GPiD Global Poverty & Inequality Dynamics Research Network
www.developersdilemma.org
Researching structural change & inclusive growth

ESRC GPID Research Network Working Paper Number 2

WHAT DO WE KNOW ABOUT THE RELATIONSHIP BETWEEN STRUCTURAL TRANSFORMATION, INEQUALITY AND POVERTY?

Author(s): Cinar Baymul and Kunal Sen

Affiliation(s): Global Development Institute, University of Manchester

Email(s): cinar.baymul@manchester.ac.uk

Date: 19 September 2017

Notes: Background Paper prepared for ESRC Workshop: Global Poverty and Inequality Dynamics, 20-21 April 2017

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

GCRF Global Challenges Research Fund

ABSTRACT

This paper asks what we know about the relationship between structural transformation, inequality and poverty using comparable time-series data for 32 developing and recently developed countries for the post-1950 period. We find that structural change in the majority of our countries has been a move of workers from agriculture to services, and not to manufacturing. This has been accompanied by a fall in the relative productivity of services to agriculture, indicating that structural transformation has not been growth-enhancing for the majority of countries. Countries show different paths of structural transformation which cuts across geographical regions and growth experiences, with a set of 10 countries being structurally developed, another 14 being structurally developing and the remaining 8 countries being structurally under-developed. We see clear differences in the structural transformation-inequality relationship, depending on the stage of structural transformation that a particular country is in. While a movement of workers away from agriculture is unambiguously related to an increase in inequality, we do not see a Kuznets type relationship between manufacturing employment share and inequality when we take into account the different paths of industrialisation that our countries have followed. On the other hand, inequality unambiguously increases with structural transformation, if the movement of workers from agriculture is to services and not to manufacturing. Structural transformation is linked to falling poverty across all categories of countries, though there are differences in the response of poverty to structural transformation, depending on whether the country is structurally developed, developing or under-developed, and whether the movement of workers is from agriculture to manufacturing or to services. Overall, our findings suggest the structural transformation-inequality/poverty relationship depends on the path of structural transformation that a country has followed and whether the shift of employment away from agriculture is towards manufacturing or services.

KEYWORDS

Structural transformation; inequality; poverty;

About the GPID research network:

The ESRC Global Poverty and Inequality Dynamics (GPID) research network is an international network of academics, civil society organisations, and policymakers. It was launched in 2017 and is funded by the ESRC's Global Challenges Research Fund.

The objective of the ESRC GPID Research Network is to build a new research programme that focuses on the relationship between structural change and inclusive growth.

See: www.gpidnetwork.org

THE DEVELOPER'S DILEMMA

The ESRC Global Poverty and Inequality Dynamics (GPID) research network is concerned with what we have called 'the developer's dilemma'.

This dilemma is a trade-off between two objectives that developing countries are pursuing. Specifically:

1. Economic development via structural transformation and productivity growth based on the intra- and inter-sectoral reallocation of economic activity.
2. Inclusive growth which is typically defined as broad-based economic growth benefiting the poorer in society in particular.

Structural transformation, the former has been thought to push up inequality. Whereas the latter, inclusive growth implies a need for steady or even falling inequality to spread the benefits of growth widely. The 'developer's dilemma' is thus a distribution tension at the heart of economic development.

1. INTRODUCTION

In the recent decades, most developing and emerging countries have seen large shifts of workers from agriculture to manufacturing and services sectors. At the same time, in several countries, inequality has increased, often accompanied by falling poverty. In a famous 1955 paper, Kuznets argued that as low-income countries industrialise, inequality will increase over time as workers move from low productivity agriculture to high productivity manufacturing. Since agriculture tends to be characterised by low inequality while manufacturing is characterised by high inequality, this shift of workers from agriculture to manufacturing will tend to increase overall inequality, though the process of industrialisation will also increase economic growth. Though Kuznets did not explicitly discuss the implications of industrialisation on poverty, it follows from his argument as well as that of Lewis (1954) that industrialisation will be accompanied by sharp falls in poverty as well (Athukorala and Sen 2014).

Two complications arise when considering Kuznets' thesis from the viewpoint of today. Firstly, very few countries have followed successful industrialisation strategies since the time that Kuznets published his article, and some countries may well be undergoing "premature deindustrialisation" currently (Rodrik 2016). It is not clear what would be the inequality and poverty implications of the mixed record on industrialisation in developing countries. Secondly, as we will show in this paper, much of the shift of workers from agriculture has been to services, and not to manufacturing. Services, in general, tend to have lower levels of productivity than manufacturing, so it is not obvious that structural change that is biased towards services is necessarily inequality enhancing to the same degree as the agriculture to manufacturing shift in employment.

In this paper, we revisit the stylised facts of structural transformation, inequality and poverty, using comparable data on these measures for a range of low, middle and now high income countries in Asia, Africa and Latin America for the period 1950-2010 (the end year is 2012 in some cases, and the start year differs across countries, depending on data availability).[1] We ask whether there is a positive relationship between structural transformation and inequality (and a

[1] By structural transformation, we mean the movement of workers from low productivity agriculture to higher productivity services and manufacturing (McMillan et al 2014).

negative relationship with poverty) as had been hypothesised by Kuznets, and whether this relationship may differ across countries which have followed different paths of structural transformation.

For the rest of the paper, we first provide a brief literature review of the recent studies on structural transformation. We then describe the data that we use in the paper. We next document the patterns of structural transformation. We then discuss the relationship between structural transformation and inequality, and structural transformation and poverty in turn. We end with a recap of our main findings.

2. LITERATURE REVIEW

In recent years, there has been a revival of interest in patterns and determinants of structural transformation/change. In this section, we briefly review the recent literature. Duarte and Restuccia (2010) investigate the role of sectoral labour productivity in shaping sectoral labour reallocation and aggregate productivity experience across countries. Their analysis illustrates the significant differences sectoral differences in productivity across countries and over time, and that these differences explain the broad patterns of structural transformation. Moreover, they also find that productivity differences between rich and poor countries are larger in agriculture and services than manufacturing, and a productivity catch-up of poor countries compared to the US exists in agriculture and industry.

Haraguchi and Rezonja (2010) examine the power of income levels in explaining the variations in sectoral outputs. Using data from UN's Industrial Statistics Unit in their simultaneous equation model that integrates both supply and demand side factors, they find that income is the most important determinant of sectoral development and it explains most of the output variations. Dabla-Norris et al. (2013) demonstrate that while country fundamentals, such as income, endowments and population explain a large proportion of the variation in sectoral shares across countries, structural reforms, globalization and other policy and institutional variables also have significant impacts on observed patterns of structural change.

Haraguchi (2015) also discusses the three major factors that form the pattern of structural change in manufacturing across countries. According to the author, these are the level of economic development, country-specific factors such as geographic and demographic conditions, and the speed of development. While labour-intensive primary industries provide the major source of employment as countries commence economic development, labour shifts

to capital and technology intensive industries as average income increases. Haraguchi (2015) argues that the speed of the development process is also essential in determining the structural pattern in manufacturing, as globalization allows countries more opportunities for technological advancement.

McMillan et al.'s (2014) empirical study highlight the large gaps in labour productivity between the traditional and modern parts of the economy in developing countries. Emphasizing the importance of labour flows from low to high productivity activities in economic development, they show that since 1990, structural change in Africa and Latin America had been growth reducing, with labour moving away from high productivity activities. In the most extensive review of literature on structural transformation to date, Herrendorf et al. (2014) stress the need for more quantitative case studies on the subject in currently poor countries. Through a multi-sector model of growth, they have built in order to encompass the existing theories on structural transformation; they conduct theoretical and empirical analysis on the economic forces that drive structural transformation.

In a more recent study, Rodrik (2016) undertakes to display and explain a puzzling trend of "premature deindustrialization" in developing countries. The author defines 'premature deindustrialization' as the shift of labour to services sector without undergoing a complete process of industrialization of the economy. The share of industry in total value added output, or total employment, follows an inverted U-shaped pattern. The rapid increase in the share of industry in the early stages of economic development eventually slows down and decreases. However, Rodrik shows that developing countries in Latin America and Africa have reached their industrial peak at lower shares of value added output, or employment, compared to the developed countries or the Asian manufactures exporters. Rodrik argues that 'premature deindustrialization' poses a threat to the growth prospects of developing countries, since reallocation of employment from agriculture to manufacturing where productivity is higher, and increasing in the long term, is a primary source of economic growth.

Wood (2017) examines how globalization changed the structural patterns of exports, output and employment in relation to factor endowments around the world. Establishing his analysis around the Augmented Heckscher-Ohlin theory, which states that countries export goods that can be produced by the factors they are relatively well endowed with, and import those that they lack a good supply of factors to produce, Wood (2017) empirically shows that the variation in structural change around the world between 1985 and 2015 confirms the theory. Land abundant countries produce and export primary goods more than skill abundant countries,

which are more advanced in producing manufactured goods. Wood (2017) also addresses the question of 'premature deindustrialization', and finds that even though the share of employment and output in manufacturing rose across the land scarce developing world, the land abundant developing regions went through deindustrialization.

In addition to the empirical research on describing structural transformation across countries, two recent studies focus on how the reallocation of labour between sectors impact economic growth. Timmer and Vries (2009) construct a modified shift-share method, where they use estimates of the shadow price of labour to measure the difference between average and marginal productivity, to study the contribution of sectors to growth accelerations. They find that productivity increases in market services, commonly regarded as a sector lacking productivity growth, are in fact the largest contributors to economic growth accelerations, followed by productivity increases in manufacturing. Diao et al. (2017) analyse the growth accelerations of countries in the GGDC 10-Sector Database with an emphasis on the developing countries in the sample. According to the authors, within sector labour productivity growth becomes ever more important for labour productivity growth, while the importance of structural change decreases after the initial stages of economic development. Productivity increase in modern sectors is vital for long-term development, even though their model also suggests that rapid productivity growth in agriculture played an important role in Africa as a driver of growth-increasing structural change. However, this change in Africa was accompanied by declining labour productivity in modern sectors.

Lastly, in their study to explain the determinants of income inequality, Jaumotte et al. (2013), also control for the shares of employment in agriculture and industry, and relative labour productivities. They expect the labour shift away from agriculture to industry, and the relative productivity increase in agriculture to have inequality reducing effects. The authors find that an increase in the share of employment of industry reduces income inequality; however, they advise caution in drawing conclusions due to the methodological concerns arising from the short and unbalanced panel dataset that they use.

Apart from the Jaumotte et al. (2013) study, none of the recent studies look at the relationship between structural change, inequality and poverty in developing countries. In this note, we examine the relationship between structural change, inequality and poverty for 32 developing and emerging countries for which we have comparable data for a reasonably long period of time.

3. DATA

In this section, we describe the data we use in the analysis of structural transformation, inequality and poverty.

Structural Change: Data on structural change in countries is taken from Groningen Growth and Development Centre's (GGDC) 10-Sector Database. GGDC's 10-Sector Database includes data for 42 countries covering a time span from 1950 to 2012. We have excluded countries from Europe, Japan and the USA from our sample, which left us with 32 countries from four geographic regions. A list of countries in our sample with the time period that the data cover is given in Table 1. The GGDC database consists of annual series for the gross value-added output and the number of people employed in agriculture, mining, manufacturing, utilities, construction, trade services, transport services, business services, government services and personal services. We have grouped these ten sectors into four main categories as follows:

Categories	Sectors
Agricultural Sector	Agriculture
Manufacturing Industry	Manufacturing
Non-manufacturing Industry	Mining + Utilities + Construction
Service Sector	Trade Services + Transport Services + Business Services + Government Services + Personal Services

However, annual series for government services are missing for eight countries, while an additional two countries lack series on personal services[2]. For these countries, the service sector excludes the missing series.

[2] Bolivia, Chile, Colombia, Peru, Singapore, South Korea, Venezuela and Zambia do not have data on government services. Egypt and Morocco do not have data on personal services. In addition, Indonesia lack both only in one year, 1961.

Table 1. List of Countries in our Sample

Region	Country	Value Added Data	Employment Data
Sub-Saharan Africa	Botswana	1964-2010	1964-2010
	Ethiopia	1961-2010	1961-2010
	Ghana	1960-2010	1960-2010
	Kenya	1964-2010	1969-2010
	Malawi	1966-2010	1966-2010
	Mauritius	1970-2010	1970-2010
	Nigeria	1960-2010	1960-2011
	Senegal	1970-2010	1970-2010
	South Africa	1960-2010	1960-2010
	Tanzania	1960-2010	1960-2010
	Zambia	1965-2010	1965-2010
North Africa	Egypt	1960-2012	1960-2012
	Morocco	1960-2012	1960-2012
Asia	China	1952-2010	1952-2011
	Hong Kong	1974-2011	1974-2011
	India	1950-2012	1960-2010
	Indonesia	1960-2012	1961-2012
	South Korea	1953-2011	1963-2011
	Malaysia	1970-2011	1975-2011
	Philippines	1971-2012	1971-2012
	Singapore	1960-2012	1970-2011
	Taiwan	1961-2012	1963-2012
	Thailand	1951-2011	1960-2011
Latin America	Argentina	1950-2011	1950-2011
	Bolivia	1950-2011	1950-2010
	Brazil	1950-2011	1950-2011
	Chile	1950-2011	1950-2012
	Colombia	1950-2011	1950-2010
	Costa Rica	1950-2011	1950-2011
	Mexico	1950-2011	1950-2012
	Peru	1950-2011	1960-2011
	Venezuela	1950-2012	1950-2011

Gross value added data is taken from national income accounts of the various countries and compiled according to the UN System of National Accounts (SNA). The 10 sectors have been classified using the International Standard Industrial Classification (ISIC), Revision 3.1. Using the ISIC classification of manufacturing instead of the narrower SITC classification implies that primary processed products are also included in the definition of manufacturing. Employment is defined as "all persons engaged, thus including all paid employees but also self-employed and family workers". This implies that the GGDC employment data includes both

the formal and informal sectors. The primary source of the employment data is the population census, supplemented by labour force and business surveys (De Vries et al. 2015)

The share of employment for the four main categories is calculated by dividing the number of people employed in each category by the total number of people employed in the country in a given year. *Productivity* in each category is calculated by dividing the value-added output in constant 2005 local currency by the number of people employed.

GGDC provides the highest quality of data available on sectoral output across countries, however, it is also subject to certain limitations, which can raise concerns when the data is used to calculate productivity. The first set of limitations relate to the quality of the source data, and the extent to which they include the informal sector. Quality of data on the sectoral value-added output published by national statistical agencies of the under-developed countries can be unsatisfactory, and whether the data successfully account for the informal sector depends on the quality of the national sources. On the other hand, as the annual series on the number of people employed in each sector is obtained from census data and household surveys by the GGDC researchers, they are more likely to capture informal employment.

Income Inequality: Income inequality data is taken from the standardized income inequality dataset computed by Shorrocks and Baymul (forthcoming). The Gini coefficient, calculated from household surveys, is the most commonly used measure of inequality. However, due to conceptual and methodological differences between household surveys, comparability of inequality data is an issue that troubles empirical researchers. The standardized dataset used in this research tries to enhance comparability by adjusting all available data that exceeds a quality threshold from various sources through a regression adjustment method that includes an extensive list of independent variables. Despite generating the highest number of individual annual observations per country compared to any other available dataset, the number of observations still vary between countries and sometimes a standardized observation cannot be produced, as in the case of Taiwan.

In this paper, we use Gini coefficients that indicate the net income per capita inequality. Income shares of the bottom 40% of the population is also standardized when available. It is important to note that standardized income inequality data is prone to measurement errors made in source data. Measurement errors could be especially problematic in least developed countries where the quality of the data collection methods is questionable.

Poverty: The indicator of preference to measure poverty in countries is the poverty headcount ratio at $1.90 a day. Data is taken primarily from the World Bank's PovcalNet Data published in February 2016, and complemented by data from the World Bank's World Development Indicators (WDI). The headcount ratio is the percentage of people living under the income threshold depicting the poverty line, which is evaluated at $1.90 a day. When needed, population data from WDI is used to calculate absolute poverty, which is the total number of people living under the poverty line.

4. PATTERNS OF STRUCTURAL TRANSFORMATİON

A striking feature of structural transformation in our 32 countries is that the movement of employment from agriculture has been mostly to services (Figure A1). We observe an agriculture to manufacturing shift in employment for an appreciably long period only for North East and South East Asian countries and for Mauritius. Even for these latter set of countries, the share of manufacturing in total employment shows a hump shape in the case of Korea, Hong Kong, Malaysia, Mauritius, Singapore, and Taiwan, which suggest that the share of employment in manufacturing has reached its peak and now falling steadily over time. Labour shifts from agriculture to manufacturing and services take place gradually, even though countries do experience shocks that create abrupt changes in the sectoral decomposition of labour (Figure A2).

A second striking feature of structural transformation has been that the shift of employment from agriculture to services has been accompanied by falling productivity of services to agriculture (Figure A3). The productivity of services compared to the productivity in agriculture has seen a steady increase only in Botswana, China, Hong Kong, India and Zambia. Productivity in manufacturing has also stagnated or decreased for most countries, with the exception of Botswana, China, Korea, Malaysia, Taiwan and Zambia (Figure A4). Productivity in manufacturing has also stagnated or decreased for most countries, with the exception of Botswana, China, Korea, Malaysia, Taiwan and Zambia.

The large shift of employment from agriculture to services accompanied by falling relative productivity of services suggests that structural transformation in most developing countries (barring a few countries in Asia) has not been growth enhancing. This has implications for the possible effects that structural transformation may have on inequality and poverty, which we explore next.

Figure 1. Shifts in Employment between Sectors and Relative Labour Productivity

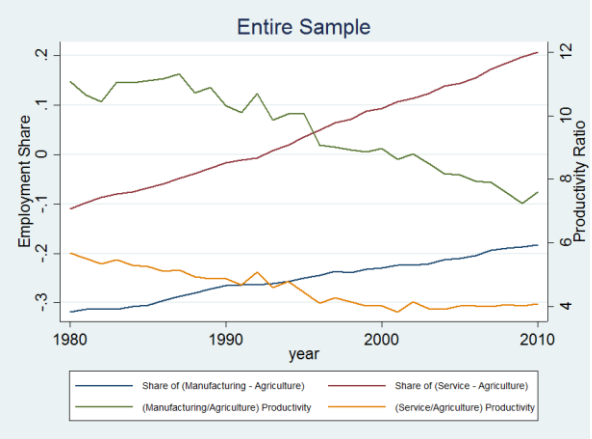


Figure 2. Shifts in Employment between Sectors and Relative Labour Productivity in Structurally Developed Countries

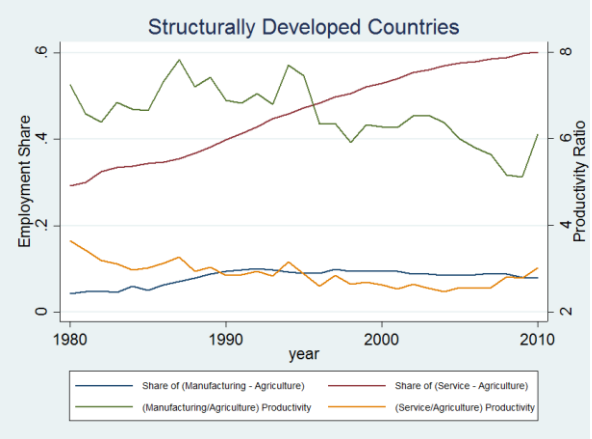


Figure 3. Shifts in Employment between Sectors and Relative Labour Productivity in Structurally Developing Countries

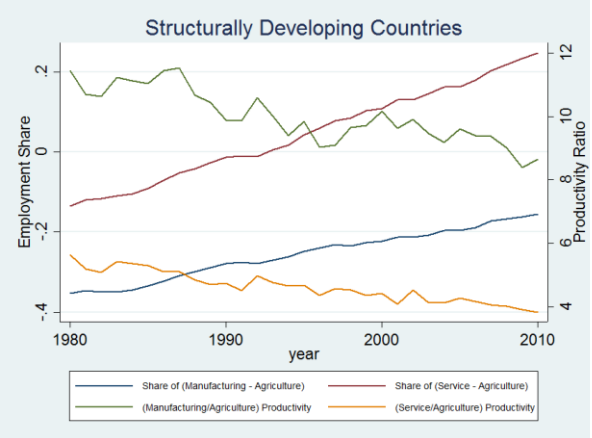
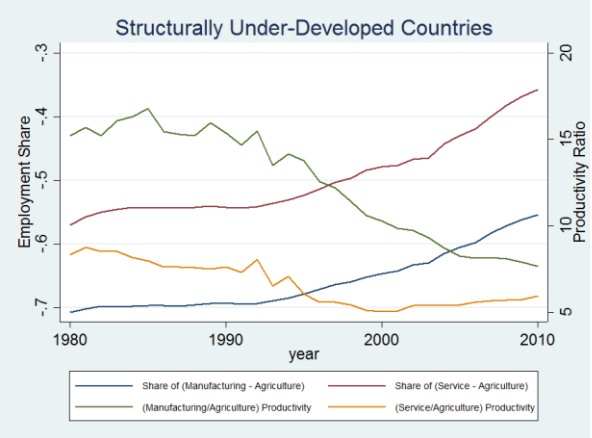


Figure 4. Shifts in Employment between Sectors and Relative Labour Productivity in Structurally Under-Developed Countries



The country level graphs in Figures A1-A4 show very different patterns of structural transformation which cut across geographical region. To help with the interpretation of the country level graphs, we categorize the countries in our sample into three groups that we call "Structurally Under-Developed", "Structurally Developing" and "Structurally Developed".

We define structurally under-developed countries as countries where agriculture is the largest sector in terms of the number of people employed in the most recent time period available. In our sample, these countries are Ethiopia, India, Kenya, Malawi, Nigeria, Senegal, Tanzania and Zambia. These countries are all in Sub-Saharan Africa, with only India being the non-African country. Structurally developing countries are where more people are employed in the services sector than agriculture, with agriculture being the second largest sector. Bolivia, Botswana,

Brazil, China, Colombia, Costa Rica, Egypt, Ghana, Indonesia, Morocco, Peru, Philippines, Thailand and South Africa are structurally developing countries according to our definition. These countries span all three continents – Africa, Asia and Latin America. Lastly, structurally developed countries are counties that have more people employed in manufacturing sector than agriculture. These countries in the sample are Argentina, Chile, Hong Kong, Korea, Malaysia, Mauritius, Mexico, Singapore, Taiwan, and Venezuela. These countries are either in East Asia or Latin America (with the exception of Mauritius, which is in Africa). We note that within each category, average growth rates of GDP per capita has differed significantly across countries, suggesting a weak link between stages of structural transformation and economic growth (Figure A7). For example, in the structurally developed group of countries, the Latin American countries show lower growth rates than the other countries than the Asian countries. Similarly, for the structurally underdeveloped category, India's growth rate has exceeded those of the African countries. For the structurally developing category, we have fast growers such as Botswana and Egypt and slow growers such as South Africa.

We present summary graphs of paths of structural transformation, first for all countries (Figure 1), and then by the country categories as defined above (Figures 2, 3 and 4). In the full sample, we see the steady movement of labour from agriculture to services. However, as already noted, this move of workers to services is not supported by increases in the relative productivity in that sector. Even though agriculture remains the sector with lowest productivity in all country groups, its relative productivity has increased greatly in the previous 30 years. The average share of employment in the service sector has surpassed the share of employment in agriculture in mid-90s. Structurally developed countries have passed this level prior to 1980, while the share of employment in their manufacturing sectors has stayed relatively stable with a slight decrease in the relative productivity of manufacturing. Despite decreasing relative productivity compared to agriculture, labour shares of both services and manufacturing have been increasing over the 30-year period for structurally developing and under-developed countries. Structurally under-developed countries started to experience significant labour shifts from agriculture to other sectors only from mid-1990s onwards.

5. STRUCTURAL TRANSFORMATION AND INEQUALITY

What is the relationship between structural transformation and inequality? Figures 5-10 show the pooled relationship between structural transformation and two measures of inequality – the net income per capita Gini and the income share of the bottom 40 per cent. Country graphs of this relationship are available in the Appendix, Figure A5. We summarise the key relationships between structural transformation and inequality, first for the overall sample in Figures 5-7, and then by the three groups of countries: a) structurally developed, b) structurally developing) and c) structurally under-developed in Figures 8, 9 and 10 respectively. We focus on the relationship between structural transformation and the net income Gini as the relationship between structural transformation and the income share of the bottom 40 per cent of the population is broadly similar.

Agriculture vs Inequality

In the overall sample, we see evidence of the Kuznets curve – with an increase in inequality (whether measured by the net income Gini or the income share of the bottom 40 per cent of the population), then a decrease with a fall in the share of employment in agriculture (Figure 5).
In structurally developed countries, we see that as the share of agriculture in employment decreases, inequality follows an inverted U-shaped pattern (Figure 8). It first increases, peaking around when agriculture's share is around 20% of total employment. Inequality reduces once its share drops below this level. In structurally developing and underdeveloped countries, we only witness the first half of the transformation, where agriculture's share has not declined below 20% yet for most countries, and inequality has been increasing while agriculture's share drops (Figures 9 and 10).

Developed:	Inverted U
Developing:	Lower Agriculture → Higher Inequality & Lower Bottom 40 Income
Under-developed:	Lower Agriculture → Higher Inequality (weakly U shaped) & Lower Bottom 40 income

Manufacturing vs Inequality

In the overall sample, we do not see any clear relationship between the share of employment in manufacturing/non-manufacturing industry and inequality (Figure 6). As the share of manufacturing increases in structurally developed countries, inequality decreases (Figure 8). There is weaker evidence of this relationship for developing and under-developed countries, likely because they have not yet reached the level of development that is necessary to foster a more equal distribution of income (Figures 9 and 10).

