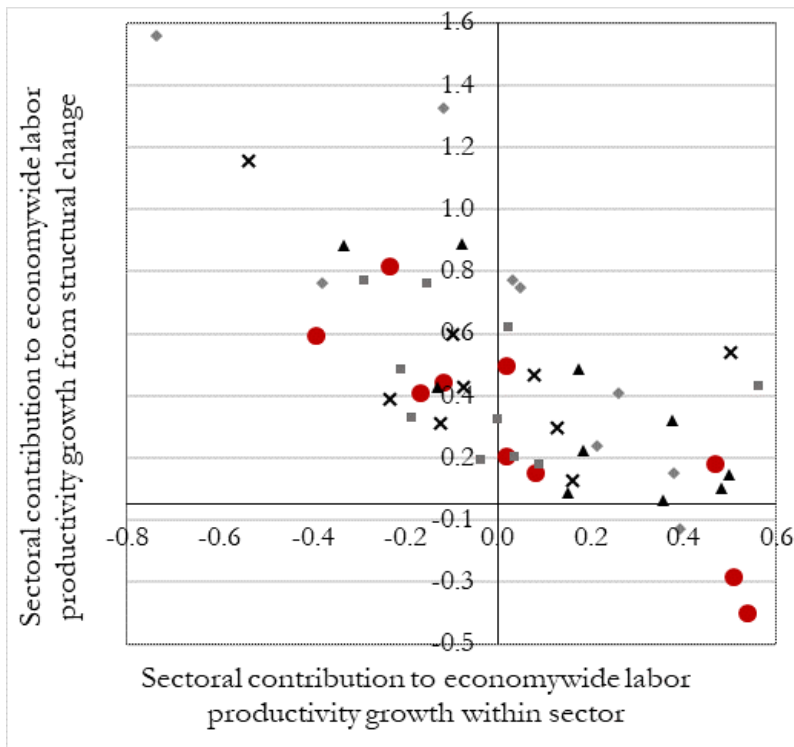
Countries where structural change contributed the most to overall growth also experienced the lowest productivity growth in modern (non-agr.) sectors.

Notes: Both x-axis and y-axis are percentages that measure the economywide annual labor productivity growth rate in the 10-year period of growth accelerations.

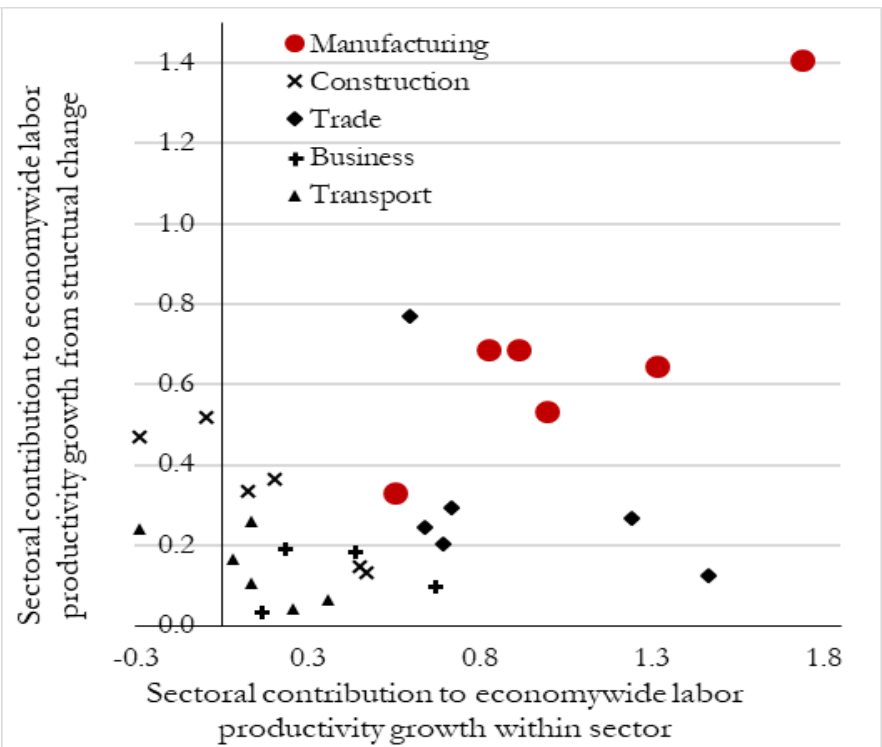
The correlation value is -0.882 among the rapid growth countries, -0.901 among the modest growth countries, and -0.700 for all countries.

Structural change and productivity growth within modern sectors: Africa and Asia by sector

Africa



Asia



Questions/Observations

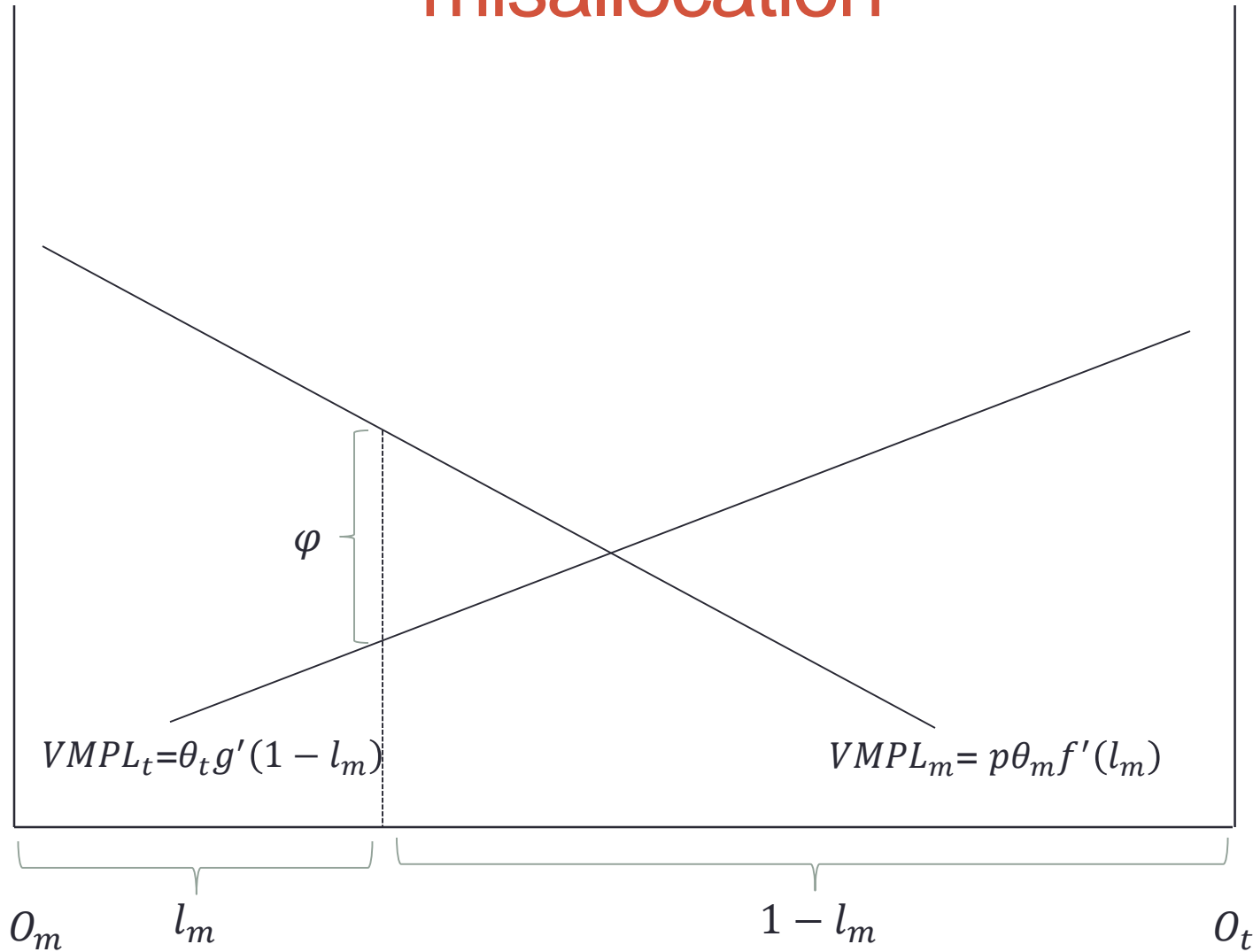
- Where is the rapid structural change coming from in recent high-growth episodes?
- What do these patterns imply for sustainability of growth?

