International Development

ISSN 1470-2320

Prizewinning Dissertation 2017

No.17-HK

Premature Deindustrialization and Stalled Development, the Fate of Countries Failing Structural Transformation?

Helen Kirsch

Published: March 2018

Department of International Development

London School of Economics and Political Science

Houghton Street

London

WC2A 2AE UK

Tel: +44 (020) 7955 7425/6252

Fax: +44 (020) 7955-6844

Email: d.daley@lse.ac.uk

Website: http://www.lse.ac.uk/internationalDevelopment/home.aspx

Candidate Number: 65008

MSc in Development Studies

Dissertation submitted in partial fulfilment of the requirements of the degree

Word Count: 10,043

Premature Deindustrialization and Stalled Development, the Fate of Countries Failing Structural Transformation?

Evidence from three Countries Stuck in the Middle-Income Trap

Abstract

This dissertation explores whether premature deindustrialisation has been a major contributing factor to the economic stagnation of three countries stuck in the Middle-Income Trap. Applying a Kaldorian framework to the qualitatively selected case studies, two main findings stand out. First, premature deindustrializers experience decreasing manufacturing labour productivity throughout the course of their development. Second, the speedily reallocation of labour into services constitutes a drag on labour productivity development ultimately leading to a slowdown in growth and stalled development. In light of these findings, I argue that premature deindustrialization and the absence of structural transformation constitute two sides of the same coin.

Contents

Abbreviations

HIC	High-income country
MIC	Middle-income country
LIC	Low-income country
MIR	Middle-income range
MIT	Middle-income trap
UMIR	Upper-middle-income range
LMIR	Lower-middle-income range
Manva	Manufacturing value added
Manemp	Manufacturing employment
GDPpc	Gross domestic product per capita
WB	World Bank
IMF	International Monetary Fund

1.) Introduction

In recent decades, a few countries mainly in Asia have sustained high growth rates leading them on a path of convergence. Others were not able to maintain these and got stuck in the heavily contested "middle-income trap" (MIT). The term was coined, almost in passing, in 2007 by Gill and Kharas. Since then it inspired two types of debates: A debate about its existence, intermingled with a debate about its measurement, and a debate about the right strategies in navigating the transition from middle to high income status. The first debate, quite unfortunately, has diverted much attention from the latter, despite the question's relevance for policy making. Nonetheless, there is growing support for the notion that upon exhaustion of Lewisian[1] structural transformation, the reallocation of labour from agriculture to manufacturing, the upgrading but especially diversification of a country's industry through targeted industrial policy, is critical for middle-income countries (MICs) managing the transition to high-income status (Imbs, Wacziarg, 2003; Ohno, 2009; Wade, 2016a; 2016b). Studies correlating different measures of this post-Lewisian structural transformation with the event of transitioning the middle-income range (MIR) (Felipe, 2012b; Jankowska, Nagengast, Perea, 2012) or the likelihood of experiencing a growth slowdown in the MIR (Eichengreen, Park, Shin, 2013; Ergin, 2015) lend strong empirical support to this proposition. The implicit counterfactual assumption of these studies is that in the absence of sustained industrial diversification and upgrading (i.e. structural transformation) and under the pressure of increasing global competition followed by the dismantling of protective barriers, MICs experienced a process of *deindustrialization* diverting them from their hypothetical path of convergence.

It is well known that during the later stages of economic development the share of industrial employment and output drops. The gradual decline of manufacturing employment (manemp) in total employment (Rowthorn, Ramaswamy, 1999: 18) and manufacturing value added (manva)[2] of total GDP (Tregenna, 2009: 461) is considered a natural process endogenous to development. Relative variations in the extent, speed and beginning of that process, however, constitute a phenomenon that is as young as the MIT, and has only recently attracted growing attention: *premature deindustrialization* (Palma, 2005; Dasgupta, Singh, 2006; Rodrik, 2016). A google scholar search identifies only ~650 publications mentioning the phenomenon, two thirds of which have emerged since 2013.

Studies dealing with premature deindustrialization are largely concerned with defining its existence, categorizing different types, causes and regional patterns, as well as identifying its varied consequences. While it is considered mostly harmless in developed economies[3] the most commonly mentioned

[1] The term goes back to Arthur Lewis (1954) dual sector model, who divides an economy into a traditional (often equated with agriculture) and modern (often equated with industry) sector (Pages, 2010: 45).
[2] Manufacturing output will be used synonymously with manva.
[3] Although recent Euro-American political developments put that assertion into question. In fact, countries in the Western world have regained interest in reindustrialization too (Felipe, 2015; Helper, Krüger, Wial, 2012).

consequences for developing countries – or premature deindustrializers – are faltering growth rates and ultimately delayed development (Palma, 2005: 103; Tregenna, 2009: 15; Rodrik, 2016: 28). This assumption is by no means far-fetched, but is based on a long tradition of development economics that goes back to the likes of Hirschman (1958), who investigates industry's forward and backward linkages, Rosenstein-Rodan (1943), who analyses increasing returns to scale in manufacturing and last but not least, Kaldor (1967; 1989) who stated the famous law that manufacturing is the 'engine of growth'. Yet, despite its obvious relevance for todays' MICs, this assumption is rarely tested by scholars interested in premature deindustrialization, largely due to a lack of data. Premature deindustrialisation thus provides a framework to investigate two counterfactual assumptions.

Firstly, do MICs failing to transition suffer from premature deindustrialization? Secondly, will the experience of this symptom lead to the predicted slowdown in growth rates, deferral of development and ultimately a higher likelihood of becoming 'trapped' at the middle-income level? Using a Kaldorian approach, this thesis attempts to shed light on these questions by examining the historical trajectory of growth rates and industrialisation in three countries said to be stuck in the MIT. The case studies, Brazil, South Africa, and Egypt, are selected on the basis of regional breadth including all developing regions said to be affected by premature deindustrialization (Rodrik, 2016: 2).

The remainder of this paper is structured as follows: In section two, I will briefly review the literature on the hitherto only loosely associated phenomena of the MIT and premature deindustrialization. In section three, the methodology, case-selection criteria and data-sources shall be discussed. In section four, the analysis, I first provide some evidence illustrating the relevance of the phenomenon for MICs before analysing and comparing the three case studies. Section six concludes.

2.) Literature Review & Theory

For the above described scientific endeavour we first need to carve out the linkages between three strands of the literature: (a) the literature on the MIT, or better, the question if it exists (b) the literature on premature deindustrialization and if that phenomenon could contribute to the existence of the MIT and finally (c) the literature on manufacturing as the engine of growth, which provides the very theoretical foundations of why premature deindustrialization could be considered to contribute to the MIT.

a.) The Middle-Income Trap

The term middle-Income trap was coined to describe the *challenges* faced by economies squeezed between a low-wage poor-country and an innovation based high-wage, rich-country equilibrium (Gill, Kharas, 2015: 3-4). However, a significant part of the debate still revolves around its mere existence with some including its founders in favour and others, grounded mainly in neo-classical growth theory, denying the theoretical and empirical idiosyncrasy of the phenomenon. This debate has been summarized in meticulous detail elsewhere and shall therefore be reviewed here only briefly[4].

According to Gill and Kharas we can differentiate three types of definitions. The first, to which my definition, their own definition and most of the supporters' definitions belong, is of mainly descriptive character and identifies a set of policy challenges contributing to being squeezed between the beforementioned equilibria (c.f. Ohno, 2009; Kharas, Kholi, 2011; Wade, 2016a). However, say the sceptics, viewing the MIT in this light, every country found in the MIR is trapped because by definition it then faces these challenges (Felipe, Kumar, Galope, 2017: 3).

The second definition is theoretical and grounded in the neo-classical prediction of unconditional convergence which holds that countries with access to the same technology should converge to a similar income level as long-term growth is predicted by technological change. It is measured as the absence or presence of convergence with a benchmark country, usually the US. Here, scepticism seems to be the most unified position. Im and Rosenblatt (2013) find that MICs are no less likely to transition the high-income threshold than low income countries are to transition the middle-income threshold. Others add that stagnation is not particularly more likely at any defined income level (Bulman, Eden, Nguyen, 2014; 2017; Han, Wei, 2015) or that MICs are not negative outliers, in an unconditional convergence framework (Sutirtha, Kessler, Arvind, 2016).

The third definition is empirical[5] and tends to lend support to the advocates of the existence of a MIT. It is defined in one of two ways: The first is time spent at a defined middle-income level, (Spence, 2011; Felipe, 2012a). The most widely applied of these is Felipe's definition which classifies countries at an income level of 2,000 to 11,750 at 1990s constant PPP US$ as middle-income. He considers a country as 'stuck' if it stays in the lower-middle-income range (LMIR) longer than 28 years and in the upper-middle-income range (UMIR) longer than 14 years[6]. The other definition is based on an increased likelihood of experiencing growth slowdowns, (Eichengreen, Park, Shin, 2011; 2013; Aiyar et al. 2013).

Opposition towards the relevance of both these empirical observations stems from two ultimately related premises. First, standard growth theory predicts that poorer countries will grow faster than richer countries, and eventual slowdowns are implicit in the notion of convergence (Williams, 2012: 7; Sutirtha, Kessler, Arvind 2016: 48). Consequently, a slowdown does not mean a country is being trapped it only means taking successively longer to reach steps further along the way (Felipe, Kumar, Galope,

[4] For excellent summaries of the MIT and policy challenges associated with being trapped see (Gill, Kharas, 2007; Wade, 2016a; Vivarelli, 2017; Glawe, Wagner, 2016)
[5] So is the second but its theoretical grounding is generally emphasised.
[6] Although the latter now refers to "slow" and "not slow" middle-income transitions rather than a trap in combination with broadening the acceptable duration from 28 to 55 and from 14 to 15 years before a country is considered transitioning slowly (Felipe, Kumar, Galope, 2017: 12-19).

2017: 3). In terms of policy, the debate is thus counterproductive having more to do with the semantics of what constitutes a 'trap' than an empirical phenomenon seeking explanation let alone a solution.

Yet, taking these challenges seriously, one further question arises. Are growth slowdowns in the MIR really just regular bumps on the path to convergence, as neoclassical theory would predict, or are we experiencing a more substantial phenomenon? After all, it is true that growth rates are highly volatile and characterized first and foremost by regression to the mean (Pritchett and Summers, 2014). In order to answer this question, it makes sense not only to examine which factors are crucial to transitioning the MIR (c.f. Felipe, 2012b; Jankowska, Nagengast, Perea, 2012; Eichengreen, Park, Shin, 2013; Ergin, 2015) but to put the cart before the horse, and pay closer attention to those countries experiencing them. The phenomenon of premature deindustrialization provides a suitable framework for this inquiry.

b.) Premature deindustrialization

The literature on deindustrialization[7] emerged in the UK in the late 1970s with the seminal contribution of Ajit Singh (1977) whose primary concern was a slowdown in the growth rate of the British economy. The ultimate cause for deindustrialization was to be found in the liberalization of trade and free capital movements at a point when the economy was in "disequilibrium" and its manufacturing sector ill-equipped to compete (133-134). Since then, however, employment deindustrialization has been regarded a natural consequence of the industrial dynamism of developed countries. Due to faster productivity growth in manufacturing, the price of manufacturing goods falls and therefore the price elasticity of demand for those goods changes relative to that of services. International trade, on the other hand, is said to account for less than 20% of deindustrialization in advanced countries (Rowthorn, Wells, 1987; Rowthorn, Ramaswamy, 1999; Rowthorn, Coutts, 2004).

Less attention has been paid to *premature* deindustrialization. Adding to the observation of Rowthorn (1994), that industrialization follows an inverted U-curve and is thus primarily a function of GDP per capita (GDPpc), Gabriel Palma (2005: 75-81) identifies three other causes of deindustrialization relevant especially for developing countries. First, he observes a declining relationship between GDPpc and manemp, meaning that premature deindustrializers reach lower levels of employment than those that had been maintained for years in advanced countries before they started to deindustrialize. Second, countries undergo deindustrialization at levels of income that are a fraction of those that have historically been observed. Finally, he claims that the ultimate cause of premature deindustrialization is the "Dutch disease". By this he means, a country's ability to generate trade surpluses in primary

[7] The literature largely treats the term deindustrialization to refer to changes in the share of the manufacturing sector in GDP and employment, which is of course not synonymous with 'industry'.

commodities, tourism and finance rather than having to (resource scarceness) or wanting to (policy) generate it through manufacturing.

This last point was restated recently in a more generalizable fashion by Rodrik (2016: 27-28), who suggests that low-income regions experience two shocks, labour saving technological change and declining costs of transportation. This leads to a rise of manufacturing activities in the region with a comparative advantage in manufacturing and a decline of manufacturing in the region without a comparative advantage in manufacturing. Illustrated most prominently by the rise of China and the divergent paths of Latin America and Asia (Kim, Lee, 2014). To further support this point, Felipe and Mehta (2016: 149) show that global manufacturing employment stays surprisingly constant. They conclude that increasing labour productivity has been counter-balanced by a shift of manufacturing towards lower productivity labour markets, further suggesting that external factors are at work for premature deindustrializers. Factors internal to a country's economy such as Rowthorn's changes in price elasticity are less relevant for developing countries because, due to their comparatively small market-share, they are essentially price-takers on the international market for manufacturing goods. In addition to the above mechanisms developing countries are thus said to have imported deindustrialization from advanced countries (Rodrik, 2016: 4). Finally, it is important to note, that the literature about deindustrialization in advanced countries is mainly concerned with falling shares in employment. When this is accompanied by a drop of output, economies may be particularly at risk of experiencing negative consequences for long-term growth (Tregenna, 2011: 15). A fate that advanced countries seem to have been avoiding successfully if demographic trends are accounted for (Rodrik, 2016: 12).

To summarize, the defining features of premature deindustrialization are (1) lower overall levels of industrialization (2) an early reversal of the industrialization process in terms of GDP and (3) the combination of both employment- and output deindustrialization. As the above discussion reveals, the literature around premature deindustrialization is largely concerned with its origins, and identifying different types and varied consequences. Besides that, multiple case studies have emerged attempting to prove that a variety of countries, mainly in Latin America, have 'caught' premature deindustrialization[8]. Fewer studies have examined its alleged economic consequences. The few studies that have attempted to do so, due to a lack of suitable data, rely on subnational data (Jenkins, 2015; Dasgupta, Singh, 2005), or revert to the very origins of the literature on manufacturing as the engine of growth using a Kaldorian framework. (Dasgupta, Singh, 2006; Cruz; 2014).