Figure 5. Employment share in Agriculture vs Income Inequality

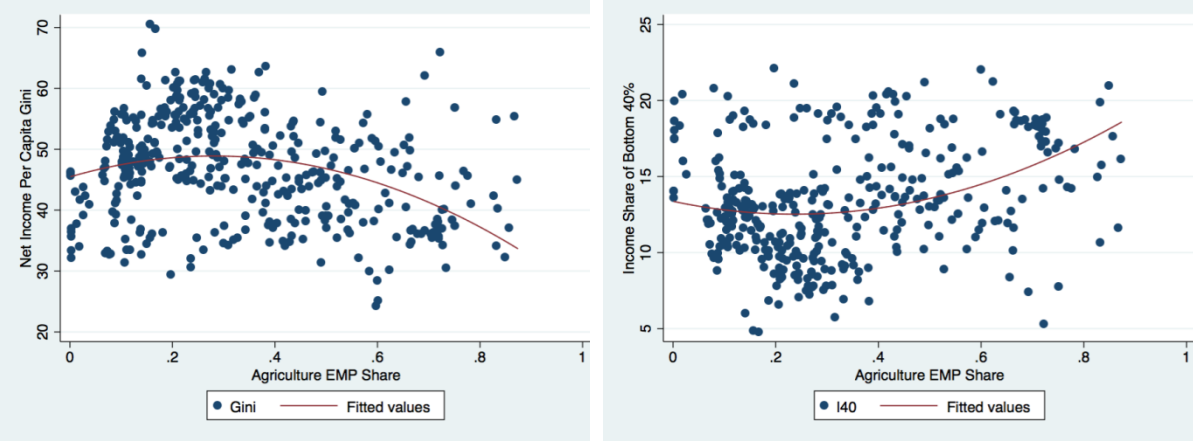
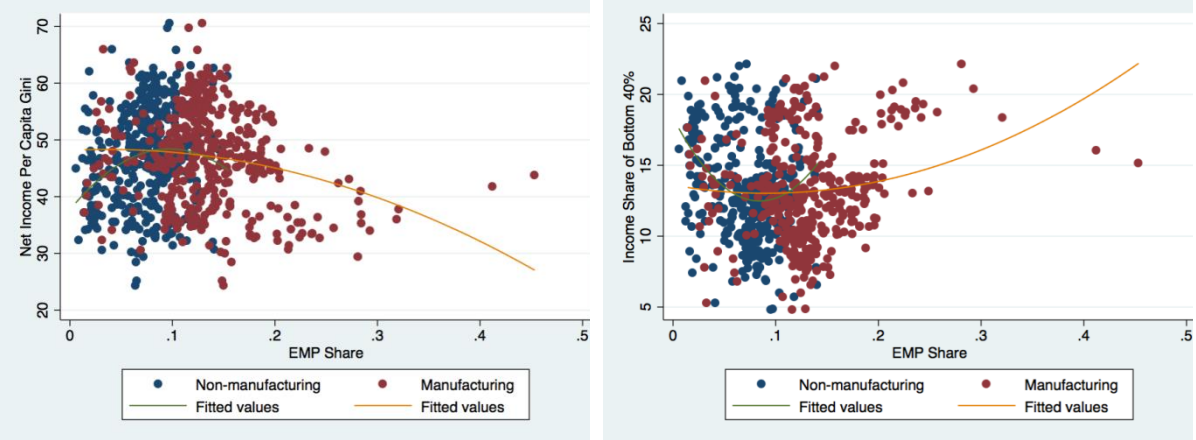


Figure 6. Employment share in Industry vs Income Inequality



Developed:	Higher Manufacturing → Lower inequality & higher bottom 40 income
	Non-manufacturing → U shaped but could actually be a vertical line
Developing:	Higher Manufacturing → Lower inequality, weakly inverted U shape
Under-developed:	Higher Manufacturing → Lower inequality

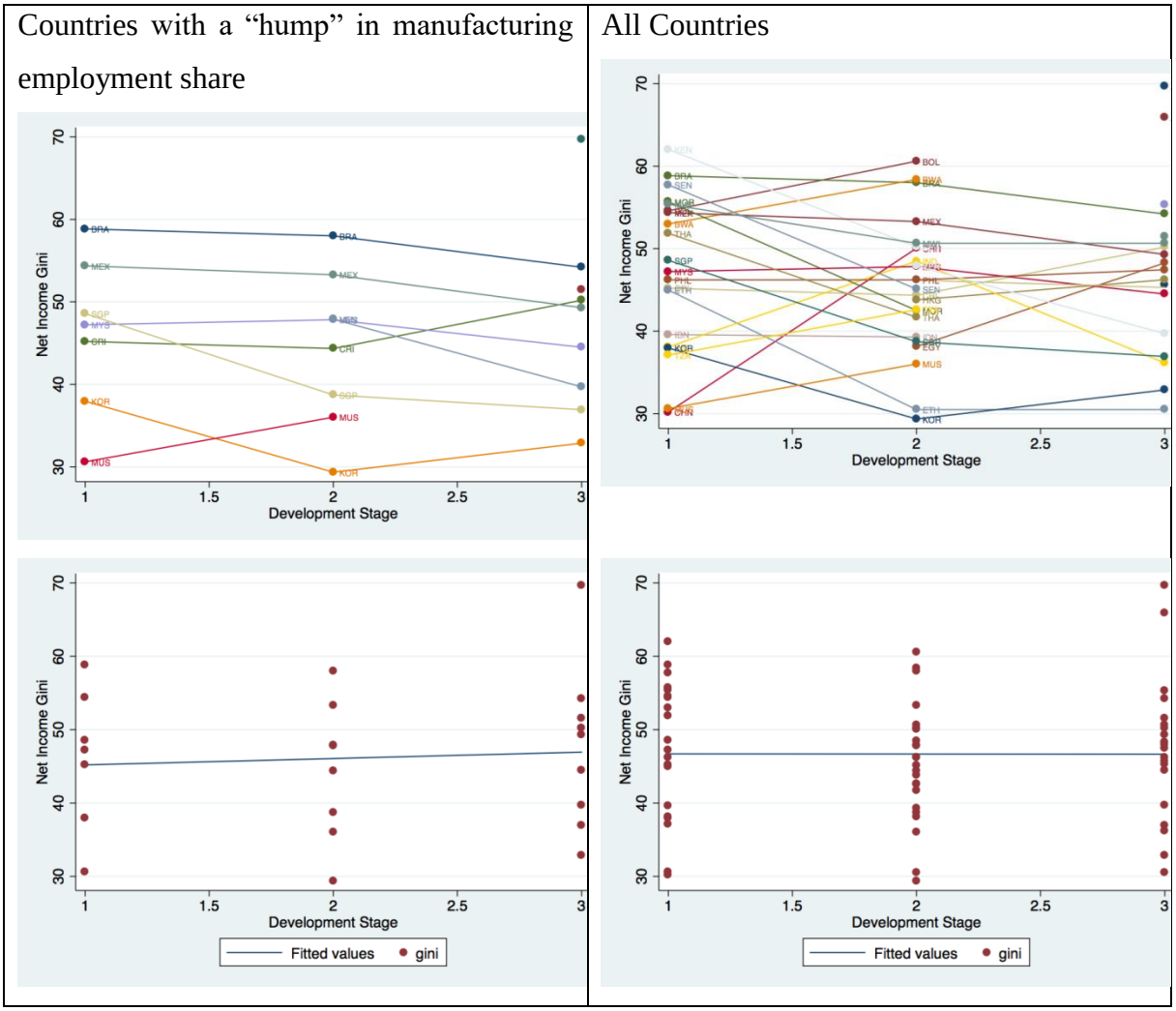
However, one problem in assessing the relationship between manufacturing employment share and inequality is that the share of manufacturing in total employment does not show a clear monotonic relationship with time. This is in contrast to the behaviour of the share of agriculture in total employment and the share of services in total employment, both of which show a clear monotonic relationship with time (in the case of agriculture, its share in total employment falls over time for our sample countries, and in the case of services, its share increases more or less continuously over time for our sample countries).

As is clear from Figure A1 in the Appendix, countries undergo the following patterns in the share of manufacturing in total employment over time: a) a "hump" shape (increasing, then decreasing), b) continuously increasing, c) continuously decreasing and d) no discernible movement. This suggests that a scatter plot of inequality against manufacturing employment share may be simply capturing cross-sectional differences in the relationship of inequality with manufacturing employment share across the sample countries, in contrast to the scatters of inequality against agricultural and services employment share which capture *both* time-series and cross-sectional variation in the relationship (in the case of the inequality-agriculture scatter, a movement in the graph from right to left in the horizontal axis is a movement in time, while in the case of the inequality-services scatter, a movement in the graph from left to right in the horizontal axis is a movement in time).

In order to further analyse the relationship between inequality and manufacturing employment share, we have separated the countries in which we observe a "hump" in manufacturing employment. We define these humps as a steady increase in manufacturing from time t to time t+1, and then a decrease from t+1 onwards. Hence countries reach the peak levels of employment in manufacturing at t+1, where t can be different for each county. We call the increase in manufacturing in time-period t, Development Stage 1, the peak at t+1 Development Stage 2, and the following decline Development Stage 3. Taking the closest net income Gini

coefficients corresponding to each stage for each country, we produced the graphs in Figure 7. Graphs on the left-hand side show the movement of Gini coefficients through the three development stages, for countries that we observe the "hump". Other countries might be on the first or third stage of development during the entire time period of the sample. Graphs depicting the same relationship are on the right-hand side for all countries. We do not observe any meaningful relationship between income inequality and the development stages of different countries. Whether we confine our analysis to the countries with a hump shape in manufacturing employment share or include all countries for which we have inequality data over the time-period, we **do not observe** a common relationship between manufacturing employment share and inequality over time across our sample countries. This clearly shows the lack of a Kuznets type relationship across all countries, with a great deal of heterogeneity in the response of inequality to manufacturing driven structural transformation across countries. In fact, we do not see a Kuznets type relationship for *any* of the 32 countries in our sample.

Figure 7. Inequality in Different Development Stages



Service vs Inequality

Higher shares of service sector employment are associated with higher inequality in all country groups, with the correlation being especially strong in structurally developing countries (Figures 8-11).

Higher Service → Higher inequality in all groups

Figure 8. Employment share in Services vs Income Inequality

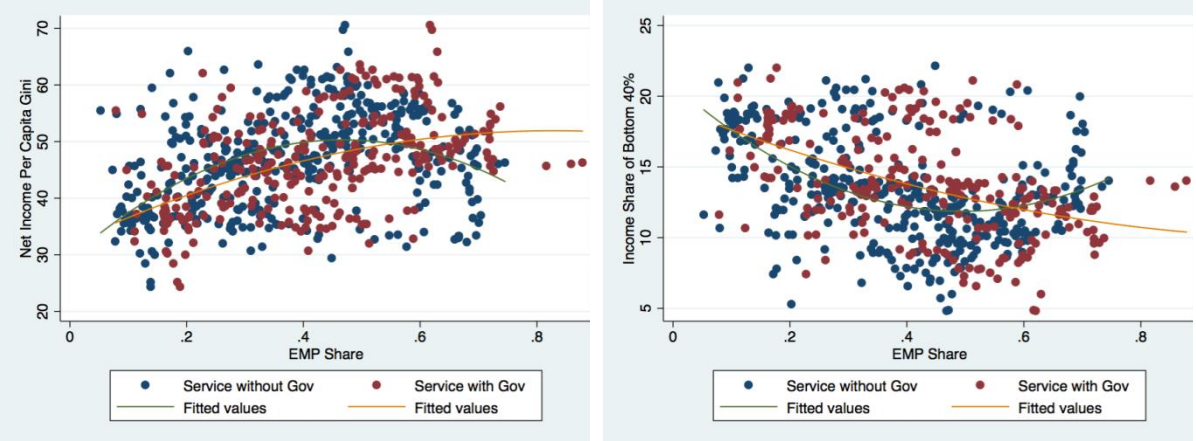
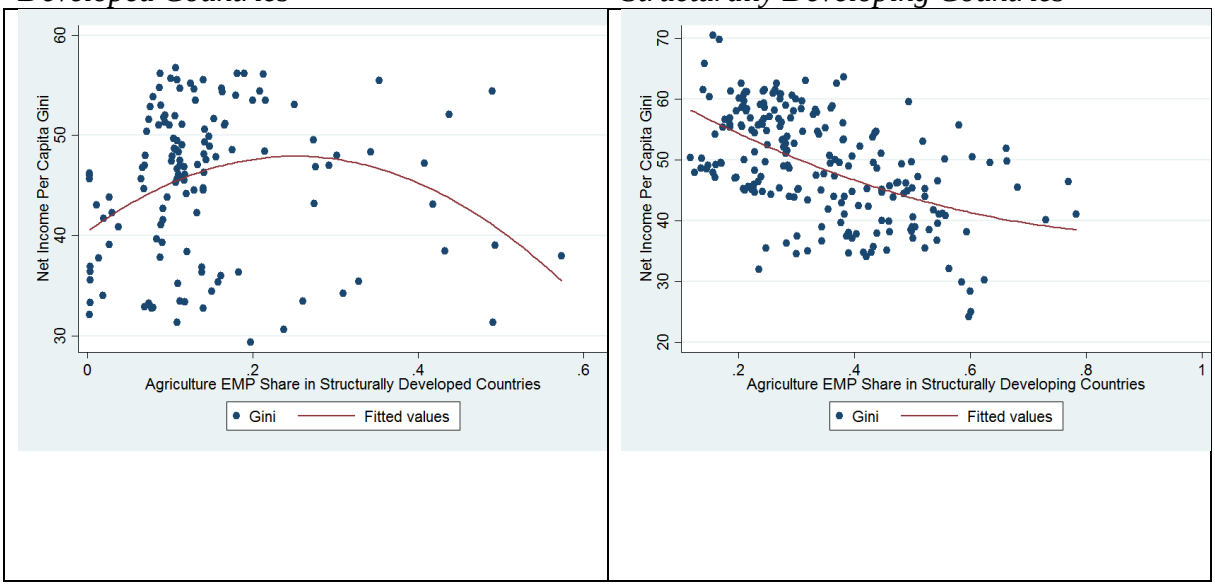


Figure 9. Agriculture, Industry and Services vs Income Inequality in Structurally Developed Countries

Figure 10. Agriculture, Industry and Services vs Income Inequality in Structurally Developing Countries



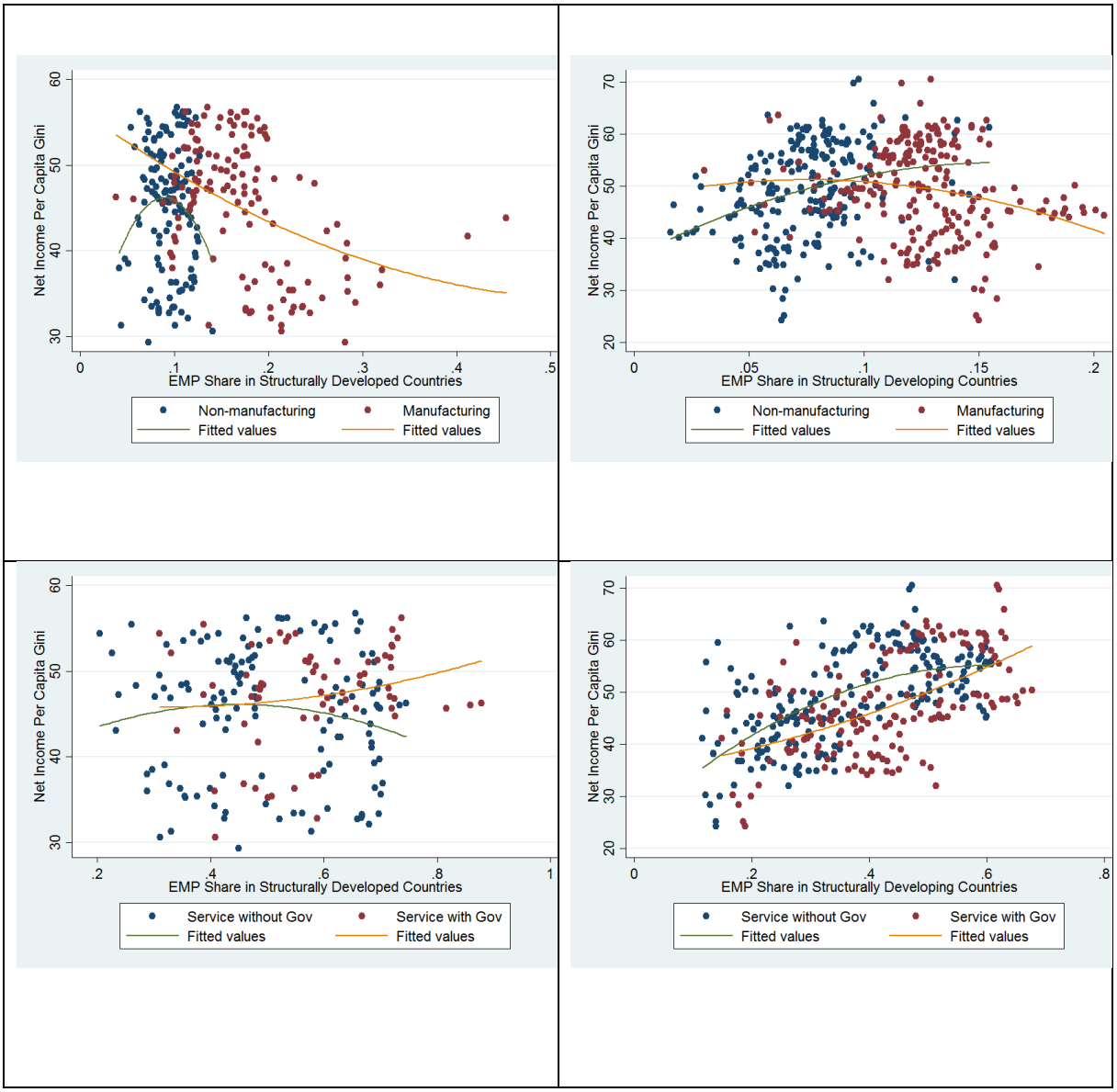
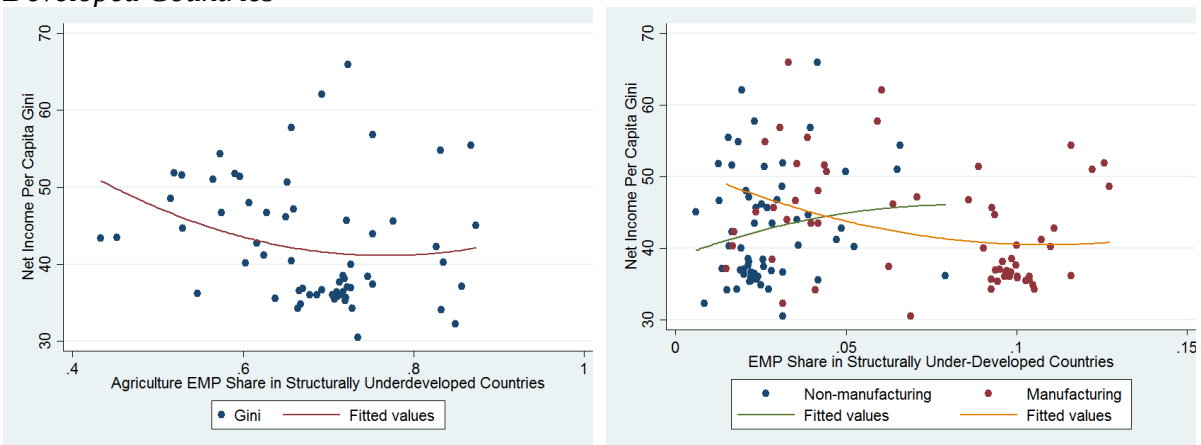
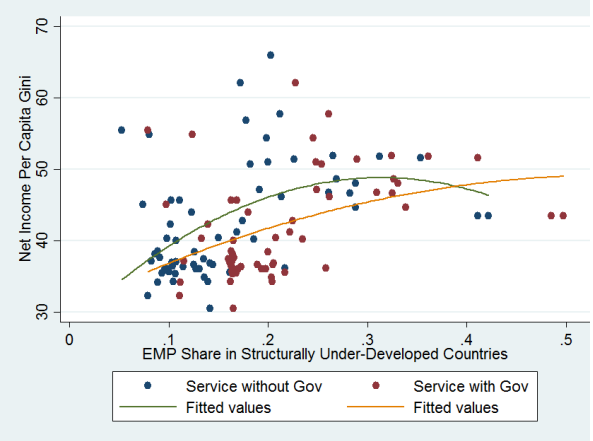


Figure 11. Agriculture, Industry and Services vs Income Inequality in Structurally Under-Developed Countries





6. STRUCTURAL TRANSFORMATION AND POVERTY

Figures 12-15 show the pooled relationship between structural transformation and poverty, as measured by the headcount ratio. Country graphs of this relationship are available in the Appendix, Figure A6. We summarise the key relationships between structural transformation and poverty, and then by the three groups of countries: a) structurally developed, b) structurally developing) and c) structurally under-developed.

Agriculture vs Poverty

A shift from agriculture to other sectors reduces poverty in all country groups (Figures 12-15).

Lower agriculture → Lower poverty in all groups

Manufacturing vs Poverty

There is a U-shaped relationship between the share of employment in manufacturing/non-manufacturing industry and headcount poverty (Figure 12). The relationship between manufacturing and poverty in structurally developed countries is not clear due to outliers that shift the right end of the curve upwards (Figure 13). If outliers were taken out, we are likely seeing the poverty reducing impact of manufacturing. Despite the outliers, manufacturing does reduce poverty in structurally developing countries, while non-manufacturing industry has a U-shaped impact on poverty (Figure 14). A rise in the share of manufacturing, or non-manufacturing, in total employment significantly reduces poverty in structurally under-developed countries (Figure 15)

Figure 12. Agriculture, Industry and Services vs Poverty Headcount Ratio in the Entire Sample

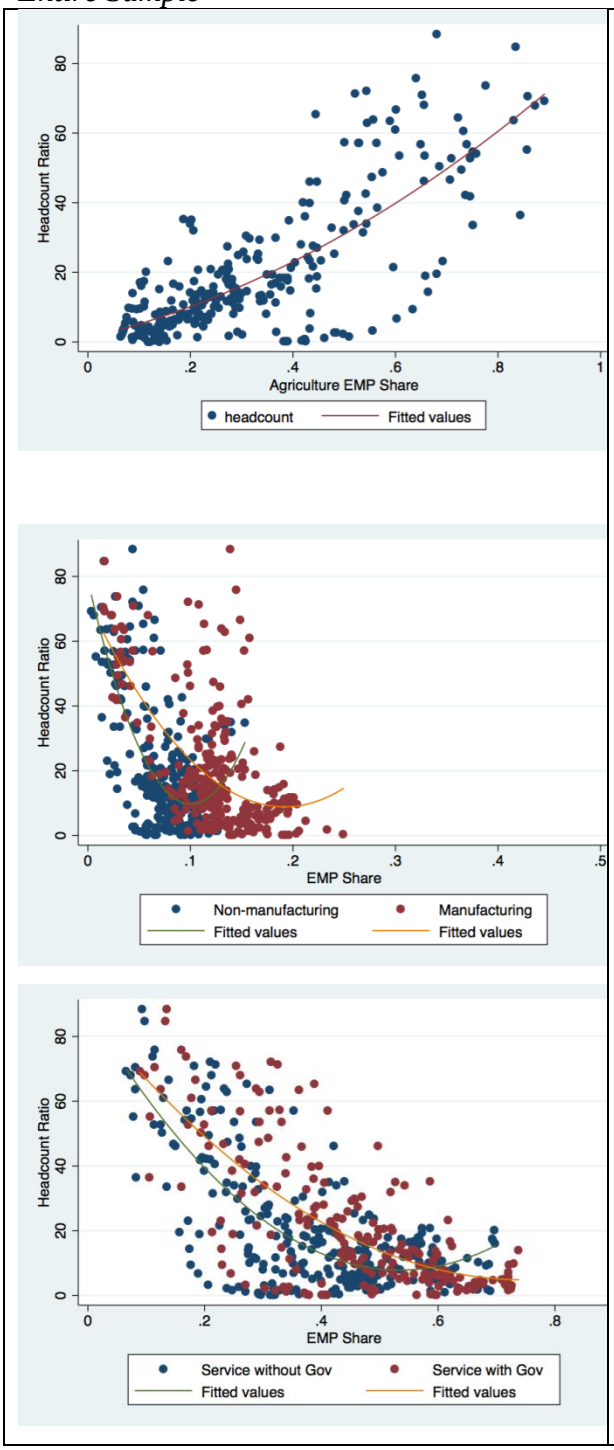
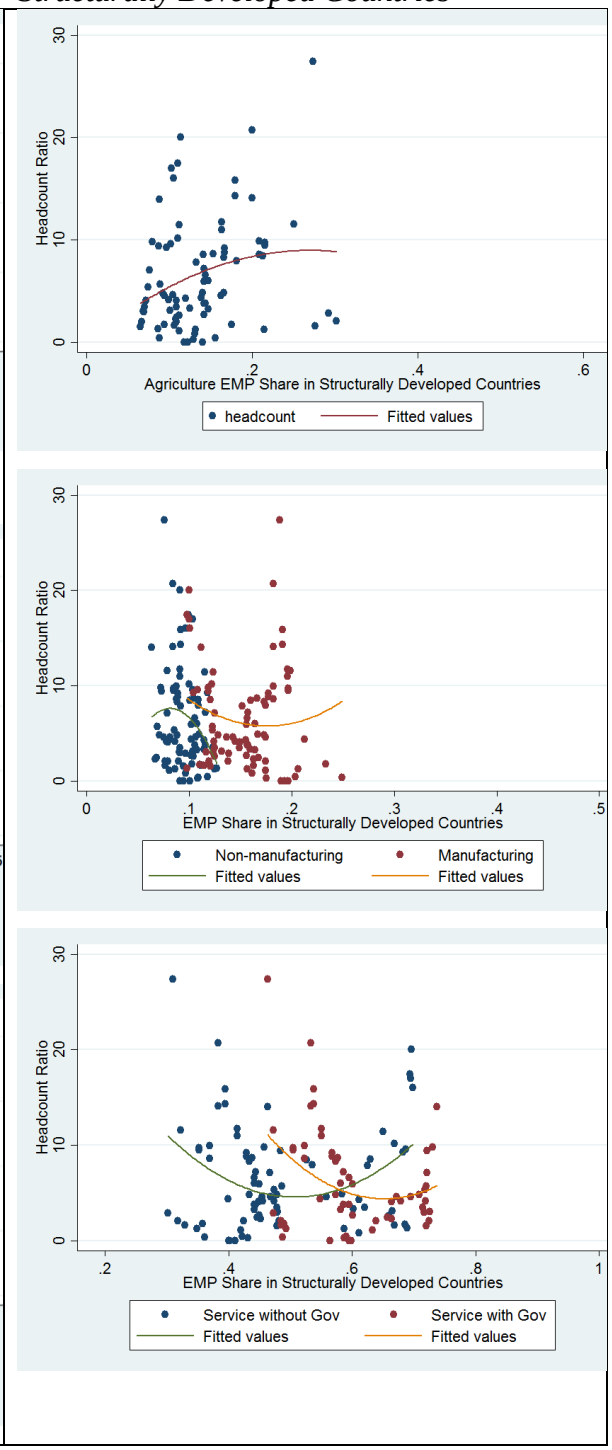


Figure 13. Agriculture, Industry and Services vs Poverty Headcount Ratio in Structurally Developed Countries



Developed:	Manufacturing → U-shaped but could be lowering poverty if outliers are taken out
	Non-manufacturing → Inverted-U shaped but could actually be a vertical line
Developing:	Higher Manufacturing → Lower poverty but weak.
	Non-manufacturing → U shaped
Under-developed:	Higher Manufacturing → Lower poverty

Service vs Poverty

There is a clear negative relationship between share of employment in services and headcount poverty (Figure 12). A strong negative correlation between higher share of service and poverty exists in structurally developing countries, while the relationship between the two follows a U-shaped pattern in structurally developed countries (Figures 13 and 14). The shift to service does not seem to have a meaningful impact on poverty in under-developed countries (Figure 15).