Analytics of structural change under different shocks

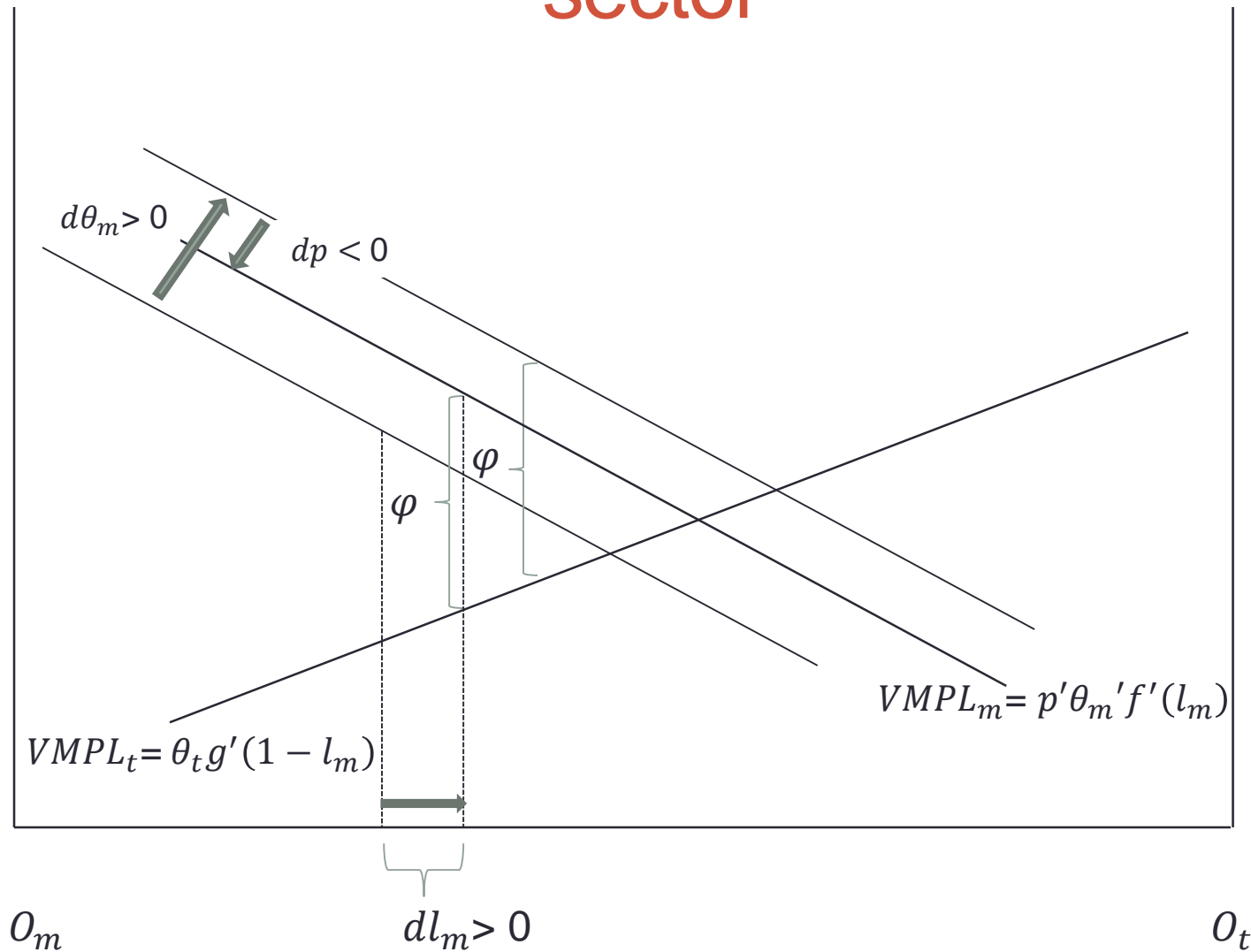
Assumptions:

- Two sectors, modern and traditional
- Preferences: non-homothetic demand that favors modern goods + price elastic demand for modern goods
- Structural misallocation: constant wedge in labor returns between two sectors