[8] For recent case-study contributions see (Kassem, 2010; Rasiah, 2011; Imbs, 2013; Cruz, 2014; Hamid, Khan, 2015; Jenkins, 2015; Cypher, 2015; de Paula, 2017; Castillo, Neto, 2017)

c.) Economic consequences – Manufacturing as the Engine of Growth?

The concern with premature deindustrialization stems from the long tradition in development economics holding that manufacturing is "the engine of growth" the intellectual foundation of which was provided by Nicholas Kaldor in 1967 (Dasgupta, Singh, 2006, 1; Tregenna, 2009: 433; Cruz, 2014: 115). Kaldor suggested a link between overall GDP growth and a nation's growth of manufacturing output owing to his belief in the increasing returns to manufacturing production (1), which stands in direct contrast to the constant or decreasing returns to scale predicted by neoclassical growth theory (McCausland, Theodissou, 2012: 80). Inspired by Arrow's (1962) 'learning by doing' he furthermore introduced the concept of dynamic returns to scale, which predicts that manufacturing productivity will grow faster, the faster manufacturing output grows (2). Finally, due to the reallocation of labour from sectors that exhibit diminishing returns to manufacturing he suggested that labour productivity of the economy as a whole would increase the faster the rate of growth of manufacturing output (3) (c.f. Thirlwall, 1983: 345; Dasgupta, Singh, 2006: 3; McCausland, Theodissou, 2012: 80). These propositions translate into three estimatable equations, known as Kaldor's growth laws (1967: 8-23):

$$Y = \beta_0 + \beta_1 ym \qquad (1)$$

Where y is GDP growth and ym is manufacturing growth. For Kaldor, the relationship between manufacturing output growth was fundamentally a causal one, instead of a simple correlation between the two variables, he thus suggested that the coefficient for manufacturing growth should thus be significantly below unity.

$$Pm = \beta_0 + \beta_1 ym \qquad (2)$$

Where Pm is productivity growth of manufacturing and ym is manufacturing growth also known as Verdoonr's law (Verdoorn, 1980). And finally,

$$P = \beta_0 + \beta_1 ym + \beta_2(e_a + e_s) \qquad (3)$$

Where P is overall labour productivity ym is manufacturing growth and e_a and e_s reflect growth in service and agricultural employment (Cripps, Tarling, 1973). When manufacturing weakens its role as the engine of growth, especially, through output deindustrialization, labour productivity is likely to decline too (c.f. Pages, 2010; McMillan, Rodrik, Verduczo-Gallo, 2014). This may result in wage stagnation and a slump in domestic demand for manufactures and hence a negative feed-back loop with further knock-on effects on the potential for structural transformation and hence long-term growth prospects (Cruz, 2014: 114; Tregenna, 2011: 15).

Recent empirical studies such as Szirmai's (2012) finding that technology developments emerge in manufacturing and spread from there to other parts of the economy, and Rodrik's (2013) observation that unconditional convergence exists only in the manufacturing sector revive Kaldor's points. In fact, Kaldorian analyses have regained attention[9] probably owing to the newly found interest in industrialization since the economic crisis of 2008-2017 struck a blow to the existing economic order (Wade, 2012; c.f. Rodrik, 2009). Furthermore, researchers from the Asian Development Bank (Felipe, Mehta, Rhee, 2015: 9) assembled a much larger data set of manufacturing employment data[10]. Investigating alternative routes to prosperity, these authors go as far as stating that no country which had less than 18% of its labour engaged in manufacturing, had ever reached an income of 12.000$. This threshold comes surprisingly close to the regularity discovered by Eichengreen, Park, Shin (2013) of a downturn at a GDPpc of 10,000-11,000$ and Felipe's definition of the MIR at 11,750$ (all in constant PPP US$). Probably coincidentally so. Still, in order to investigate if growth slowdowns in the MIR represent a substantial diversion away from the neoclassical path to convergence, and whether this is to do with 'catching' premature deindustrialization we need to examine the economic trajectories of those MICs that experience premature deindustrialization.

3.) Methodology, case-selection and data

The case studies, are selected, first and foremost, on the basis of data availability and regional breadth, to include examples from all developing regions, said to be affected by the phenomenon of premature deindustrialization, Latin America, Middle East and North Africa and Sub-Saharan Africa (Tregenna, 2009; 2011; Rodrik, 2016)[11]. In addition to that, based on patterns found in the literature, I developed a set of criteria to systematically identify suitable cases for the in-depth analysis.

1.) Countries should experience full deindustrialization. This means not only having reached their peak of manemp but also manva (Tregenna, 2011)[12] since most of the Kaldorian mechanisms work through manufacturing output growth.
2.) They should experience deindustrialization prematurely. Any given threshold is necessarily somewhat arbitrary. However, Felipe, Mehta and Rhee's (2014) threshold of <18% of manemp seems a reasonable point of reference.
3.) Finally, they should have reached a certain level of industrial development in order not to mistake the absence of industrialization for the effects of premature deindustrialization. The literature does

[9] For recent contributions see (Rodrik, 2013; McCausland,Theodissou, 2012; Szirmai, Verspagen, 2015; Su, Yao, 2017)
[10] I thank Aashish Mehta for making a linear extrapolated version of this dataset available to me for explorative analysis.
[11] Originally, I attempted to identify four cases from all developing regions. However, with the exception of the Philippines – sometimes dubbed a 'honorary Latin American country' (Tregenna, 2011: 11) – no Asian country in the dataset had begun a significant process of deindustrialization. Data for the Philippines range from 1970 to 2011, not covering the Philippian phase of industrialization. The true point at which the Philippines began to deindustrialize is not covered by the data, making the case unsuitable for the present analysis.
[12] Preferably not within the last 10 years of observations in order to assure a clear trend.

not suggest any criteria here. The best viable alternative is thus to select countries that come closest to reaching the aforementioned 18% threshold.

This leaves us with the cases of Brazil, South Africa and Egypt[13], all of which are classified as stuck in the LMIT according to – what seems to be the smallest common-denominator definition – Felipe (2012a). Following Cruz (2014), I will test Kaldor's first and third growth law to answer the question, if premature deindustrialization is responsible for the economic demise of the selected economies under increasing pressures of globalization. As Dasgupta and Singh (2006: 6-7) point out, to get a full picture, one also has to apply these to the non-dynamic sectors of the economy, agriculture and services. There is a wide debate about the applicability and possible confounding factors to Kaldor's growth laws – not surprisingly given that the laws were formulated roughly 50 years ago[14] and the potential drawbacks of regression analyses studying economic growth[15] (Su, Yao, 2017: 8). The application of such simple equations like the ones formulated by Kaldor can thus not be considered state-of-the-art econometrics. Yet, given the shortage of data, and studies investigating the phenomenon, an explorative dip into the consequences of premature deindustrialization for MICs, still is an interesting exercise. In acknowledgement of these possible confounding factors the analysis will be supplemented with as much graphical evidence as possible delving further into the inter-sectoral dynamics and their effect on labour productivity.

Following Cruz (2014), my time-series data for each of the cases will have to be divided into two periods of comparison, a high-growth period and a low-growth period. One way to do so, is to define a date at which globalization caught steam, such as the beginning of the 1980s with the Latin American debt crisis and the subsequent shift in the international political economic opinion climate (Cruz, 2014: 122) or the 1990s when the policies implemented in the 1980s took effect and globalization accelerated (c.f. Rodrik, 2016: 16). However, every such point of orientation is necessarily arbitrary and likely to differ across cases. Another alternative, grounded in theory, is to revert back to the literature on growth slowdowns in the MIR and identify a point at which each of these countries diverted from their hypothetical path of convergence.

Aiyar et al. (2013: 8-13) identify slowdowns on a 5-year period basis, by subtracting a country's actual rate of growth from a theoretically defined benchmark. To generate this benchmark, they regress GDPpc growth on lagged income level, human capital as well as the rate of investment in physical capital. Recall, that according to Solow long-term growth is dependent solely on the rate of technological change. Holding human and physical capital constant, poorer countries should see income convergence

[13] For a stepwise exclusion of the 22 cases for which data are available in the 10-sector database see Appendix A.
[14] Which goes beyond the scope of this paper. For a good summary see (McCausland and Theodissou, 2012)
[15] Such as reverse causality, highly correlated explanatory variables etc.

with the advanced countries. They then define a country as experiencing a growth slowdown in period$_t$ if performance deteriorates substantially, and does not recover in the period following the growth slowdown. Relying on their identification strategy, I take the beginning of each growth slowdown episode as a breaking point for my time-series data. This yields the year 1980 for South Africa and 1995 for Egypt. In Brazil, the authors report two subsequent periods of growth slowdowns: 1975-1980 and 1980-1985. Accordingly, I will test both demarcation points in order to ensure that the results remain unchanged[16].

This alternative is preferable, due to its theoretical grounding, which is even more relevant when testing very simple econometric equations. First it takes into account the level of growth predicted by unconditional convergence frameworks. Furthermore, it counts only those episodes as growth slowdowns that were not just temporary deviations with subsequent recovery. Finally, it fits well with the theoretical framework employed by the present study. Recall that Kaldor's assumption about increasing returns to scale in manufacturing stands in direct contrast to the neo-classical constant or decreasing returns, which build the very foundation of unconditional convergence frameworks.

My baseline results are based on data from the Groningen Growth and Development Centre (GGDC) (Timmer, DeVries, deVries, 2014) which covers the period from 1950/60 to 2011. Sectoral value added is measured at constant local currency units (LCU). Sectoral employment is measured as a share of total employment. Labour productivity is the quotient of sectoral value added divided by persons engaged in thousands weighed by the share of sectoral employment. The PPP-conversion factor is taken from the World Development Indicators (WDI) and population data are taken from the Penn World Tables (PWT) version 9.0. Table one provides an overview of sector in the database.

Table 1: Sector-coverage

Sector	Abbreviation
Agriculture, hunting, forestry and fishing	Agr
Mining and quarrying	Min
Manufacturing	Man
Public utilities (electricity, gas, water)	Pu
Construction	Con
Wholesale, retail, trade, hotels and restaurants services	Wrt
Transport, storage and communications services	Tra
Finance, real estate and business services	Fire
Government services	Gov
Community, social and personal services	Oth

[16] Originally, I intended to replicate these authors methodology on an annual basis instead of relying on their period-observations. I thank Shekar Aiyar and Romain Duval for useful comments on the disadvantages of doing so. For a list of slowdown-episodes identified by the authors see Appendix B.

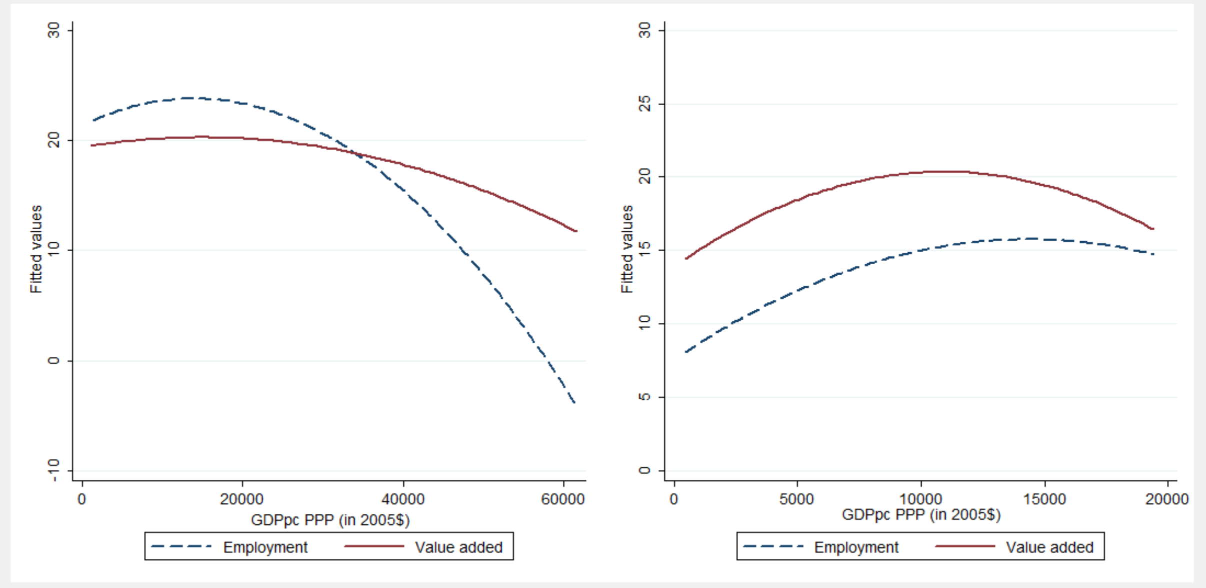
4.) Analysis

Before delving into the case-studies, I would like to reconfirm and further illustrate the relevance of the phenomenon of premature deindustrialization for MICs as a whole, beyond the selected case studies.

a.) Do MICs 'Suffer' from Premature Deindustrialization?

Figure one shows how manva and manemp have evolved over the process of development in middle- and high-income countries (HICs). As the literature at hand would suggest, in HICs manemp peaks earlier and more pronouncedly than manva. More importantly, employment exceeds value added lending support to the labour-productivity narrative.

Figure 1: manufacturing value added and employment in middle- and high-income countries



Source: author's own calculation based on Data from the GGDC's 10-sector data base. This is true for all following figures. Low income countries are excluded from the sample in order to avoid overstating the differences between advanced and developing countries.

This is the opposite for MICs, where manva is higher than manemp at all times[17]. Most strikingly, the two variables converge towards the end of the process suggesting that labour productivity declines with a drop of manufacturing output. Furthermore, while manva at peak seems to be roughly the same for each of the two country-groups, employment shares differ sharply. Advanced countries on average record employment shares of up to 30%. This value peaks at 15% for MICs. Manufacturing thus generated half as many jobs in MICs than it did in HICs (c.f. Felipe, Mehta, Rhee, 2015). Finally, manva and manemp historically peaked at a GDPpc of roughly 18.000 constant PPP US$ in advanced countries. In MICs, these variables peak at roughly 11.000$ and 14.000$ respectively. For manufacturing output, the crucial factor thus seems to be the early reversal of the industrialization process.

[17] Indeed, this pattern is quite divisive, being replicable with few exceptions for each country according to income category. For a list of country-graphs, see Appendix C.

To test the above depicted relationship more systematically, I run a simple OLS regression that interacts income with a dummy for MICs controlling for population trends and country-fixed effects (c.f. Rodrik, 2016: 21-22). Both interaction terms are significant and have the expected signs. GDPpc interacted with MI-status has a negative sign indicating that MICs reach lower levels of manemp and manva throughout the course of their development. As the descriptive analysis suggest, the effect is stronger for employment than for output where the coefficient is significant only at the 10% level. However, these calculations merely prove that MICs are in fact deindustrializing earlier than today's HICs. The Assumptions about its economic consequences remain unassessed. The three case studies attempt to shed further light on this question.