Developed:	Higher service → Lower poverty
Developing:	Higher service → Lower poverty

Figure 14. Agriculture, Industry and Services vs Poverty Headcount Ratio in Structurally Developing Countries

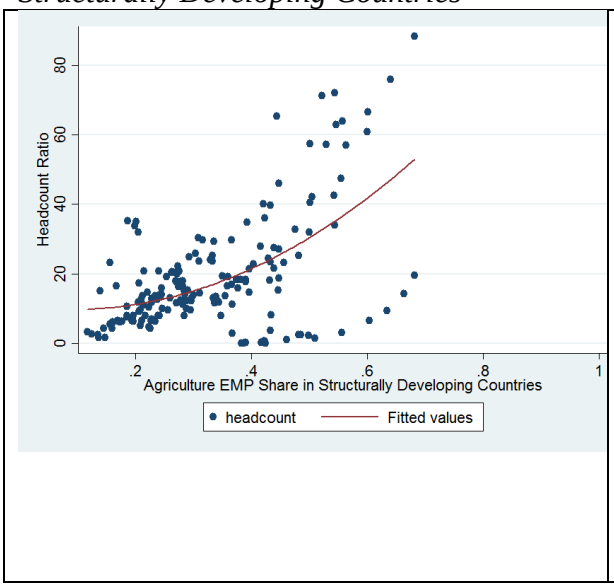
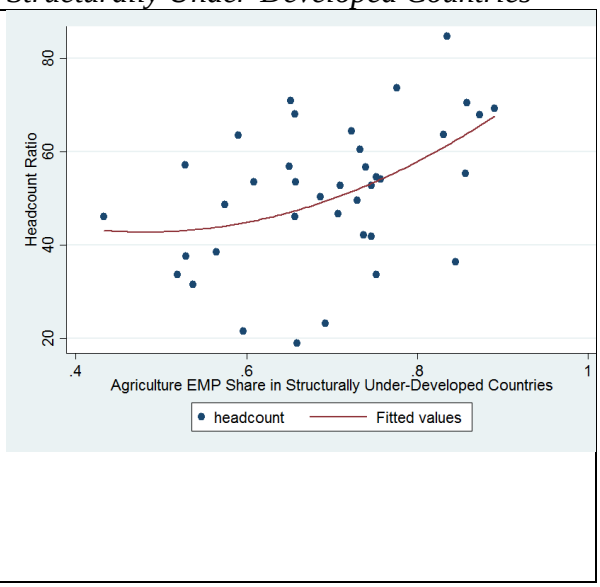
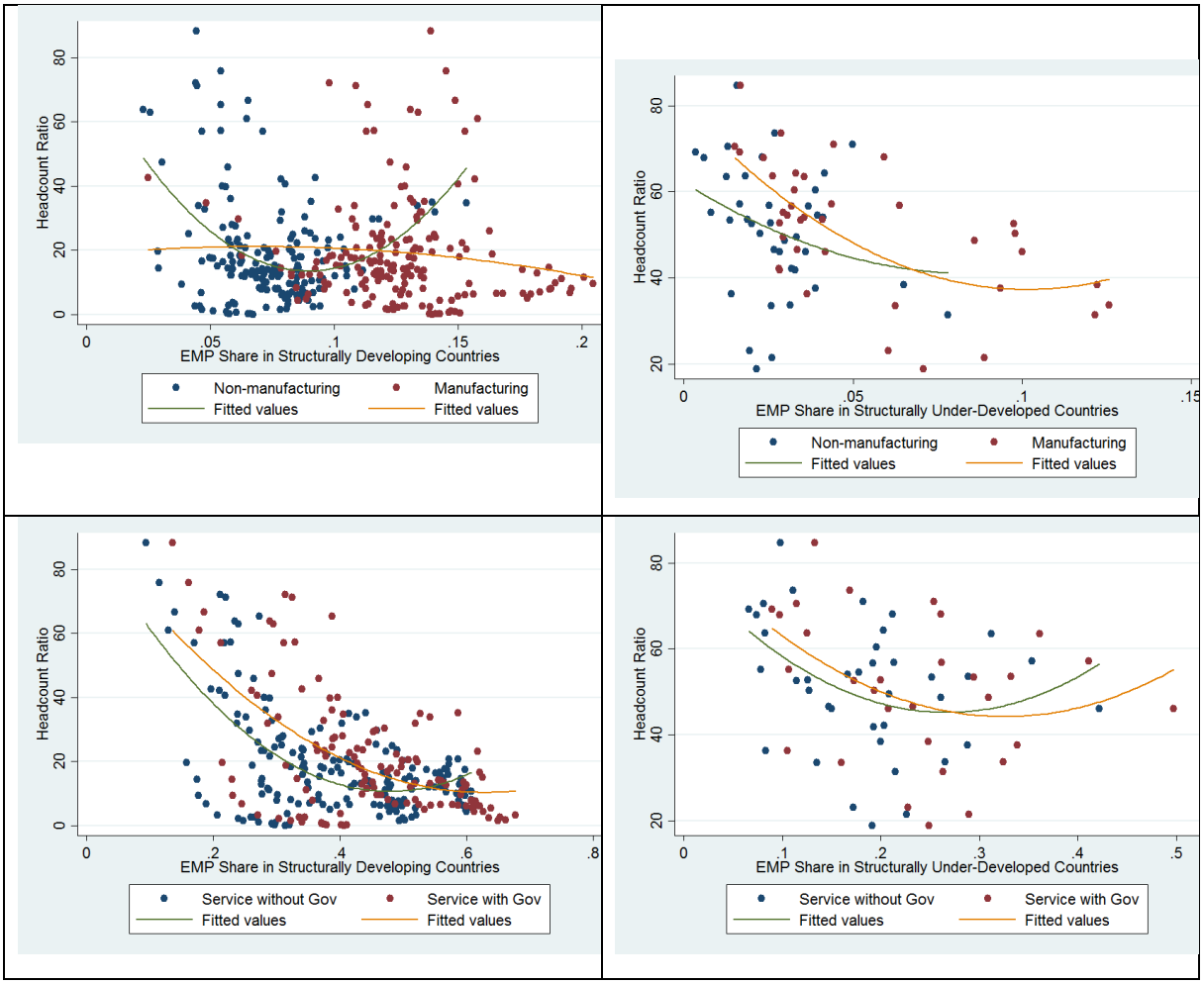


Figure 15. Agriculture, Industry and Services vs Poverty Headcount Ratio in Structurally Under-Developed Countries





7. CONCLUSIONS

We can summarise the main findings of our paper as follows:

i) Structural transformation in the majority of our 32 countries has been a move of workers from agriculture to services, **and not to** manufacturing. Further, the move of workers from agriculture to services (and to manufacturing, wherever it has occurred) has been accompanied by a fall in the relative productivity of services and manufacturing to agriculture (barring a few countries in North and South East Asia), suggesting that structural transformation has, on the whole, not been growth enhancing.

ii) The countries in our sample have shown different paths of structural transformation which cuts across geographical regions. A set of countries can be categorised as structurally developed as the number of workers employed in manufacturing exceeds the number of workers in agriculture. These countries are Argentina, Chile,

Hong Kong, Korea, Malaysia, Mauritius, Mexico, Singapore, Taiwan, and Venezuela. Structurally under-developed countries have agriculture as the largest sector in terms of the number of people employed in the most recent time period available. In our sample, these countries are Ethiopia, India, Kenya, Malawi, Nigeria, Senegal, Tanzania and Zambia. Structurally developing countries are where more people are employed in the services sector than agriculture, with agriculture being the second largest sector. Bolivia, Botswana, Brazil, China, Colombia, Costa Rica, Egypt, Ghana, Indonesia, Morocco, Peru, Philippines, Thailand and South Africa are structurally developing countries according to our definition.

iii) If we use look at the relationship of the share of agriculture in total employment and inequality, we we see a Kuznets type inverted U relationship for structurally developed countries. For structurally developing and under-developed countries, a lower employment share in agriculture is accompanied by higher inequality However, we do not observe a Kuznets relationship between the share of manufacturing in total employment and inequality. This is particularly evident when we take into account the different paths of industrialisation that developing countries have followed. However, a shift to services unambigously increases inequality in all categories of countries with different types of structural transformation. This suggests that contrary to Kuznets' argument, the move of employment from agriculture to manufacturing is not necessarily inequality enhancing. On the other hand, a move from agriculture to services clearly is.

iv) Structural transformation is broadly linked to falling poverty across all categories of countries. Within this overall finding, there are differences in the response of poverty to structural change, depending on whether the country is structurally developed, developing or under-developed, and whether the movement of workers is from agriculture to manufacturing or to services.

REFERENCES

Athukorala, P. and K. Sen (2014), "Industrialization, Employment and Poverty", in J. Weiss and M. Tribe (eds.), *Routledge Handbook of Industry and Development* London: Routledge, pp. 84-96.

Dabla-Norris, E., Thomas, A.H., Garcia-Verdu, R. and Chen, Y. (2013). Benchmarking structural transformation across the world.

De Vries, G., de Vries, K., Gouma, R., Pahl, S. and Timmer, M. (2015). GGDC 10-Sector Database: Contents, Sources and Methods.

Diao, X., McMillan, M. and Rodrik, D. (2017). *The recent growth boom in developing economies: A structural change perspective* (No. w23132). NBER.

Duarte, M. and Restuccia, D. (2010). The role of the structural transformation in aggregate productivity. *The Quarterly Journal of Economics*, *125*(1), pp.129-173.

Haraguchi, N. and Rezonja, G. (2010). *Patterns of Manufacturing Development Revisited*. United Nations Industrial Development Organization.

Haraguchi, N. (2015). *Patterns of structural change and manufacturing development*. Routledge Handbooks Online.

Herrendorf, B., Rogerson, R. and Valentinyi, Á. (2014). Growth and Structural Transformation. *Handbook of Economic Growth*, *2*, pp.855-941.

Jaumotte, F., Lall, S. and Papageorgiou, C. (2013). Rising income inequality: technology, or trade and financial globalization?. *IMF Economic Review*, *61*(2), pp.271-309.

Kuznets, S. (1955), "Economic Growth and Income Inequality", American Economic Review, Vol. 45, No. 1, pp. 1-28.

Lewis, W. A. (1954), "Economic development with unlimited supplies of labour.", *The Manchester School* 22(2), 139-191.

McMillan, M., Rodrik, D. and Verduzco-Gallo, Í. (2014). Globalization, structural change, and productivity growth, with an update on Africa. *World Development*, *63*(1), 11-32.

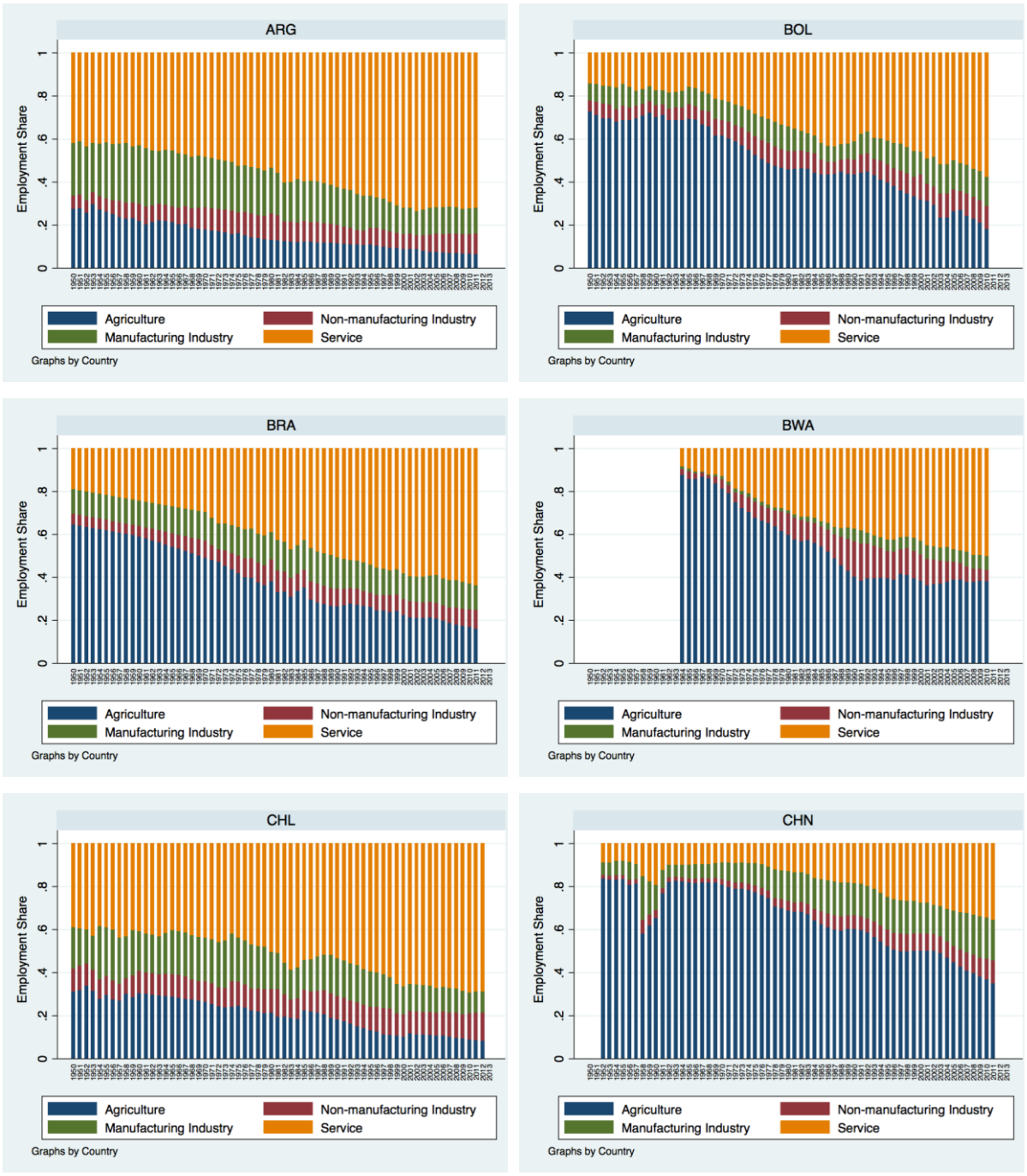
Rodrik, D., (2016). Premature deindustrialization. *Journal of Economic Growth*, *21*(1), 1-33.

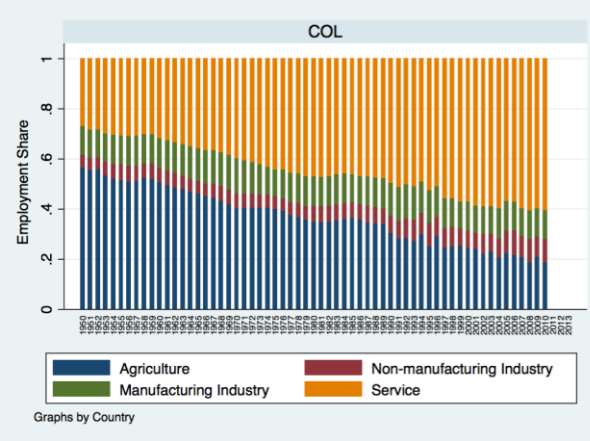
Timmer, M.P. and de Vries, G.J. (2009). Structural change and growth accelerations in Asia and Latin America: a new sectoral data set. *Cliometrica*, *3*(2), pp.165-190.

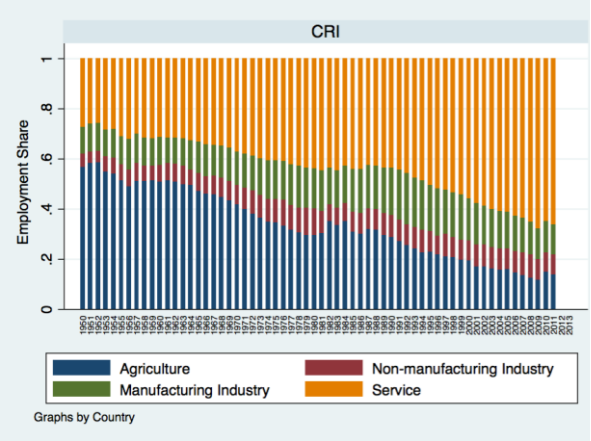
Wood, A. (2017). Variation in structural change around the world, 1985-2015. WIDER Working Paper 2017/34.

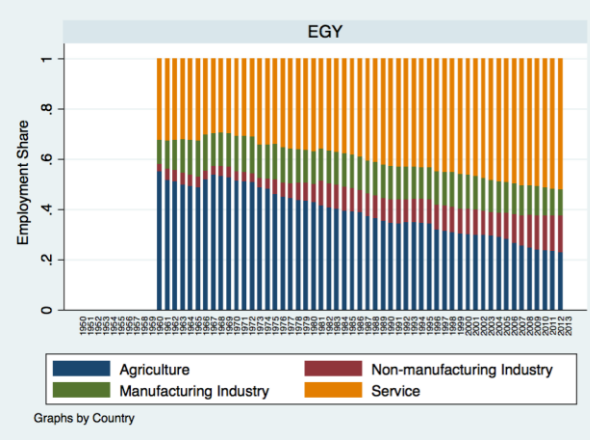
APPENDIX

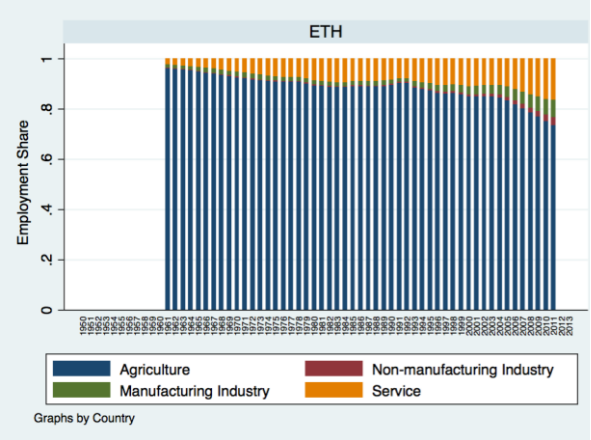
Figure A1. Structural Transformation Over Time

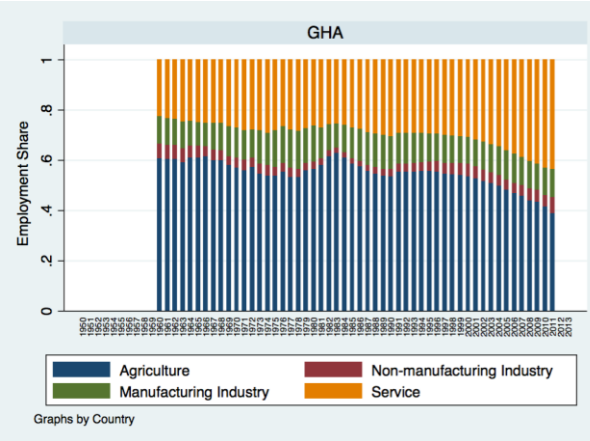


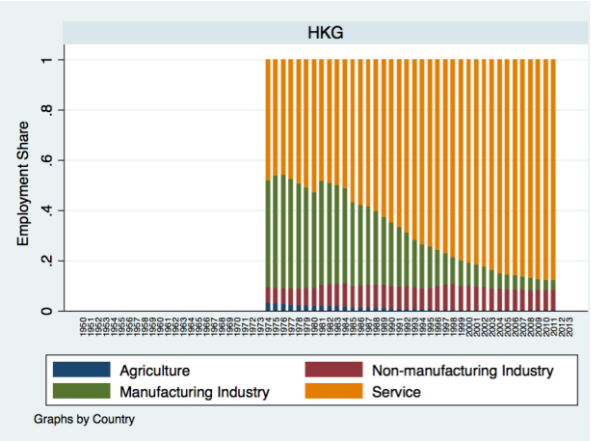

COL
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Manufacturing Industry
Non-manufacturing Industry
Service
Graphs by Country

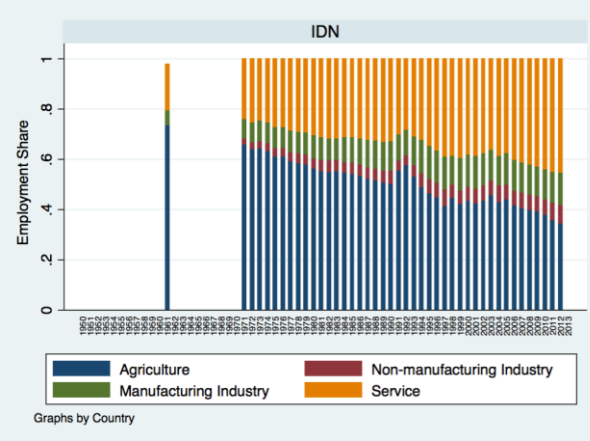

CRI
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Manufacturing Industry
Non-manufacturing Industry
Service
Graphs by Country

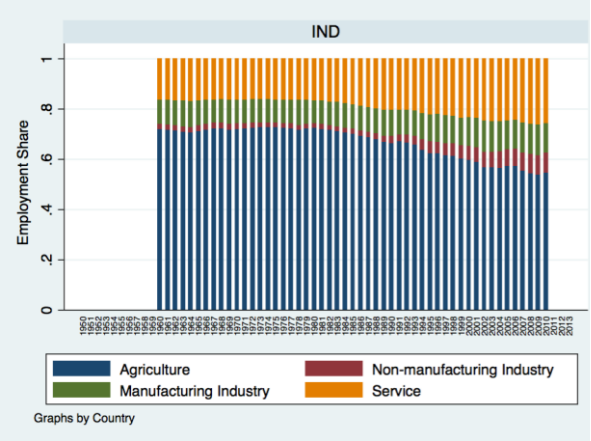

EGY
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Manufacturing Industry
Non-manufacturing Industry
Service
Graphs by Country

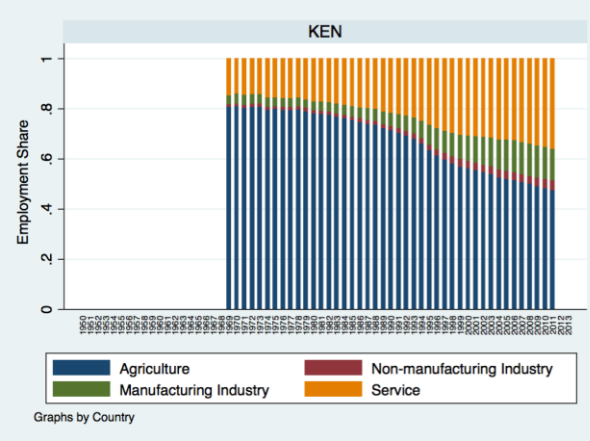

ETH
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Manufacturing Industry
Non-manufacturing Industry
Service
Graphs by Country

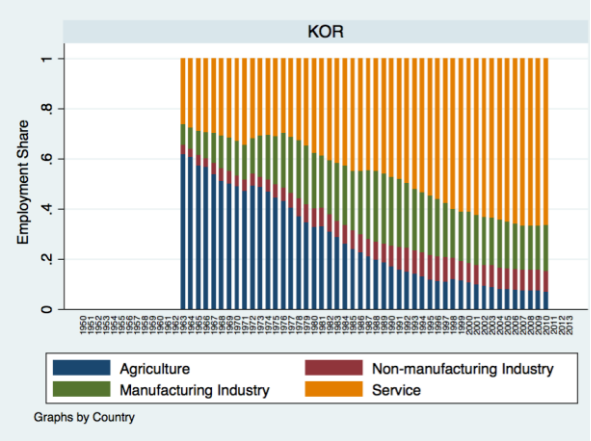

GHA
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Manufacturing Industry
Non-manufacturing Industry
Service
Graphs by Country

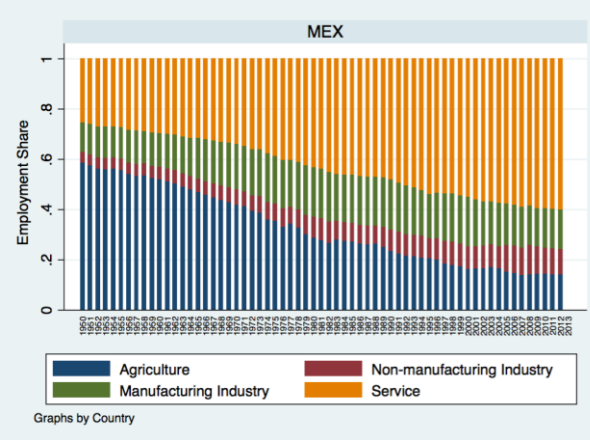

HKG
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Manufacturing Industry
Non-manufacturing Industry
Service
Graphs by Country