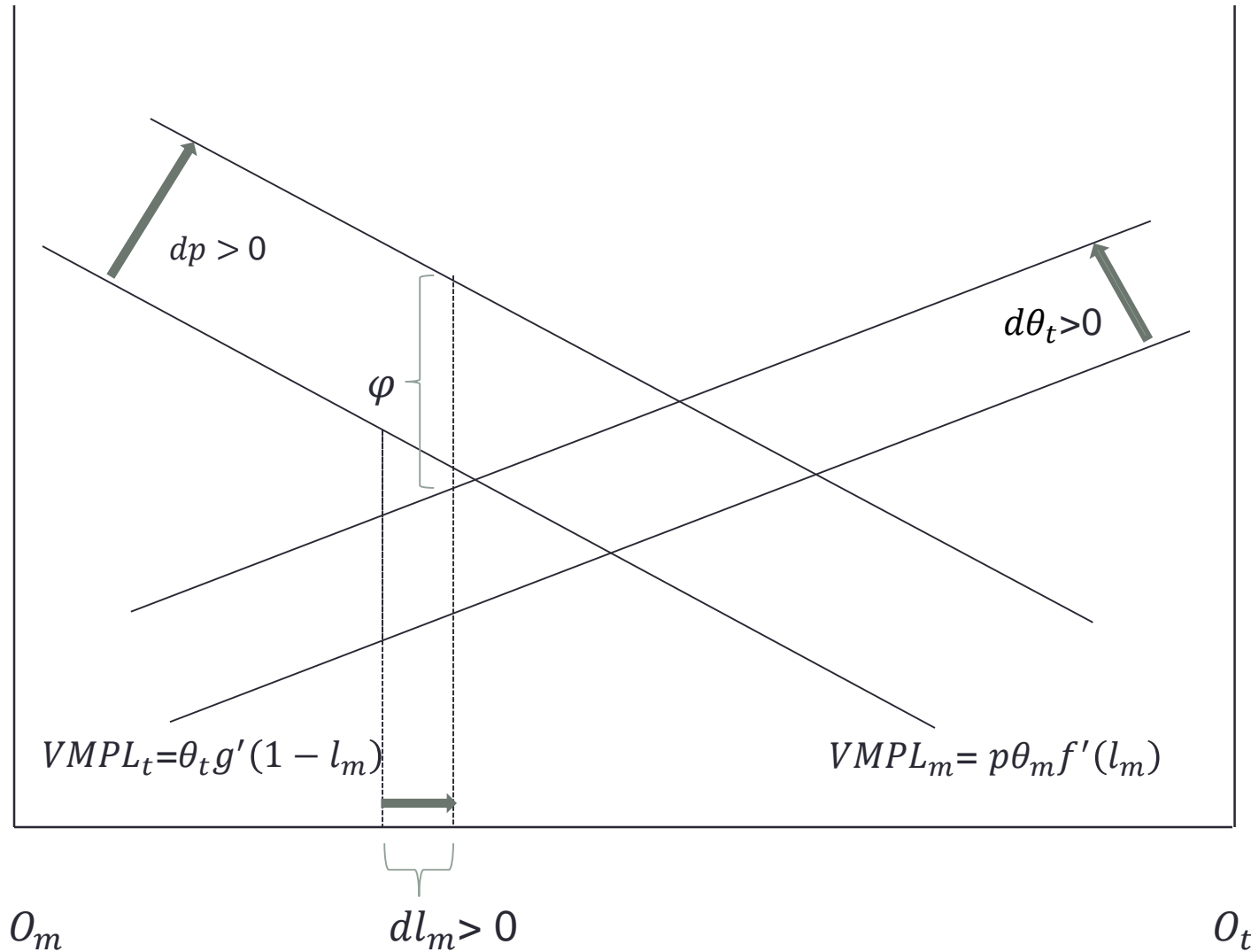
Equilibrium in two-sector economy with misallocation



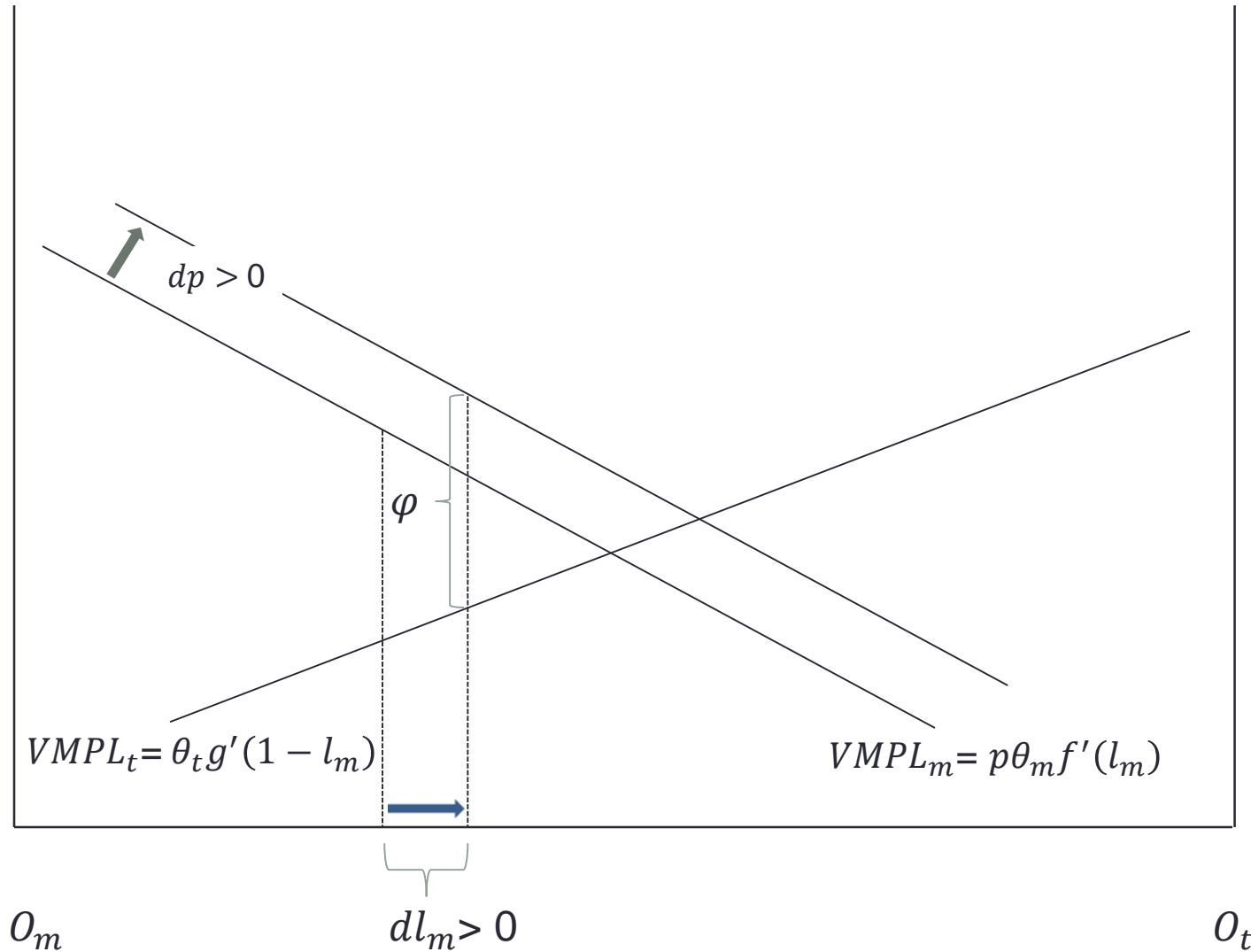
Supply/Productivity shock in modern sector



Productivity increase in traditional sector



Increase in “aggregate demand”