Table 2: Regression with interaction term for MICs

Explanatory Variables		
	Employment	Value added
ln population	-.008 (.023)	-.037 (.047)
Ln population²	-.000 (.003)	.007 (.006)
Ln GDPpc	.973 (.244)***	.540 (.153)***
Ln GDPpc²	-.053 (.013)***	-.028 (.008)***
Ln GDPpc * MICs	-.959 (.255)***	-.410 (.086)*
Ln GDPpc² * MICs	.055 (.014)***	.022 (.10)*
Country fixed effects	Yes	Yes
Number of countries	35	35
Number of observations	1869	1856

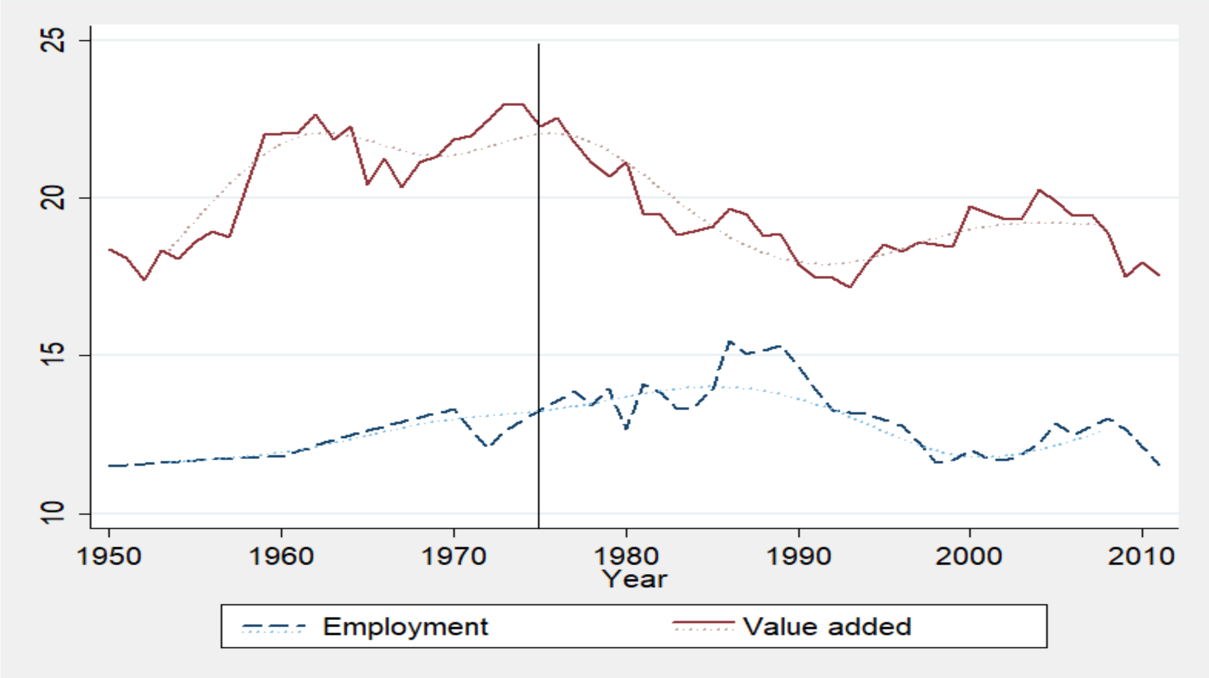
Robust standard Errors are reported in parentheses Levels of statistical significance *** 99%; **95%; * 90%; LICs are again excluded from the sample in order not to overstate the coefficient of the interaction term.

b.) Brazil

To answer this question let us first take a look at the development of manva and manemp in Brazil from 1950-2011. Figure two shows manva as a percentage of GDPpc and manemp as a percentage of total employment. Like most Latin American countries Brazil started to industrialize during WWII resulting in two and a half decades of import substitution industry (ISI) inspired by the structuralism of the Economic Commission for Latin America and the Caribbean(ECLAC) (FitzGerlad, 2015: 42). Manva peaks at 23% in 1973 but declines sharply with the onset of the Latin American Debt crisis and the structural adjustment programmes implemented by the IMF throughout the 1980s.

It recovered slightly in the 1990s, only to drop again in 2008 with the onset of the global financial crisis. The peak in manva coincides with the growth slow-down episodes in 1975-80 and 1980-85, identified by Aiyar et al. (2013). Employment, on the other hand, despite taking a hit with the Latin American debt crisis in the early 1980s, continues to rise until the 1990s, peaks at 15.32% and then falls sharply. This pattern stands in contrast to that observed in developed economies, where employment peaks earlier and more pronouncedly than value added. This is likely due to the export-strengthening reforms (at least in the short run) instituted since the early 1980s. Yet again, it also implies that manufacturing labour productivity declined between 1975 and 1990 hinting at a change in the sorts of manufacturing goods that were produced in the aftermath of the crisis. The Brazilian economy thus started to 'suffer' from premature deindustrialization in the mid-1970s at an income per capita of 6257 constant 2005 PPP US$. Is this the reason for Brazil's economic demise?

Figure 2: Manufacturing value added and employment in Brazil



The performance of the region's largest economy post WWII is well known and often related to the performance of its manufacturing industry (c.f. Aldrighi, Colistete, 2015, 175-181). However, a Kaldorian analysis, confirming these interpretations, is yet to be made. To investigate the differential role the manufacturing sector has played for Brazil's growth prospects we will compare the period of economic success and economic stagnation. Table three shows the application of Kaldor's first growth law.

During the first period, there is evidence that manufacturing did in fact constitute the 'engine of growth'. The beta coefficient is significant at the 1% level. Crucially, it is also significantly less than unity. Together with the positive constant this implies that the rate of growth of the manufacturing sector is in excess of GDP growth pulling the rest of the economy along (Kaldor, 1967: 10). While there is no significant relationship between agriculture and GDP growth, the beta coefficient for services, is positive and close to unity implying that service growth is likely equivalent to GDP growth and thus a result rather than a cause (Dasgupta, Singh, 2006: 8).

In the second period, in contrast, the beta coefficient for manufacturing becomes much larger. In fact, it now resembles the coefficient for services suggesting that manufacturing lost its growth enhancing effect. The granger causality test confirms this interpretation. In the first period manufacturing growth caused GDP growth, then causality was reversed in the second period. The results remain unchanged when substituting the year 1975 for the year 1980[18], the second episode of growth slowdown identified by Aiyar et al. (2013). To summarize, manufacturing lost its role as the 'engine of growth', due to the event of premature (output) deindustrialization (Tregenna, 2011: 15)[19]. Neither agriculture nor services replace manufacturing as the engine of growth.

Table 3: Brazil Kaldor's first growth law: (dependent variable gGDP)

Explanatory Variables	1950-1980 (annual gGDP 7.8%)			1981-2011 (annual gGDP 2.1%)		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	.049 (.007)***	.078 (.007)***	.019 (.007)***	.014 (.002)***	.019 (.01)*	-.003 (.002)
gMan	.608 (.088)***			.911 (.05)***		
gAgr		.031 (.088)			.101 (.232)	
gServ			.898 (.073)***			.953 (.055)***
R^2	0.370	.000	.807	.829	.010	.909
Shapiro Wilk-Test	.02[20]	.709	.28	.073	.605	.511
Granger-causality: gMan	.001			.317		
gGDP	.081			.047		

*Notes: OLS estimation; robust standard error[21] are in parentheses; Levels of statistical significance *** 99%; **95%; * 90%; gGDP is the annual growth rate of GDP and gMan is the annual growth rate of the manufacturing sector; gAgr is the annual growth rate of the service sector and gServ is the annual growth rate of the services sector. Diagnostic test reports p-values.*

However, the seminal contribution of Kaldor has been the observation that manufacturing is critical for the development of labour productivity. To complete our understanding of the dynamics of the sector throughout the process of Brazil's development, we thus have to turn to productivity. Figure three shows the evolution of labour productivity. Economy-wide Labour productivity closely follows the productivity of manufacturing until the early 1990s when the two curves diverge slightly. While

[18] The year 1980s will be depicted throughout as it splits the data-set roughly in half.

[19] It has rightfully been pointed out, that the above coefficients could be artificially high, because the manufacturing sector constitutes a large part of the economy (Thirlwall, 1983; McCausland, Theodissou, 2012: 81). An alternative specification thus regresses GDP-growth on *excess* manufacturing-growth (gMan – gAgr – gServ) was thus proposed. It must be noted that the results are not robust to this specification of Kaldor's first law. There are a number of reasons why that could be the case. First, these considerations have emerged with regards to developed countries, where manufacturing constituted a larger share of the economy. Moreover, the service sector is larger in developing countries and due to the prematurity of deindustrialization starts to grow relatively early on. Excess growth of manufacturing over the other parts of the economy may thus not be pronounced enough. However, that does not render the original criticism irrelevant. Yet, were the above results *merely* reflective of the size of each sector, this would fail to explain why the coefficient of manufacturing grows in the second period despite the shrinking size of the sector. Albeit not being able to rule out very likely confounding factors with regards to these rather ancient equations, we can suggest that the Kaldorian relationship holds.

[20] Some of the specifications of interest do not pass the normality test, indicating that, given the small sample size, the t-statistics might not be reliable. graphical analysis with distributional diagnostic plots (qnorm) however reveals that the deviations are mostly not substantial. I leave this interpretation to the eye of the beholder and report diagnostic plots for specifications that do not pass the normality test in Appendix D.

[21] Throughout the remainder of the analysis robust (vce(hc3) standard errors are chosen as these assume that heteroscedasticity is present (which it is in some specifications) and are suited to small sample sizes (see: http://www.stata.com/manuals13/rregress.pdf).

manufacturing productivity recovers from its sharp fall in the 1980s overall labour productivity remains almost stagnant, indicating again that manufacturing has lost its key function.

Figure 3: Manufacturing and economy-wide labour productivity:

Table four largely supports these interpretations, manufacturing remains crucial for economy-wide labour productivity in both periods, contrary to what is expected more so in the second period. The beta coefficient for agriculture is negatively associated with productivity growth. This means that when agricultural employment drops productivity rises and vice versa. This is true for both periods suggesting that the reallocation of labour from agriculture into other sectors of the economy continued to affect productivity positively. The coefficient for services is negative too, yet significant only in the second period. Note also, that while agricultural employment was falling, service employment was on the rise, which implies that growth rates are on average more often positive than negative.

Table 4: Brazil Kaldor's third growth law

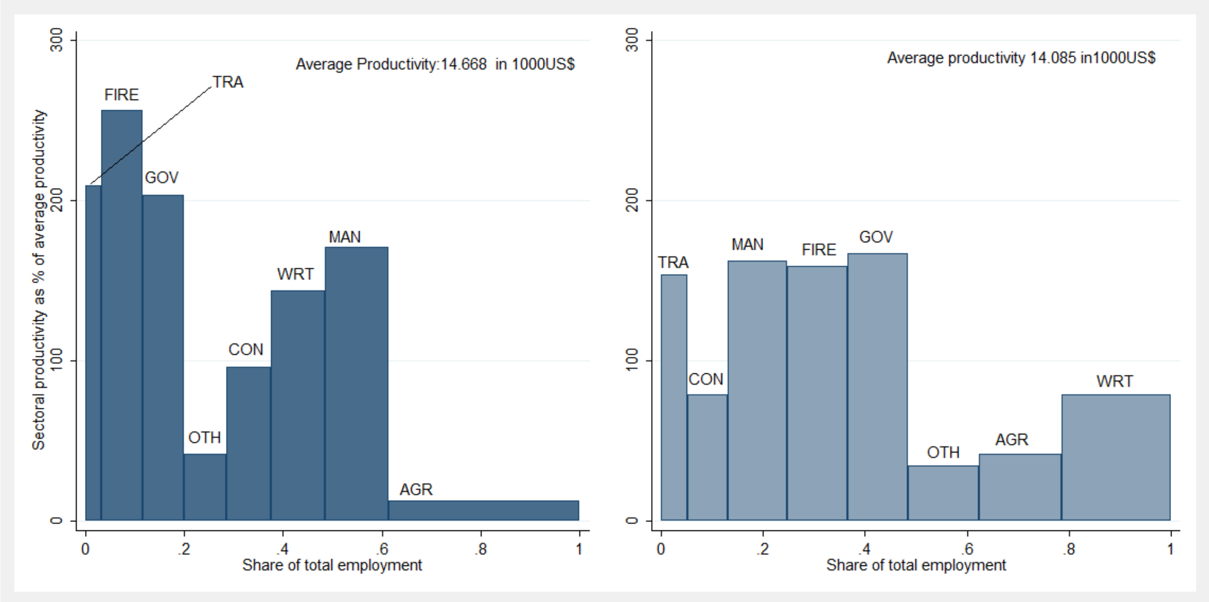
Explanatory Variables	Dependent variable gProd	
	1950-1980	1981-2011
Constant	.037 (.009)	.011 (.004)***
gMan	.511 (.075)***	.78 (.055)***
gAgremp	-.558 (.229)***	-.581 (.050)***
gServemp	-.202 (.264)	-.548 (.062)***
R^2	.909	.889
Shapiro-Wilk test	.322	.511

Note: OLS estimation robust standard errors are in parentheses. gLPman is the annual growth rate of manufacturing labour productivity; gProd is the annual growth rate of overall labour productivity, gAgremp is the annual growth rate of agricultural employment; gServemp is the annual growth rate of services employment.

This means that in the latter period the reallocation of labour towards services might have had a negative effect on productivity. However, the service sector is quite diverse in terms of productivity including high productivity activities such as financial services and low productivity activities such as community social and personal services. The observations regarding labour productivity thus merit further discussion.

A simple decomposition of productivity levels and employment shares across sectors provides further evidence. Figure four compares gaps in labour productivity and employment shares at the beginning and end of the second period.