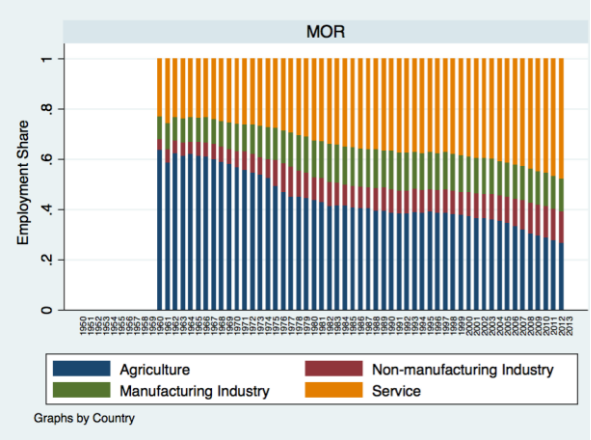

IDN
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Manufacturing Industry
Non-manufacturing Industry
Service
Graphs by Country

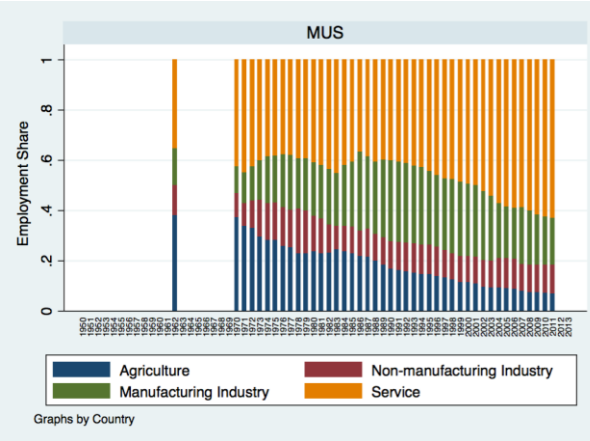

IND
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Manufacturing Industry
Non-manufacturing Industry
Service
Graphs by Country

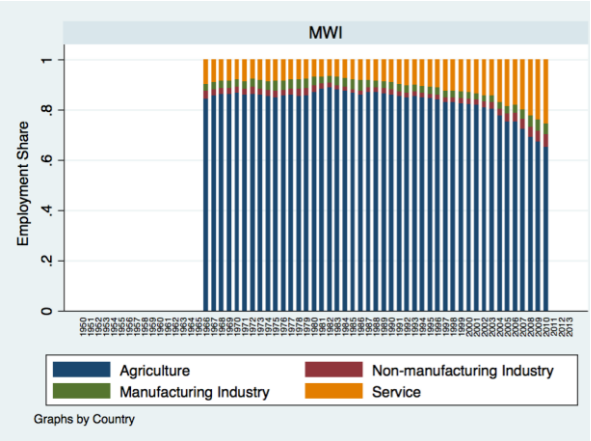

KEN
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service
Graphs by Country

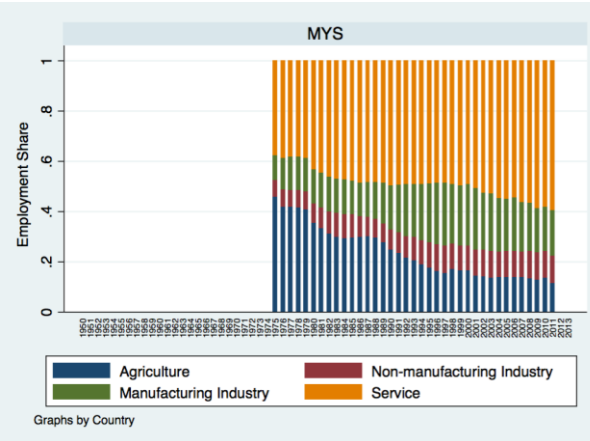

KOR
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service
Graphs by Country

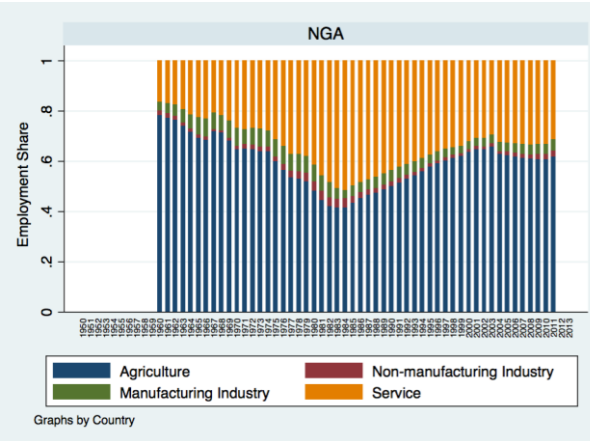

MEX
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service
Graphs by Country

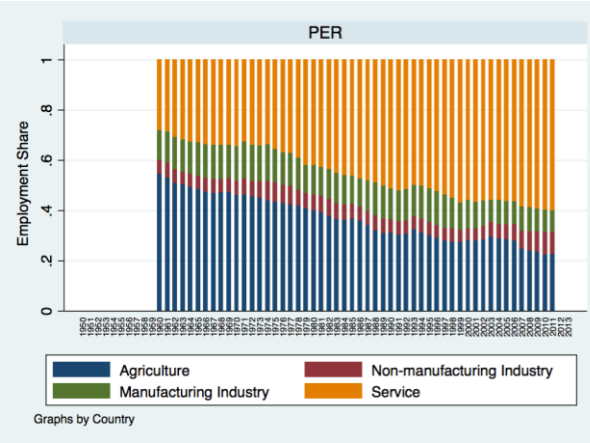

MOR
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service
Graphs by Country

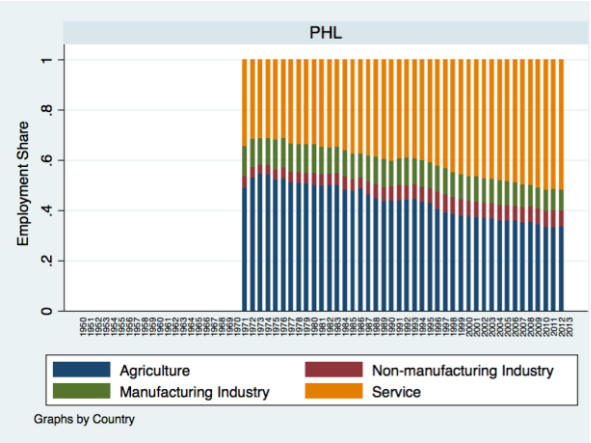

MUS
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service
Graphs by Country

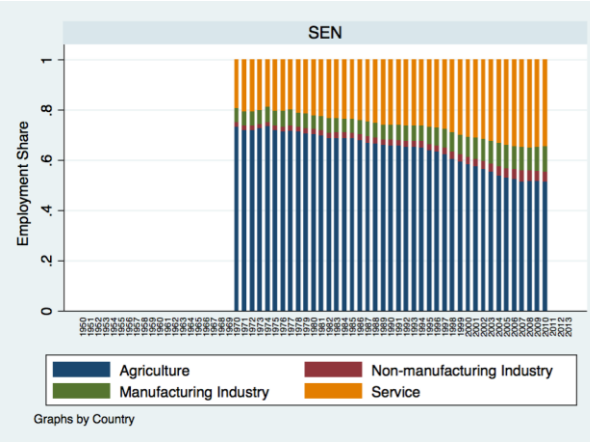

MWI
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service
Graphs by Country

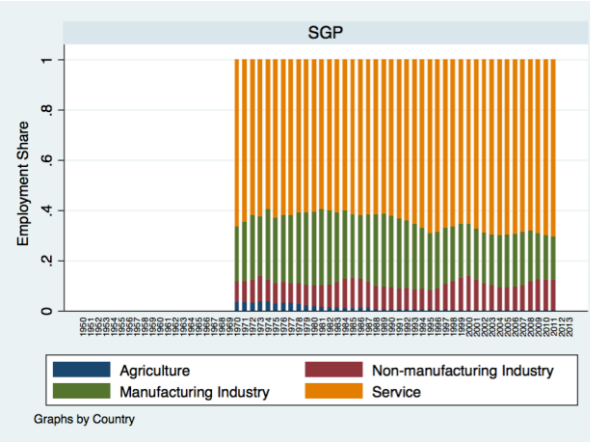

MYS
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service
Graphs by Country

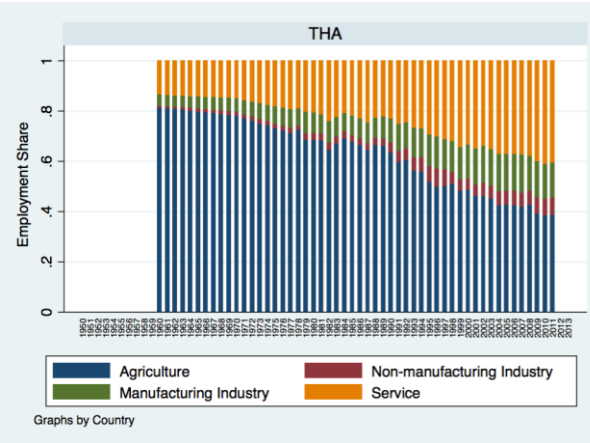

NGA
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service
Graphs by Country

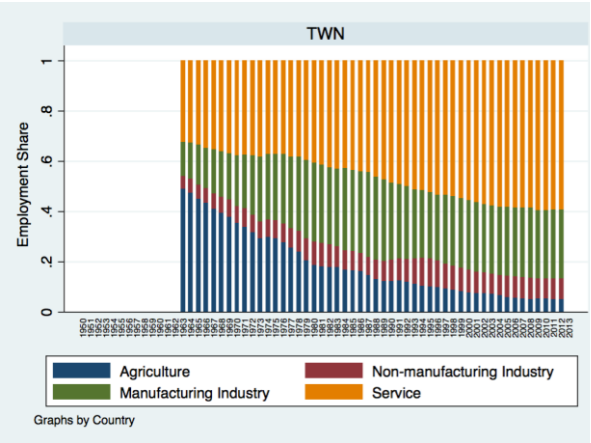

PER
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Manufacturing Industry
Non-manufacturing Industry
Service
Graphs by Country

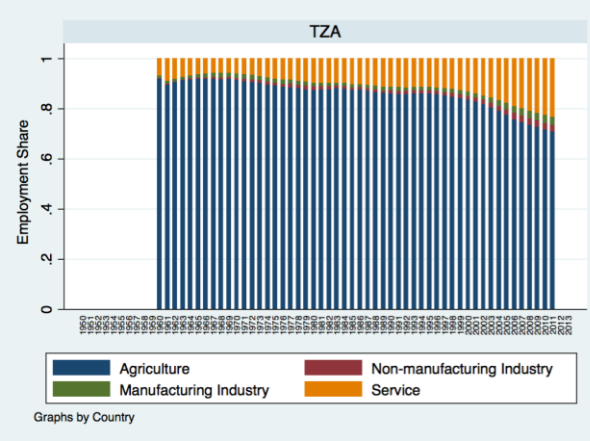

PHL
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Manufacturing Industry
Non-manufacturing Industry
Service
Graphs by Country

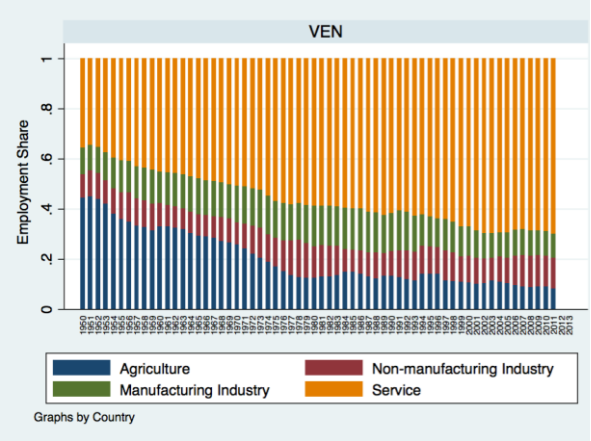

SEN
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Manufacturing Industry
Non-manufacturing Industry
Service
Graphs by Country

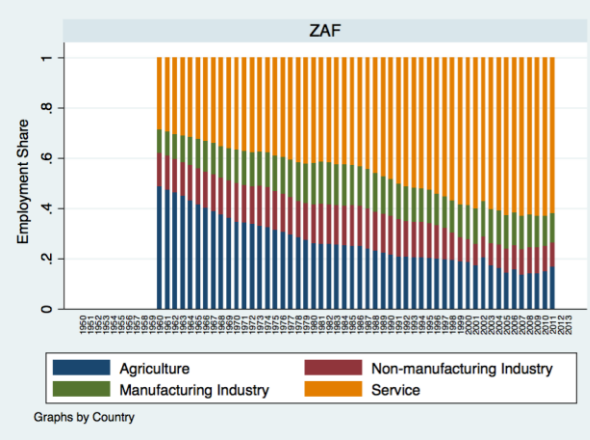

SGP
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Manufacturing Industry
Non-manufacturing Industry
Service
Graphs by Country


THA
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Manufacturing Industry
Non-manufacturing Industry
Service
Graphs by Country


TWN
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Manufacturing Industry
Non-manufacturing Industry
Service
Graphs by Country


TZA
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service
Graphs by Country


VEN
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service
Graphs by Country


ZAF
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service
Graphs by Country

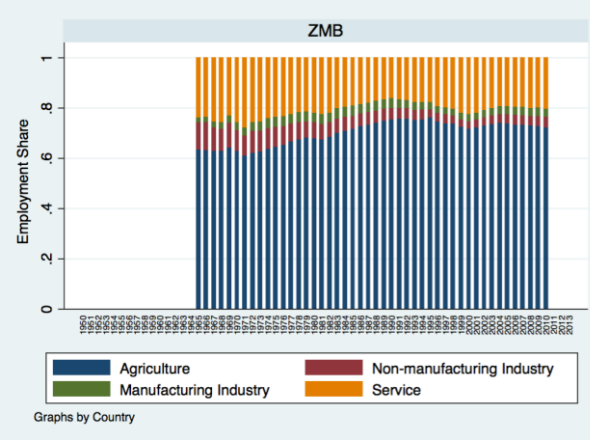
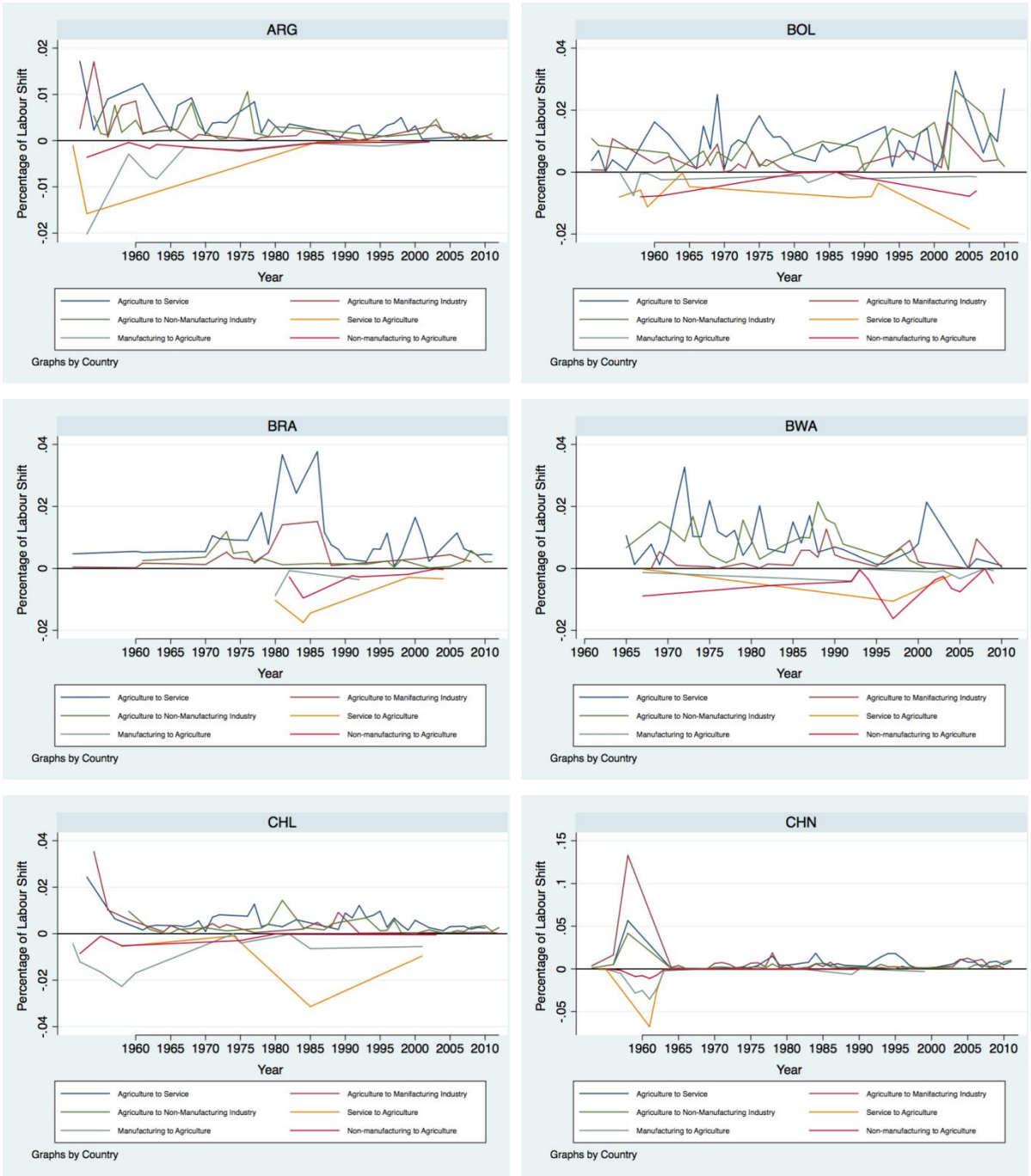
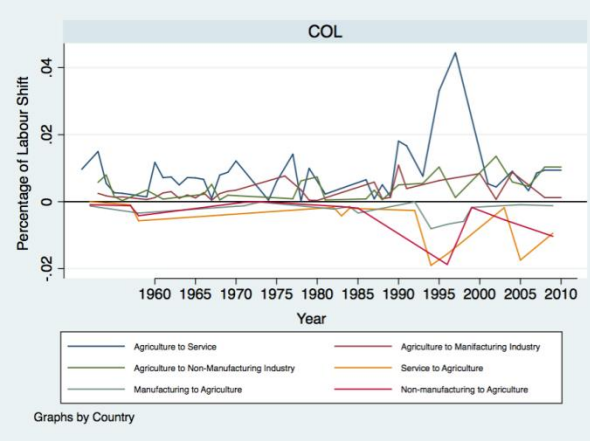
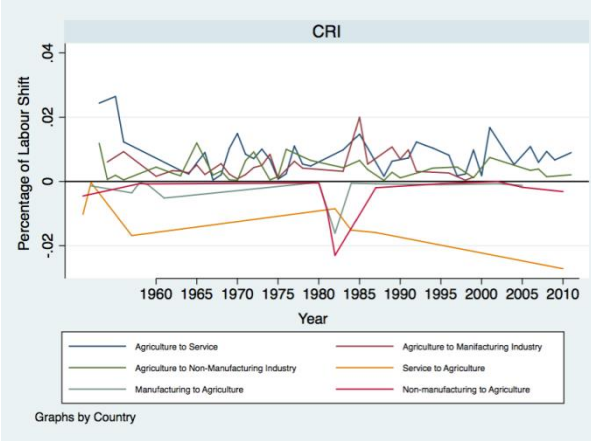
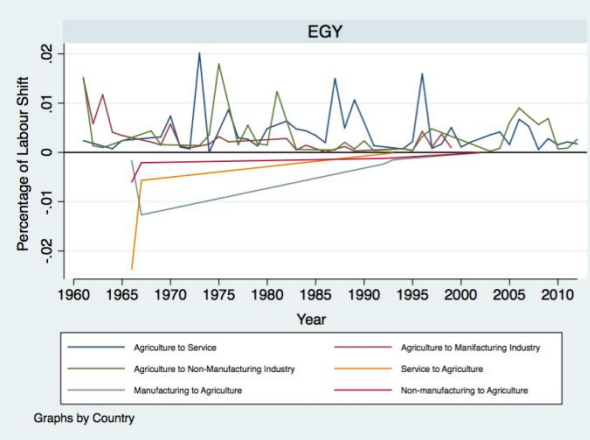

ZMB
Employment Share
0
.2
.4
.6
.8
1
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service
Graphs by Country

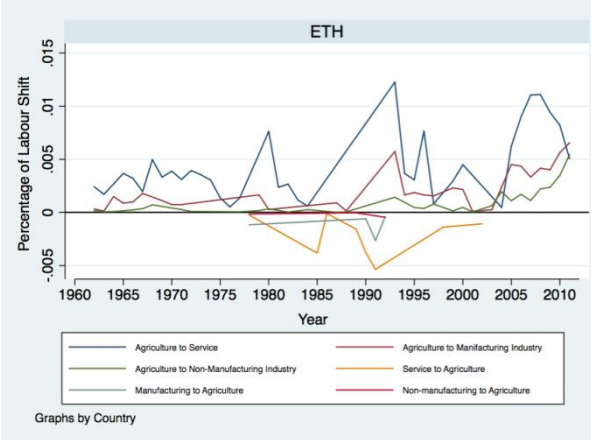
Figure A2. Movements to and from Agriculture Over Time

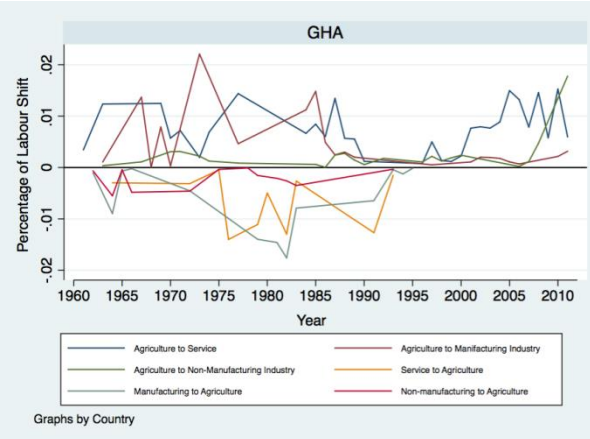


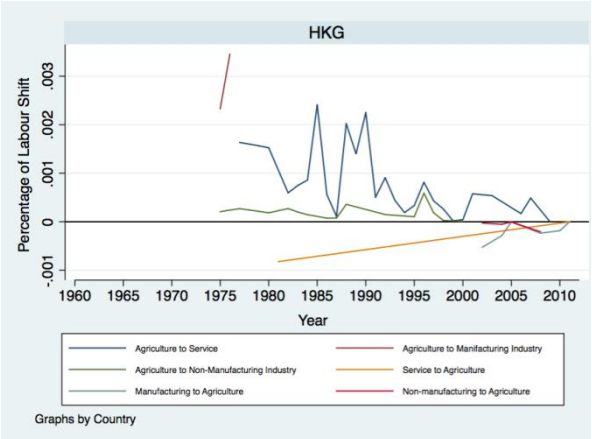

COL
Percentage of Labour Shift
-.02
0
.02
.04
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

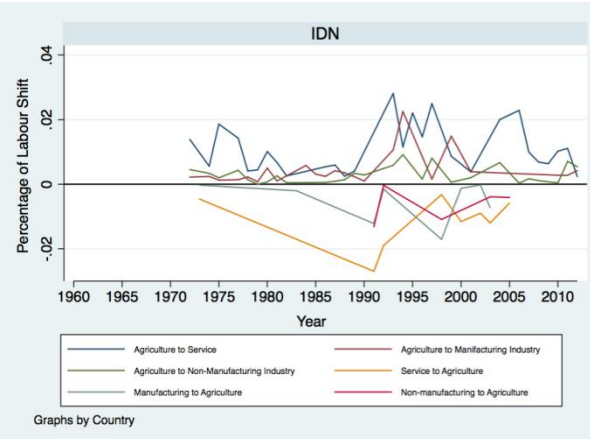

CRI
Percentage of Labour Shift
-.02
0
.02
.04
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

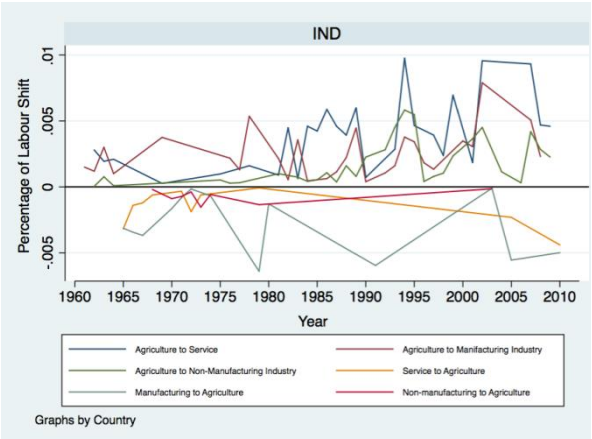

EGY
Percentage of Labour Shift
-.02
-.01
0
.01
.02
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

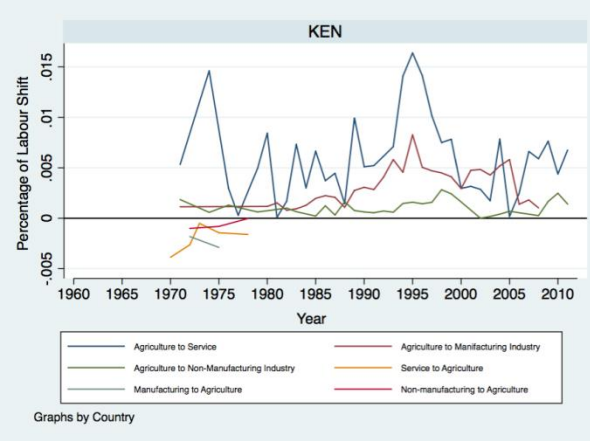

ETH
Percentage of Labour Shift
-.005
0
.005
.01
.015
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