Summarizing

- Structural change in recent rapid-growth episodes very different than traditional industrialization cases
- Evidence that this growth is demand-led, and may be difficult to sustain
- Curious that this is the case even in manufacturing the archetypal modern sector
- Let's take a look at firm level data from Ethiopia and Tanzania to further illustrate the consequences of demand lead growth in the manufacturing sector

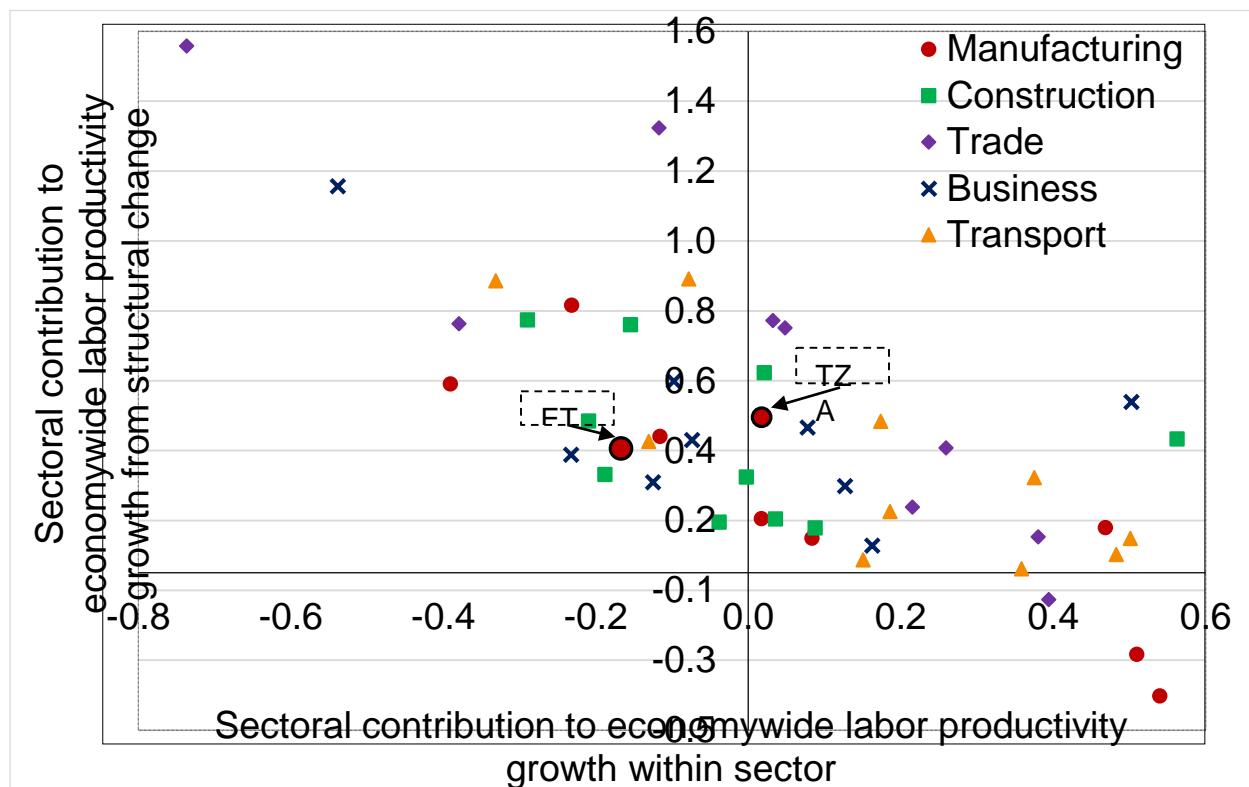


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An Illustration of the Dilemma of Demand Lead Structural Change: Manufacturing in Ethiopia and Tanzania

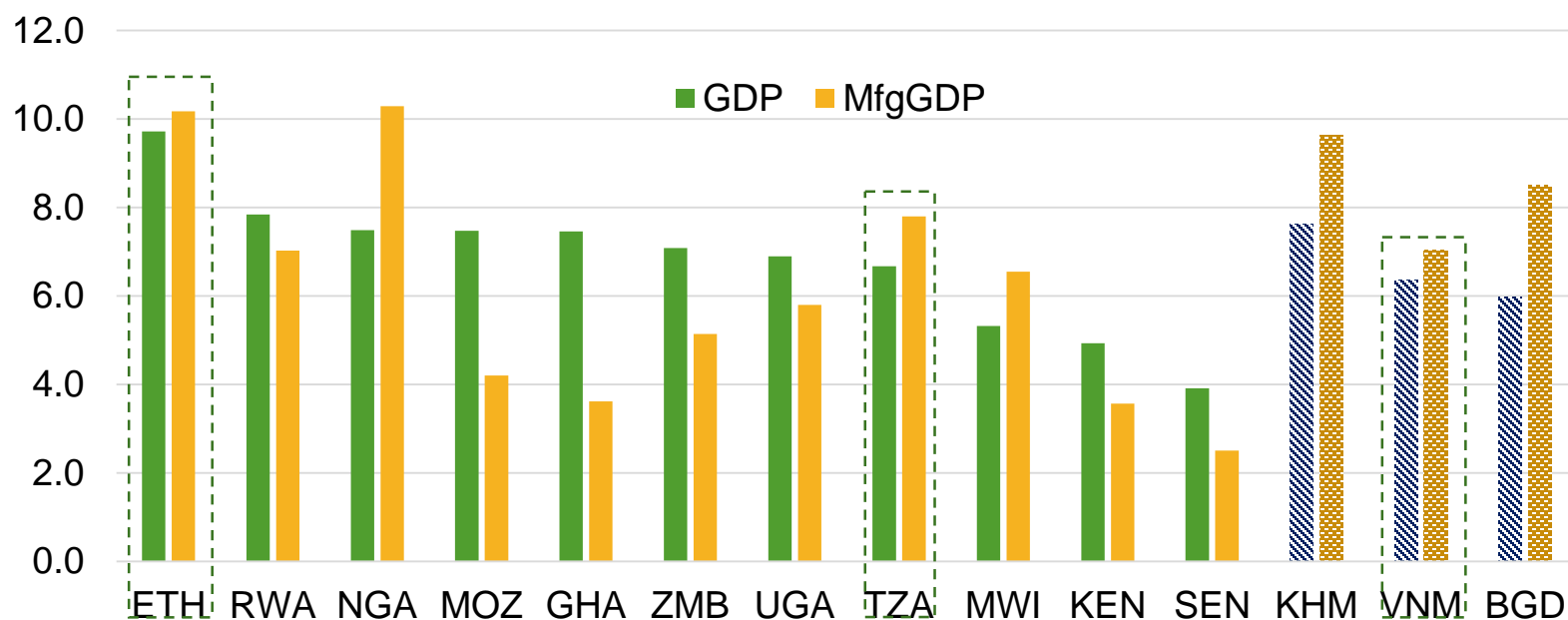
Recall: Structural Change in Africa is Negatively Correlated with Within Sector Labor Productivity Growth – Manufacturing is no exception!