Figure 4: Labour productivity gaps and employment shares in Brazil 1980 vs. 2011

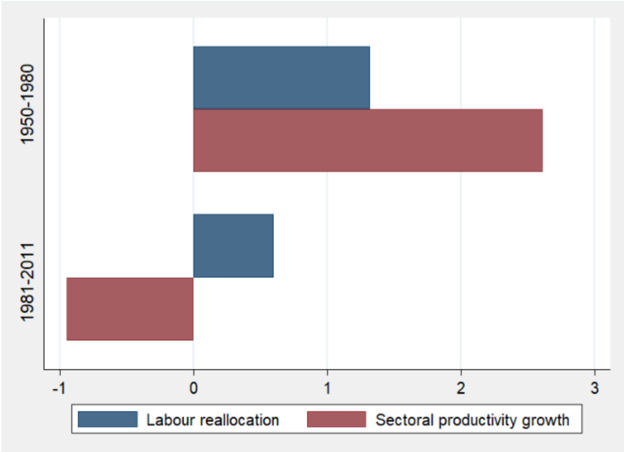


While average labour productivity drops slightly, intersectoral gaps in productivity expectedly vanish. In support of the above stated, we can see that sectors with low productivity (oth and wrt) gained most from reallocation lending further credibility to the negative coefficient for services. More productive sectors (fire, gov, tra) remained fairly stable, as did manufacturing – although this would probably change were we comparing the year 1990s instead of 1980s when manemp reached its peak. Agricultural labour productivity increased considerably, given that it is traditionally the sector with the lowest labour productivity. The biggest increases however are in mining[22]. This supports the interpretation of those who claim that Latin America's type of premature de-industrialization reflects itself in an increased investment in primary commodities and natural resources (Palma, 2005; Castillo, Neto, 2016), which in Brazil's case are mainly iron, ore and soya beans. (Jenkins, 2015, 2).

[22] Note that the graph excludes mining and public utilities. In both sectors productivity increased three-fold from 1980 till 2011, relative to an otherwise almost unchanged labour productivity. It did so in none of the other sectors, artificially dragging average labour productivity up and covering finer differences between the other sectors. Note likewise, that because average productivity differs between the two periods the height of the bars is not strictly comparable. (Average labour productivity including min and pu is decreasing at 16.000 in 1980 and 15.000 in 2012).

Finally, Kaldor's growth laws say little to nothing about post-Lewisian structural transformation. Recall, one of the starting points of this thesis' inquiry was that MICs which fail to structurally transform beyond the gains to be had from inter-sectoral reallocation are at risk of experiencing premature deindustrialization. Decomposing changes in labour productivity into a within- (sectoral productivity growth multiplied by the share of employment at the beginning of each year) and a between-component (the sum of employment changes multiplied with the level of productivity of each sector), where the latter measures inter-sectoral and the former measures intra-sectoral productivity gains (McMillan, Rodrik, Verduzco-Gallo, 2014: 19), depicted in figure five, helps shed light on this missing piece[23].

Figure 5: Decomposition of Productivity Growth by Period



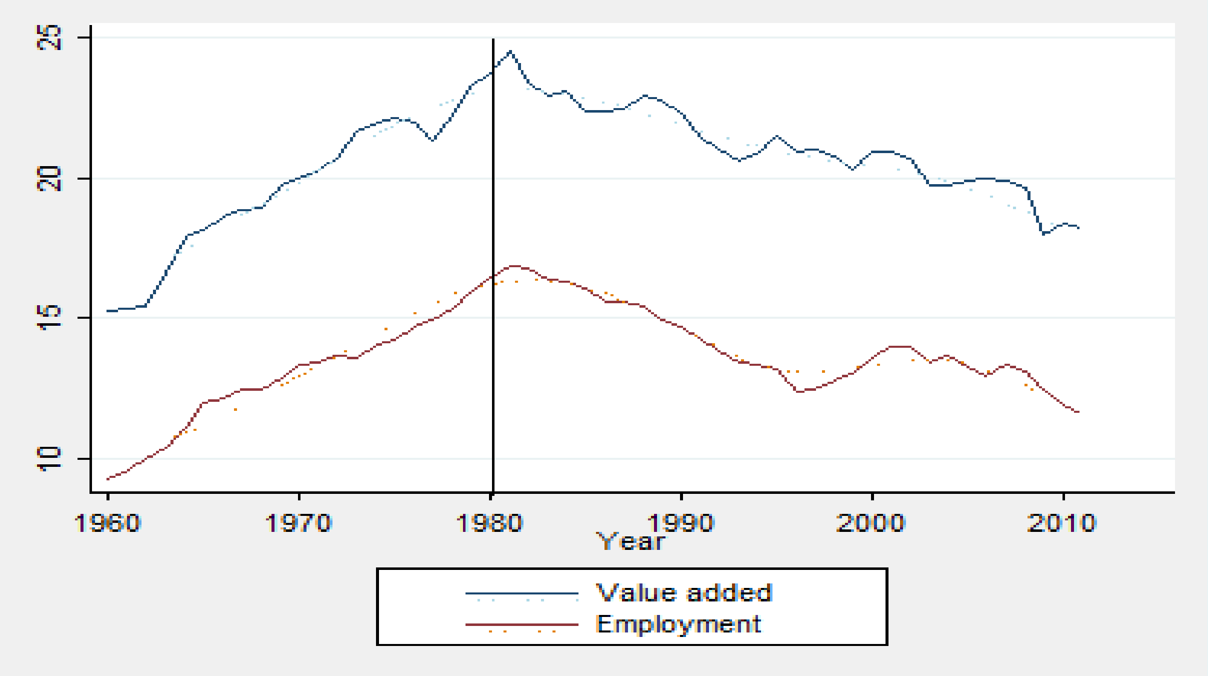
From 1950 to 1980 The reallocation of labour between sectors contributed positively to overall labour productivity with roughly 1.3% per annum. Sectoral productivity growth (reflective of post-Lewisian structural transformation) far exceeds that contributing roughly 2.6% on average per year. In the second period, gains from the former are halved, probably due to the service-drag on productivity discussed in table four. Yet, this is a process endogenous to the developmental process when intersectoral productivity gains are slowly exhausted (Wade, 2016a: 472). Strikingly though, intrasectoral productivity gains are on average negative in the latter period, indicating that Brazil failed to transform its economy structurally beyond the Lewisian point. Moreover, these results resemble the interpretations in figure two. Manufacturing continued to grow, yet labour productivity within manufacturing declined. The results are similar yet slightly less pronounced when substituting the year 1975 for the year 1980.

c.) South Africa

In South Africa both manemp and manva peak in the early 1980s, as a result of two decades of ISI policies, and start a continuous decline thereafter. This process is often related to broad global trends such as trade liberalization beginning in the mid-1980s and the well-known faults of ISI policies (Black, Gerwel, 2014: 249; c.f. Levy, 1973) Subsequently, South Africa chose a path of and capital and skill-intensification in favour of heavy industries (Joffe, et al. 1995; Rodrik, 2008: 10) a patterns that correspond to an early re-specialization (rather than continuous diversification) of South Africa's industrial strategy since 2003 with serious ramifications for unemployment (Imbs, 2013: 529).

[23] Only insofar as labour (and not capital/total factor productivity) is considered.

Figure 6: Manufacturing value added and employment in South Africa.



Most studies on South Africa, however, situate these changes in the early-to-mid 1990s with the transition from Apartheid, to a democratically elected regime. Figure six suggests that the process of deindustrialization began quite a bit earlier. Moreover, the slowdown in the growth rate of South Africa identified by Aiyar et al., (2013) again coincides with the beginning of deindustrialization. The South African Economy thus 'caught' premature deindustrialization in the early 80s at an income per capita of 6648 constant 2005 PPP US$. To investigate how the differences in South Africa's industrialization strategy have played out for growth in the two periods, we turn to Kaldor's first growth law shown in table five.

Table 5: South Africa Kaldor's first growth law: (dependent variable gGDP)

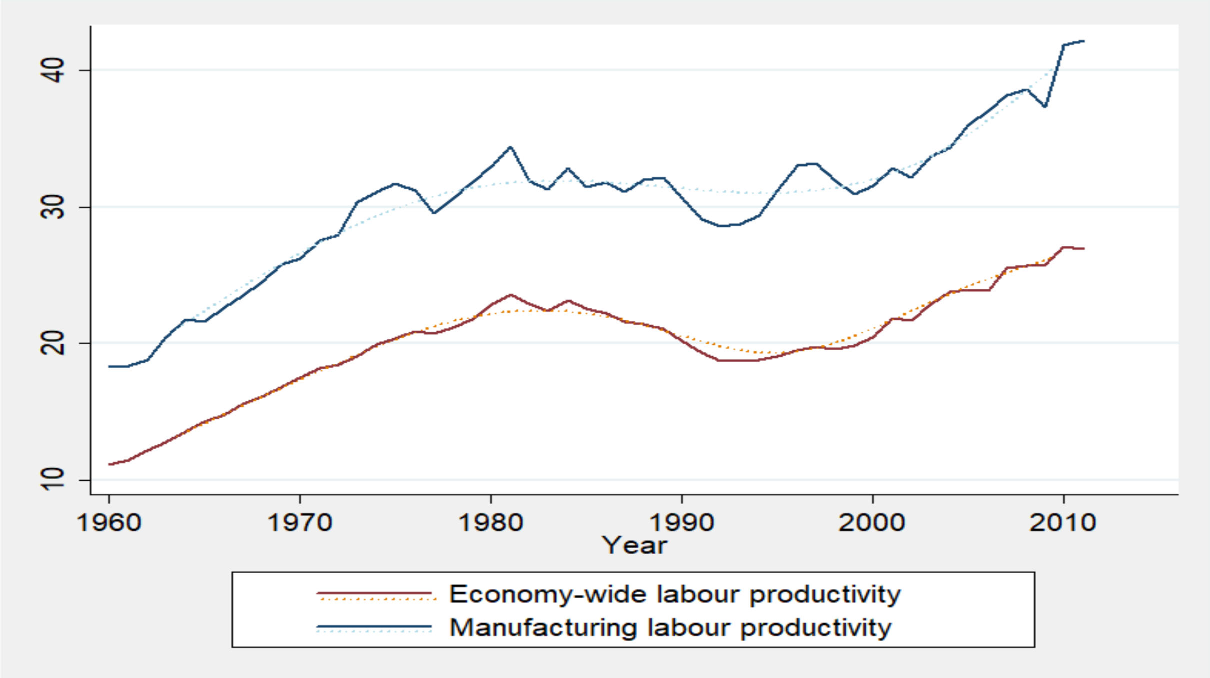
Explanatory Variables		1960-1980 (annual gGDP 4.5%)			1981-2011 (annual gGDP 2.5%)		
Constant		.020 (.006)***	.046 (.005)***	.012 (.01)	.017 (.002)***	.025 (.004)***	-.011 (.004)**
gMan		.803 (.074)***			.888 (.051)***		
gAgr			-.010 (.037)			.273 (.038)	
gServ				.746 (.171)***			911 (.088)***
R^2		.645	.000	.557	.789	.075	.830
Shapiro-Wilk Test		.038	.049	.377	.329	.172	.969
Granger-	gMan	.009			.188		
Causality	gSum	.002			.078		

Notes: OLS estimation; Robust standard errors are in parentheses. gGDP is the annual growth rate of GDP and gMan is the annual growth rate of the manufacturing sector; gAgr is the annual growth rate of the service sector and gServ is the annual growth rate of the services sector. Diagnostic test reports p-values.

Similar to Brazil, the coefficients behave largely as expected. Agriculture is insignificantly related to the growth performance of the economy, while the coefficients for services and manufacturing are positive and highly statistically significant. In contrast to Brazil, the coefficient for manufacturing is very large already in the first period, indicating that manufacturing did not pull the rest of the economy along in the fashion noticed by Kaldor in HICs. The granger causality test confirms this. As both coefficients are significant at the 1% level it is impossible to assert a direction of causality. Nevertheless, performance deteriorates further in the second period of observation, where growth is more likely to have caused manufacturing and the coefficient for manufacturing increases.

Turning to productivity, we again see that manufacturing labour productivity has been crucial for the development of economy-wide labour productivity and even more strongly so, than it was in the Brazilian case. Moreover, despite the reduction in manemp and manva, manufacturing productivity drops only mildly, between the 1980 and 2000, which is likely due to the skill-intensive heavy industry

Figure 6: Manufacturing- and economy-wide labour productivity



strategy pursued thereupon. Moreover, in the last two decades, labour productivity rises to unprecedented heights, coinciding with the much-celebrated period of catch-up growth for the developing world. Along the same lines, table six shows that the reallocation of labour between sectors had no effect on labour productivity in the first period, but started to contribute in the second period. The pattern revealed is the same as in the Brazilian case. While the drop in agricultural employment contributes positively, because agricultural employment is largely growing negatively, the rise in service employment contributes negatively to overall productivity growth and is of similar magnitude.

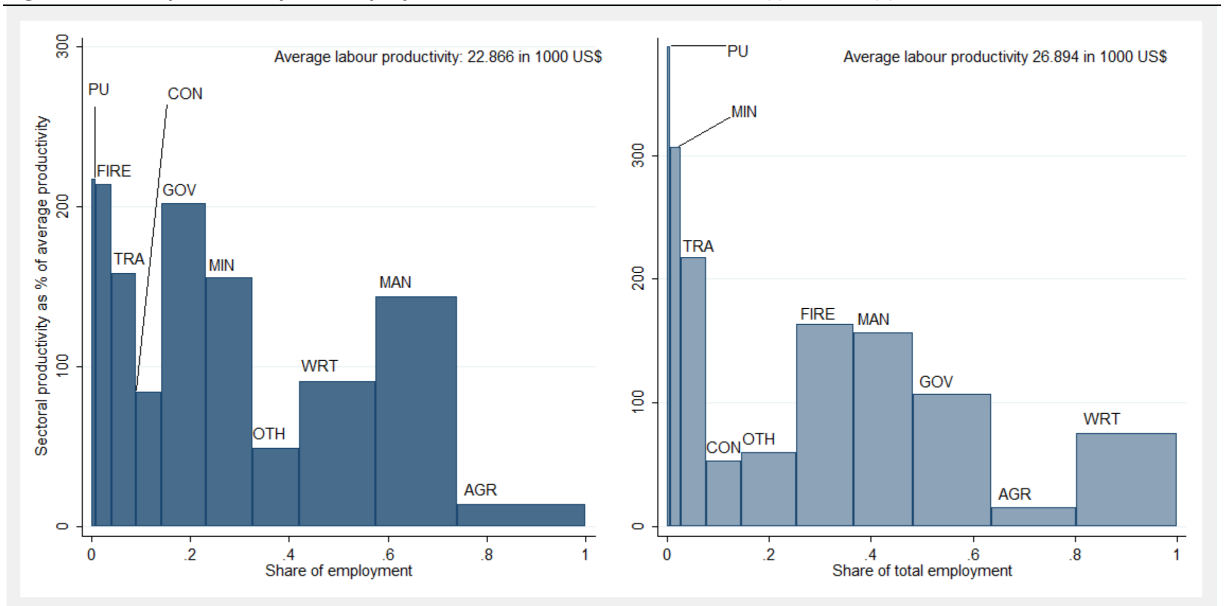
Table 6: South Africa Kaldor's second and third growth law

Explanatory Variables	Dependent variable gProd	
	1950-1980	1981-2011
Constant	.011 (.011)	.023 (.003)***
gMan	.819 (.083)***	.534 (.050)***
gAgremp	-.002 (.556)	-.542 (.039)***
gServemp	.073 (.286)	-.585 (.056)***
R^2 adjusted	.655	.862
Shapiro-Wilk test	.539	.584

Note: OLS estimation robust standard errors are in parentheses. gLPman is the annual growth rate of manufacturing labour productivity; gProd is the annual growth rate of overall labour productivity, gAgremp is the annual growth rate of agricultural employment; gServemp is the annual growth rate of services employment.