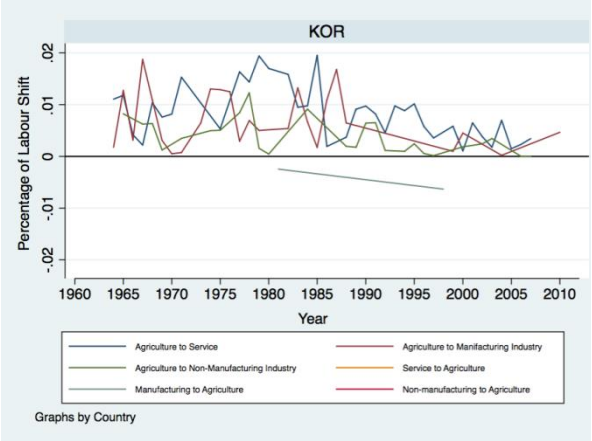

GHA
Percentage of Labour Shift
-.02
-.01
0
.01
.02
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

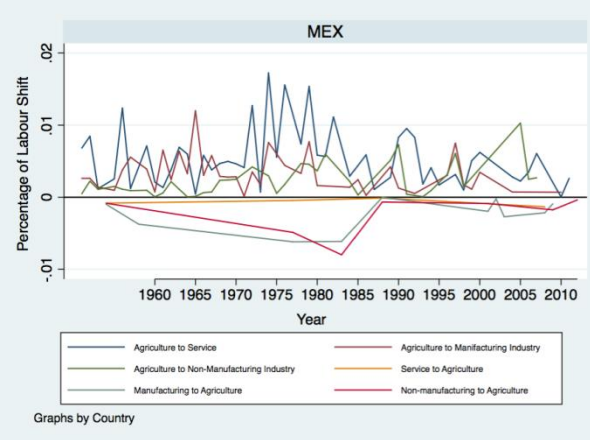

HKG
Percentage of Labour Shift
-.001
0
.001
.002
.003
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

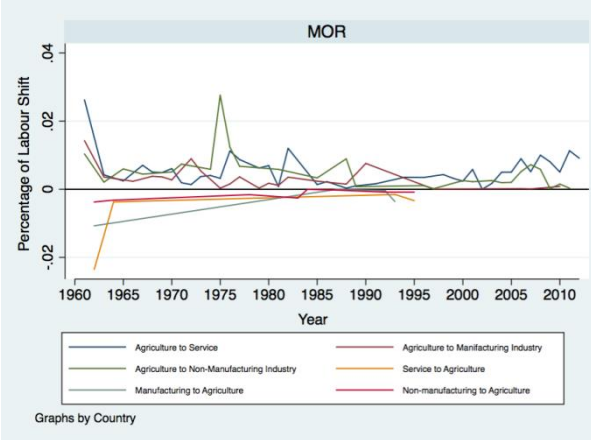

IDN
Percentage of Labour Shift
-.02
0
.02
.04
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

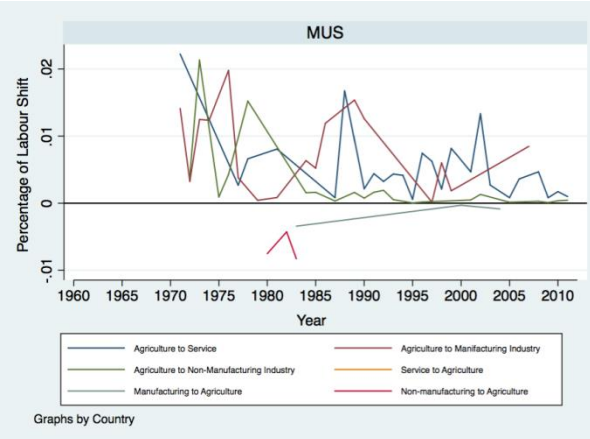

IND
Percentage of Labour Shift
-.005
0
.005
.01
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

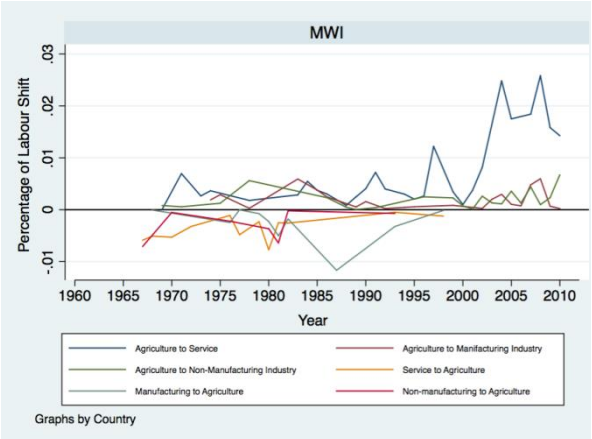

KEN
Percentage of Labour Shift
-.005
0
.005
.01
.015
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

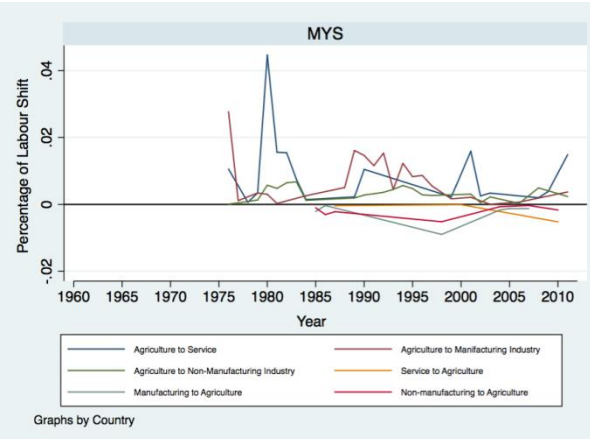

KOR
Percentage of Labour Shift
-.02
-.01
0
.01
.02
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

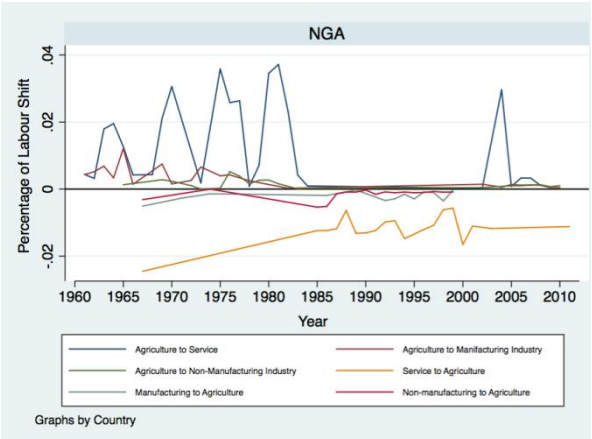

MEX
Percentage of Labour Shift
-.01
0
.01
.02
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

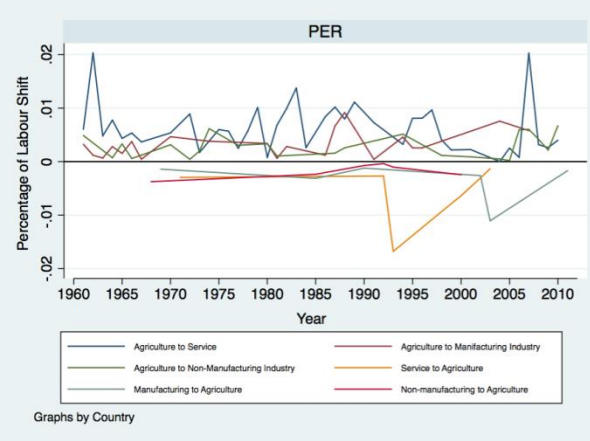

MOR
Percentage of Labour Shift
-.02
0
.02
.04
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

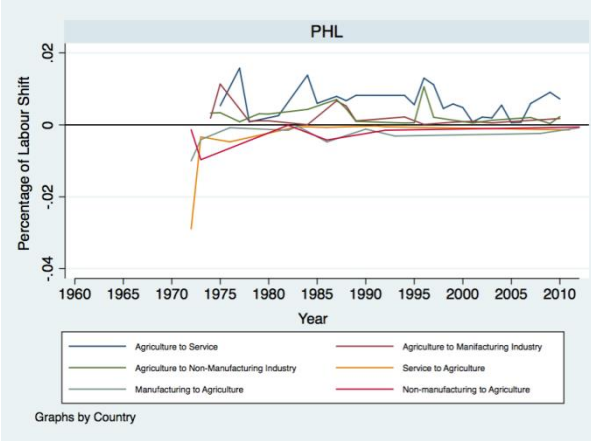

MUS
Percentage of Labour Shift
-.01
0
.01
.02
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

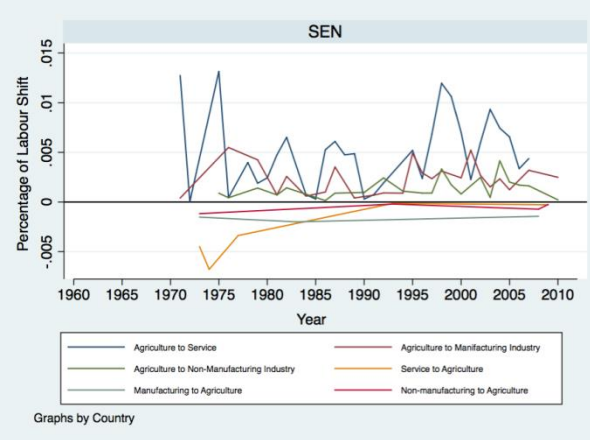

MWI
Percentage of Labour Shift
-.01
0
.01
.02
.03
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

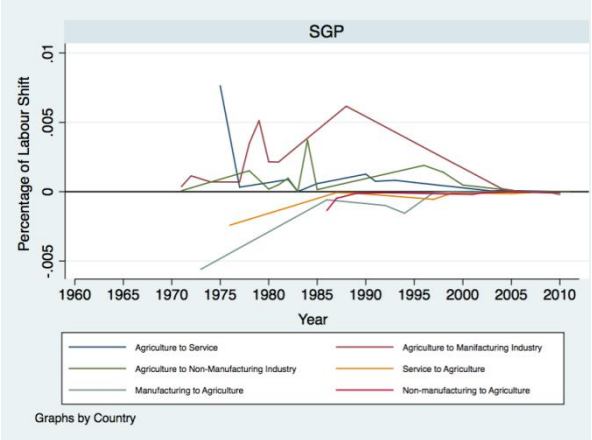

MYS
Percentage of Labour Shift
-.02
0
.02
.04
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

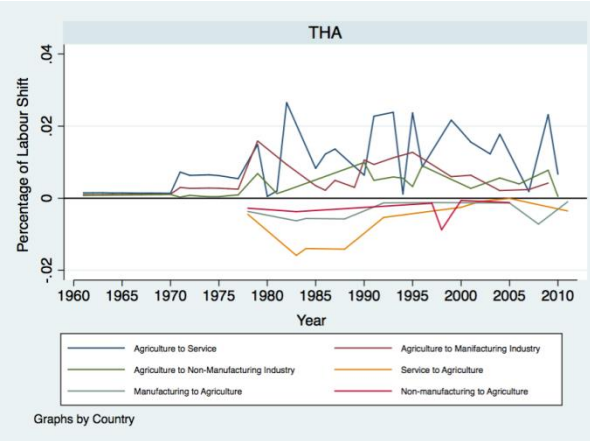

NGA
Percentage of Labour Shift
-.02
0
.02
.04
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

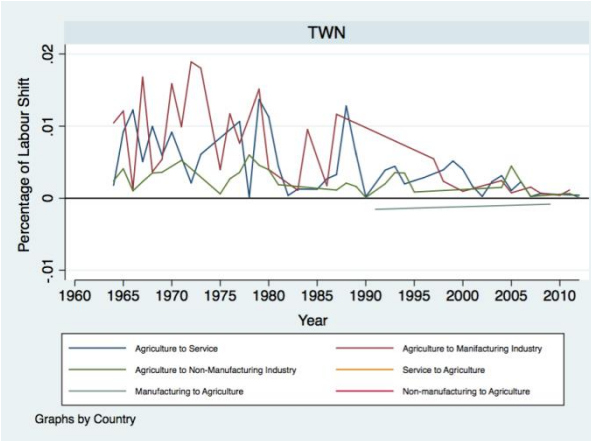

PER
Percentage of Labour Shift
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

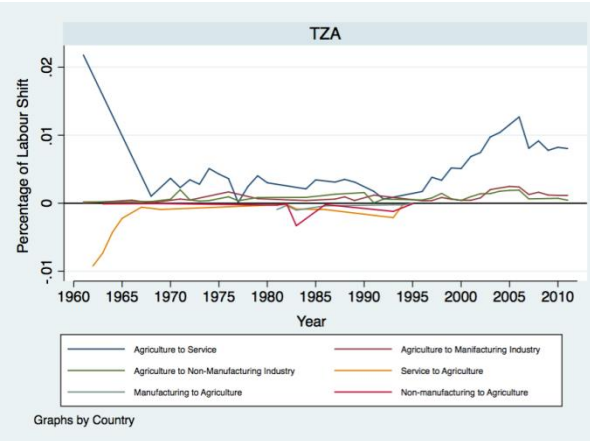

PHL
Percentage of Labour Shift
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

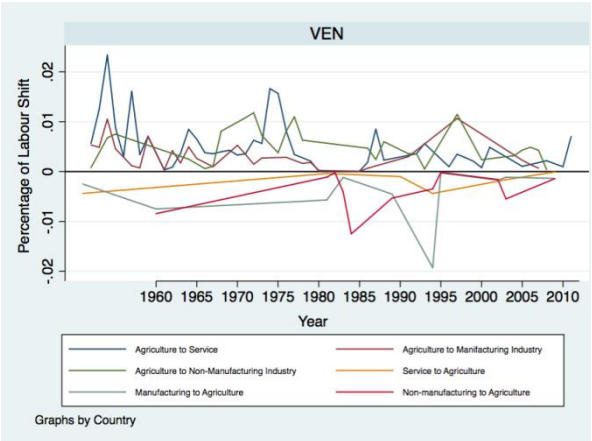

SEN
Percentage of Labour Shift
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

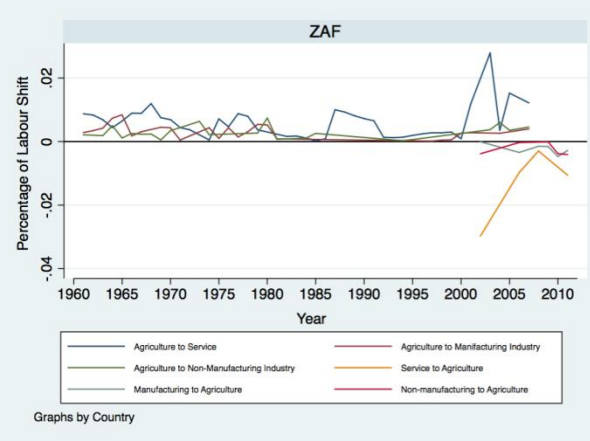

SGP
Percentage of Labour Shift
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country


THA
Percentage of Labour Shift
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country


TWN
Percentage of Labour Shift
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country


TZA
Percentage of Labour Shift
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country


VEN
Percentage of Labour Shift
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country


ZAF
Percentage of Labour Shift
-.04
-.02
0
.02
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

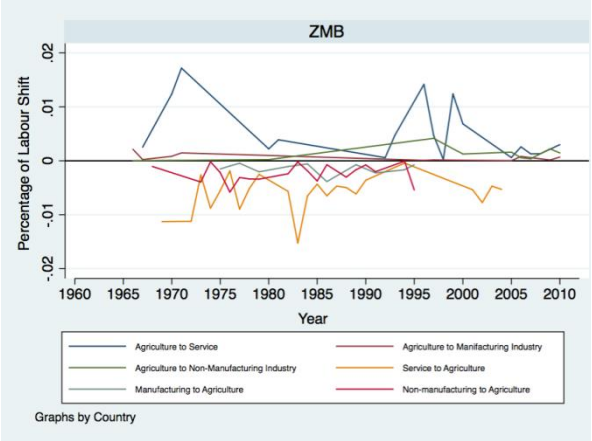
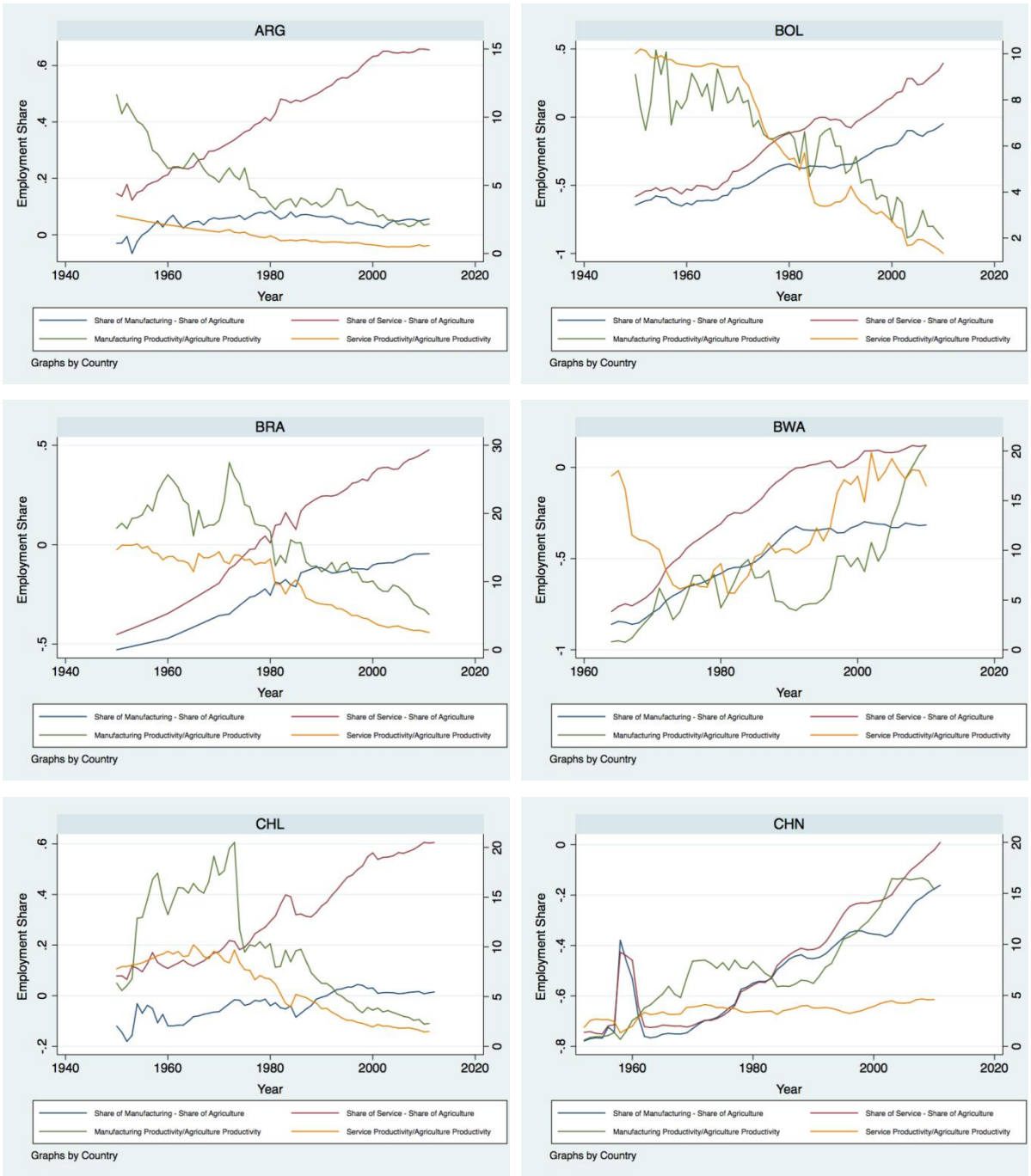
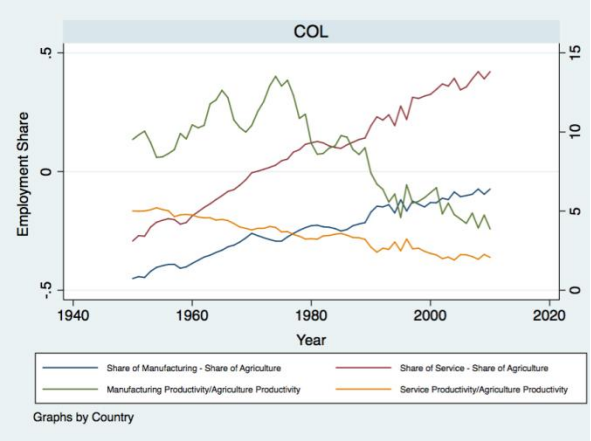
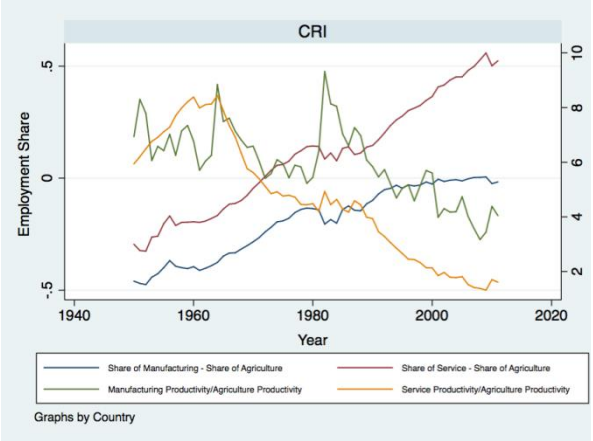
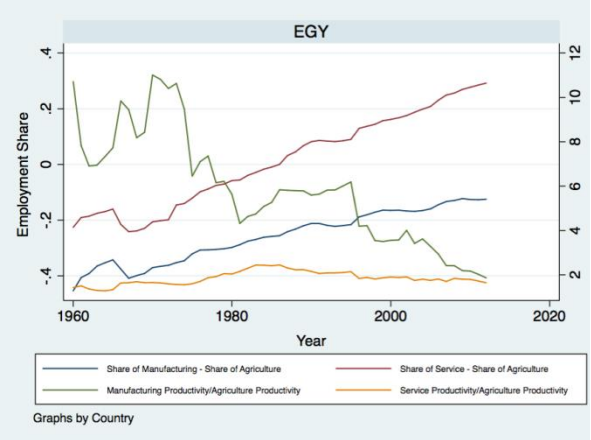

ZMB
Percentage of Labour Shift
-.02
-.01
0
.01
.02
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
Year
Agriculture to Service
Agriculture to Manifacturing Industry
Agriculture to Non-Manufacturing Industry
Service to Agriculture
Manufacturing to Agriculture
Non-manufacturing to Agriculture
Graphs by Country

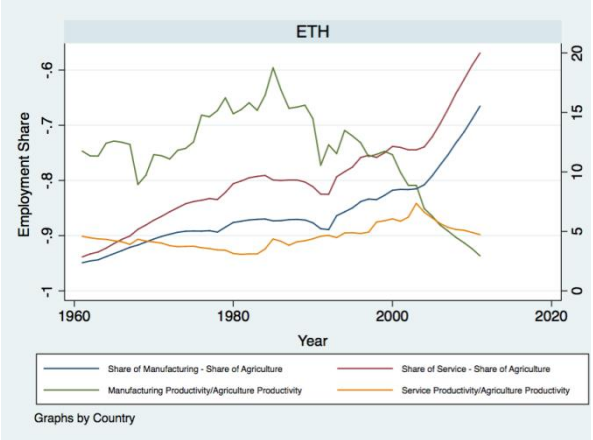
Figure A3. Shifts in Employment between Sectors and Relative Labour Productivity

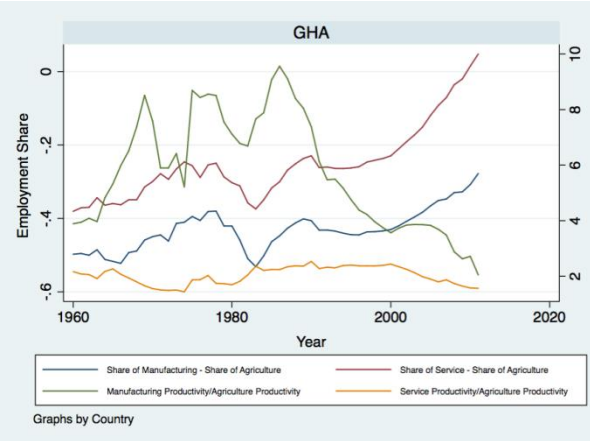


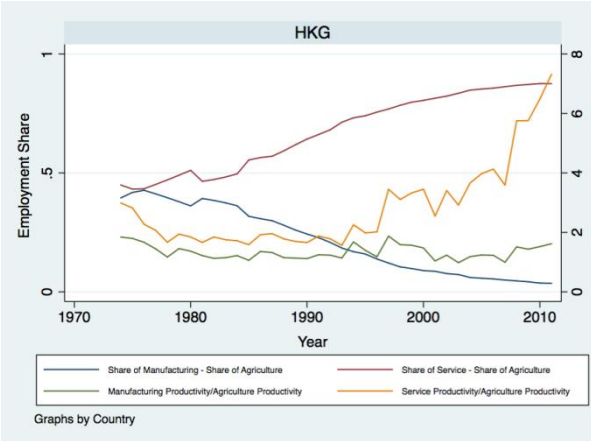

COL
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

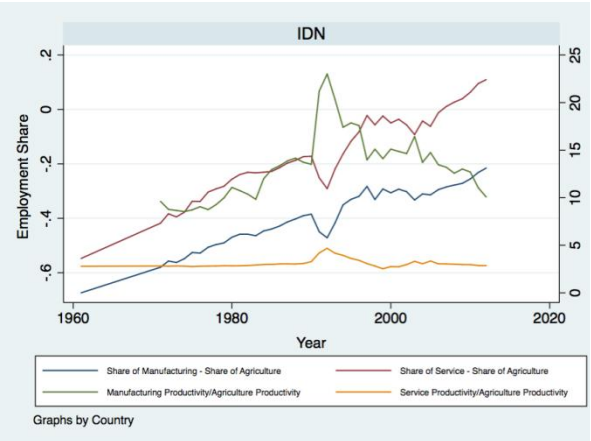

CRI
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

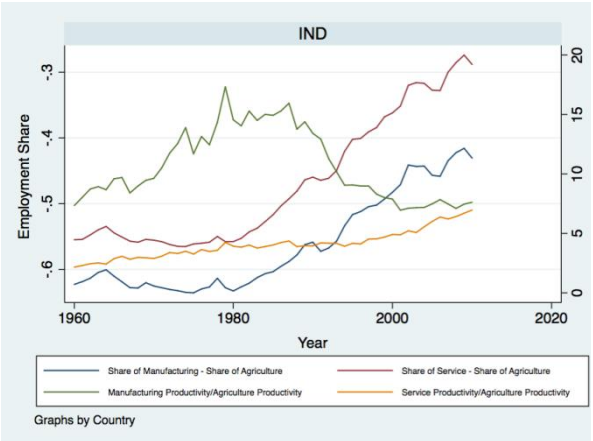

EGY
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

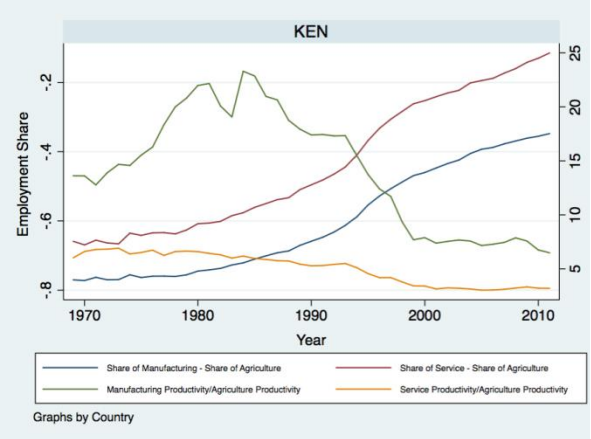

ETH
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

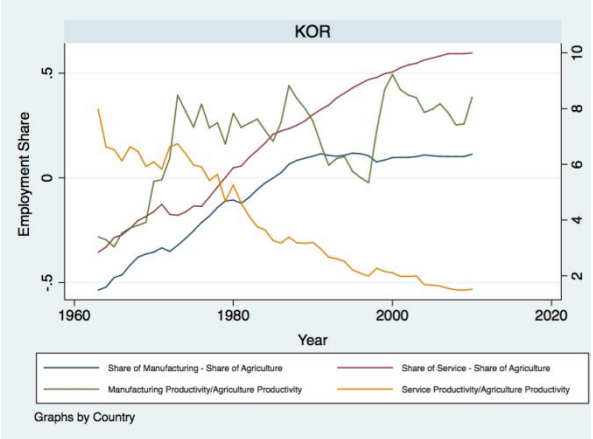

GHA
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

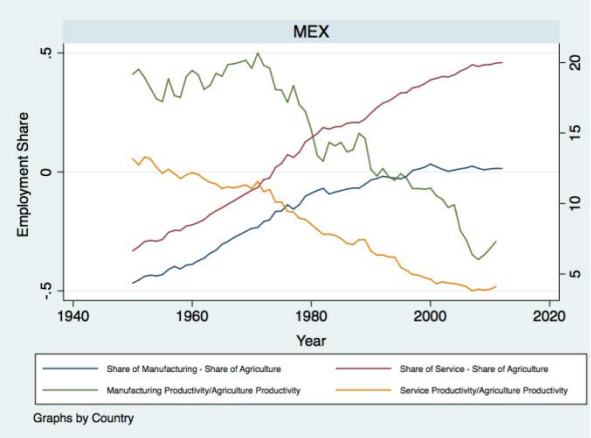

HKG
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

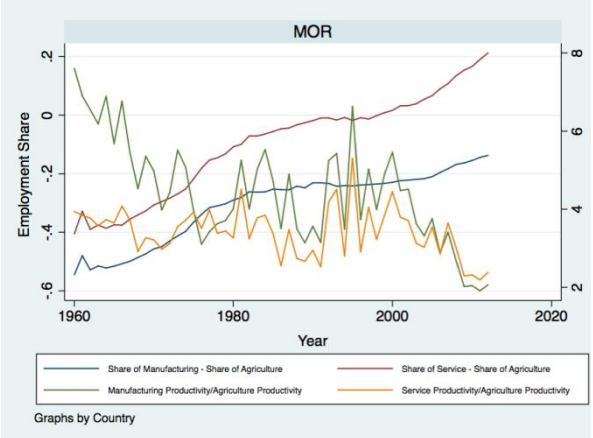

IDN
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

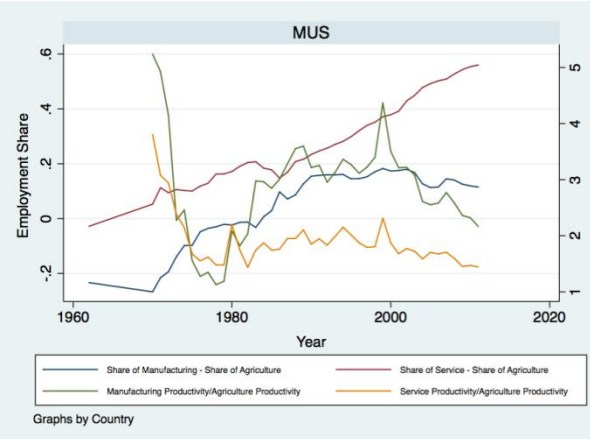

IND
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

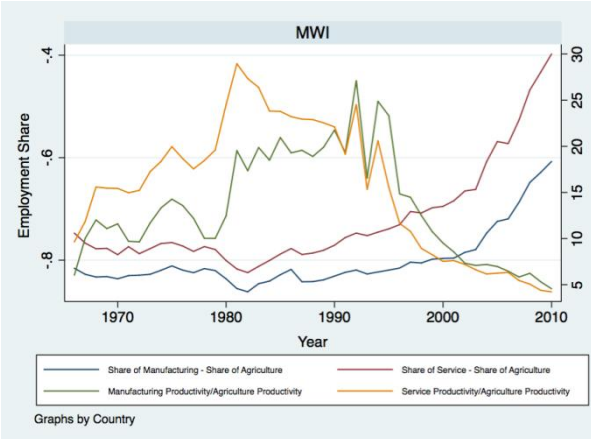

KEN
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

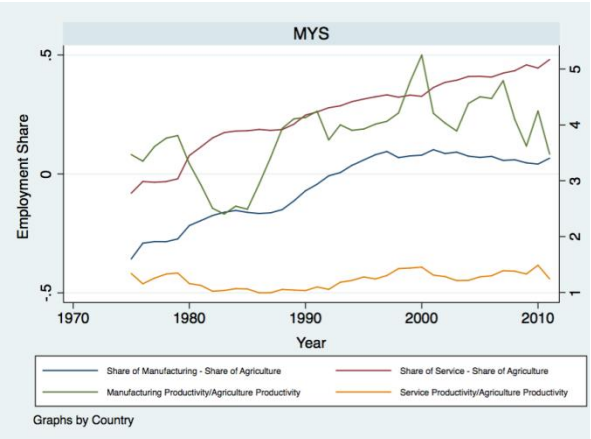

KOR
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

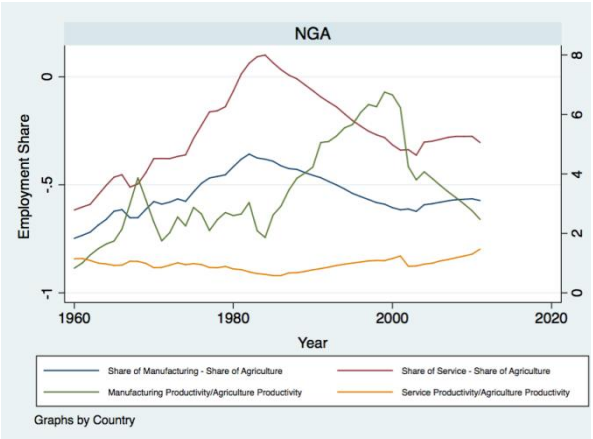

MEX
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

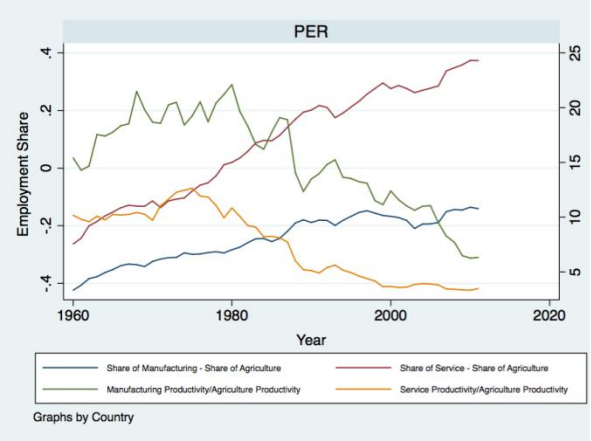

MOR
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

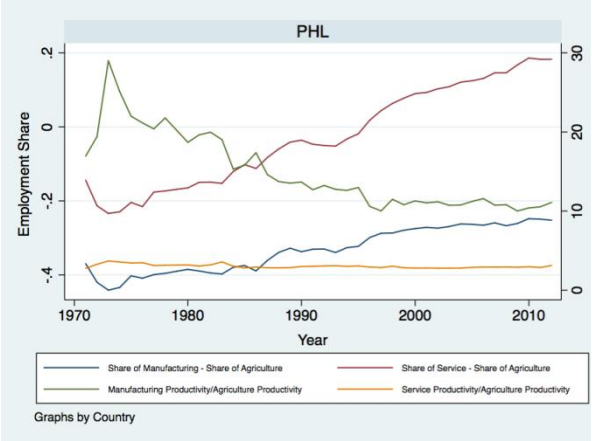

MUS
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

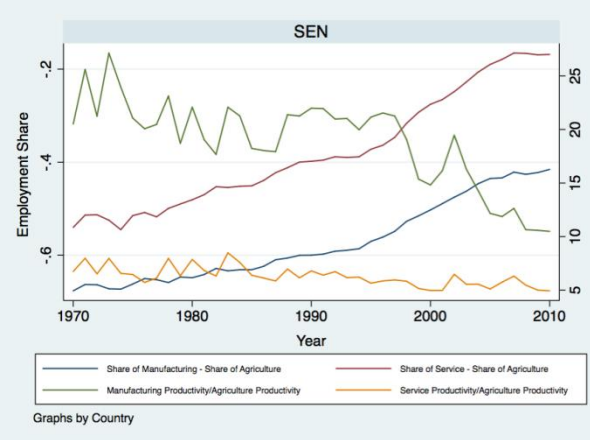

MWI
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

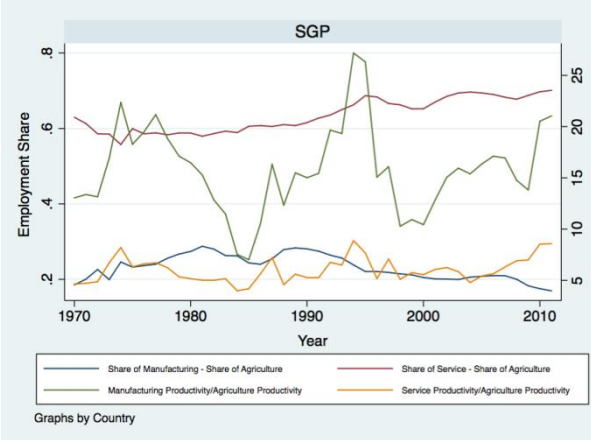

MYS
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

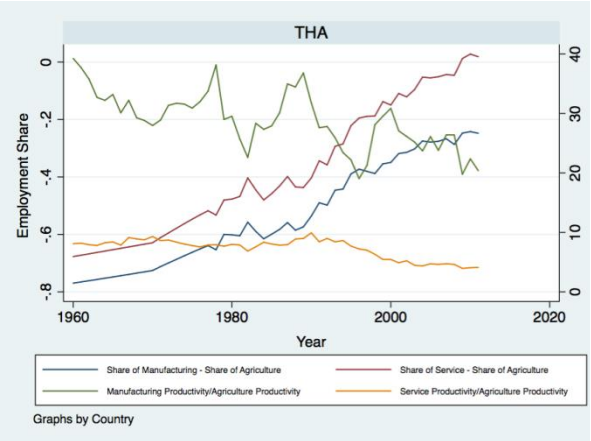

NGA
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

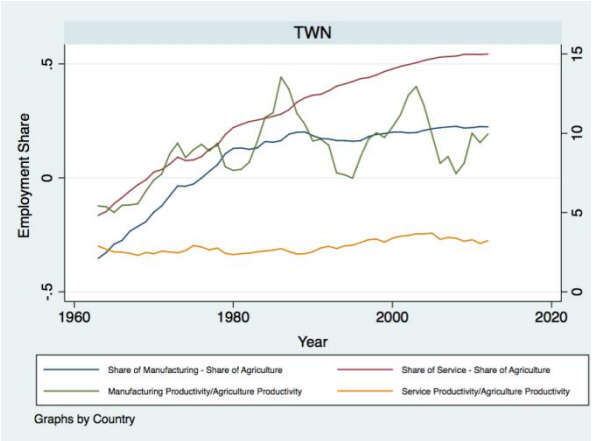

PER
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

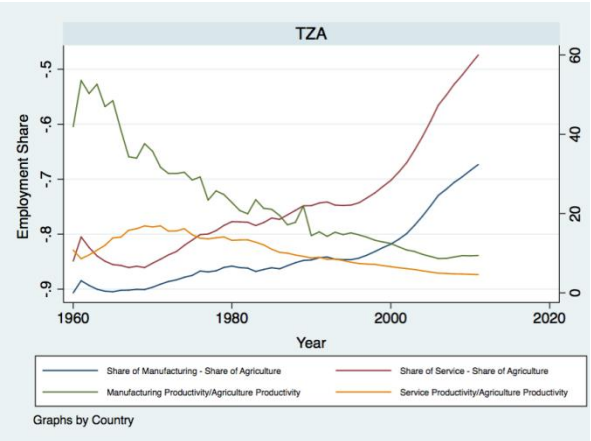

PHL
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

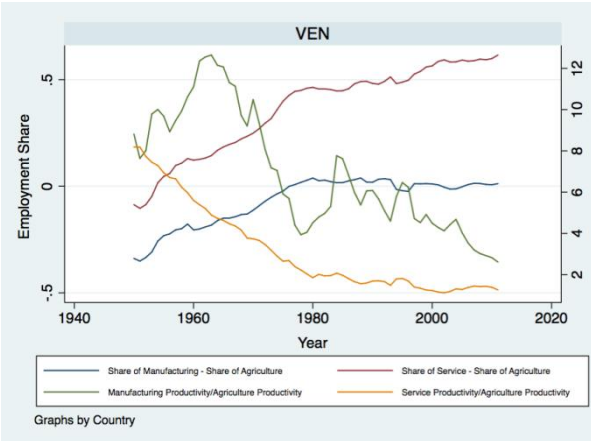

SEN
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

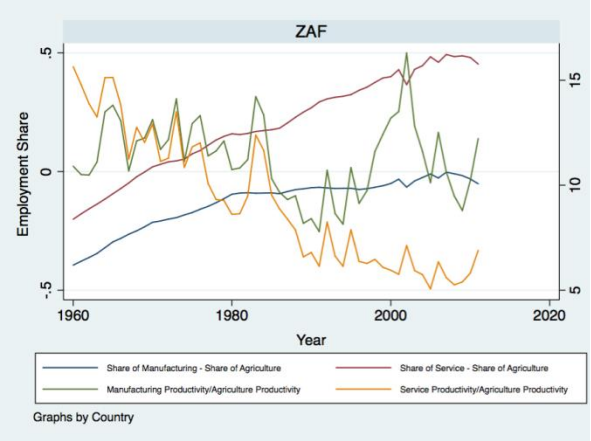

SGP
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country


THA
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country


TWN
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country


TZA
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country


VEN
Employment Share
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country


ZAF
Employment Share
-.5
0
.5
5
10
15
1960
1980
2000
2020
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

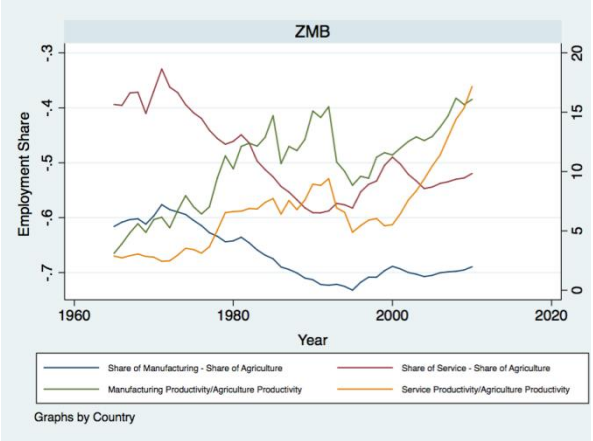
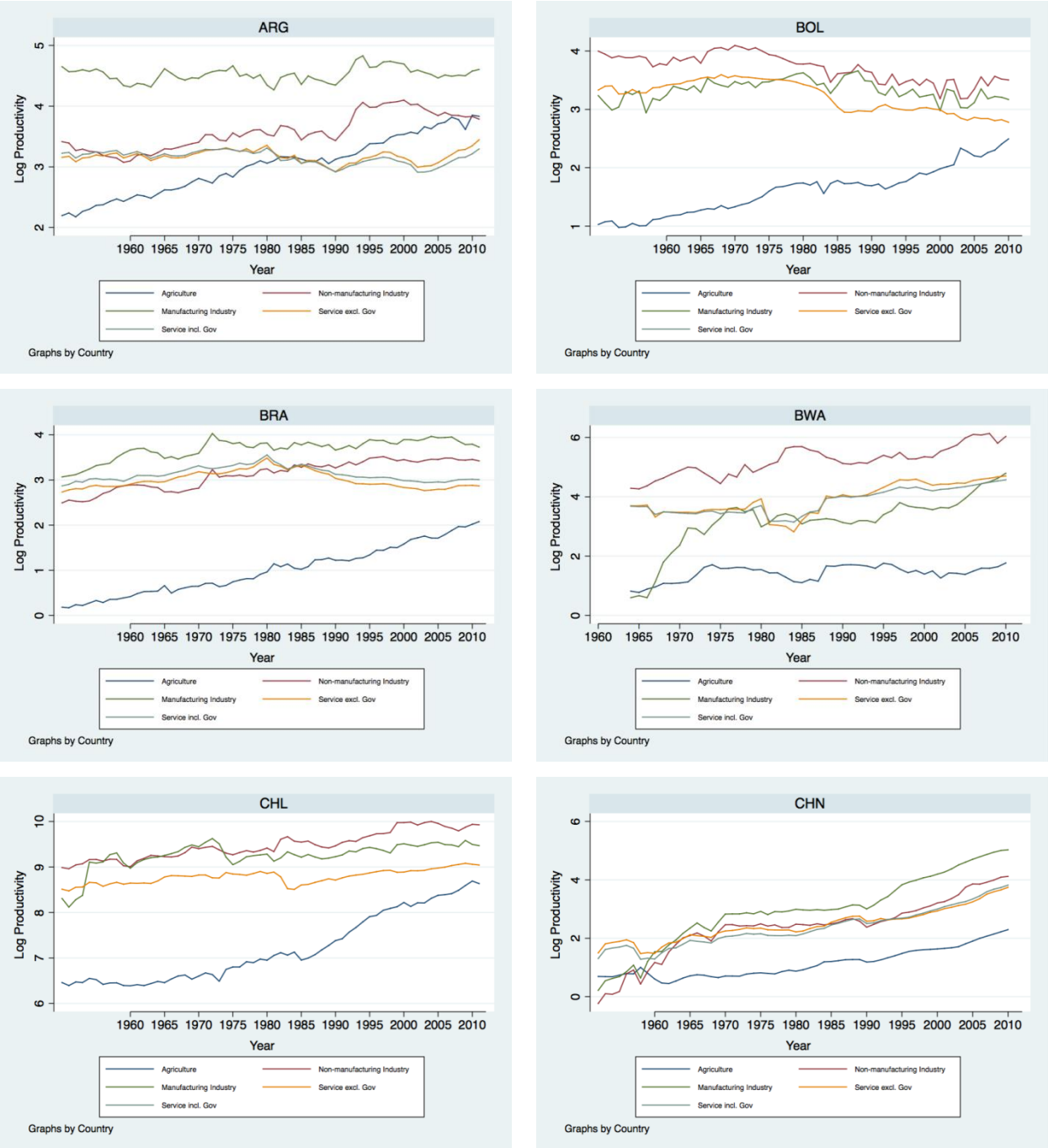
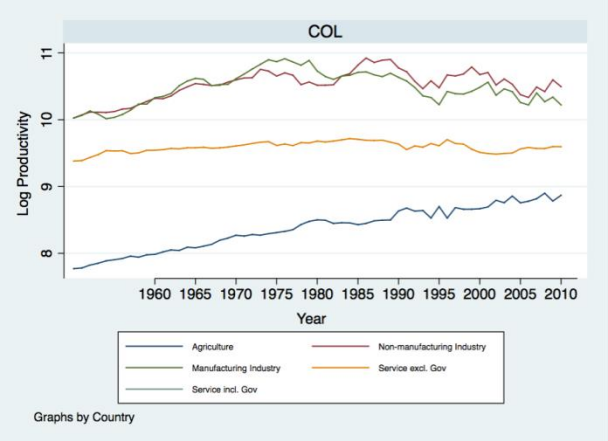
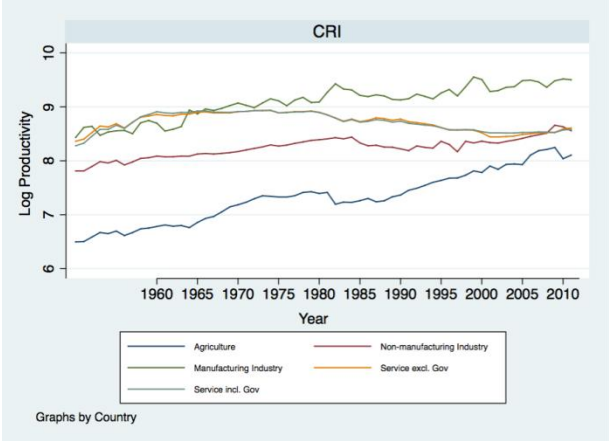
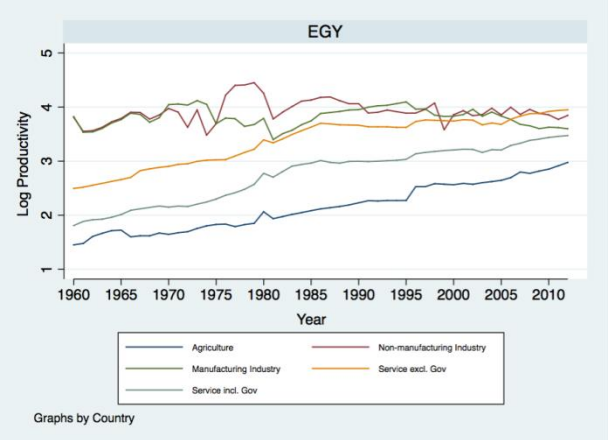

ZMB
Employment Share
-.7
-.6
-.5
-.4
-.3
0
5
10
15
20
1960
1980
2000
2020
Year
Share of Manufacturing - Share of Agriculture
Share of Service - Share of Agriculture
Manufacturing Productivity/Agriculture Productivity
Service Productivity/Agriculture Productivity
Graphs by Country

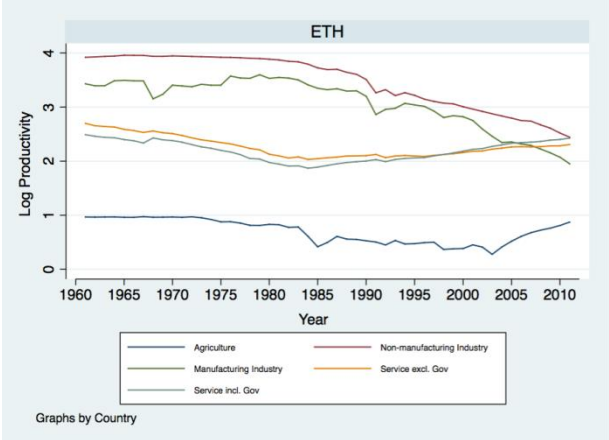
Figure A4. Labour Productivity over Time

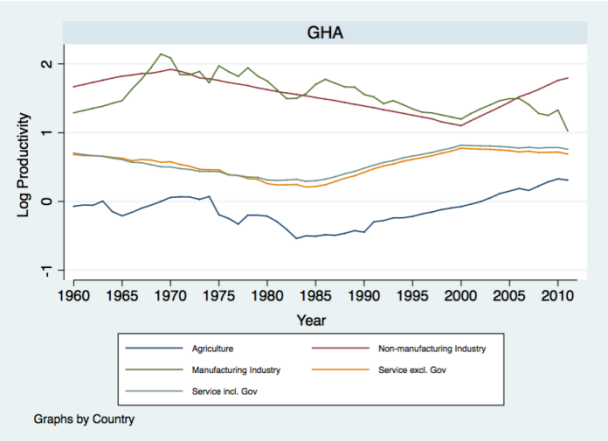


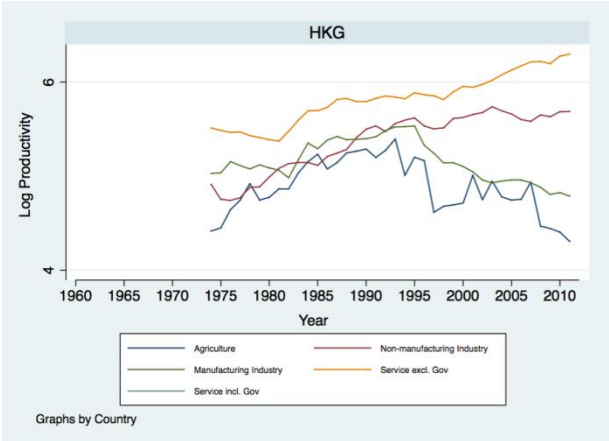

COL
Log Productivity
8
9
10
11
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