(Measured in Percentage Points of Economywide Productivity Annual Growth)

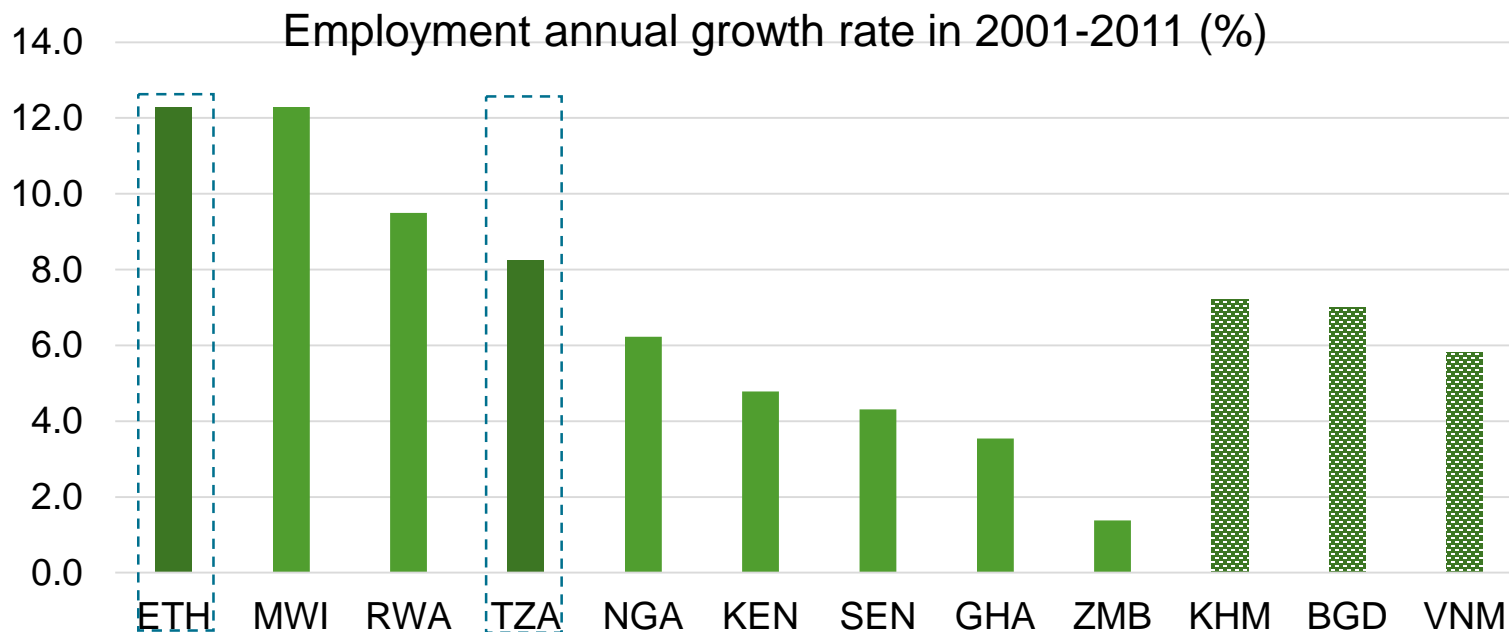
Source: Diao, X., McMillan, M. and Rodrik, D., 2017. *The recent growth boom in developing economies: A structural change perspective* (No. w23132). National Bureau of Economic Research.

Yet, National Accounts Data Indicate Manufacturing GDP is Growing at Least as Rapidly in Africa as in Late Developers in Asia (Annual percent, 2000-2016)