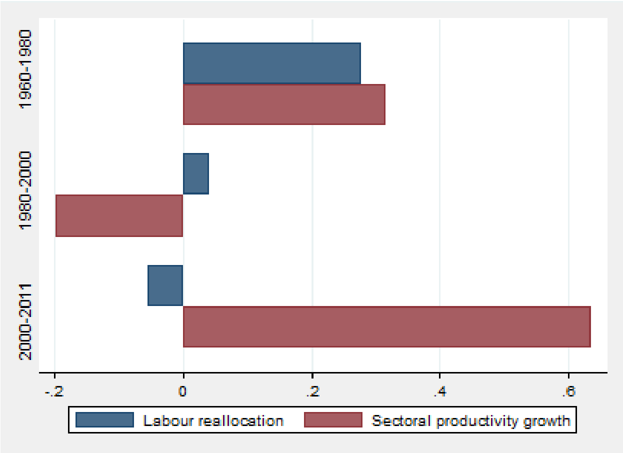
To get a better picture of the dynamics behind table six we compare sectoral labour shares and productivity levels at the beginning and end of the last period, relative to the average labour productivity. Different service sectors have diverse levels of productivity and thus reallocation of labour into services cannot be considered having a unified effect on productivity. While average labour productivity rose between 1980 and 2011, we can again, see that the service sectors with the lowest labour productivity (wrt, oth, and gov) have gained the most from sectoral reallocation of agriculture and manufacturing labour. A positive trend is the expansion of the fire sector. Contrary to what is commonly argued, the share of mining fell in the second period, suggesting that South Africa did not mainly invest in extractive activities but was deindustrializing in a way similar to developed countries, investing into services (Imbs, 2013: 529).

Figure7: Labour productivity and employment shares in South Africa in 1980(l) vs. 2011(r)



The observation that average labour productivity at roughly 23 thousand US$ is much higher than that of Brazil at the time it started to de-industrialize, indicates once more that this process begun at a later stage of development, albeit still prematurely. Lastly, the height of the y-axis suggests that differences in average productivity between sectors are rising again suggesting that the productivity gains of sectoral reallocation is slightly reversed.

Figure 8: Decomposition of productivity growth by period



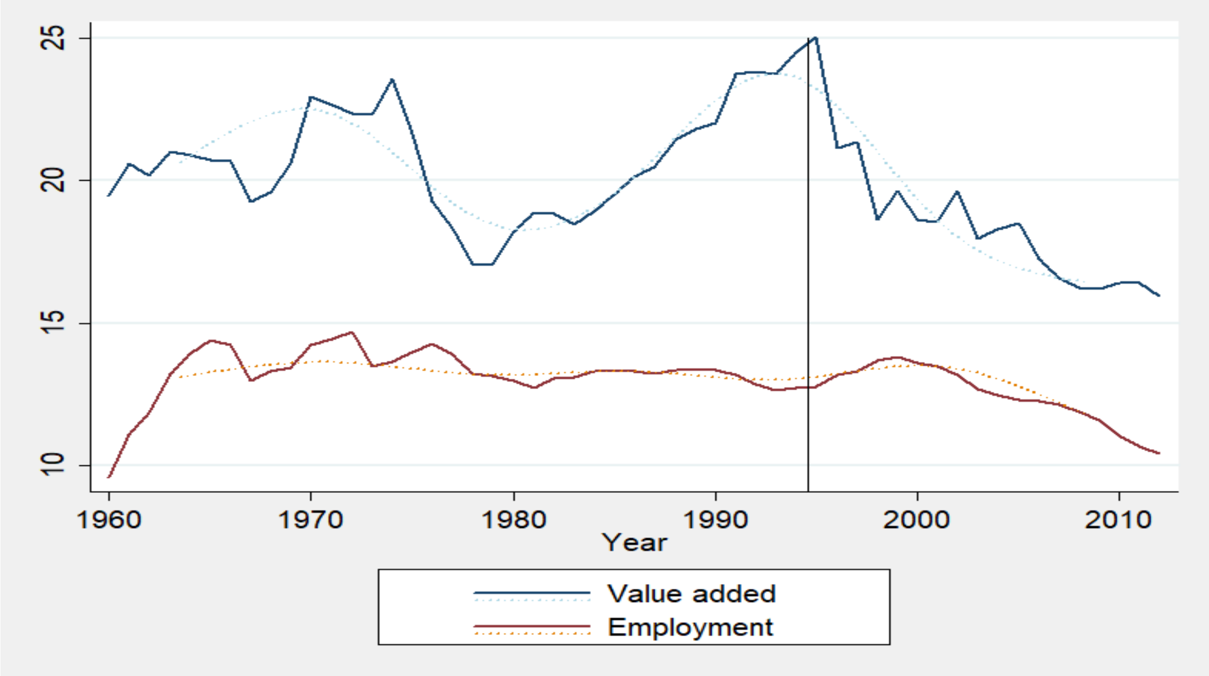
Indeed, this interpretation is supported when looking at the decomposition of labour productivity gains due to sectoral reallocation (between-component) and sectoral changes in productivity (within component). In the period of industrialization joint productivity growth reached 6% with almost equal contributions from both the within and between component. Thereafter, sectoral reallocation ran out of steam whilst, like in the case of Brazil, the gains from intra-sectoral structural transformation turned negative. In the period of economic success throughout the developing world (2000-2011), intrasectoral productivity finally caught up balancing the now negative productivity-effect of sectoral reallocation that has been found now o be prevalent in very recent decades across sub-Saharan Africa and Latin America (McMillan, Rodrik, Verduczo-Gallo, 2014) and is also reflected in the slightly increasing productivity differences in figure seven.

d.) Egypt

Egypt's modern industrialization process began after independence in the early 1930s but only caught steam with the military coup of general Nasser in 1952. The government subsequently pushed for a strong ISI policy grounded in heavy industries, to which nearly one third of total investment was allocated during the 1960s (Aglan, 2003:, 1960-63). The early success of that strategy can be seen in figure nine below, showing a continuous rise of manva throughout the 60s and the first half of the 70s. This was coupled with an outright socialist orientation ensuring everyone free education and since 1964 government-granted full employment resulting in the very stable employment pattern of roughly 12% of total employment, seen below[24]. Yet, for the most populous country in the MENA region. After the war with Israel in 1973 and due to mounting debt, the government adopted an 'open door policy' supported by the IMF leading to a surge in imports of consumer goods (El-Ghonemy, 2003: 78-80) clearly visible in the deterioration of manva between 1975 and 1980. Together with a very rigid labour market this had huge negative implications with regards to disguised unemployment and labour productivity (Hansen, 1991: 176-179) as is visible in the convergence of the two curves. A heavy focus on foreign direct investment and the oil-price boom, both of which encouraged further lending from

[24] This policy has in fact never been officially abandoned although in practice it has become inviable by now.

Figure 9: Manufacturing value added and employment in Egypt



Saudi Arabia in the 1980s, allowed Egypt to continue its relatively unsuccessful and corruption-tainted investments in industrialization (Nabli, Keller, 2006: 3). In 1991 increasing indebtedness, due to the high numbers of imports and excessive prior lending, finally forced the government into a structural adjustment programme with the WB and the IMF. With rapid privatization and a dismantling of protective barriers the share of manva and since the 2000s manemp decreased steeply (Aglan, 2003: 162), at a GDPpc of 3540 constant 2005 PPP US$, making Egypt the most premature of the three cases of deindustrialization – and the least developed case. Again, this event coincides with the growth slowdowns identified by Aiyar et al. (2013).

Table 7: Egypt Kaldor's first growth law: (dependent variable gGDP)

Explanatory Variables							
		1960-1995 (5.9%)			1996-2012 (4.9%)		
Constant		.011 (.011)	.045 (.014)***	.003 (.018)	.043 (.014)***	.043 (.018)**	.006 (.014)
gMan		.710 (.131)***			.377 (.217)		
gAgr			.363 (.234)			.176 (.167)	
gServ				.775 (.324)**			.614 (.212)***
R^2		.505	.132	.600	.142	.031	.377
Shapiro-Wilk test		.017	.017	.019	131	.039	.168
Granger-	*gMan*	.850			.639		
causaltiy	*gSUM*	.303			.211		

Notes: OLS estimation; robust standard errors are in parentheses. gGDP is the annual growth rate of GDP and gMan is the annual growth rate of the manufacturing sector; gAgr is the annual growth rate of the service sector and gServ is the annual growth rate of the services sector.

Table seven shows the application of Kaldor's first growth law to the case of Egypt. In contrast to Brazil and South Africa the annual growth rate of GDP remained quite high in the low growth period in Egypt. This factor is however, almost entirely accounted for by population growth (Doemland, Schiffbauer, 2016: 30) Similar to South Africa, manufacturing never played the role ascribed to it in the Kaldorian framework as strongly as it did in developed countries. The coefficient is positive and significant at the 1% level, yet roughly equals the magnitude of the services coefficient. The granger causality test for both GDP and Manufacturing growth is insignificant in both periods. Nevertheless, in the second period, the relationship between GDP growth and manufacturing growth breaks down entirely[25]. Only services remain significantly related to GDP growth. Indeed, the coefficient for services is shrinking indicating that its relevance for GDP growth might be increasing in the second period.

Figure 10: Manufacturing and economy-wide labour productivity

Turning to productivity, figure ten shows that manufacturing was an important driver of overall labour productivity until the 1980s. From there on the two curves slope upwards slightly more independently. While overall labour productivity continues to grow quite steadily manufacturing labour productivity exhibits more volatility facing a drop between 1995 and 2000 the post-structural adjustment period and the episode identified as growth slowdown by Aiyar et al. (2013). Thereafter productivity growth recovers reaching its peak at the end of the data-series in 2012.

These developments are reflected in table eight. Economy-wide labour productivity is positively associated with the size of the manufacturing sector across both periods, although the effect is

[25] This is not merely a symptom of the small number of observations (17). The results remain the same if the breaking point is substituted with the Year 1990.

weakened in the second period as suggested by figure ten above. Moreover, growth of agricultural employment is negatively and significantly associated with rising labour productivity and becomes stronger in the second period. The coefficient for services turns negative in the second period, but remains statistically insignificant which could be due to the fact that data for oth, the service sector with the lowest productivity in both Brazil and South Africa are missing in the 10-sector data base for the case of Egypt. The evolution of labour productivity thus merits further discussion.

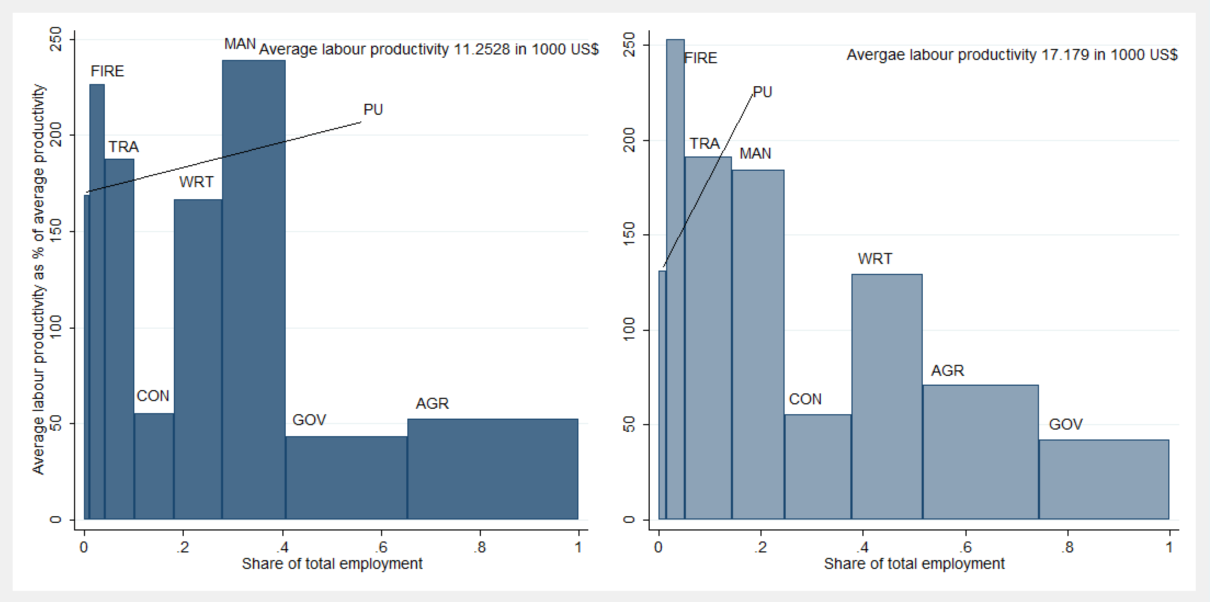
Table 8: Egypt Kaldor's second and third growth law

Explanatory Variables	Dependent variable gProd	
	1996-2012	1995-2012
Constant	-.001 (.015)	.037 (.026)
gMan	.562 (.196)**	.486 (.209)*
gAgremp	-.158 (.161)**	-.643 (.514)**
gServemp	.114 (.295)	-.162 (.706)
R^2 adjusted	.455	.5
Shapiro-Wilk test	.640	.006

Note: OLS estimation robust standard errors are in parentheses. gLPman is the annual growth rate of manufacturing labour productivity; gProd is the annual growth rate of overall labour productivity, gAgremp is the annual growth rate of agricultural employment; gServemp is the annual growth rate of services employment.