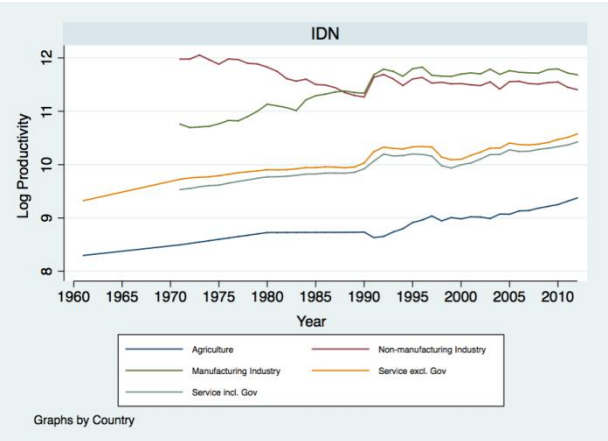

CRI
Log Productivity
6
7
8
9
10
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

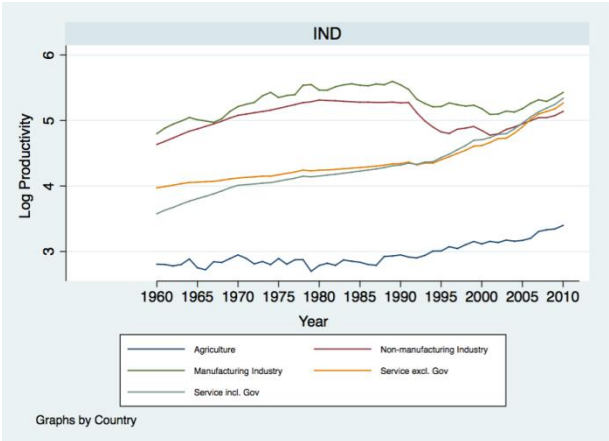

EGY
Log Productivity
1
2
3
4
5
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

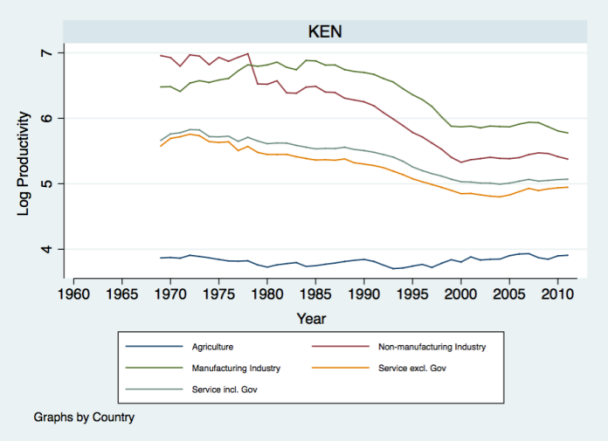

ETH
Log Productivity
0
1
2
3
4
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

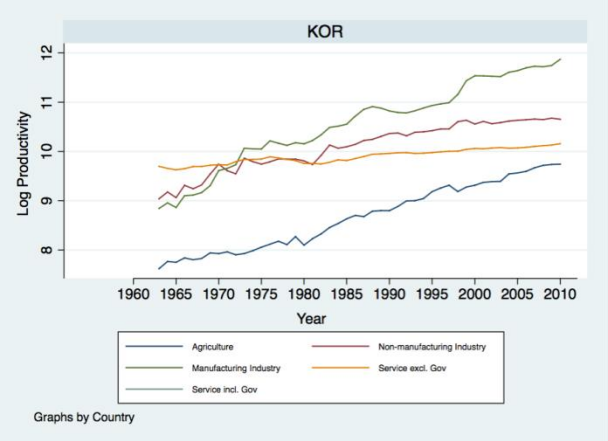

GHA
Log Productivity
-1
0
1
2
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

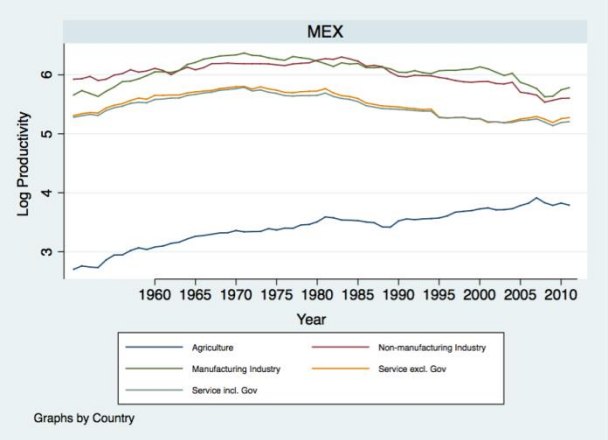

HKG
Log Productivity
4
6
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

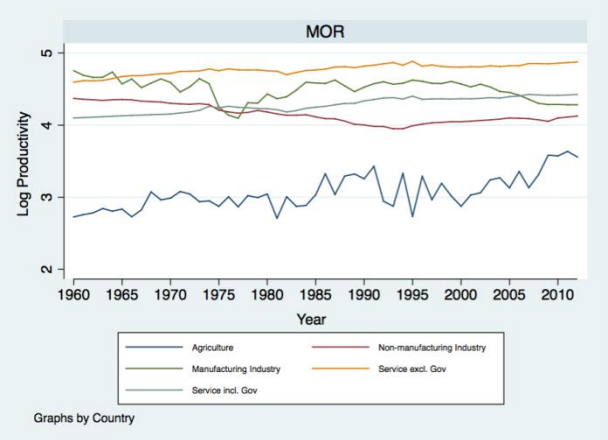

IDN
Log Productivity
8
9
10
11
12
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

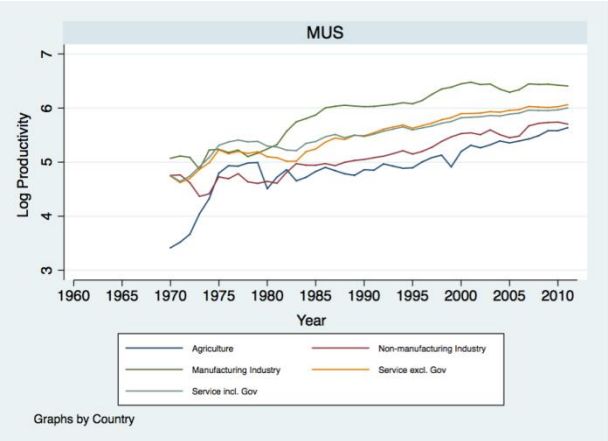

IND
Log Productivity
3
4
5
6
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

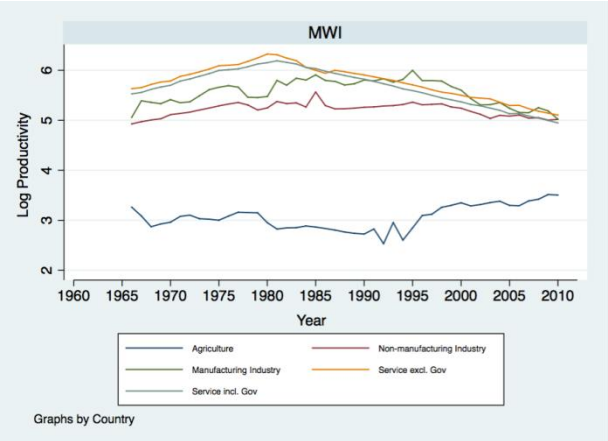

KEN
Log Productivity
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

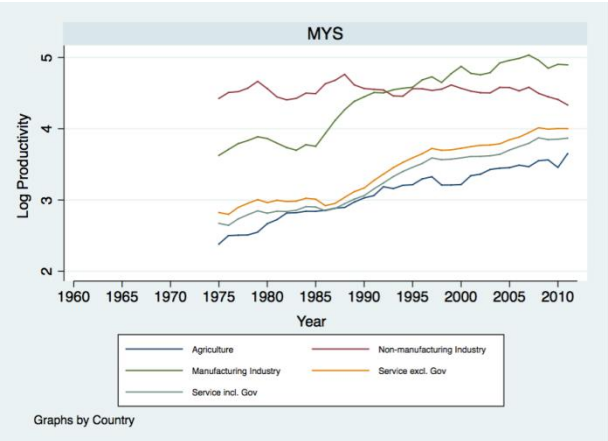

KOR
Log Productivity
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

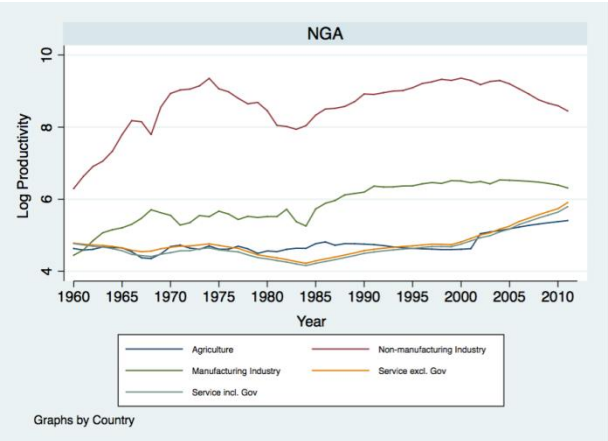

MEX
Log Productivity
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

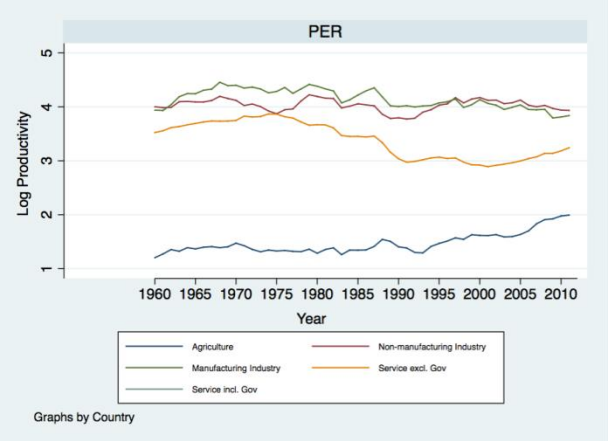

MOR
Log Productivity
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

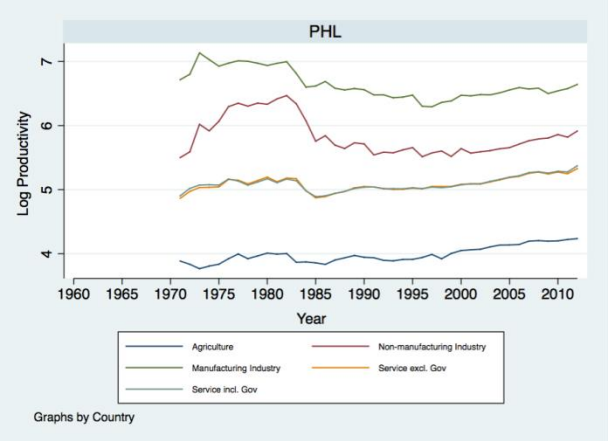

MUS
Log Productivity
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

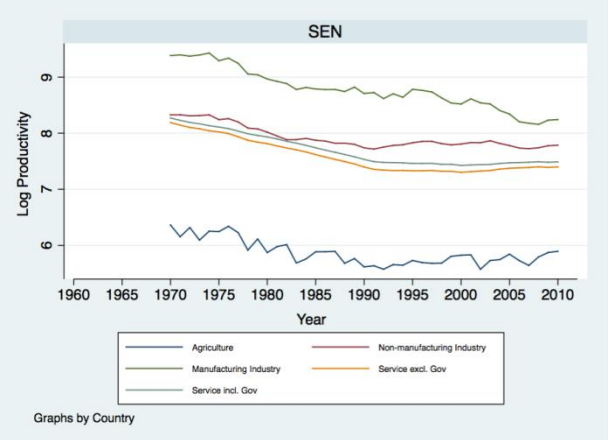

MWI
Log Productivity
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

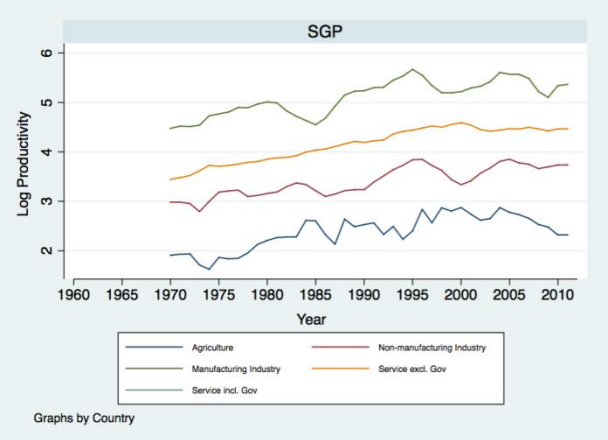

MYS
Log Productivity
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

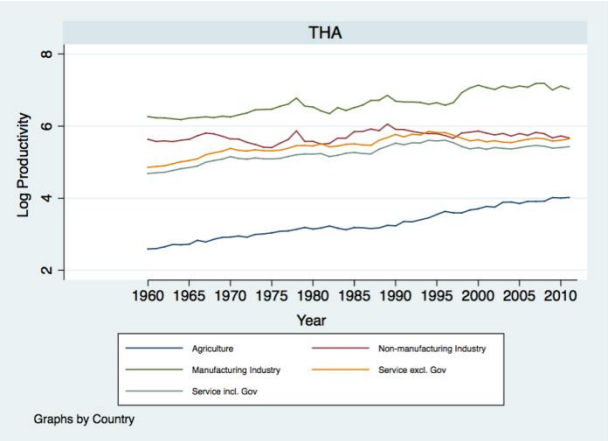

NGA
Log Productivity
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

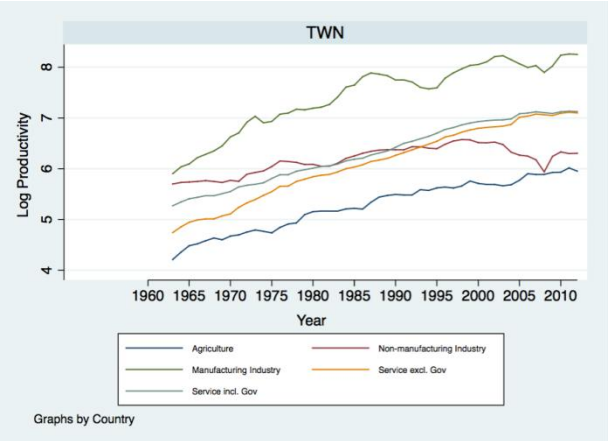

PER
Log Productivity
1 2 3 4 5
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

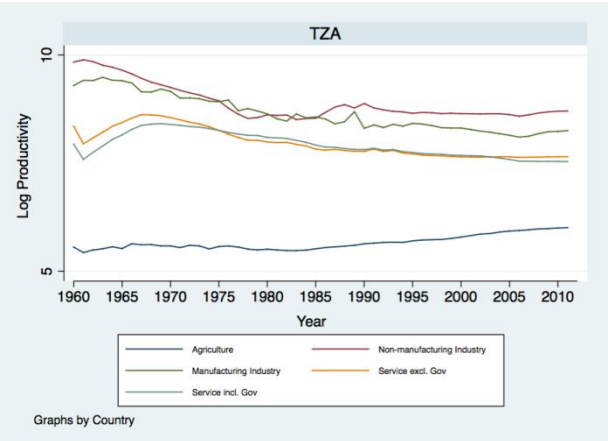

PHL
Log Productivity
4 5 6 7
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

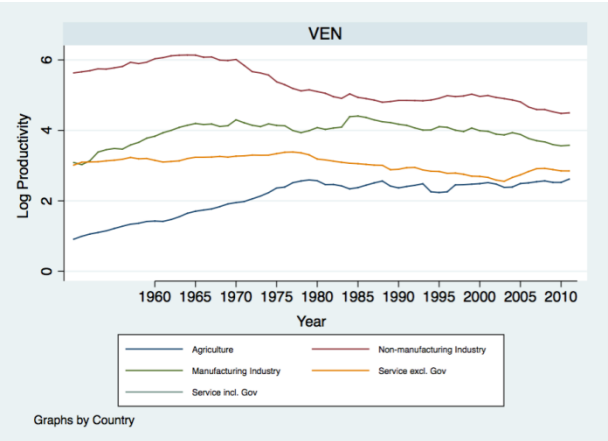

SEN
Log Productivity
6 7 8 9
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

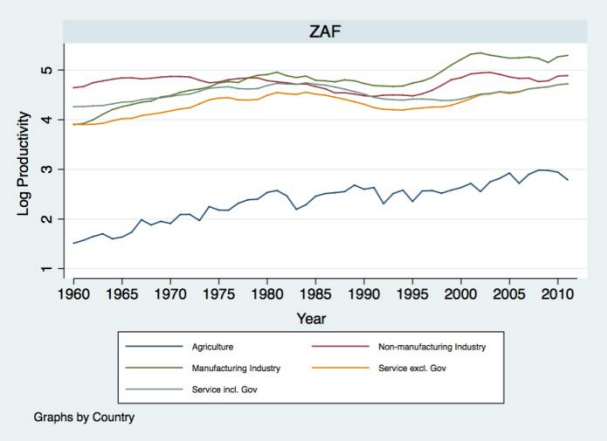

SGP
Log Productivity
2 3 4 5 6
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country


THA
Log Productivity
2 4 6 8
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country


TWN
Log Productivity
4 5 6 7 8
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country


TZA
Log Productivity
5 10
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country


VEN
Log Productivity
0 2 4 6
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country


ZAF
Log Productivity
1
2
3
4
5
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

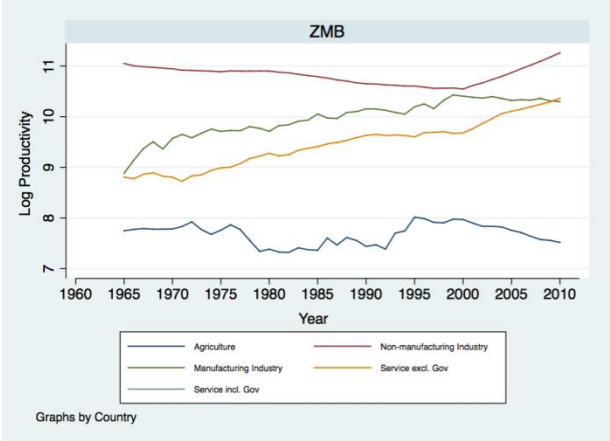
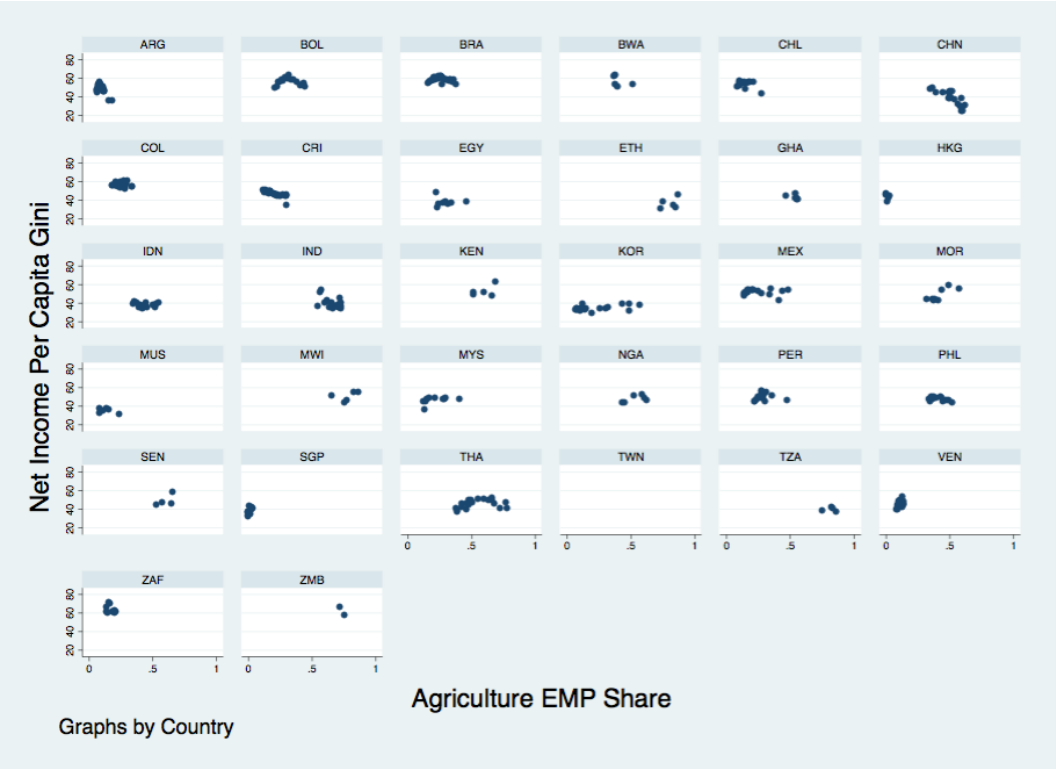
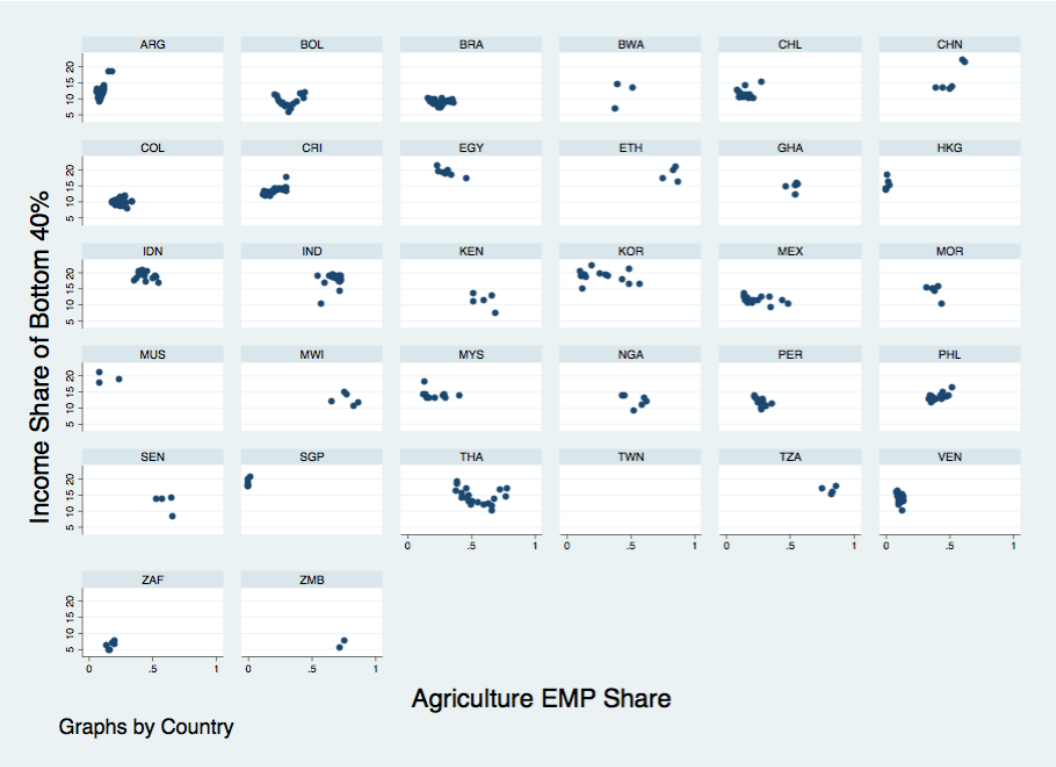
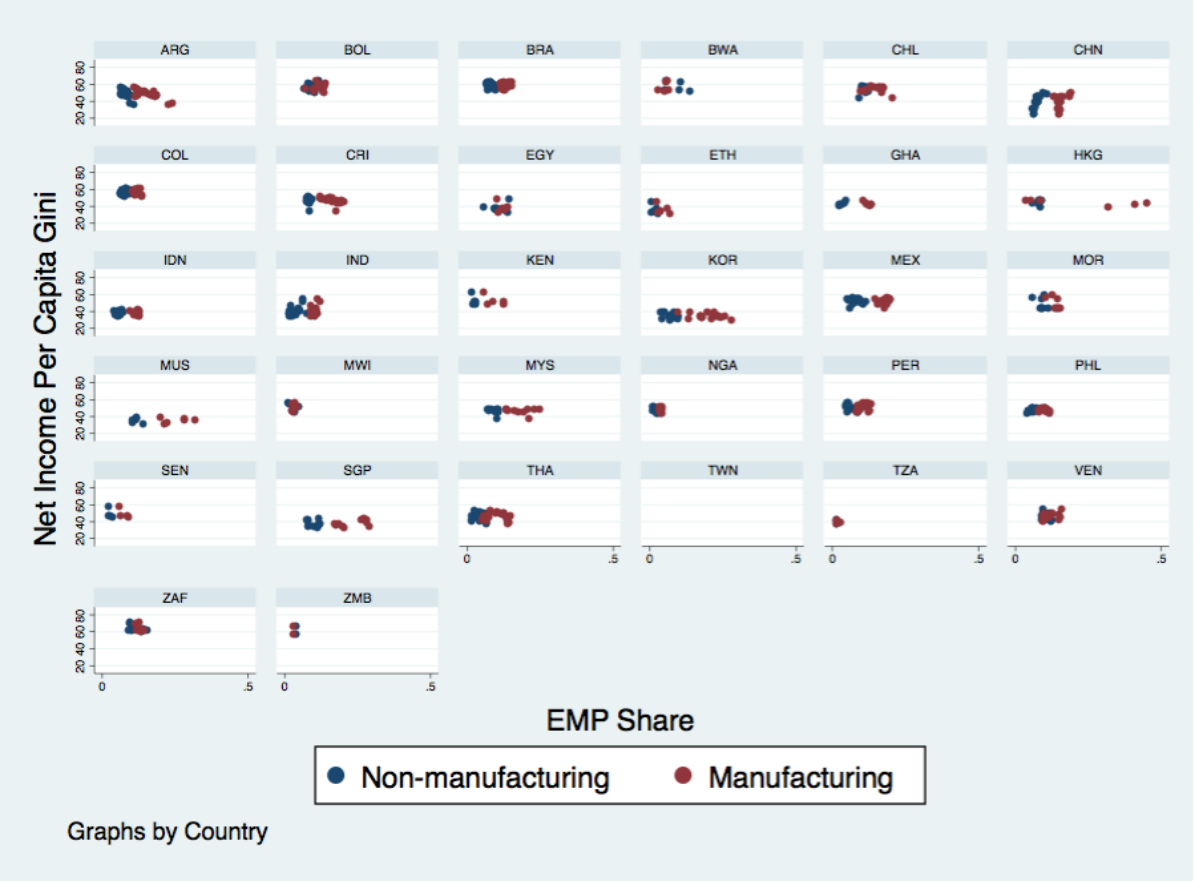

ZMB
Log Productivity
7
8
9
10
11
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010
Year
Agriculture
Non-manufacturing Industry
Manufacturing Industry
Service excl. Gov
Service incl. Gov
Graphs by Country

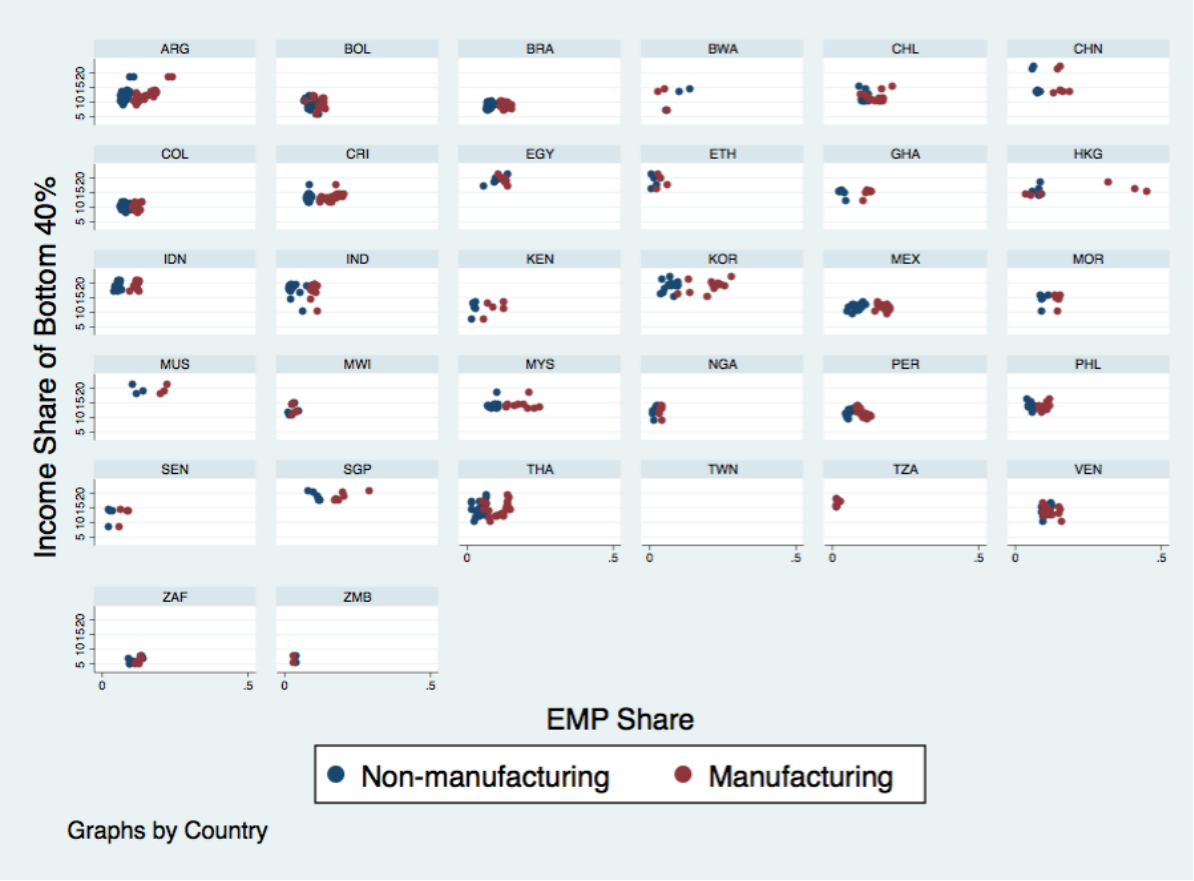
Figure A5. Structural Transformation and Inequality

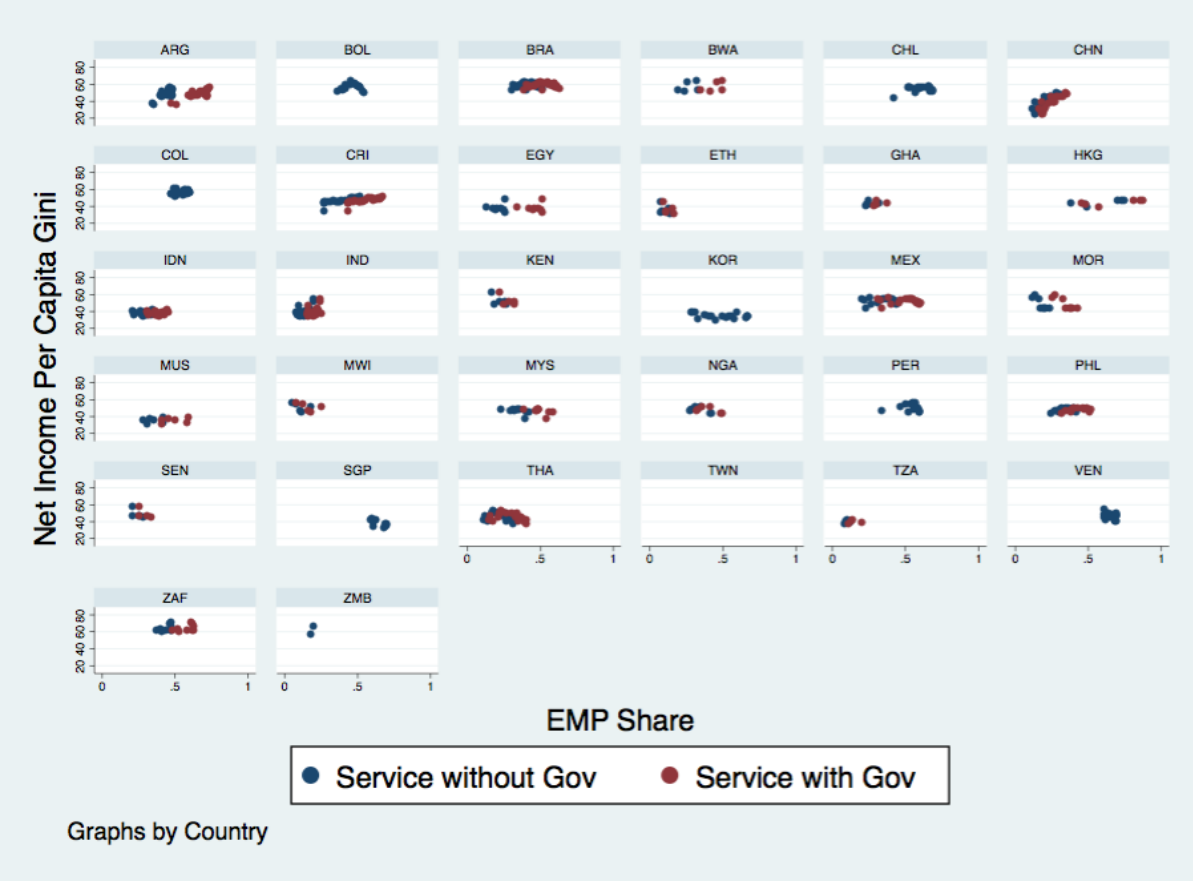
Plots of Share of Agriculture in Employment, Share of Manufacturing in Employment and Share of Services in Employment against Net Income Per Capita Gini and Income Share of Bottom 40 per cent by Country






Net Income Per Capita Gini
ARG
BOL
BRA
BWA
CHL
CHN
COL
CRI
EGY
ETH
GHA
HKG
IDN
IND
KEN
KOR
MEX
MOR
MUS
MWI
MYS
NGA
PER
PHL
SEN
SGP
THA
TWN
TZA
VEN
ZAF
ZMB
EMP Share
Non-manufacturing
Manufacturing
Graphs by Country


Income Share of Bottom 40%
ARG
BOL
BRA
BWA
CHL
CHN
COL
CRI
EGY
ETH
GHA
HKG
IDN
IND
KEN
KOR
MEX
MOR
MUS
MWI
MYS
NGA
PER
PHL
SEN
SGP
THA
TWN
TZA
VEN
ZAF
ZMB
EMP Share
Non-manufacturing
Manufacturing
Graphs by Country


Net Income Per Capita Gini
ARG
BOL
BRA
BWA
CHL
CHN
COL
CRI
EGY
ETH
GHA
HKG
IDN
IND
KEN
KOR
MEX
MOR
MUS
MWI
MYS
NGA
PER
PHL
SEN
SGP
THA
TWN
TZA
VEN
ZAF
ZMB
EMP Share
Service without Gov
Service with Gov
Graphs by Country

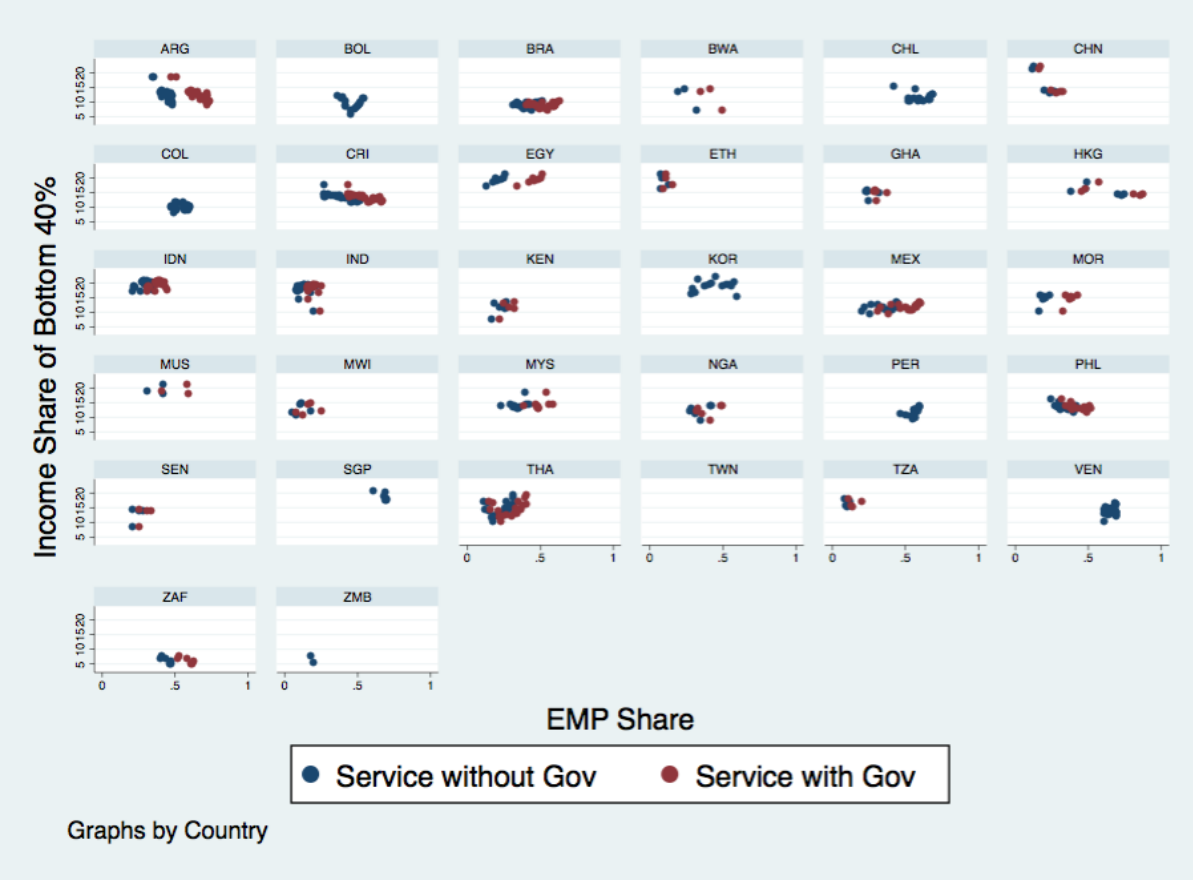
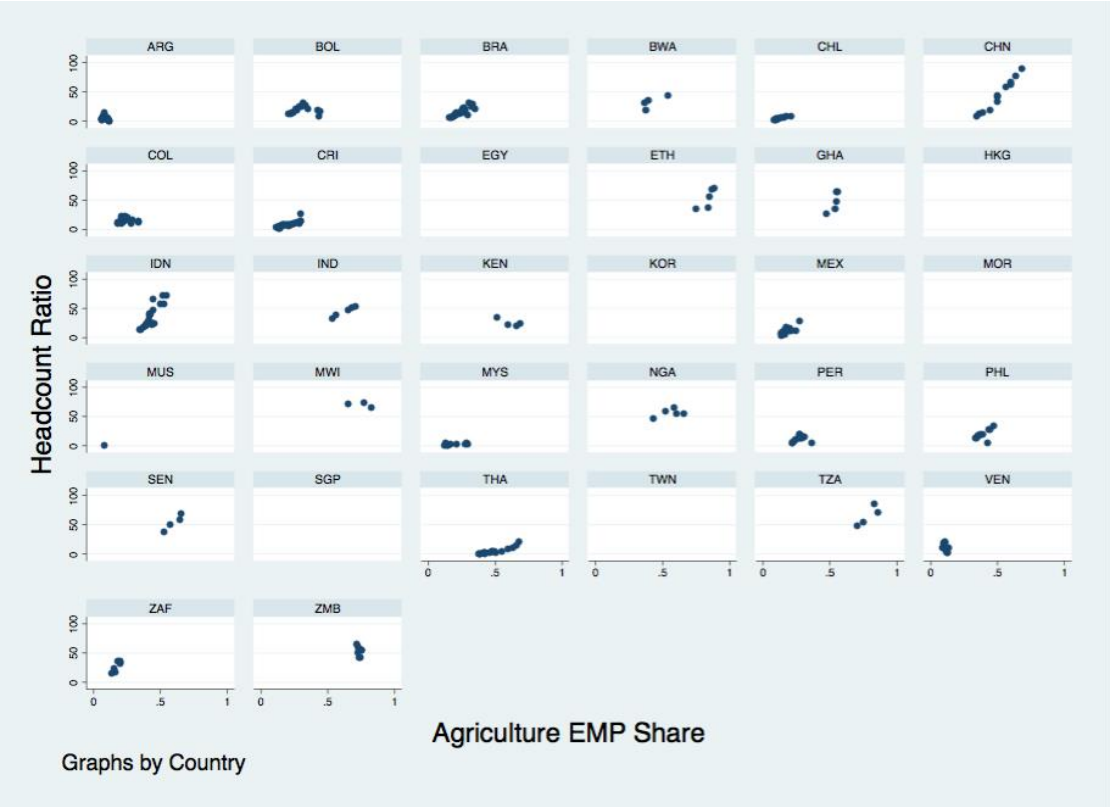
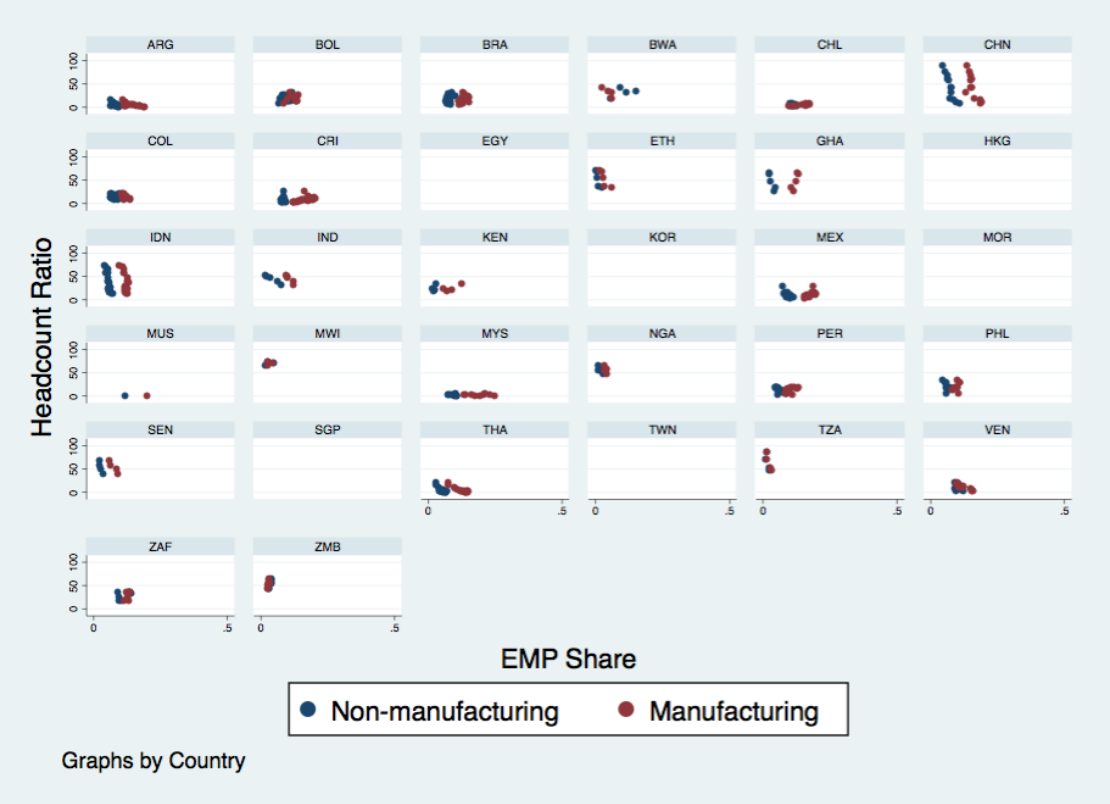

Income Share of Bottom 40%
ARG
BOL
BRA
BWA
CHL
CHN
COL
CRI
EGY
ETH
GHA
HKG
IDN
IND
KEN
KOR
MEX
MOR
MUS
MWI
MYS
NGA
PER
PHL
SEN
SGP
THA
TWN
TZA
VEN
ZAF
ZMB
EMP Share
Service without Gov
Service with Gov
Graphs by Country

Figure A6. Structural Transformation and Poverty (Headcount Ratio)

Plots of Share of Agriculture in Employment, Share of Manufacturing in Employment and Share of Services in Employment against Headcount Ratio by Country





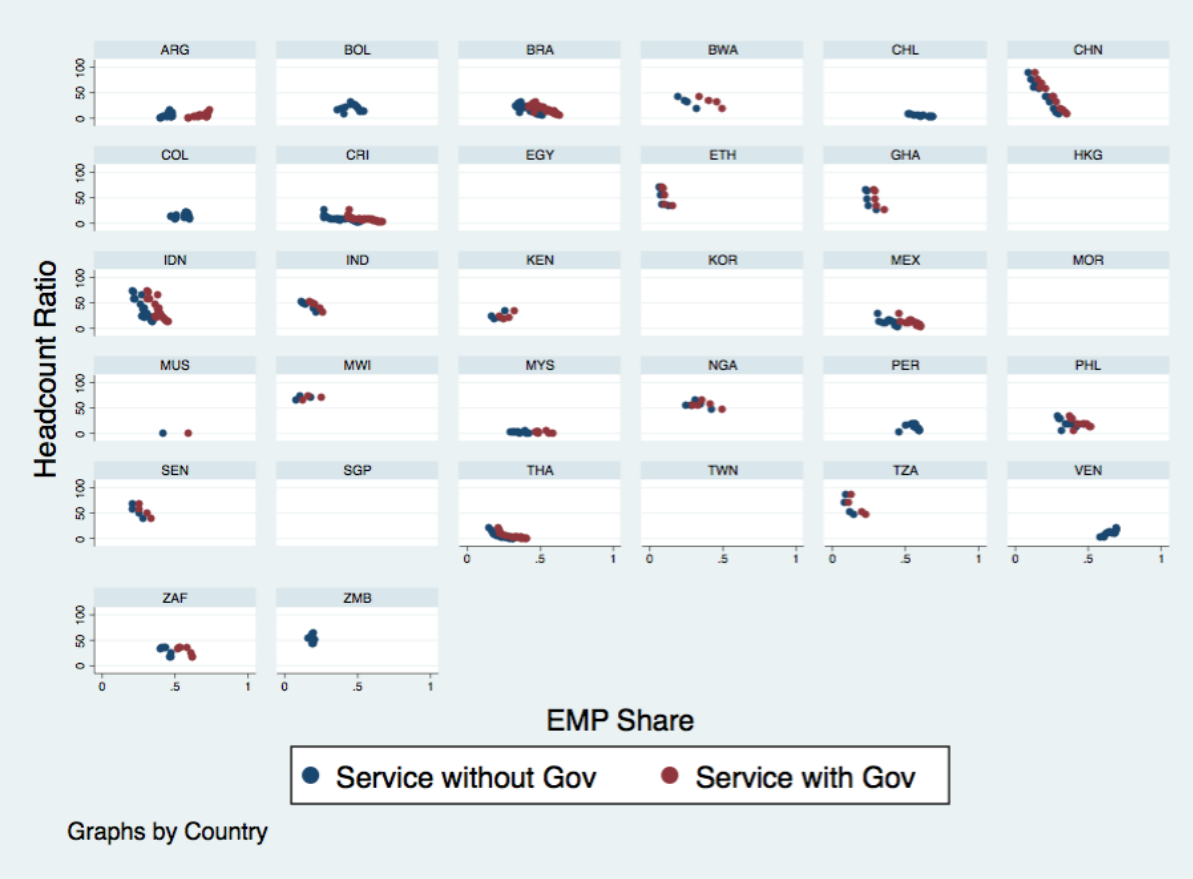
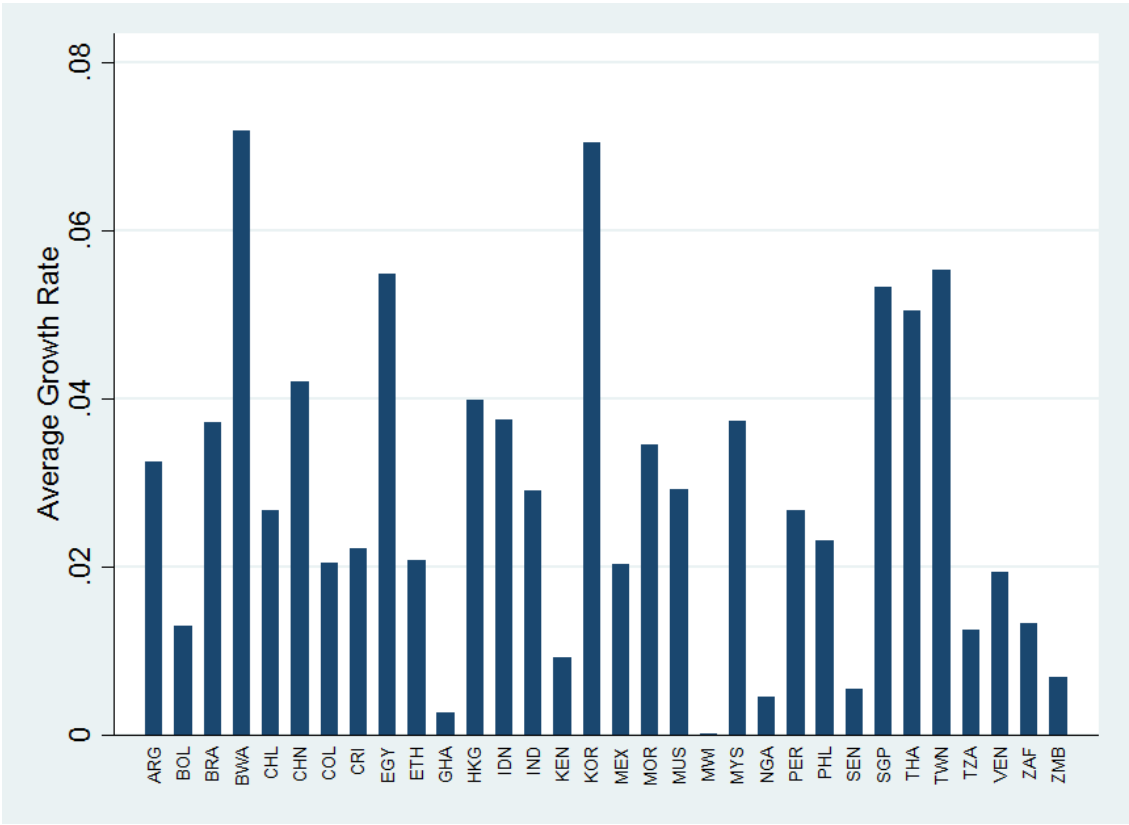


Figure A7. Average GDP per capita Growth Rate by Country



List of Country Abbreviations

ARG	Argentina
BOL	Bolivia
BRA	Brazil
BWA	Botswana
CHL	Chile
CHN	China
COL	Colombia
CRI	Costa Rica
EGY	Egypt
ETH	Ethiopia
GHA	Ghana
HKG	China, Hong Kong SAR
IDN	Indonesia
IND	India
KEN	Kenya
KOR	Republic of Korea
MEX	Mexico
MOR	Morocco
MUS	Mauritius
MWI	Malawi
MYS	Malaysia
NGA	Nigeria
PER	Peru
PHL	Philippines
SEN	Senegal
SGP	Singapore
THA	Thailand
TWN	Taiwan
TZA	Tanzania: Mainland
VEN	Venezuela
ZAF	South Africa
ZMB	Zambia