Source: calculated using WDI data

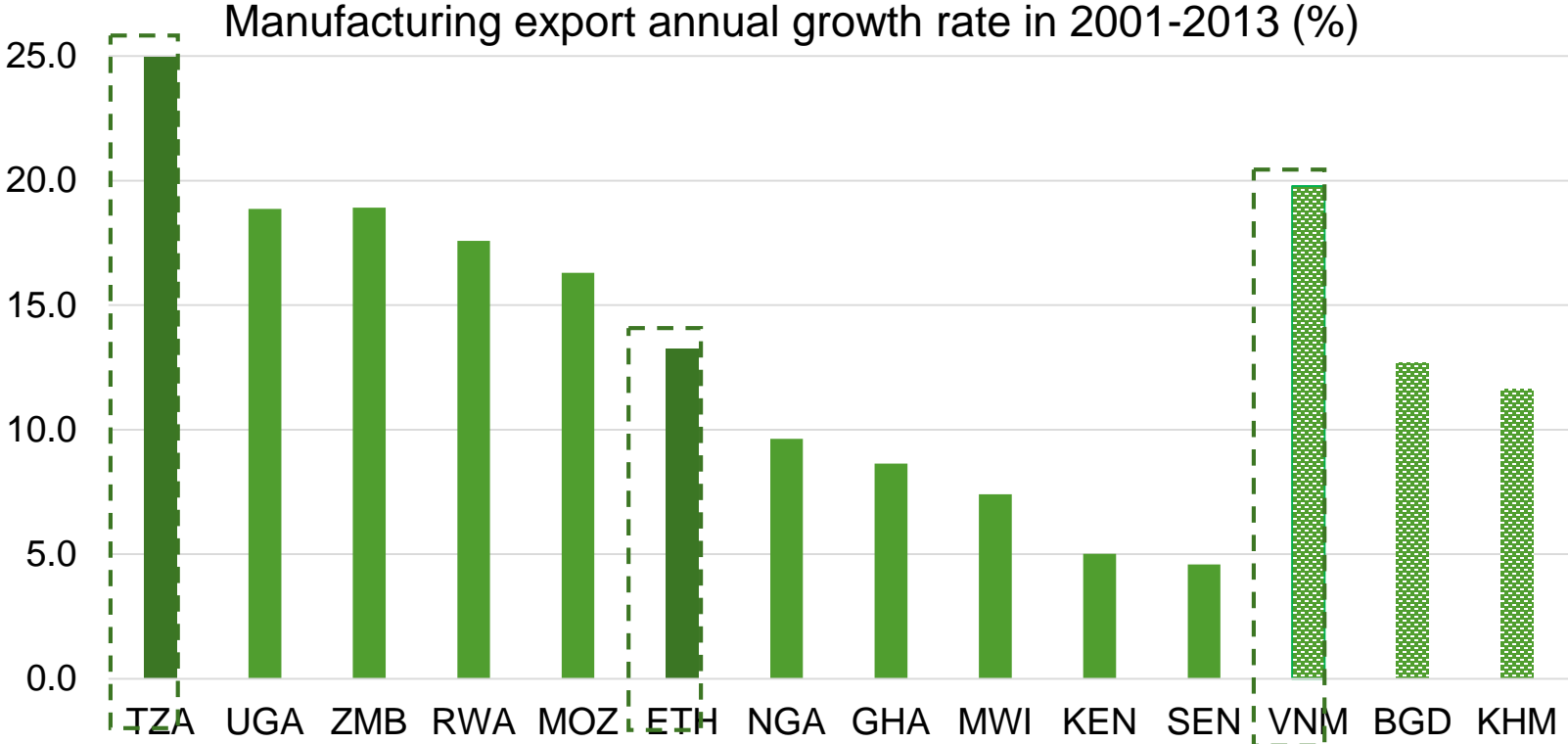
Manufacturing Employment is Growing



Notes: Data for most African countries, except for RWA, is from GGDC for 2001-2011 (and the data for MWI, SEN and ZMB is for 2001-2010). RWA data is from the country's two rounds of population census in 2002 and 2012. Data for the three Asian countries is from ILO. KHM data is for industrial sector employment in 2003-2014, and BGD and VNM data are for manufacturing employment in 2001-2011.

Source: calculated from various data sources.

Manufacturing Exports are Growing



Source: calculated from Comtrade data.

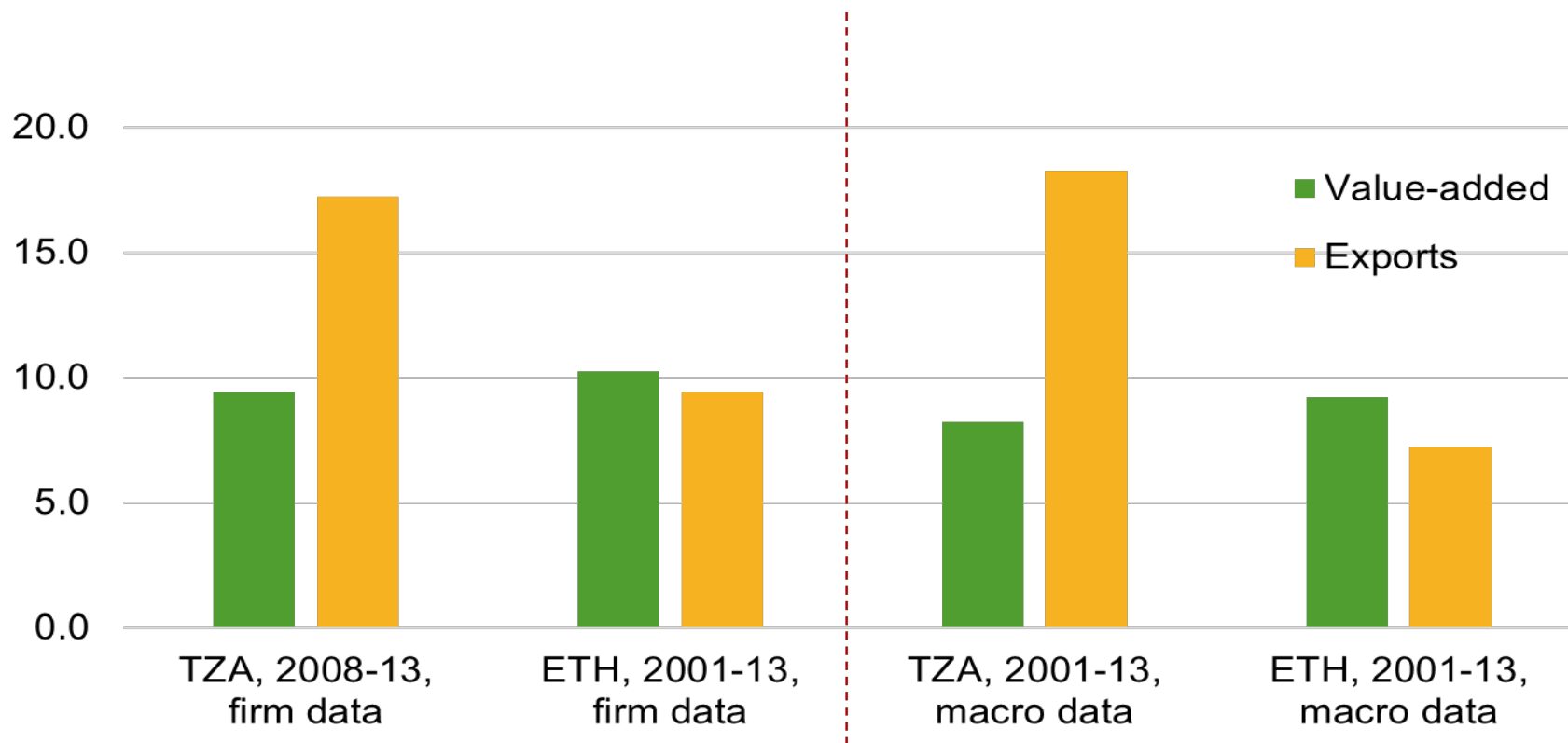
The Puzzle

- Impressive growth in VA, employment and exports
- Negative to zero growth in labor productivity
- To better understand why, we examine the performance of the formal manufacturing sector in Ethiopia and Tanzania using firm level censuses