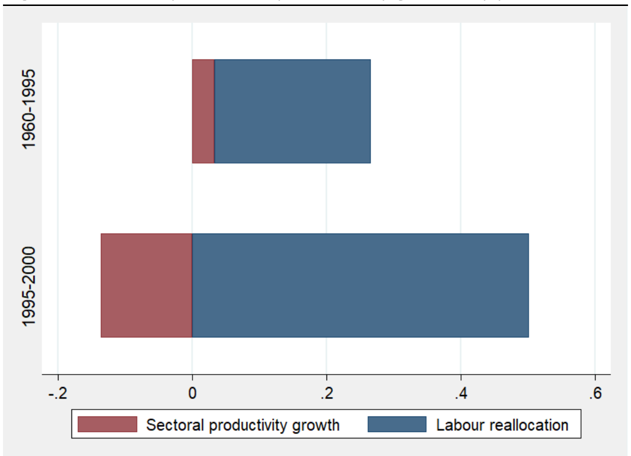
Figure eleven shows gaps in labour productivity between sectors comparing the year 1995 and 2012. Similar to Brazil we can see that differences between sectors are decreasing slightly a positive consequence of structural transformation, although the still rather large differences suggest that gains from sectoral reallocation are not exhausted yet. While manufacturing and agriculture have lost labour shares the biggest gains have been made in the service sector.

Figure 11: Labour productivity and employment shares in Egypt 1995(l) vs. 2012(r)



This time, however, sectors with low and high labour productivity (especially tra but also wrt) have made roughly equal gains[26]. The share of government employment is large compared to the other cases and remains stable throughout the second period reflecting the guaranteed employment policy mentioned above. In contrast to Brazil and South Africa, in Egypt the government is the least productive sector of all, a rather notorious fact. Similar to Brazil, Egypt has seen increases in relative productivity of mining[27] and agriculture, indicating that its type of premature deindustrialization too is related to investment in primary commodities.

Figure 12: Decomposition of productivity growth by period



In support of the interpretations suggested by table eight, figure twelve confirms that the gains from inter-sectoral reallocation are not exhausted yet. This is probably due to its comparatively low level of development in general. Productivity enhancing reallocation of labour increased in the latter period. Intra-sectoral productivity growth was only marginal in the first period and turns negative in the latter, a pattern that is found to be typical for the Mena region (Doemland, Schiffbauer, 2016: 42) despite relatively high levels of development in terms of GDPpc which is somewhat representative of the striking absence of structural transformation in the MENA region as such (Nicet-Chenaf, Rougier, 2016: 185) and eventually due to the regional oil and gas abundance. Similar to Brazil and South Africa, signs are that Egypt's experiences negative intra-sectoral productivity growth, supporting the notion that builds one of the starting points of this paper that premature deindustrialization is a consequence of failed structural transformation.

5.) Discussion and Conclusion

The Kaldorian approach chosen in this dissertation shows some clear limitations. Patterns are not as pronounced as they are in developed countries, highlighted for example by unsatisfactory granger causality tests in two cases but most importantly by the fact that the results are not robust to the specification of Kaldor's first growth law suggested by Thirlwall in 1983[28] where growth of the non-dynamic sectors is subtracted from growth in the manufacturing sector, in order to avoid that the results are overstated due to sectoral size. While there are potential explanations for that, first and foremost

[26] Given that oth is missing.
[27] Not depicted in figure eleven as the value is so high that differences between other sectors are invisible in the graphic. The productivity of mining lies roughly at 1000% of average labour productivity. (Average labour productivity including min is roughly 14.000 in 1995 and 20.000 in 2012).
[28] See footnote 20.

the early growth and relatively larger size of the service sector, the results depicted in table three, five and seven are not immune to this criticism. This suggests that the identification strategy put forward by Cruz (2014) is not easily applicable beyond the case of Mexico.

Nevertheless, in all three cases the period of growth slowdown coincides with the beginning of premature deindustrialization and in two of these cases the process was initiated externally, coinciding with the implementation of WB and IMF supported structural adjustment programs. In all three cases, the performance of the manufacturing sector deteriorated in the 'slow-growth' period and could not be replaced by the service sector or agriculture. Finally, all of these cases are said to be stuck in the MIT. Yet they constitute those regional examples that had industrialized most significantly within the range of the given case-selection criteria, raising questions about the consequences for those that are even less industrialized before starting to deindustrialize. Together with the graphical analysis and the decomposition of the development of labour productivity, we can thus fairly surely conclude that premature deindustrialization, as suggested by the literature, has rather not been advantageous for MICs.

While South Africa maintained certain industrial activities and thus, deindustrialized in a fashion more similar to developed countries and at higher levels of development, Brazil's deindustrialization matches the concerns voiced by Palma (2005) and later Rodrik (2016). Egypt, on the other hand started to deindustrialize and reallocate labour into services even before the gains from sectoral reallocation of labour were running out of steam indicating that the phenomenon is not necessarily prone to a certain stage of development. However, in all three countries it the periodical split, was associated with negative intra-sectoral (i.e. post-Lewisian) structural transformation.

Two findings stand out. First, in many MICs manva peaks earlier than manemp with direct implications for manufacturing labour productivity. This is true for the cases Brazil and Egypt but is also clearly visible in figure one and has been exactly opposite for today's advanced countries (Appendix C). It is partially explained by the fact that there have been critical advancements in labour-saving technology, a process not to be reversed, despite representing a significant challenge for late-late developers' patterns of employment generation. It does not, however, explain why manemp and manva converge in MICs throughout the process of development, illustrated most clearly in the case of Brazil. One explanation for this is the relatively slow adaptation of rather rigid labour markets during the sweeping phase of liberalization in the early 1980s which is certainly true for Egypt. Another explanation is that it reflects the type of manufacturing goods produced in developing countries vis à vis developed countries. This interpretation resonates with Raphael Kaplinsky's Phenomenon of 'immiserising growth' (2014: 112) where ever-lower-value added goods are produced by developing countries facing easy-entry competition from other low-skill low-wage economies. These explanations are not mutually exclusive.

Nevertheless, the latter is supported by the fact that the convergence of manva and manemp seems to be a phenomenon affecting MICs overall (see figure one) despite the fact that labour markets were flexibilized and gains were made in manufacturing labour productivity throughout the course of many MICs' development.

Second, the early and speedily reallocation of labour into services constitutes a drag on labour productivity growth, most pronouncedly in the cases of South Africa and Brazil. While this might not have been too different in developed countries, it happened at lower levels of average labour productivity (i.e. development). This means that aggregate productivity trends depend on service-sector developments much earlier than before (c.f. Pages, 2012, 45) due to premature deindustrialization. At the same time however, the only sector with unconditional convergence, manufacturing, is weakened. Lastly, labour is mainly reallocated to the unproductive parts of the service sector implying that gains therein might not be sufficient, possibly contributing to the negative average contribution of intra-sectoral productivity gains captured by the within component in all three cases. To put it differently, MICs are not just experiencing a regular growth slowdown accounted for by unconditional convergence. Instead they experience a decreasing share of the dynamic sector of the economy at an income level too low for rapid catch up with HICs.

The analysis presented in this thesis is merely explorative, besides the beforementioned confounding factors, largely due to a lack of data. The central argument of this thesis thus remains that premature deindustrialization presents an excellent counterfactual to assess what happens in the absence of successful structural transformation. Hence the literature might benefit from treating these concepts more explicitly as inherently related as they are, especially in relation to the Middle-Income trap. As the number of countries in the only recently (2007) established 10-sector database continues to grow and researchers are assembling larger datasets of value added but especially employment (c.f. Felipe, Mehta, Rhee, 2015; Su, Yao, 2017), premature deindustrialization and its alleged economic consequences will continue to be an interesting field for further investigation.

Sources:

Aglan, Sabry (2003): "Industrial Development: Progress and Challenges in the Future". In: Riad M. El Ghonemy (Ed.): Egypt in the Twenty First Century: Challenges for Development. London; New York, NY: RoutledgeCurzon advances in Middle East and Islamic studies, (2), 160–179.

Aiyar, Shekhar; Duval, Romain A.; Puy, Damien; Wu, Yiqun; Zhang, L. (2013): Growth Slowdowns and the Middle-Income Trap. In: *IMF Working Papers* 13 (71), 1–63. DOI: 10.5089/9781484330647.001.

Aldrighi, Dante, M.; Colistete, Renato, P. (2015): "Industrial Growth and Structural Change: Brazil in a Long-run Perspective". In: Wim Naudé (Ed.): Structural Change and Industrial Development in the BRICS. Oxford: Oxford University Press, 162–198.

Black, Anthony; Gerwel, Heinrich (2014): Shifting the Growth Path to Achieve Employment Intensive Growth in South Africa. In: *Development Southern Africa* 31 (2), 241–256. DOI: 10.1080/0376835X.2013.871198.

Bulman, David; Eden, Maya; Nguyen, Ha (2017): Transitioning from Low-Income Growth to High-Income Growth: Is There a Middle-Income Trap? In: *Journal of the Asia Pacific Economy* 22 (1), 5–28. DOI: 10.1080/13547860.2016.1261448.

Castillo, Mario; Neto, Antonio N. (2016): Premature Deindustrialization in Latin America. Production Development Series No. 205. United Nations Economic Commission for Latin America and the Caribbean (ECLAC), Santiago.

Cripps, Timothy F.; Tarling, Roger J. (1973): Growth in Advanced Capitalist Economies: 1950 - 1970. Cambridge: Cambridge University Press (40).

Cruz, Martinez (2014): Premature De-Industrialisation: Theory, Evidence and Policy Recommendations in the Mexican Case. In: *Cambridge Journal of Economics* 39 (1), 113–137. DOI: 10.1093/cje/beu036.

Cypher, James M. (2015): Emerging Contradictions of Brazil's Neo-Developmentalism: Precarious Growth, Redistribution, and Deindustrialization. In: *Journal of Economic Issues* 49 (3), 617–648. DOI: 10.1080/00213624.2015.1071961.

Dasgupta, Sukti; Singh, Ajit (2005): Will Services be the New Engine of Indian Economic Growth? In: *Development and Change* 36 (6), 1035–1057. DOI: 10.1111/j.0012-155X.2005.00449.x.

Dasgupta, Sukti; Singh, Ajit (2006): Manufacturing, Services and Premature Deindustrialization in Developing Countries: A Kaldorian Analysis. Helsinki: UNU-WIDER Research Paper No. 46, 1-20.

Doemland, Doerte; Schiffbauer, Marc (2016): „Structural Transformation". In: Ishac Diwan und Ahmed Galal (Ed.): The Middle East Economies in Times of Transition. (International Economic Association Series) London: Palgrave Macmillan UK, 27–62.

Eichengreen, Barry; Park, Donghyun; Shin, Kwanho (2013): Growth Slowdowns Redux. In: *Japan and the World Economy* 32, 65–84. DOI: 10.1016/j.japwor.2014.07.003.

El-Ghonemy, Riad M. (2003): Development Strategies, 1950–2001: Progress and Challenges for the Twenty First Century. In: Riad M. El Ghonemy (Hg.): Egypt in the Twenty First Century: Challenges for Development. London, New York, NY: RoutledgeCurzon Advances in Middle East and Islamic studies, (2), 73–110.

Ergin, Ipek (2016): Breaking Out of the Middle-Income Trap: Assessing the Role of Strucutral Transformation. Department of International Development, London School of Economics. Available online at: http://www.lse.ac.uk/internationalDevelopment/study/Dissertations/2015-IpekErgin.aspx

Felipe, Jesus (2012a): Tracking the Middle-Income Trap: What is It, Who is in It, and Why? Part 1. Economics Working Paper Series No. 306, Asian Development Bank (ADB).

Felipe, Jesus (2012b): Tracking the Middle-Income Trap: What is it, Who is in it, and Why? Part 2. Economics Working Paper Series No. 307, Asian Development Bank (ADB).

Felipe, Jesus (Ed.) (2015): Development and Modern Industrial Policy in Practice: Issues and Country Experiences. Cheltenham: Elgar.

Felipe, Jesus; Kumar, Utsav; Galope, Reynold (2017): Middle-Income Transitions: Trap or Myth? In: *Journal of the Asia Pacific Economy* 22 (3), 429–453. DOI: 10.1080/13547860.2016.1270253.

Felipe, Jesus; Mehta, Aashish (2016): Deindustrialization? A Global Perspective. In: *Economics Letters* 149, 148–151. DOI: 10.1016/j.econlet.2016.10.038.

Felipe, Jesus; Mehta, Aashish; Rhee, Changyong (2015): Manufacturing Matters: But It's the Jobs that Count. Working Paper Series No. 420, Asian Development Bank (ADB).

FitzGerald, E.V.K. (2000): "ECLA and the Theory of Import Substitution Industrialization in Latin America". In: Enrique Cárdenas, José Antonio Ocampo und Rosemary Thorp (Ed.): An Economic History of Twentieth-Century Latin America: Volume 3: Industrialization and the State in Latin America: The Postwar Years. Basingstoke, England: Palgrave MacMillan UK, 58–97.

Gill, Indermit, S.; Kharas, Homi (2015): The Middle-Income Trap Turns Ten. Policy Research Working Paper No. WPS 7403. Washington, D.C. : World Bank Group.

Glawe, Linda; Wagner, Helmut (2016): The Middle-Income Trap: Definitions, Theories and Countries Concerned — A Literature Survey. In: *Comparative Economic Studies* 58 (4), 507–538. DOI: 10.1057/s41294-016-0014-0.

Grivoyannis, Elias C. (Ed.) (2017): The New Brazilian Economy. New York: Palgrave Macmillan US.

Hamid, Naved; Khan, Maha (2015): Pakistan: A Case of Premature Deindustrialization? In: *The Lahore Journal of Economics* 20 (4), 107–141.

Han, Xuehui; Wei, Shang-Jin (2015): Re-Examining the Middle-Income Trap Hypothesis: What to Reject and What to Revive. Economics Working Paper Series No. 436 Asian Development Bank.

Hansen, Bent (1991): The Political Economy of Poverty, Equity, and Growth in Egypt and Turkey: A World Bank Comparative Study. New York: Oxford University Press.

Helper, Susan; Krueger, Timothy; Wial, Howard (Ed.) (2012): Why Does Manufacturing Matter? Which Manufacturing Matters? A Policy Framework. Metropolitan Policy Program. Washington D.C.: Brookings.

Hirschman, Albert O. (1958): The Strategy of Economic Development. Boulder and London: Westview Press.

Im, Fernando, G.; Rosenblatt, David (2013): Middle-Income Traps: A Conceptual and Empirical Survey. Policy Research Working Paper No. 6594. Washington, D.C.: The World Bank Group.

Imbs, Jean (2013): "The Premature Deindustrialization of South Africa". In: J. Esteban, Joseph E. Stiglitz und Lin, Yustin, L. (Ed.): The Industrial Policy Revolution II: Africa in the 21st Century. Hampshire, England: Palgrave McMillan UK, 529–540.

Imbs, Jean; Wacziarg, Romain (2003): Stages of Diversification. In: *American Economic Review* 93 (1), 63–86. DOI: 10.1257/000282803321455160.

Jankowska, Anna; Nagengast, Arne; Perea, Jose, R. (2012): The Product Space and the Middle-Income Trap: Comparing Asian and Latin American Experiences. OECD Development Centre Working Paper No. 311. Paris: OECD.

Jenkins, Rhys (2015): Is Chinese Competition Causing Deindustrialization in Brazil? In: *Latin American Perspectives* 42 (6), 42–63. DOI: 10.1177/0094582X15593553.

Joffe, Avril; Kaplan, David; Kaplinsky, Raphael; Lewis, David (1995): Improving Manufacturing Performance in South Africa. The Report of the Industrial Strategy Project. Cape Town: UCT Press.

Kaldor, Nicholas (op. 1967): Strategic Factors in Economic Development. Ithaca (N.Y.): New York State school of industrial and labour relations, Cornell University (The Frank W. Pierce memorial lectures).

Kaplinsky, Raphael (2014): Spreading the Gains from Globalization: What can be Learned from Value-Chain Analysis? In: *Problems of Economic Transition* 47 (2), 74-115.

Kassem, Dina (2010): Premature Deindustrialization: The Case of Colombia. Discussion Paper Series. No. 2010-CSEG-06. Center of Corporate Strategy and Economic Growth (CSEG). Jokahoma National University. Available online at: http://www.cseg.ynu.ac.jp/doc/dp/2010-CSEG-06.pdf.

Kharas, Homi; Kohli, Harinder (2011): What Is the Middle-Income Trap: Why do Countries Fall into It, and How Can It Be Avoided? In: *Global Journal of Emerging Market Economies* 3 (3), 281–289. DOI: 10.1177/097491011100300302.

Kim, Chong-Sup; Lee, Seungho (2014): Different Paths of Deindustrialization: Latin American and Southeast Asian Countries from a Comparative Perspective. In: *Journal of International and Area Studies* 21 (2), 65–81.

Levy, Brian (1992): How can South African Manufacturing Efficiently Create Employment? An Analysis of the Impact of Trade and Industrial Policy. Informal Discussion Papers on Aspects of the Economy in South Africa No. 1. Washington D.C.: World Bank Group.

Lewis, Arthur, W. (1954): Economic Development with Unlimited Supplies of Labour. In: *The Manchester School* 22 (2), 139–191. DOI: 10.1111/j.1467-9957.1954.tb00021.x.

McCausland, David, W.; Theodossiou, Ioannis (2012): Is Manufacturing Still the Engine of Growth? In: *Journal of Post Keynesian Economics* 35 (1), 79–92. DOI: 10.2753/PKE0160-3477350105.

McMillan, Margaret; Rodrik, Dani (2011): Globalization, Structural Change and Productivity Growth. NBER Working Paper No. 17143. DOI: 10.3386/w17143.

McMillan, Margaret; Rodrik, Dani; Verduzco-Gallo, Íñigo (2014): Globalization, Structural Change, and Productivity Growth, with an Update on Africa. In: *World Development* 63, 11–32. DOI: 10.1016/j.worlddev.2013.10.012.

Mended de Paula, Germano (2017): “Deindustrialization in Brazil?” In: Elias C. Grivoyannis (Ed.): The New Brazilian Economy. New York: Palgrave MacMillan US, 63–85.

Nabli, Mustafa K.; Keller, Jennifer, Nassif, Claudia; Silva-Jauregui, Carlos (2006): The Political Economy of Industrial Policy in the Middle East and North Africa. Working Paper Series No. 110. Cairo: World Bank Group.

Nicet-Chenaf, Dalila; Rougier Eric (2016): Is Middle East and North Africa Different? A Comparative Analysis of Growth and Structural Change in and Outside MENA. In: *Middle East Development Journal* 8 (2), 177–197. DOI: 10.1080/17938120.2016.1225453.

Ohno, Kenichi (2009): The Middle-Income Trap: Implications for Industrialization Strategies in East Asia and Africa. GRIPS Development Forum Discussion Papers, 1-27. Available online at: http://www.grips.ac.jp/forum-e/.

Pagés, Carmen (Ed.) (2010): The Age of Productivity. Transforming Economies from the Bottom Up. New York, NY: Palgrave MacMillan US.

Palma, Jose G. (2012): “Four Sources of De-Industrialization and a New Concept of the Dutch Disease”. In: Jos Antonio Ocampo (Ed.): Beyond Reforms. Structural Dynamics and Macroeconomic Vulnerability. Washington, DC: World Bank and Stanford University Press, 71–116.

Paz, Lourenco S. (2014): Intermediate Inputs and Premature Deindustrialization: An Analysis of the Brazilian Case. Syracuse University. Available online at: http://sites.bu.edu/neudc/files/2014/10/paper_173.pdf.

Pritchett, Lant; Summers, Lawrence (2014): Asiaphoria Meets Regression to the Mean. Proceedings, Federal Reserve Bank of San Francisco, NBER Working Paper No. 20573, 1–35. DOI: 10.3386/w20573.

Rasiah, Rajah (2011): Is Malaysia Facing Negative Deindustrialization? In: *Pacific Affairs* 84 (4), 714–735. DOI: 10.5509/2011844715.

Rodrik, Dani (2008): Understanding South Africa's Economic Puzzles. In: *Economics of Transition* 16 (4), 769–797. DOI: 10.1111/j.1468-0351.2008.00343.x.

Rodrik, Dani (2009): Industrial Policy: Don’t Ask Why, Ask How. In: *Middle East Development Journal* 1 (1), 1–29. DOI: 10.1142/S1793812009000024.

Rodrik, Dani (2013): Unconditional Convergence in Manufacturing. In: *The Quarterly Journal of Economics* 128 (1), 165–204. DOI: 10.1093/qje/qjs047.

Rodrik, Dani (2016): Premature Deindustrialization. In: *Journal of Economic Growth* 21 (1), 1–33. DOI: 10.1007/s10887-015-9122-3.

Rosenstein-Rodan, P. N. (1943): Problems of Industrialisation of Eastern and South-Eastern Europe. In: *The Economic Journal* 53 (2), 202–211. DOI: 10.2307/2226317.

Rowthorn, Robert; Ramaswamy, Ramana (1999): Growth, Trade and Deindustrialization. *IMF Staff Papers* 46 (1), 18–41.

Rowthorn, Robert, Coutts, Ken (2004): De-Industrialisation and the Balance of Payments in Advanced Economies. In: *Cambridge Journal of Economics* 28 (5), 767–790. DOI: 10.1093/cje/beh034.

Rowthorn, Robert, E.; Wells, John R. (1987): De-Industrialization and Foreign Trade. Cambridge: Cambridge University Press.

Roy, Sutirtha; Kessler, Martin; Subramanian, Arvind (2016): Glimpsing the End of Economic History? Unconditional Convergence and the Missing Middle-Income Trap. Centre for Global Development Working Paper No. 438. DOI: 10.2139/ssrn.2860872.

Singh, Ajit (1977): UK Industry and the World Economy: A Case of De-Industrialisation? In: *Cambridge Journal of Economics* 1, (2), 113–135. DOI: 10.1093/oxfordjournals.cje.a035354.

Spence, Andrew M. (2011): The Next Convergence. The Future of Economic Growth in a Multispeed World. New York, NY: Picador.

Su, Dan; Yao, Yang (2017): Manufacturing as the Key Engine of Economic Growth for Middle-Income Economies. In: *Journal of the Asia Pacific Economy* 22 (1), 47–70. DOI: 10.1080/13547860.2016.1261481.

Szirmai, Adam (2012): Industrialisation as an Engine of Growth in Developing Countries, 1950–2005. In: *Structural Change and Economic Dynamics* 23 (4), 406–420. DOI: 10.1016/j.strueco.2011.01.005.

Szirmai, Adam; Verspagen, Bart (2015): Manufacturing and Economic Growth in Developing Countries, 1950–2005. In: *Structural Change and Economic Dynamics* 34 (C), 46–59. DOI: 10.1016/j.strueco.2015.06.002.

Thirlwall, Anthony P. (1983): A Plain Man's Guide to Kaldor's Growth Laws. In: *Journal of Post Keynesian Economics* 5, (3), 345–358.

Timmer, Marcel; de Vries, Gaaitzen, J.; de Vries, Kees (2016): “Patterns of Structural Change in Developing Countries”. In: John Weiss (Ed.): Routledge Handbook of Industry and Development. London: Routledge, 65–83.

Tregenna, Fiona (2009): Characterising Deindustrialisation: An Analysis of Changes in Manufacturing Employment and Output Internationally. In: *Cambridge Journal of Economics* 33 (3), 433–466. DOI: 10.1093/cje/ben032.

Tregenna, Fiona (2011): Manufacturing Productivity, Deindustrialization, and Reindustrialization. WIDER Working paper No. 2011/57). Helsinki: UNU-WIDER.

Tregenna, Fiona (2014): A new Theoretical Analysis of Deindustrialisation. In: *Cambridge Journal of Economics* 38 (6), 1373–1390. DOI: 10.1093/cje/bet029.

Verdoorn, Petrus, J. (1980): Verdoorn's Law in Retrospect: A Comment. In: *The Economic Journal* 90 (358), 382–385.

Vivarelli, Marco (2016): The Middle-Income Trap. A Way Out Based on Technological and Structural Change. In: *Economic Change Restructuring* 49 (2-3), 159–193. DOI: 10.1007/s10644-015-9166-6.

Wade, Robert H. (2012): Return of Industrial Policy? In: *International Review of Applied Economics* 26 (2), 223–239. DOI: 10.1080/02692171.2011.640312.

Wade, Robert H. (2016a): Industrial Policy in Response to the Middle-income Trap and the Third Wave of the Digital Revolution. In: *Global Policy* 7 (4), 469–480. DOI: 10.1111/1758-5899.12364.

Wade, Robert H. (2016b): The Role of the State in Escaping the Middle-Income Trap: The Case for Smart Industrial Policy. In: *METU Studies in Development* 43 (1), 21–42.

Williamson, John (2012): Some Basic Disagreements on Development. Paper Presented to the Development Policy Forum on “Rethinking Development Policy Packages”. Washington D.C.: World Bank Group.

Appendices:

Appendix A Stepwise exclusion according to case-selection criteria

Region:	***Criterion 1:*** *Data availability for MICs (Felipe 2012a) across regions; based on 10-sector database from the GGDC*		***Criterion 2****: Experience full Deindustrialization (MVAc peaked). Based on: Tregenna (2009).*			***Criterion 3:*** *Experience De-industrialization after some degree of prior industrialization and experiencing it prematurely (MEP<18%; >10%). Based on (Felipe et al., 2014)*		
S-SA	UMICs	Botswana	Yes	Peak MVA(c): 12,28%	1977	No	Peak MEP: 7,10 %	2007
		South Africa	Yes	Peak MVA(c): 24,54%	1981	Yes	Peak MEP: 16,83%	1981
	LMICs	Ghana	Yes	Peak MVA(c): 19,14%	1969	No	Peak MEP: 15,30%	1978
		Nigeria	Yes	Peak MVA(c): 5,50%	1982	No	Peak MEP: 7,31%	1973
		Zambia	Yes	Peak MVA(c):15,23%	1990	No	Peak MEP: 4.15%	1985
Asia	UMICs	China	No	Peak MVA(c): 36,53%	2010*	X	X	X
		Malaysia	Yes	Peak MVA(c): 29,18%	2000	No	Peak MEP: 24,92%	1997
		Thailand	No	Peak MVA(c): 37,9%	2010*	X	X	X
	LMICs	India	No	Peak MVA(c): 19,27%	1996	X	X	X
		Indonesia	No	Peak MVA(c): 28,41%	2001*	X	X	X
		Philippines	Yes	Peak MVA(c): 32,68%	1973	No	Peak MEP: 11,99%	1971**
LA	UMICs	Peru	Yes	Peak MVA(c): 20,20%	1976	No	Peak MEP: 14,75%	1971
		Brazil	Yes	Peak MVA(c): 23,00%	1973	Yes	Peak MEP 15,32%	1989
		Venezuela	X	X	X	X	X	X
		Colombia	Yes	Peak MVA(c): 20,74%	1979	No	Peak MEP: 14,25%	1970
		Costa Rica	Yes	Peak MVA(c): 23,64%	1999	No	Peak MEP: 20,45%	1992
	LMICs	Bolivia	Yes	Peak MVA(c): 15,87%	1980	No	Peak MEP: 14,04%	2002
MENA	LMICs	Egypt	Yes	Peak MVA(c): 25,04%	1995	Yes	Peak MEP: 14,67%	1972
		Morocco	Yes	Peak MVA(c): 18,16%	1983	No	Peak MEP: 14,51%	1985

* *peak lay within last 10 years of observation, clear trend not visible yet.*

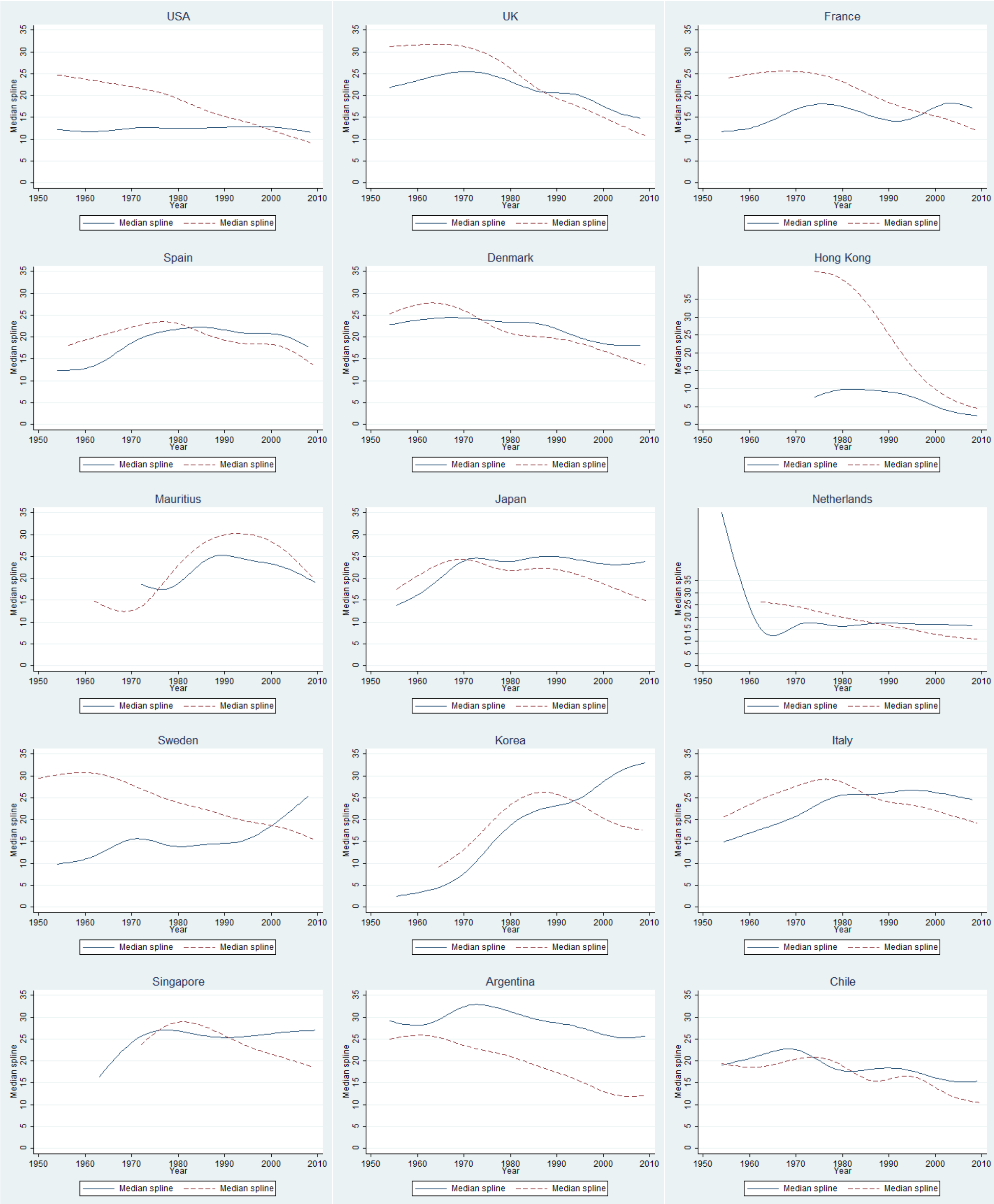
** *time-series does not report true peak value as it begins only in 1970.*