Data and Roadmap

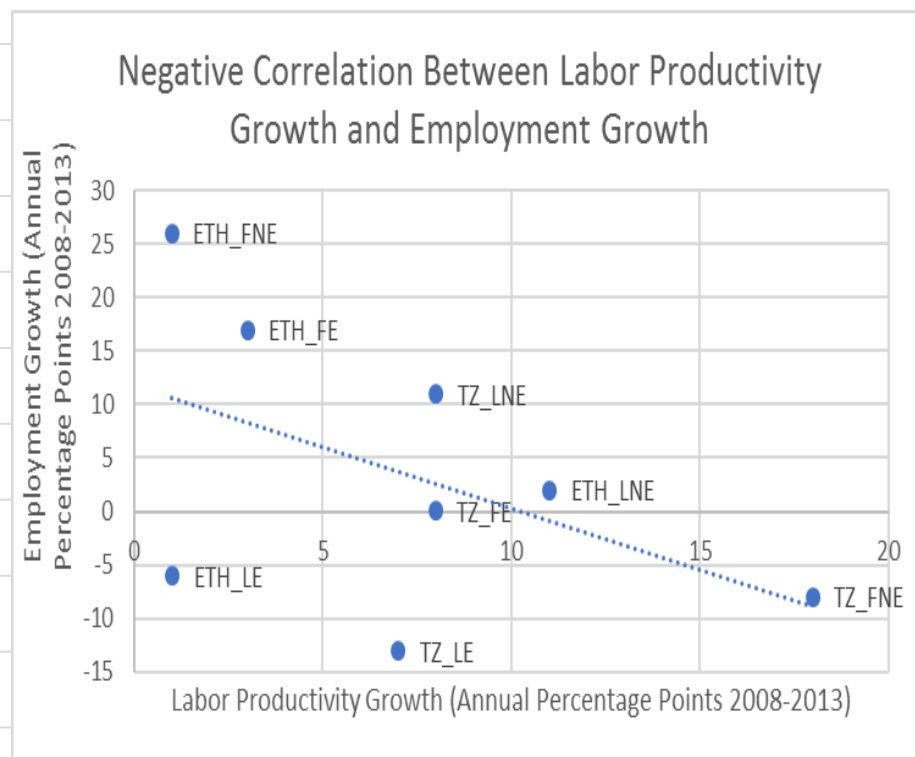
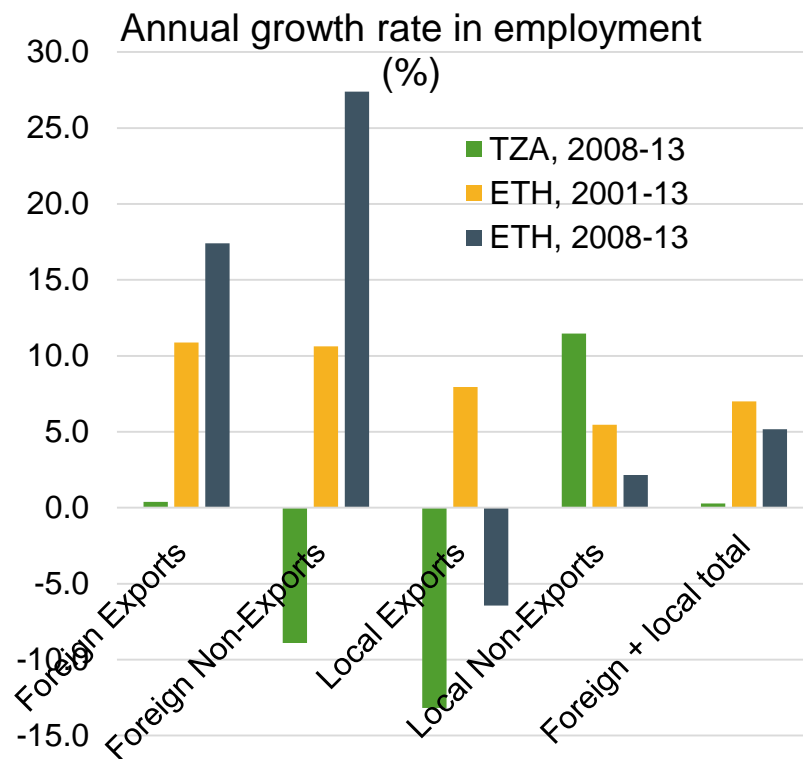
- Data: manufacturing firm censuses and trade data to explore the performance of formal sector mfg in ETH and TZ
- Caveat: many investments in the manufacturing sector appear to be recent – will have firm data for 2016/2017 shortly
- Trends: formal sector manufacturing value added, exports, employment and productivity
- Back to Puzzle: will argue that aggregate picture we started with of negative/zero labor productivity growth in manufacturing likely a result of rapid expansion of informal mfg.

Annual Growth in Value Added and Exports (%) : Formal Firm Data Mirrors Aggregate Data

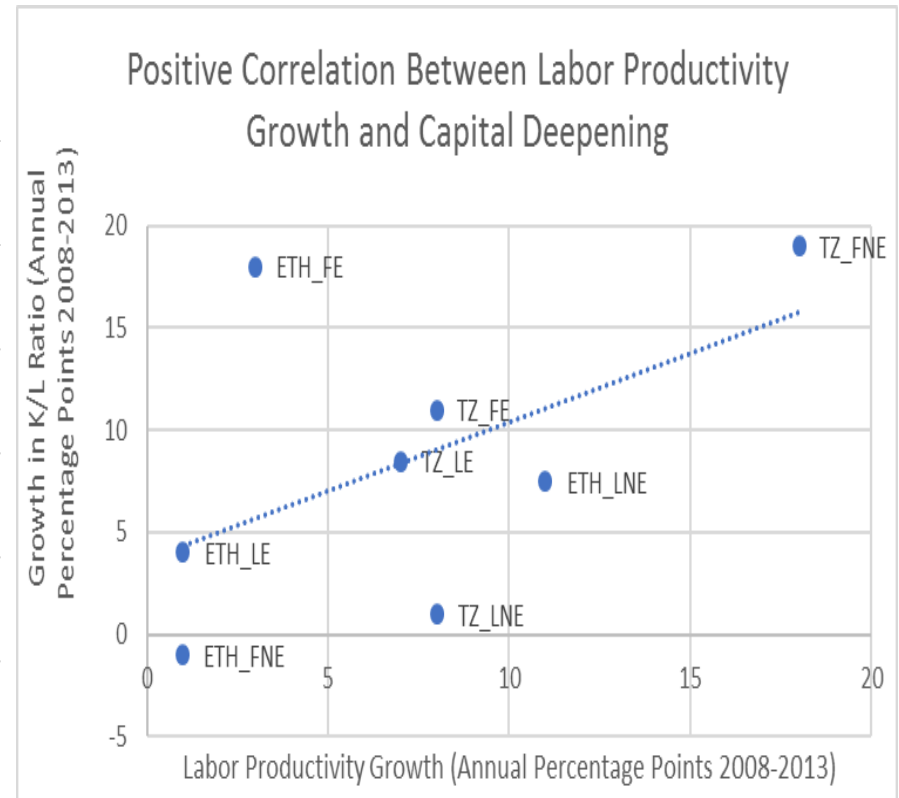
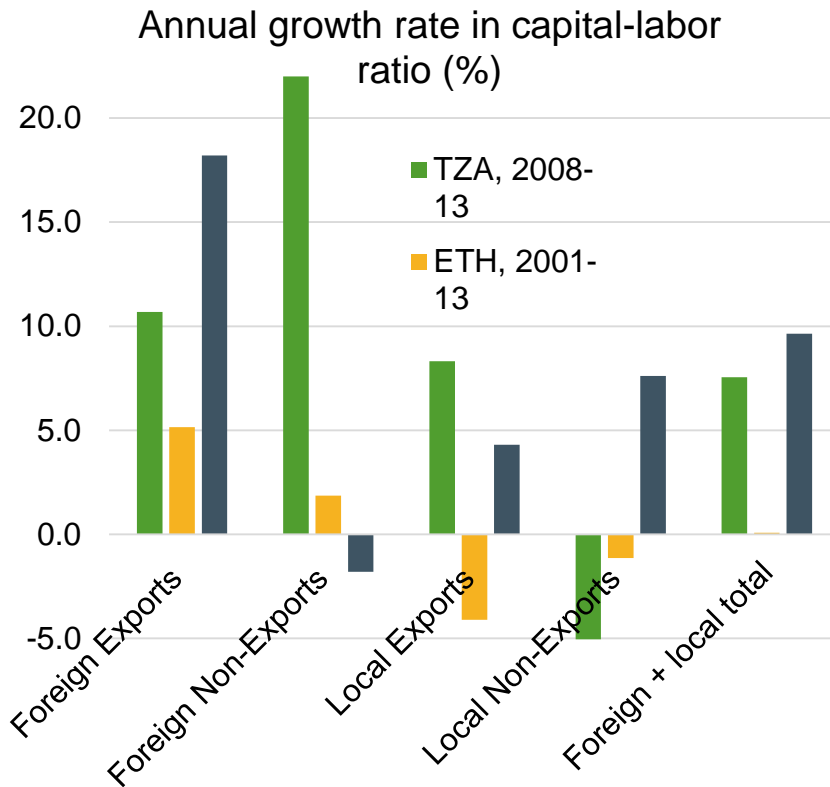


Notes: The annual growth rate for TZA 2008-2013 is calculated from two years' data, while the compound annual growth rate for ETH 2001-2013 is calculated using data 2001-2013. TZA firm data is aggregate from Annual Survey of Industrial Production (ASIP) for 2008 and Census of Industrial Production (CIP) for 2013, obtained from NBS Tanzania. ETH firm data is aggregated from Large and Medium Scale Manufacturing and Electricity Industries Survey (LMMIS) for 2001-2013, obtained from CSA Ethiopia. Manufacturing value-added macro data is from WDI and manufacturing export data is from the BACI International Trade database.

Labor productivity and employment growth are negatively correlated

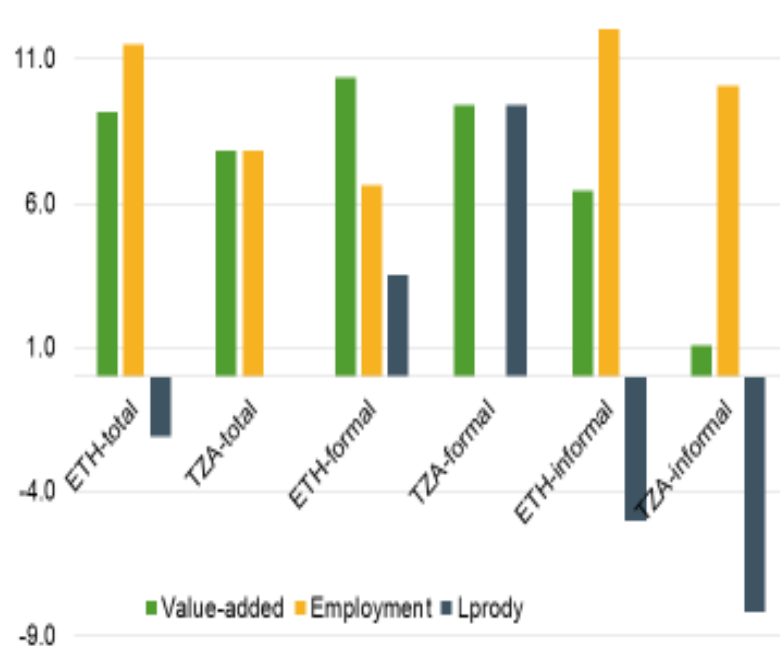


Labor Productivity and K/L Growth Positively Correlated

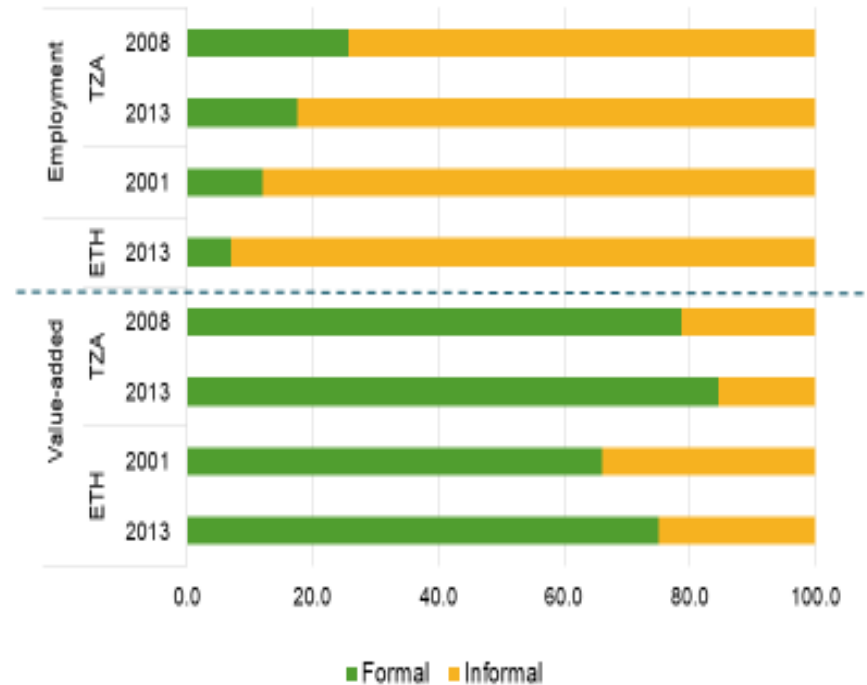


Solving the Puzzle: (i) Modern manufacturing creates growth in value-added, exports and productivity but not so many jobs and; (ii) Informal manufacturing creates jobs but is productivity-reducing

Annual growth in value-added, employment, and labor productivity: total, formal and informal manufacturing



Share of formal and informal firms in manufacturing value-added and employment



CAVEAT: Informal sector numbers are not derived from firm surveys. Instead they are calculated as a residual

Summarizing

- Labor productivity in modern manufacturing firms in ETH and TZA is relatively high and growing
 - ✓ Global value chains have played a modest role
 - ✓ Firms serving local and regional markets have played a bigger role
- Direct generation of employment within modern manufacturing has been disappointing
 - ✓ Instead of job growth we see capital investment
- Small and informal manufacturing firms create the majority of jobs, but contribute very little to value added and labor productivity growth
- This micro evidence brings to life the macro conclusions in 'The Recent Growth Boom' paper and is a dilemma not only for Africa but also for other low income developing countries
- From a policy perspective, these results raise a number of important issues:
 - Are there indirect benefits of modern manufacturing?
 - Do these benefits depend on the type of modern manufacturing?
 - Can policy make labor more attractive to modern manufacturing firms?
 - What types of policies are needed (if any) to foster labor productivity and employment growth among small often informal firms?