Appendix B: Slowdown episodes identified by Aiyar et al. (2013)

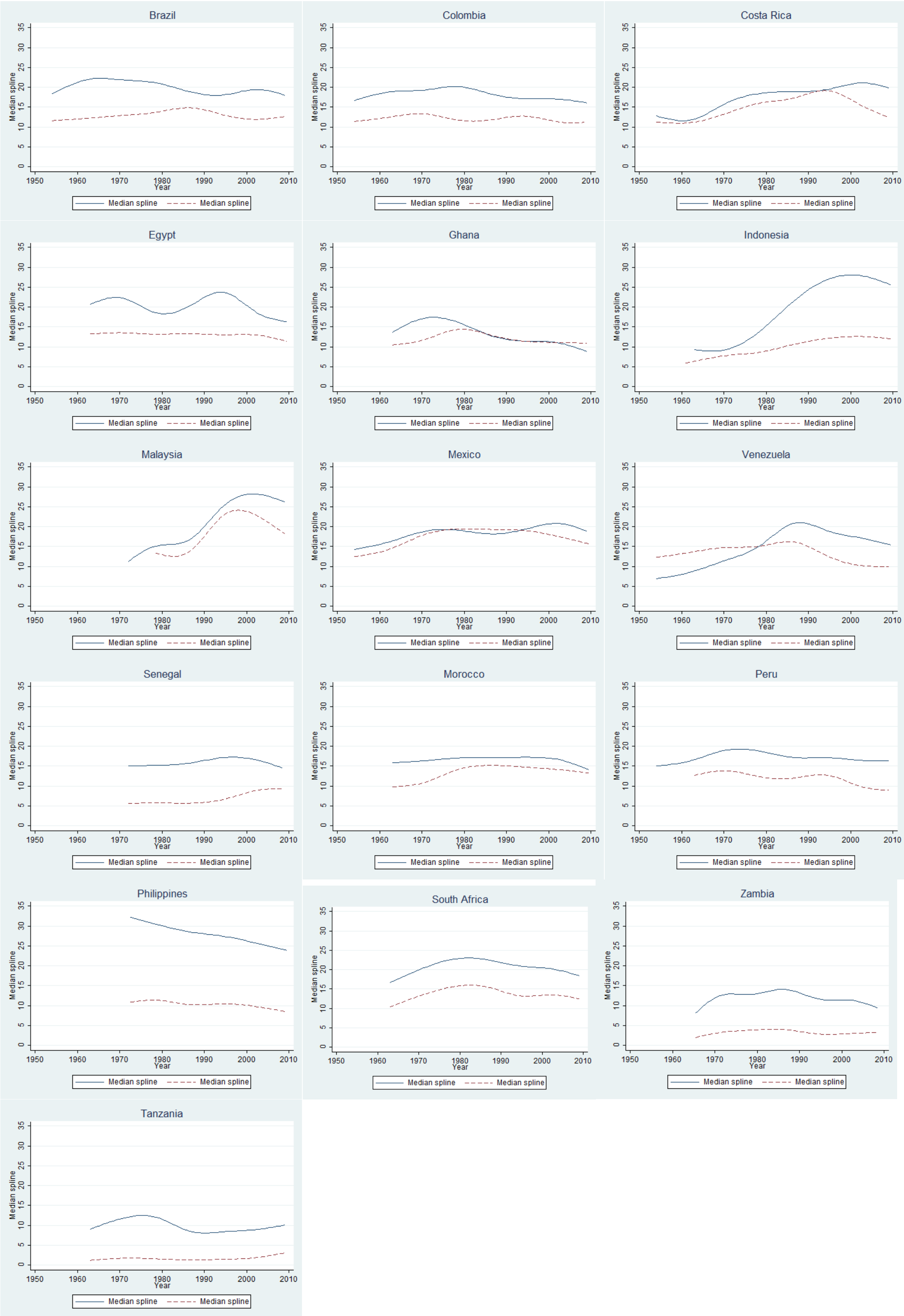
Middle Income					
Algeria	1980-1985	Haiti	1980-1985	Papua New Guinea	1995-2000
Algeria	1985-1990	Honduras	1960-1965	Paraguay	1980-1985
Argentina	1980-1985	Honduras	1980-1985	Peru	1975-1980
Argentina	1995-2000	Indonesia	1995-2000	Peru	1980-1985
Belize	1990-1995	Iran	1970-1975	Poland	1980-1985
Bolivia	1975-1980	Iran	1975-1980	Portugal	1970-1975
Botswana	1975-1980	Iraq	1980-1985	Romania	1975-1980
Botswana	2000-2005	Jamaica	1970-1975	Romania	1980-1985
Brazil	1975-1980	Jamaica	1990-1995	South Africa	1980-1985
Brazil	1980-1985	Jordan	1965-1970	Spain	1965-1970
Bulgaria	1980-1985	Jordan	1980-1985	Swaziland	1990-1995
Chile	1995-2000	Korea, Republic of	1970-1975	Syria	1975-1980
Congo, Republic of	1985-1990	Malaysia	1980-1985	Syria	1980-1985
Cyprus	1980-1985	Malaysia	1995-2000	Syria	1995-2000
Dominican Republic	1975-1980	Maldives	1985-1990	Thailand	1995-2000
Ecuador	1975-1980	Malta	1980-1985	Tonga	1985-1990
Ecuador	1980-1985	Mauritius	1975-1980	Trinidad &Tobago	1960-1965
Egypt	1995-2000	Mexico	1980-1985	Trinidad &Tobago	1980-1985
El Salvador	1975-1980	Namibia	1970-1975	Tunisia	1975-1980
El Salvador	1995-2000	Nicaragua	1965-1970	Uruguay	1995-2000
Gabon	1975-1980	Nicaragua	1985-1990	Venezuela	1975-1980
Guatemala	1980-1985	Panama	1980-1985	Yemen	2000-2005
Guyana	2000-2005	Papua New Guinea	1980-1985	Zambia	1970-1975

Appendix C: Patterns of Deindustrialization by Country Group

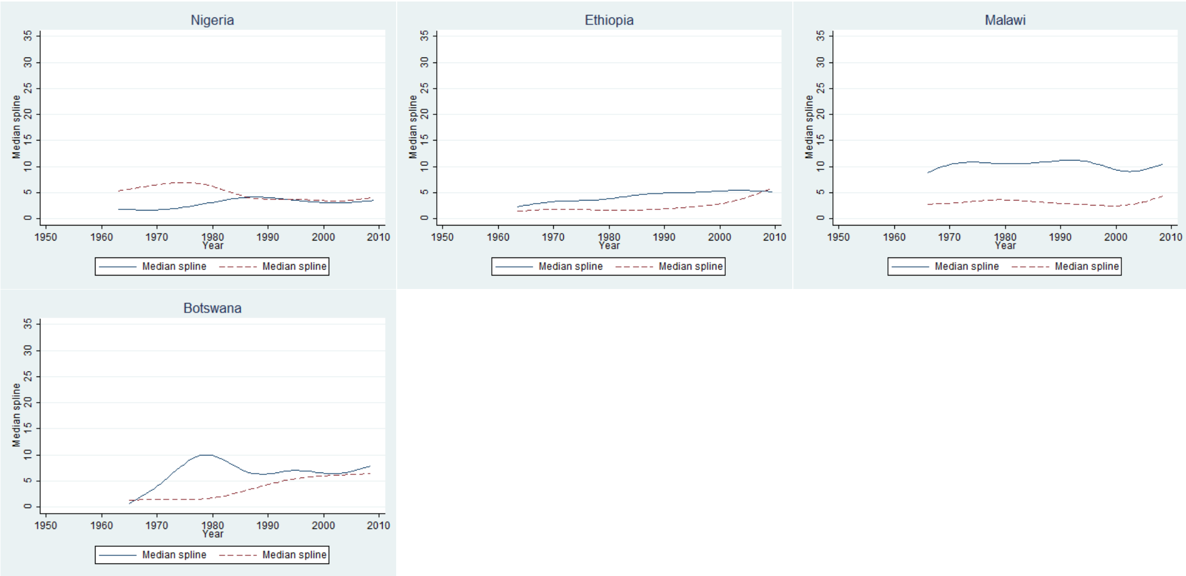
Industrialized/ High-Income Countries



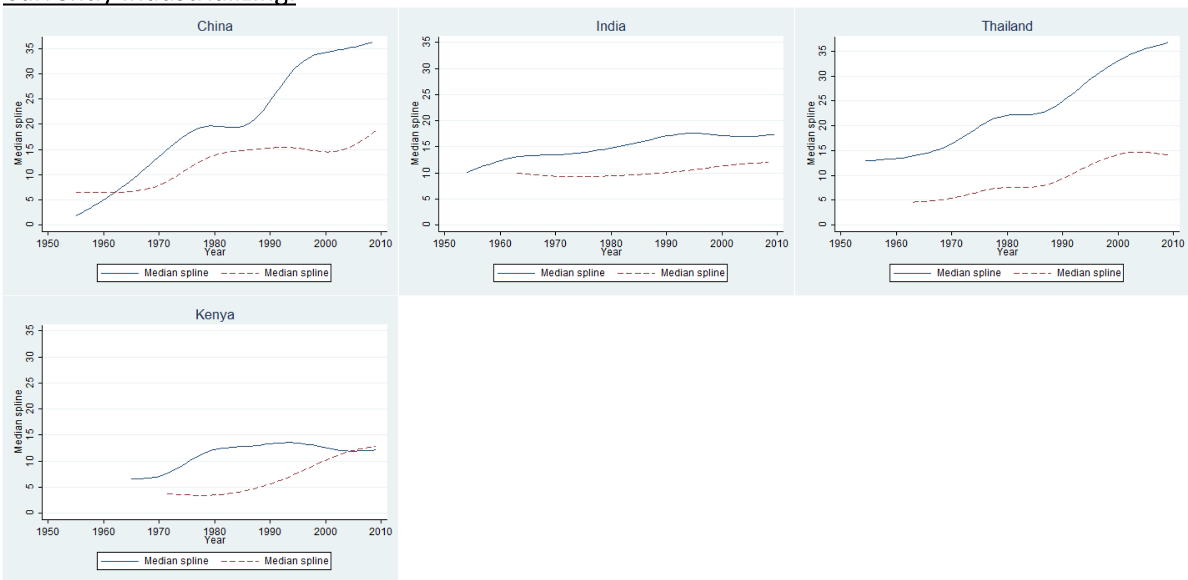
Prematurely Deindustrializing:



Not sufficiently industrialized (manva below 10%):

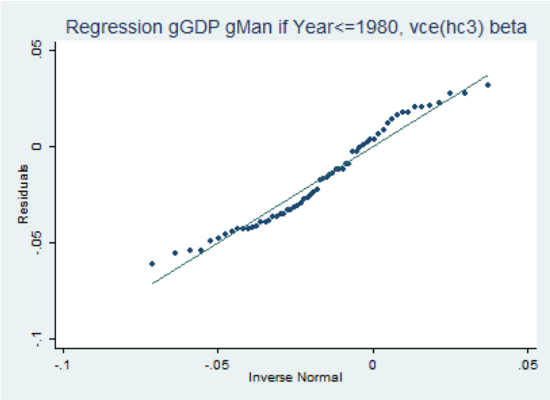


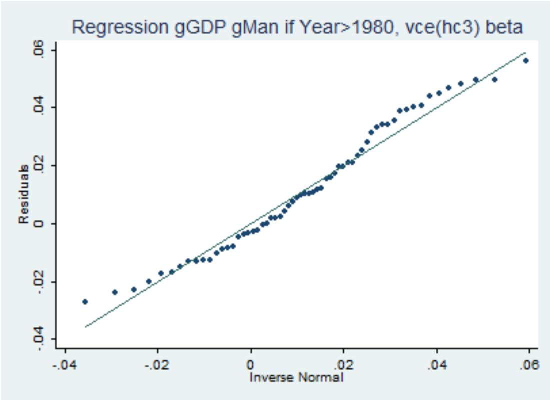
Currently Industrializing:



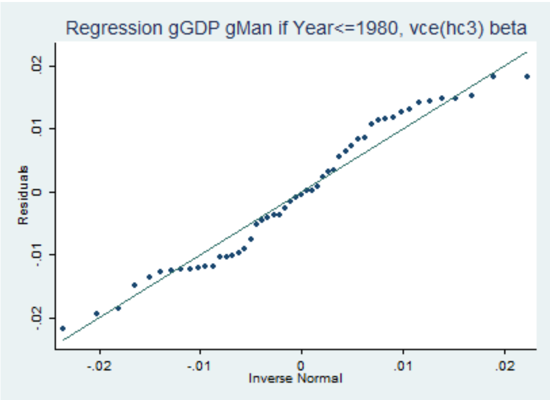
Appendix D: Diagnostic Plots Normal Distribution of Residuals

Brazil:





South Africa:



Egypt: