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THE IMPORTANCE OF MANUFACTURING IN ECONOMIC DEVELOPMENT: HAS THIS CHANGED?

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The importance of manufacturing in economic development: Has this changed?

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Abstract

Manufacturing has traditionally played a key role in the economic growth of developing countries. It has been argued in recent years that the importance of manufacturing has diminished over the last 20-25 years, resulting in premature deindustrialization or non-industrialization in developing countries. This study explores whether the low levels of industrialization in developing countries are attributable to long-term changes in the development characteristics of manufacturing or to the manufacturing sector's general global prospects. The study's findings indicate that the decline in both manufacturing value added and manufacturing employment shares in many developing countries has not been caused by changes in the manufacturing sector's development potential, but is primarily caused by the failures of manufacturing development in a large number of developing countries against the backdrop of rapid manufacturing development in a small number of countries, thus resulting in a concentration of manufacturing activities in developing countries.

Keywords: Manufacturing, Structural Change, Economic Development, Concentration.

JEL: O10 (Economic Development, General); O14 (Industrialization); N6 (Manufacturing and Construction)

1. Introduction

Kuznets (1966) described long-term development patterns of countries based on empirical analyses of national accounts and argued that industrialization—or increases in the share of manufacturing in GDP—is a key feature of modern economic growth, which is markedly different from the much lower growth rates observed in the world before the onset of the industrial revolution. Kaldor examined the relationship between industrial development and economic growth, and based on empirical results, characterized the manufacturing sector as "the main engine of fast growth" (Kaldor, 1967:48). This not only held true for the 12 early industrializers Kaldor examined, from the UK to Japan, but is also characteristic of catching-up countries that have experienced rapid, sustained growth (The Growth Report, 2008; Felipe et al., 2014). At high income levels, and as a standard feature of successful structural change, countries invariably experience deindustrialization, resulting in lower growth rates. Deindustrialization is primarily attributed to a decline in labour intensity and a shift of manufacturing activities to lower income countries based on trade between mature economies and developing countries (Tregenna, 2009; Kucera and William, 2003; Rowthorn and Ramaswamy, 1997).

Premature deindustrialization or non-industrialization has recently been increasingly noticeable in developing countries with a lower share of manufacturing in GDP at their peak, which they reached at a much lower level of income than the early industrializers (Dasgupta and Singh, 2006; Amirapu and Subramanian, 2015; Rodrik, 2015; Ghani and O'Connel, 2014). While the debate on whether services can become a new growth-enhancing sector continues, research indicates that premature deindustrialization is prevalent in developing countries and that manufacturing no longer plays the role of the engine of growth in developing countries.

However, to attribute premature deindustrialization to a fundamental decline in the significance of manufacturing in the world due to changes in global demand and supply rather than to the failures of some countries to develop their manufacturing sector, we need to ascertain at least one of the following two conditions.

A. Manufacturing is no longer the driver of economic growth in developing countries (based on Kaldor's formulations).

B. The share of manufacturing value added (MVA) relative to that of other sectors and employment have decreased significantly in developing countries.

The first condition (A) essentially focuses on whether the relationship between the share of manufacturing in the economy and economic growth is positive and stronger than the relationship between the share of other sectors and economic growth. The second condition (B) focuses on the relative size of MVA and manufacturing employment in the economy.

Even though manufacturing might be the main driver of economic growth (i.e. a rejection of (A)), let us consider a scenario in which manufacturing plays a less significant role in developing countries' economic development than it previously did because its size decreased considerably. It is widely believed that manufacturing jobs are shrinking globally (Ghani and O'Connel, 2014). Hence, even if manufacturing retained the same size, it could be considered as playing a less important role due to its weakened ability to boost economic growth.

If both (A) and (B) are rejected, we could conclude that the importance of manufacturing in developing countries' economic growth has not changed. In that case, we could claim that premature deindustrialization is not caused by changes in any development characteristics of manufacturing—which might have diminished its role in economic development—but is attributable to the inabilities of some countries to develop their manufacturing sector relative to others.

Several empirical studies have examined condition (A), i.e. the role of manufacturing as a driver of economic growth in developing countries. Szirmai and Verspagen (2015) tested the relationship between the value added share of manufacturing and growth of GDP per capita using fixed effects, random effects, Hausman-Taylor estimations and between effects models for an unbalanced panel of 92 countries. This relationship was examined for three periods, 1950–1970, 1970–1990 and 1990–2005, and compared with the results of the service sector. Focusing primarily on the results of conservative Hausman-Taylor estimations, Szirmai and Verspagen's study focuses on the contribution of manufacturing to GDP per capita growth conditional on the level of education and stage of development. They find that manufacturing acts as an engine of growth for low and for some middle income countries, provided they have a sufficient level of human capital. Such growth engine features are not found for the service sector. Interestingly, the findings for more recent periods indicate that a higher level of human capital (at least 7-8 years of education) is necessary for manufacturing to play the role of engine of growth in developing countries.

Necmi (1999) tested whether Kaldor's conclusions were still valid beyond the heydays of rapid industrialization and catch-up of the 1970s, applying an instrumental variable econometric technique for 45 mostly developing countries for the period 1960-1994. The results confirmed

Kaldor's argument that "manufacturing is an engine of growth" for most of the developing countries included in the study, with the possible exception of sub-Saharan countries. Even for developed countries, McCausland and Theodossiou (2012) found that Kaldor's thesis largely held true for the period 1992-2007.

By contrast, the results of Fagerber and Verspagen (1999) indicate that manufacturing only acted as an engine of growth for developing, but not for developed countries in the 1970s and 1980s. A cross-sectional regression study by Dasgupta and Singh (2006) for 48 developing countries from 1990 to 2000 concluded that manufacturing continued to play an engine of growth role, but that services played a similarly important role during that period.

Chakravarty and Mitra (2009) and Kathuria and Natrajan (2013) examined the engine of growth hypothesis for India, where the service sector has played a key role in the country's economic development (Aggarwal and Kumar, 2015). In the former study (Chakravarty and Mitra, 2009), which covers the period 1973 to 2004, manufacturing was found to have been one of the drivers of growth, together with construction and services. Kathuria and Raj (2013) tested the hypothesis for all 15 states of India in the period 1994-1995 to 2005-2006, and concluded that manufacturing had indeed acted as an engine of growth in India, despite its declining share in GDP.

In a series of recent publications, Rodrik discussed the driving nature of manufacturing (2013), how successful regions have changed their structure to benefit from this driver of economic growth (McMillan, Rodrik and Verduzco-Gallo, 2014) and whether this path of economic development is still available for currently developing countries (2015). This series demonstrates that the formal manufacturing sector exhibited a rapid unconditional convergence in labour productivity and that Asian countries grew faster than other regions by moving labour from low to high productive sectors, particularly manufacturing. However, Rodrik is pessimistic about the continuation of this pattern of economic development for currently developing countries due to premature deindustrialization.

In short, evidence from literature suggests that the engine of growth hypothesis for manufacturing by and large still holds for developing countries – particularly those with a higher level of human capital (given their income level). However, availability of the opportunity to use this engine seems questionable, which relates to the second condition (B).

The literature discussed above analysed the role of the manufacturing sector as a driver of growth by directly measuring the relationship between the growth of MVA share and GDP. The following empirical analysis indirectly analyses the importance of manufacturing relative to

other sectors in developing countries' sustained growth processes by comparing the sectoral growth rates of countries that had a growth rate of at least 7 per cent or higher over 25 years.[1]

To determine differences in the sectoral growth rates of countries with a high sustained growth before and after 1990, countries were classified into pre- and post-1990 groups, depending on whether at least 20 out of the 25 year high growth period occurred before or after 1990.[2] As Figure 1-A illustrates, before 1990, there were nine countries that met the long-term, high growth conditions. These included countries with very diverse demographic and geographic characteristics, namely large, small, island and natural-resource rich countries. Out of these nine countries, six (66.7 per cent) recorded the highest growth rate in their manufacturing sector between 1971 and 1990.[3]

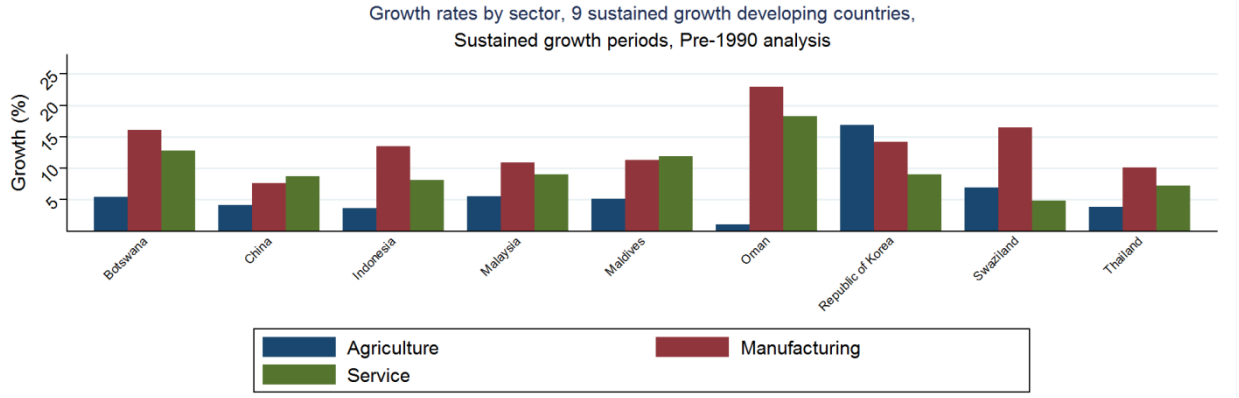
Small countries tend to have different development patterns from other countries, as their development is more dependent on their given geographic and natural endowment conditions (Perkins and Syrquin, 1989; Armstong and Read, 1995; Kuznets, 1971). In the case of very small countries, success in one or a few industries such as financial services, tourism or agri-business, could have a significant impact on long-term growth rate. Larger countries do not typically follow this development trajectory. Therefore, Figure 1-B excludes countries with a population of less than one million. The growth rate of the manufacturing sector was highest in six out of eight countries with a population of more than one million (75 per cent) between 1971 and 1990.

[1] Any period of an annual average growth rate of more than 7 per cent for 25 years.

[2] The data for this analysis derives from the National Accounts Main Aggregates Database (NAMAD, 2014) of the United Nations Statistics Division. 2015 constant prices (LCU) are used to identify high sustained growth countries as well as to measure sectoral growth rates (see data section for further explanations). For a country to be included in the group of developing countries, its income level has to be lower than the threshold level of a high income country (annually defined by WBAC) for every year from 1987 to 1990 for the pre-1990 group (as WBAC data are available from 1987), and for every year from 1990 to 2013 for the post-1990 group.

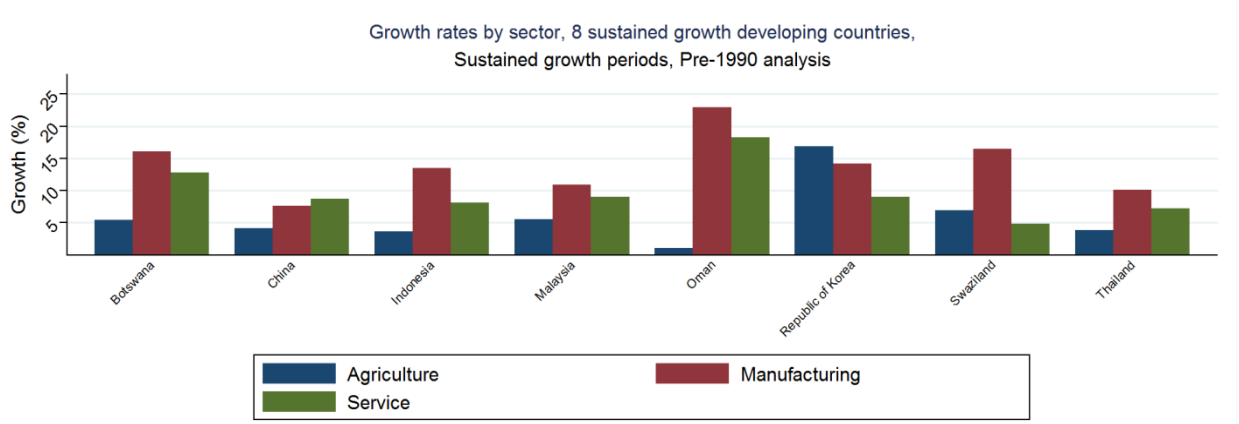
[3] The agricultural sector of the Republic of Korea had a very high growth in the early 1970s at constant prices. For the entire period studied, namely from 1970 to 2013, the manufacturing sector had the highest growth in the country.

Figure 1-A Developing countries with sustained high growth and the highest growth rate in their manufacturing sector pre-1990 (6/9 – 66.7 per cent)



Source: Sustained growth identification (1970-2013, n=10) using GDP constant LCU (USND, 2015);
Income classification: WDI (2013), GNI per capita in US$ (Atlas methodology);
Excluding China: Macao SAR due to missing values in agriculture value added;
Growth rates of rAVA, rMVA and rSVA were calculated based on sustained growth period annual average, using constant LCU, (UNSD, 2015);
Having 6 sustained growth countries experienced highest growth in manufacturing

Figure 1-B: Developing countries with sustained high growth (population > 1 million) and the highest growth rate in their manufacturing sector pre-1990 (6/8 – 75 per cent)

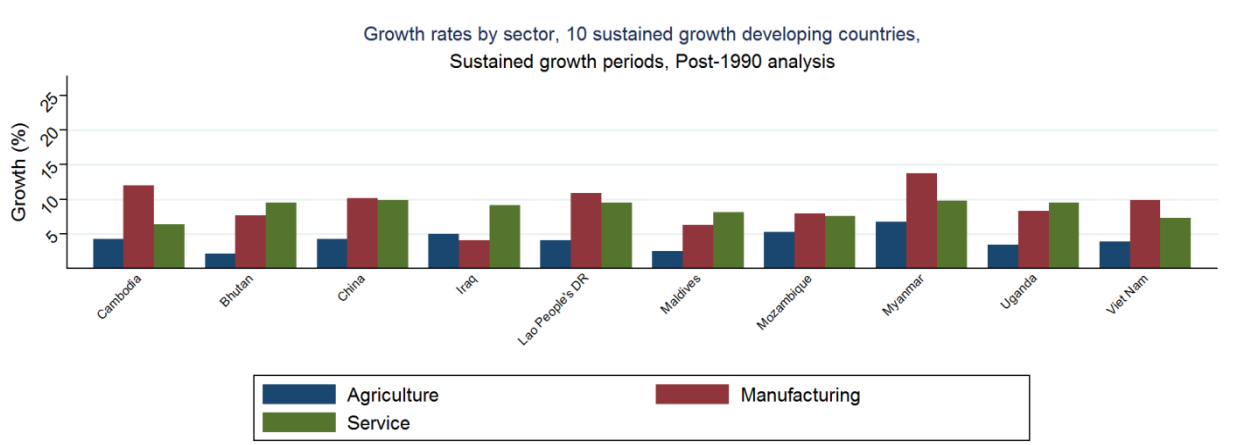


Source: Sustained growth identification (1970-2013, n=10) using GDP constant LCU (USND, 2015);
Income classification: WDI (2013), GNI per capita in US$ (Atlas methodology);
Excluding countries with less than 1 million population: China: Macao SAR and Maldives;
Growth rates of rAVA, rMVA and rSVA were calculated based on sustained growth period annual average, using constant LCU, (UNSD, 2015);
Having 6 sustained growth countries experienced highest growth in manufacturing

In post-1990, as illustrated in Figure 2-A, ten countries with very diverse demographic and geographic characteristics recorded growth rates that were at least 7 percent or higher for 25 years, out of which at least 20 years fell within the period 1990 to 2013. Six out of ten countries (60 per cent) registered the highest growth rate in manufacturing during their sustained high growth periods. If we remove the countries with a population of less than one million, six out of eight countries (75 per cent) remain, which had the highest growth rate in manufacturing during their long-term high growth periods (see Figure 2-B). There is thus not much difference in the

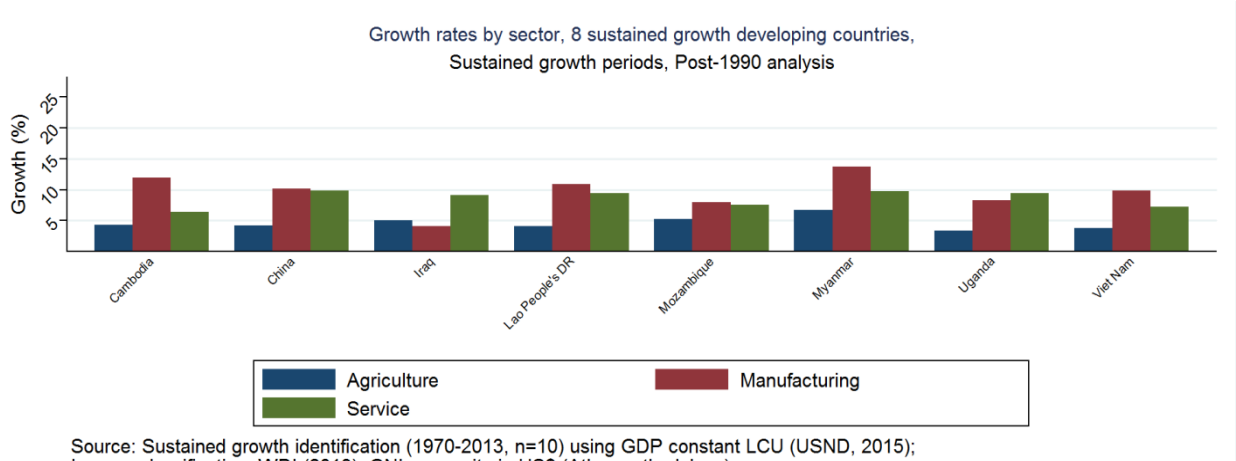
strong performance of manufacturing relative to other sectors before and after 1990. For countries with a population of more than one million, the number and percentage of countries that recorded their highest growth rate in manufacturing are exactly the same – six out of eight countries or 75 percent. This result lends additional empirical support to the findings in the literature of the continued importance of manufacturing growth to sustain high economic growth for a long period of time.

Figure 2-A: Developing countries with sustained high growth and the highest growth rate in their manufacturing sector post-1990 (6/10 – 60 per cent)



Source: Sustained growth identification (1970-2013, n=10) using GDP constant LCU (USND, 2015);
Income classification: WDI (2013), GNI per capita in US$ (Atlas methodology);
Growth rates of rAVA, rMVA and rSVA were calculated based on sustained growth period annual average, using constant LCU, (UNSD, 2015);
Having 6 sustained growth countries experienced highest growth in manufacturing

Figure 2-B: Developing countries with sustained high growth (population > 1 million) and the highest growth rate in their manufacturing sector) post-1990 (6/8 – 75 per cent)

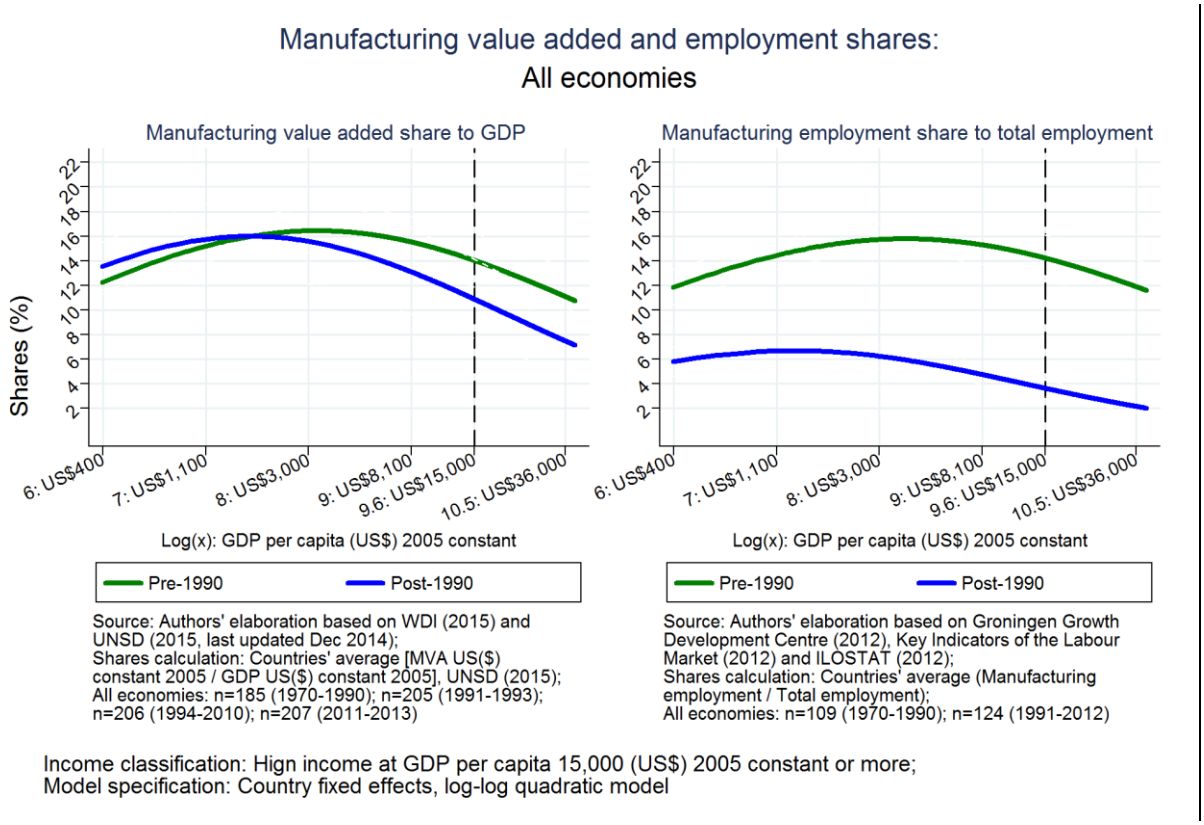


Source: Sustained growth identification (1970-2013, n=10) using GDP constant LCU (USND, 2015);
Income classification: WDI (2013), GNI per capita in US$ (Atlas methodology);
Excluding countries with less than 1 million population: Bhutan and Maldives;
Growth rates of rAVA, rMVA and rSVA were calculated based on sustained growth period annual average, using constant LCU, (UNSD, 2015);
Having 6 sustained growth countries experienced highest growth in manufacturing

Thus, the first condition (A) necessary to foster a change in the importance of manufacturing appears weak for developing countries, especially for those with a higher absorptive capability commensurate to their income level. However, this finding is insufficient to support the argument that the importance of manufacturing in economic development has not changed. Although manufacturing may remain a driver of growth, if its size is decreasing in the world economy, its impact on economic development would naturally be lower than before, or currently developing countries would have fewer opportunities to make use of this driver of economic development. If we are to argue that the importance of manufacturing for developing countries has not changed, the second condition (B) must also be rejected. If manufacturing continues to be the driver of growth and its size in developing countries has remained the same, we can safely conclude that the significance of manufacturing in economic development has not changed.

Some studies show a downward trend of MVA share in GDP and of manufacturing employment share in total employment across income levels (Palma, 2007; Ghani and O'Connel, 2014; Rodrick, 2015). As seen in Figures 3 and 4, our data confirms a downward trend of MVA and manufacturing employment share since 1990.[4]

Figure 3 **Figure 4**



[4] Vertical dashed lines are drawn at the threshold income level which separate developed countries from developing countries. For data explanation, refer to the next section.

The estimated shares of both MVA and manufacturing employment in the post-1990 period are generally lower than those in the pre-1990 period over most of the income levels of developing countries. Not only are they lower in the post-1990 period, they also reach their peaks at a lower level of income. These results are similar to the findings of previous studies.

To shed some light on the second condition (B), it does not suffice to look at countries' average MVA share and manufacturing employment in the respective totals, as is often the case in the literature on pre-mature deindustrialization, and as is also illustrated in Figures 3 and 4. Instead, it is also important to look at manufacturing shares at the world aggregate level – the share of world MVA and manufacturing employment in world GDP and employment. On the one hand, even though the manufacturing share of a given country or region may be decreasing, this drop might be compensated by a rise in manufacturing activities in other parts of the world, if the share of world manufacturing has not changed. On the other hand, if there is a substantial decline in manufacturing share at the world aggregate level, this cannot be explained by a shift among countries but rather by changes in global supply and demand conditions which have made manufacturing less important relative to other sectors of the economy. In contrast to studies on the engine of growth hypothesis, no studies are available which provide a detailed comparison of the results between country average and world aggregate shares of MVA and manufacturing employment. The empirical analysis of this paper therefore focuses primarily on the second condition (B).

In our analysis, we will compare MVA in current prices, constant prices and manufacturing employment.

2. Data

This section discusses manufacturing value added and the employment database used for our analysis, and describes the definitions of developing and developed country groups to assess their long-term structural change in terms of MVA and manufacturing employment shares.

The main data source for sectoral value added is the National Accounts Main Aggregates Database (NAMAD, 2014) [5] maintained by the United Nations Statistics Division. The advantage of this database is that it contains national accounts data of essentially all countries over a period of 43 years, i.e. it presents a global picture of changes in sectoral value added based on consistently compiled data of all countries and not based on any estimations by the

[5] Agriculture ISIC A-B, Manufacturing ISIC D, and Services ISIC G-I (United Nations Statistics Division, 2015, last updated December 2014).

authors. The database comprises data both at current and at constant prices, which allows us to evaluate any changes in MVA shares that are attributable to price changes.

Unlike manufacturing production data, our manufacturing employment database is based on various sources. Taking the need for intertemporal and international compatibility into consideration, the construction of the database entails four steps. The corresponding approaches and methods will be dealt with throughout this section. A-3 of the appendix lists the sources included in each step.

Table 1 Outline of the estimation procedures

Step 1	Step 2	Step 3	Step 4
Systemic approach: core dataset	Idiosyncratic approach: additional datasets	Extrapolation method: missing observations	Aggregate consistency

First, the *systemic approach* combines datasets that include a widely available range of data (across both the international and time spectrums). These databases are merged and their values for comparable data points (i.e. country X in year Y) compared with one another to determine whether the same definition is retained. To resolve any discrepancies among the values, several procedures are internalized. First, the data sources are ranked to select the majority of values from the most comprehensive databases[6]. Simultaneously, their patterns are graphically assessed

[6] In this case, the ranking is GGDC-ASD and GGDC-10SDB, KILM, ILO, GGDC-WIOD (see Table 4). The databases referred to as being "more comprehensive" include (1) a larger sample, and (2) less alternative definitions. ILO recently introduced a database used for the World Employment Social Outlook (WESO). The WESO database includes employment data from 174 countries since 1991. The major difference between the WESO and the databases used in this study is China's employment data. The WESO recorded a lower manufacturing employment for China, especially for recent years, and hence the share of manufacturing employment in total employment. This low figure lies in contrast with other available employment databases, such as those used in this study, the Asian Productivity Organization as well as China's national census. Nevertheless, the share of industry (including both manufacturing and non-manufacturing sectors) in total employment in the WESO and our databases is much closer in terms of levels and trends. The WESO allocates less than half of the industry's employment to manufacturing (47.6 per cent in 2012), which seems unrealistic as most non-resource rich developing countries usually have a much higher share of around 60 per cent or more. Even in many industrialized countries such as the United States, Japan, Germany or Sweden, the share of manufacturing in industry's employment is higher than 60 per cent. Furthermore, the use of the WESO database results in a very high labour productivity for China in comparison with countries at a similar income level. This indicates that there may be a mismatch between the WESO's data for China and the country's national accounts. The WESO's employment data is closer to the numbers published by the National Bureau of Statistics and China's Ministry of Labour. If the WESO's data for China derives from these sources, the manufacturing employment share in total employment may be underrepresented because these sources were not likely to include manufacturing employment in towns and villages (Banister, 2005). In any case, even using the WESO database, the trend of the aggregate manufacturing employment share is flat from 1990 to 2010 (statistically insignificant time trend). Our employment figure is slightly higher but much closer to the country's national census than to the WESO figure. Although the census entails more complete reporting than the official annual compilation, the census also seems to undercount manufacturing employment (Banister, 2005). The way the census was conducted and its timing tended to

to establish the gravity of the problem. Finally, severe outliers are excluded from the sample. A large number of observations are still missing within the required sample after the systemic approach is applied[7]. The *idiosyncratic approach* aims to resolve the majority of these gaps by obtaining data from a multitude of country- or region-specific sources (see Table 4). After the second step, the series' (internally) missing observations are linearly interpolated.

The available series are converted into their percentage contribution to total employment. The remainder of the values (at the lower or upper end of the time spectrum) is extrapolated in the third phase, the *extrapolation approach*. This approach covers three different groups: (i) countries with a maximum of 5 missing observations at either side of the time spectrum, (ii) countries with between 5 and 10 years of missing observations, and (iii) countries with gaps in excess of 10 consecutive years[8]. Group (iii) is immediately excluded from the sample, as extrapolation is likely to result in biased estimates. Group (i) undergoes a *linear extrapolation* process, whereas missing information is resolved in Group (ii) through extrapolation by means of the *last observation carried forward*[9]. Following these procedures, all percentage values are merged together in a new database, creating the foundation for the fourth and final step.

The final step aims to mitigate internal compatibility issues, thereby improving consistency at the aggregate data level. As already explained in the previous section, consistency is an important feature of the database. Having obtained the shares in the previous steps, they are multiplied in this final step with the aggregate employment values from the Total Economy Database of the Conference Board[10]. This database provides estimates on total employment levels for 128 countries. The employment series for the remaining nine countries were obtained using idiosyncratic methods[11]. Finally, note that this mechanism still implies that the estimates will better reflect the original data for the series in *percentages* and cover *aggregate* patterns as compared to those that are generated on a *level*-base for *individual* countries.

There are two conditions we have to take into consideration when classifying countries into a developing countries group to analyse its long-term structural change in terms of MVA and manufacturing employment. First, the countries classified into the developing country group

classify rural household members more as agricultural workers, even though some of them were engaged in manufacturing and other industries (Banister, 2005).

[7] The required sample here refers to having a *complete* or *comprehensive* set of countries, i.e. a sample that is not skewed towards a specific income classification, country size or region.

[8] A second metric that was considered is the behaviour of the function (i.e. trend), but this was rejected due to the high likelihood of obtaining assumption-driven rather than data-driven estimates.

[9] Initially, a spatial interpolation was considered, but this is likely to drive estimates further away from their true values.

[10] Source: https://www.conference-board.org/data/economydatabase/

[11] See Table 4.

need to have been developing countries throughout the period of analysis. We are interested in whether manufacturing opportunities in developing countries increased or decreased over the last 43 years to assess any changes in the significance of manufacturing for their economic development. For a consistent and accurate analysis, mature high income countries that usually experience deindustrialization must be excluded from the group of developing countries for the entire period of analysis. Secondly, ideally, the same number of countries and geographic coverage has to be maintained throughout the period of analysis to ensure that any changes in MVA and manufacturing employment shares are attributed to changes in the economic activities of the group analysed.

Due primarily to the break-up of the USSR and Yugoslavia in 1990, and the fact that only some of the former USSR and Yugoslav countries reached high income levels after 1990, it is not possible to simultaneously maintain the above two conditions. We therefore have two sets of balanced panel data for developing countries before 1990 and after 1990; geographical coverage is maintained within each of the balanced panel data. The difference between the two datasets is largely related to the break-ups of the USSR and Yugoslavia.[12] Before 1990, the USSR and Yugoslavia are entered into the dataset of developing countries as two individual countries. After 1990, the former USSR and Yugoslavian states are included in the dataset of developing countries, with the exception of Estonia, Latvia, Lithuania, Russia, Croatia and Slovenia, which reached a high income level in the period between 1990 and 2013. The effects of these changes are minimal as we use shares to assess changes in MVA and manufacturing employment, which does not affect the interpretation of our results, considering that we focus on the trend (increasing, decreasing or flat) of each period before and after 1990. For the robustness check, we also include the results based on the dataset, which excludes all merged or separated countries[13], so we can use a single balanced dataset of the same number of developing countries and the same geographic coverage for the entire period of 43years.

Developing countries include those that did not reach a high income level in any year until 2013[14] based on the threshold income level for high income countries defined annually by

[12] Although the (i) breaks-up of Ethiopia and Sudan and the (ii) merger of Yemen occurred after 1990, the former Ethiopian, Sudanese and Yemenis states continue to remain in the developing country group. Hence, within each of the balanced panel data, geographical coverage is maintained.

[13] They are the USSR, Yugoslavia, Yemen, Ethiopia, Sudan and their merged or separated countries.

[14] In the shares analysis, one period sample is followed in (i) MVA (1970-2013) and (ii) manufacturing employment (1970-2012). Countries are classified as developing countries based on WBAC in 2013, excluding those countries that had a high income status between 1987-2013, for instance, American Samoa (1987-1989) and Hungary (2008-2011).

World Bank Analytical Classifications (WBAC)[15]. This ensures that declines in MVA shares and manufacturing employment shares experienced by developing countries are not caused by the normal pattern of structural change, which usually leads to deindustrialization at high income levels. For countries that have not been classified by WBAC, we use WDI (2015) and NAMAD (2014)[16] to jointly assess those countries' income levels[17] and subsequently define their level of development based on WBAC. For details on the database, see Appendix 1.

3. Results

3.1 MVA shares at current prices

Figure 5-A illustrate the changes in country average shares of MVA in GDP within each development group.[18] The shares of developed countries have steadily declined since 1970. Developing countries exhibited a stable trend until 1990, but have since experienced a statistically significant declining trend (see Appendix 3). The result at current prices confirms the lower shares of MVA in developing countries in the post-1990 period. Figure 5-B illustrates the changes in the shares of aggregate MVA in the aggregate GDP of each development group as a whole (hereafter called "aggregate share"). While there is no change in the steady declining trend in developed countries, the aggregate share for developing countries shows a different trend. It decreased until 1993 and then remained more or less stable until 2013. This sudden change in the aggregate share trend may not, however, reflect the long-term trends of the world manufacturing share due to the economic collapse of the former Soviet Union and the subsequent consolidation of manufacturing industries. If we exclude the USSR, Yugoslavia and all other merged and separated countries[19] from our dataset (as shown in Figure 5-D), we find no statistically significant increasing or decreasing trend over the 43 years studied. In any case, when either including or excluding merged and separated countries, there is no statistically

[15] World Bank Analytical Classifications (presented in the WDI), using GNI per capita in US$ (Atlas methodology) from calendar year 1987 to 2014.

[16] By using GDP per capita (current US$) (NAMAD, 2014) divided by population (WDI, 2015). Total population (SP.POP.TOTL) is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship – except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of their country of origin. The values shown are mid-year estimates (WDI, 2014).

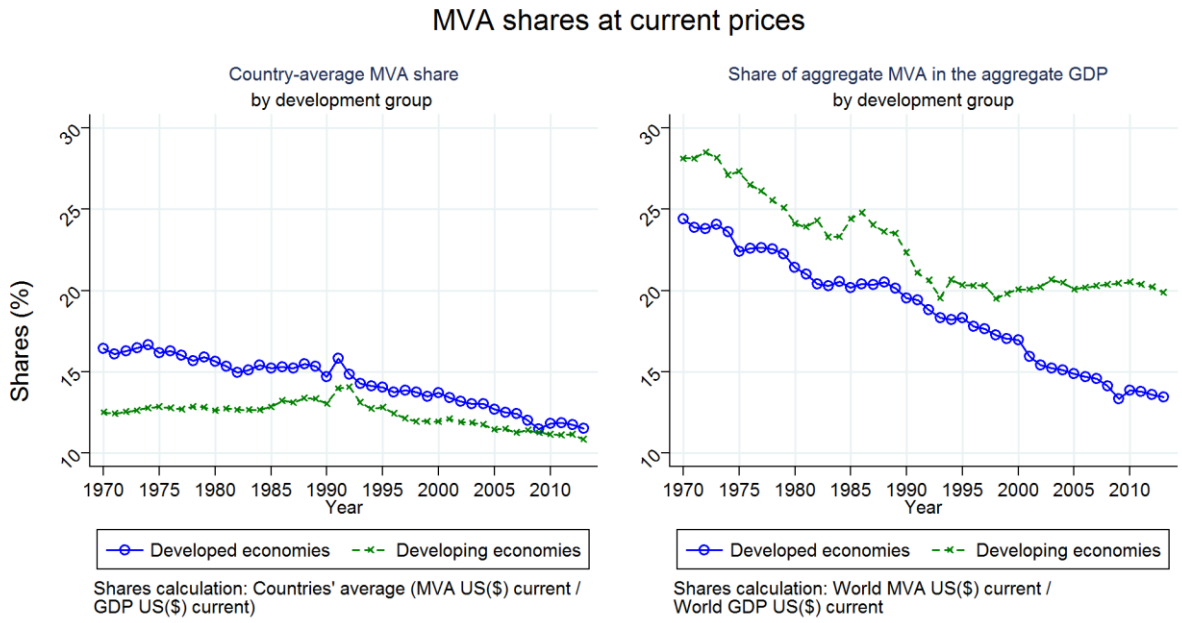
[17] Anguilla, Cayman Islands, British Virgin Islands and Turks and Caicos Islands are classified as developed countries in the pre-1990 period, Anguilla and British Virgin Islands are classified as developed countries in the post-1990 period.

[18] Country average share of MVA in GDP is calculated as the sum of each country's MVA share in GDP divided by the number of countries while the aggregate share is measured as the world's total MVA divided by the world's total GDP. The difference between country and aggregate averages can also be viewed as the difference between unweighted and weighted country averages.

[19] In addition to the USSR and Yugoslavia, Yemen, Ethiopia, Sudan and their merged or separated countries were excluded.

significant declining trend in the aggregate share of developing countries since 1990 (see Appendix 3 for the statistical results).[20]

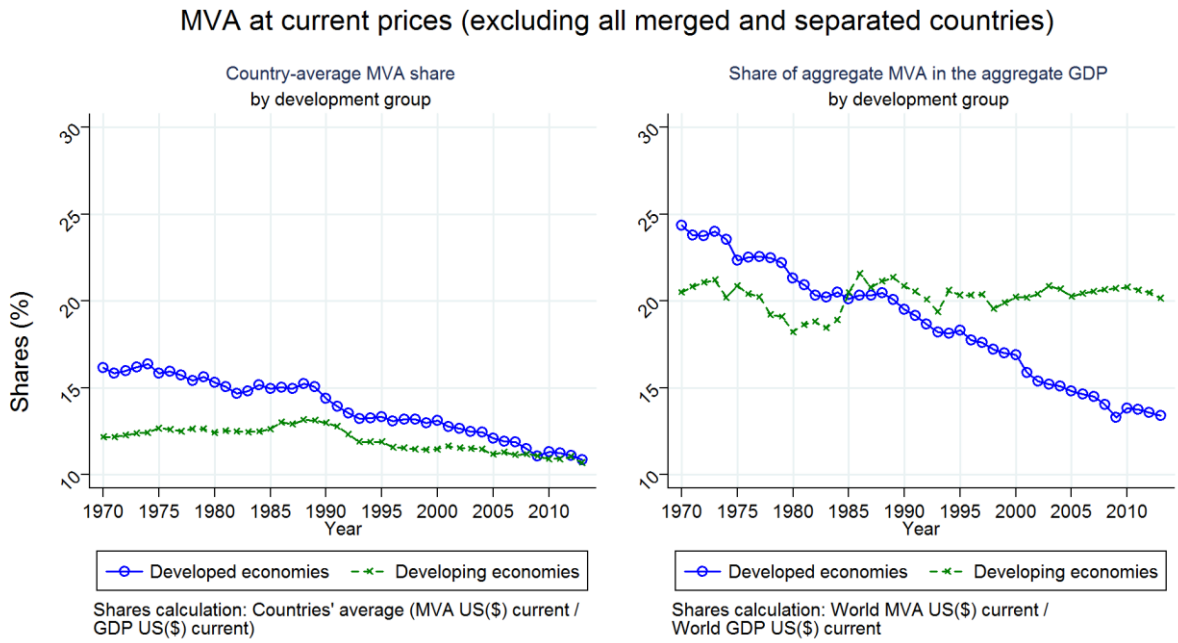
Figure 5-A **Figure 5-B**



Source: United Nations Statistics Division (2015, last updated Dec 2014);
n=185 (1970-1990); n=205 (1991-1993); n=206 (1994-2010); n=207 (2011-2013),
including all merged and separated countries;
Income classification: WDI (2013), GNI per capita in US$ (Atlas methodology);
The difference between country and aggregate averages can also be viewed as the difference between unweighted and weighted country averages

[20] It has a statistically insignificant, slightly negative trend. After 1992, it has a statistically insignificant, slightly positive trend.

Figure5-C **Figure 5-D**



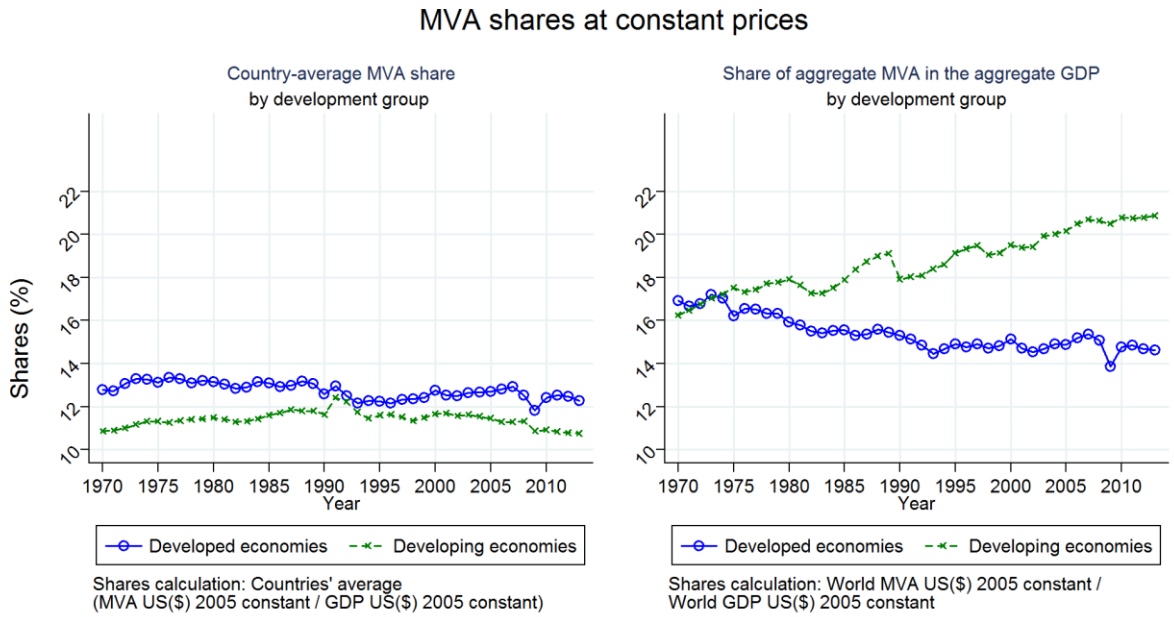
Source: United Nations Statistics Division (2015, last updated Dec 2014);
n=178 (1970-2013), excluding all merged and separated countries;
Income classification: WDI (2013), GNI per capita in US$ (Atlas methodology);
The difference between country and aggregate averages can also be viewed as the difference between unweighted and weighted country averages

3.2 MVA shares at constant prices

At constant prices, the country average MVA share in GDP has also shown a declining trend in developing countries since 1991 (see Figure 6-A and Appendix 4). In terms of aggregate share (Figure 6-B), developing countries show a rising trend over 43 years. By contrast, the share in developed countries decreased until 1993 and has remained constant since. The result remains the same if we exclude all merged and separated countries from the dataset to apply a single balanced panel data of identical countries for the entire 43-year period (Figures 6-C and 6-D).

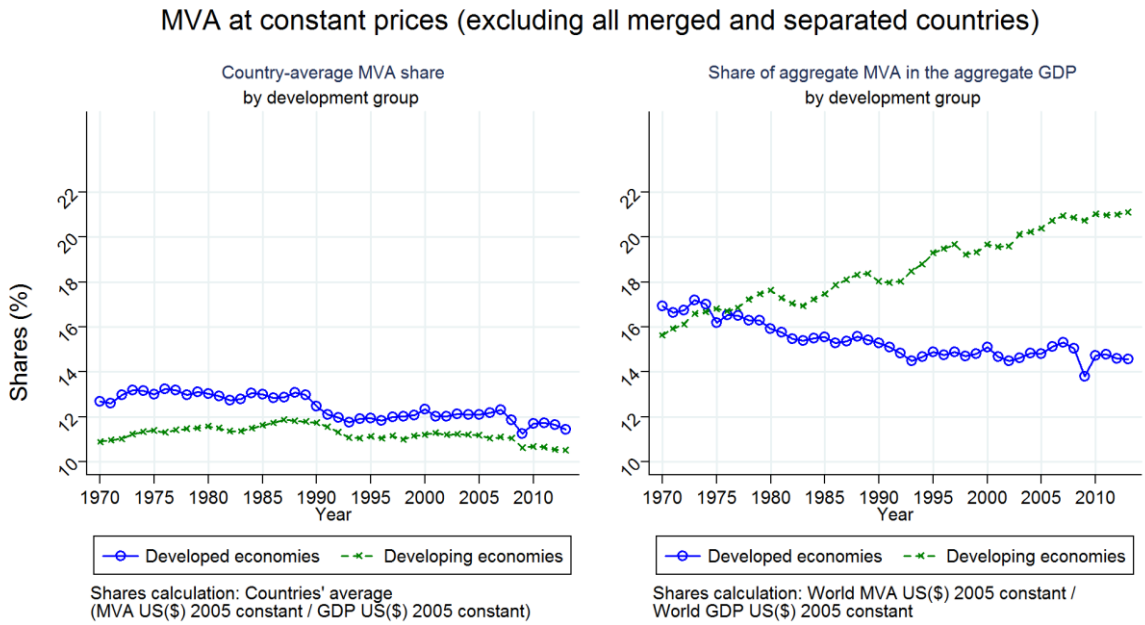
In short, whether at current or at constant prices, the country average share of MVA in GDP has been declining in developing countries for the last 20 years. This is in line with the premature deindustrialization argument, which purports a declining manufacturing share based on the average picture of developing countries (see Figures 3 and 4, for example). However, using either current or constant prices, the size of MVA in developing countries as a whole has not changed, if not increased, since 1990, as evidenced in the trend of the aggregate share. Moreover, if we exclude merged and separated countries (though the difference in the result is attributable to the breakup of the USSR alone), MVA shares in developing countries have not changed since 1970, even at current prices

Figure 6-A **Figure 6-B**



Source: United Nations Statistics Division (2015, last updated Dec 2014);
n=185 (1970-1990); n=205 (1991-1993); n=206 (1994-2010); n=207 (2011-2013),
including all merged and separated countries;
Income classification: WDI (2013), GNI per capita in US$ (Atlas methodology);
The difference between country and aggregate averages can also be viewed as the difference between unweighted and weighted country averages

Figure 6-C **Figure 6-D**

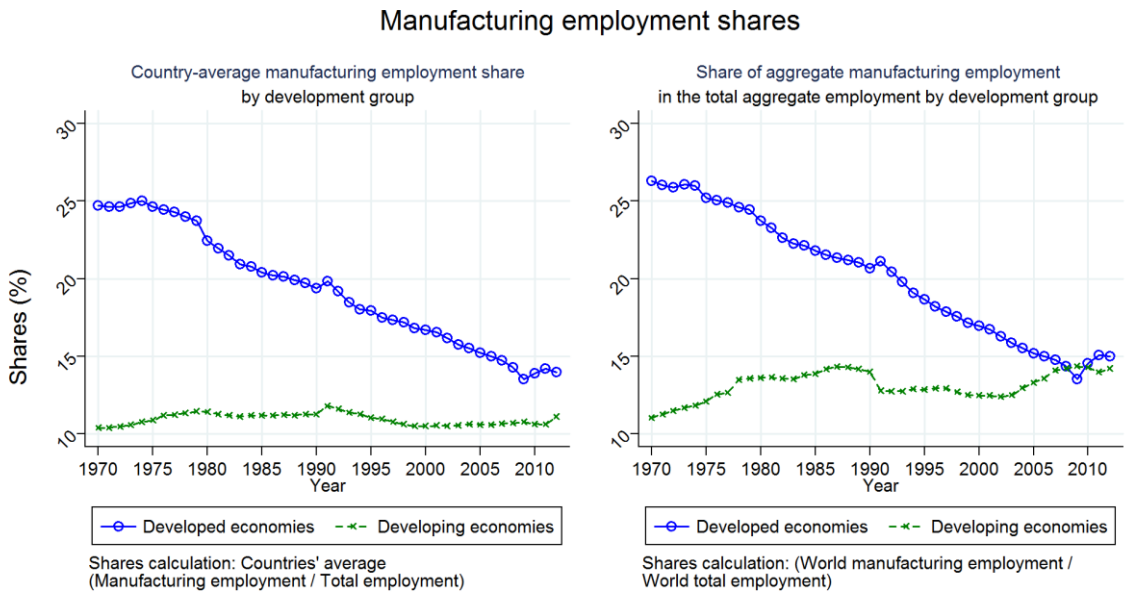


Source: United Nations Statistics Division (2015, last updated Dec 2014);
n=178 (1970-2013), excluding all merged and separated countries;
Income classification: WDI (2013), GNI per capita in US$ (Atlas methodology);
The difference between country and aggregate averages can also be viewed as the difference between unweighted and weighted country averages

3.3 Employment

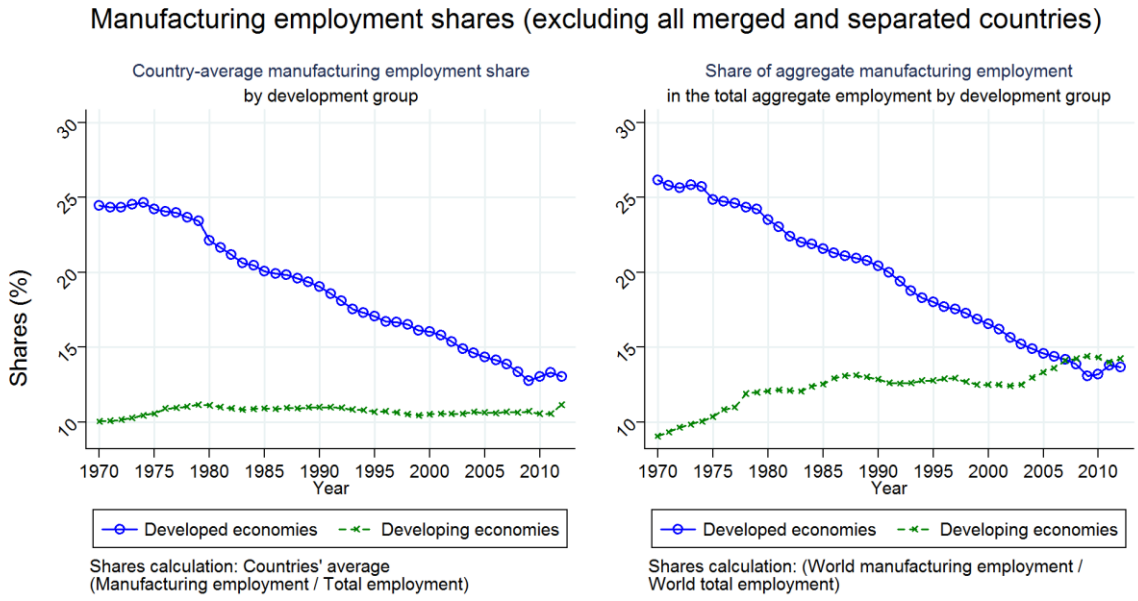
Developed countries have substantially reduced their share of manufacturing employment in total employment over the last 43 years (see Figures 7-A and 7-B). This is not surprising, as countries at high income levels usually experience deindustrialization, with falling numbers of manufacturing jobs as part of the normal pattern of structural change. In the case of developing countries, the country average share has declined since 1991, while the aggregate share has shown a statistically significant increasing trend since 1990, indicated in the statistical results (Appendix 5). As illustrated in Figures 7-C and 7-D, developing countries—without the USSR and other merged or separated countries—show similar trends. However, the declining trend of the country average share since 1990 is statistically insignificant. It is also noteworthy that the aggregate share of world manufacturing employment in total global employment (including both developed and developing countries) has hardly changed since 1970.

Figure 7-A **Figure 7-B**



Source: Groningen Growth Development Centre (2012), Key Indicators of the Labour Market (2012), and ILOSTAT (2012);
n=109 (1970-1990); n=124 (1991-2012), including all merged and separated countries;
Income classification: WDI (2013), GNI per capita in US$ (Atlas methodology);
The difference between country and aggregate averages can also be viewed as the difference between unweighted and weighted country averages

Figure 7-C **Figure 7-D**



Source: Groningen Growth Development Centre (2012), Key Indicators of the Labour Market (2012), and ILOSTAT (2012);
n=106 (1970-2012), excluding all merged and separated countries;
Income classification: WDI (2013), GNI per capita in US$ (Atlas methodology);
The difference between country and aggregate averages can also be viewed as the difference between unweighted and weighted country averages

Our analysis of value added and employment trends indicates that no matter how we look at the manufacturing aggregate share in developing countries, whether in terms of value added at current prices, constant prices or employment, or whether we include the USSR and other merged or separated countries or not, the share has not declined (if not increased) since 1990. This also holds true for the entire 43 years since 1970, if the merged and separated countries are excluded. This is quite noteworthy, especially as regards the increasing trend of manufacturing employment share in developing countries, because this occurred despite the so-called "statistic illusion" as a result of past changes in statistical classifications, which usually lowered the total number of manufacturing jobs by reclassifying certain manufacturing jobs to services (Tregenna, 2015). Because premature deindustrialization has been taking place in Africa and Latin America since the mid-1970s (Timmer et al., 2015; Tregenna, 2015), the fact that MVA and manufacturing employment shares have at least maintained their levels since 1970 signifies that the decline of manufacturing share seen in the country average share in Figures 3 and 4 has not been caused by any long-term, systemic shift in the global economic structure to reduce the manufacturing share relative to others.

Then why has the manufacturing share in GDP been decreasing in developing countries or why have they been experiencing premature deindustrialization? The differences in the results of

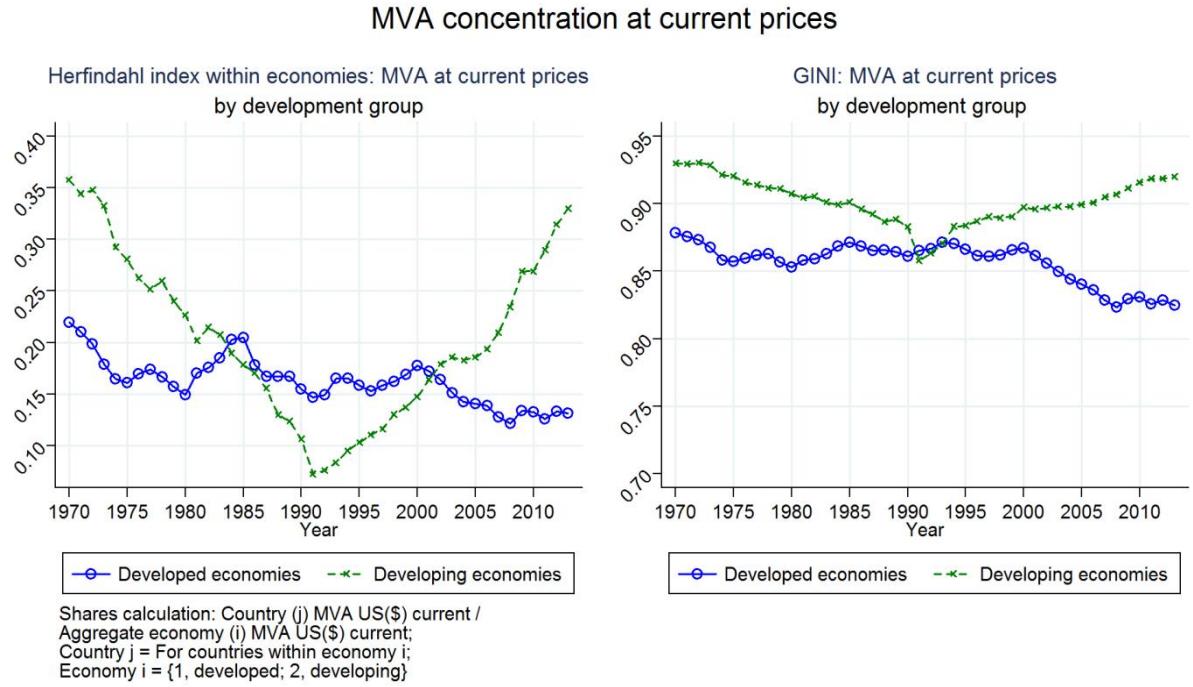
aggregate share and country average share seem to indicate the possibility of an increasing concentration of manufacturing activities in a small number of (large) developing countries while the MVA share of developing countries as a whole in their total GDP has not changed. If this is indeed the case, it makes sense that the aggregate share maintained at least a stable trend while a large number of developing countries' manufacturing share (country average share) has declined in recent years. In order to test this hypothesis, we examine the level of MVA and employment concentration for developing countries from 1971 to 2013, using the Herfindahl index and Gini[21]. While the discussion here focuses on developing countries, the following figures also include the results of developed countries for reference purposes.

Figures 8 demonstrate how the level of MVA concentration in developing and developed countries has changed since 1970 at current prices based on the Herfindahl index (Figure 8-A) and Gini (Figure 8-B). The changes are less drastic in Gini, but the concentration trends are similar in both results. In either case, the concentration level remained largely stable for developed countries over the 43-year period, but has increased in developing countries since the beginning of the 1990s. This onset of the increase in concentration corresponds with the point in time when the country average share began to decline (Figures 5-A and 5-C).

[21]The Herfindahl Index, $HI = \sum_{i=1}^{I} share_i^{\propto}$, for $\boldsymbol{i}$ = Countries within the development group and $\boldsymbol{I}$ = Total number of countries within the development group. $\propto$ = 2 determines whether a country with a dominant share exists, the lower bound is $\frac{1}{I}$ and the upper bound is at 1. The HI implicitly takes the equi-proportion as a reference, this implies that the lowest degree of concentration is reached if each country has the same share within the development group; the highest degree of concentration is reached if the share is concentrated in one country within the development group. Thus, more weight is given to the country with the largest share in the distribution and a lower weight to countries with small shares.

Unlike the Herfindahl Index, GINI does not satisfy the axiom of progressive transfers (Palan, 2010). Cowell (2011) points out that Gini's main disadvantage is that it places a rather curious implicit relative value on change that may occur in different parts of the distribution. The values in the middle part of the distribution are weighted more than values at the tails of the distribution. Similar to Amiti's elaboration (1999) at country level, for instance, the transfer of a share from a country with a larger share to a country with a smaller one within the development group has a much greater effect on the development group's GINI coefficient, if the countries are near the middle rather that at either end of the distribution.

Figure 8-A **Figure 8-B**

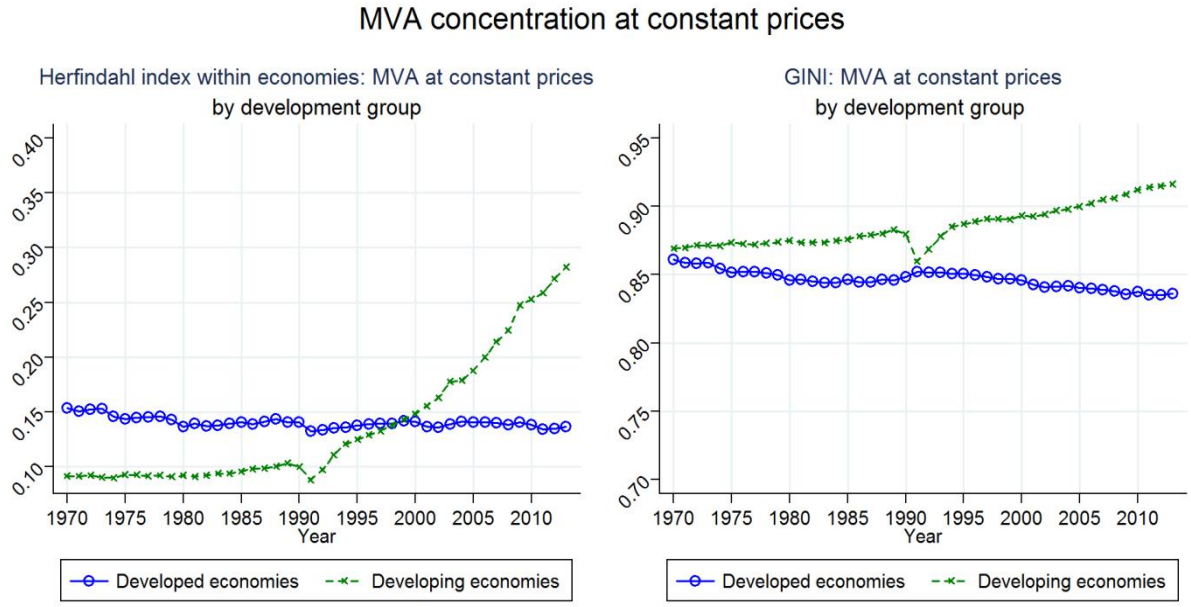


Shares calculation: Country (j) MVA US($) current / Aggregate economy (i) MVA US($) current;
Country j = For countries within economy i;
Economy i = {1, developed; 2, developing}

Source: United Nations Statistics Division (2015, last updated Dec 2014);
n=185 (1970-1990); n=205 (1991-1993); n=206 (1994-2010); n=207 (2011-2013), including all merged and separated countries;
Income classification: WDI (2013), GNI per capita in US$ (Atlas methodology)

The trends based on constant prices (Figures 9-A and 9-B) show the stability of the level of concentration for developing countries until 1990, and a steady and faster increase in developing countries' level of MVA concentration since the beginning of the 1990s.

Figure 9-A **Figure 9-B**

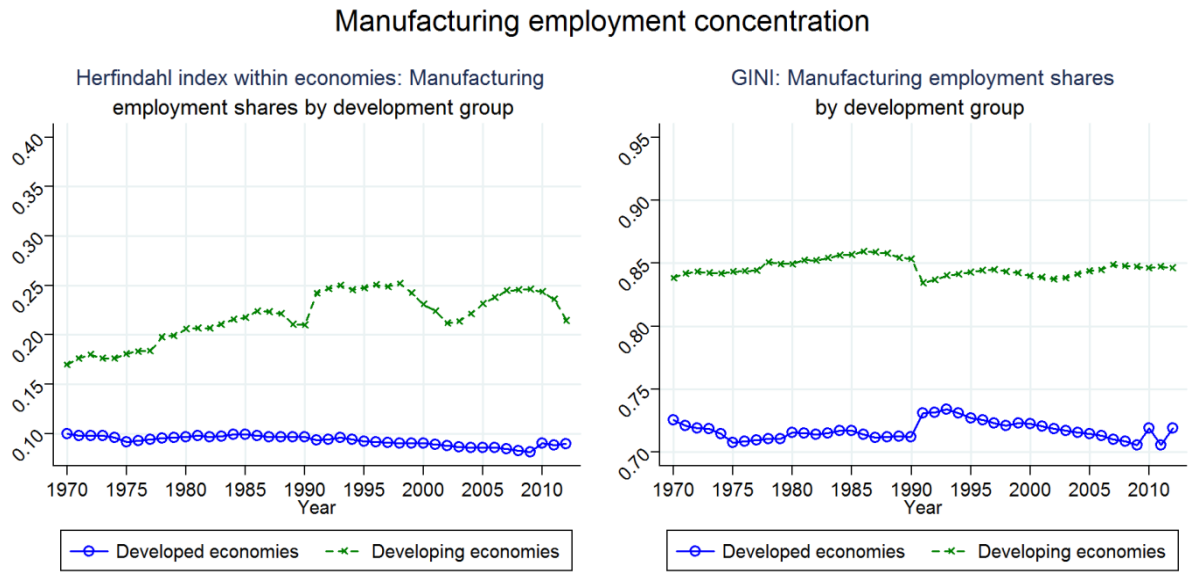


Shares calculation: Country (j) MVA US($) 2005 constant / Aggregate economy (i) MVA US($) 2005 constant;
Country j = For countries within economy i;
Economy i = {1, developed; 2, developing}

Source: United Nations Statistics Division (2015, last updated Dec 2014);
n=185 (1970-1990); n=205 (1991-1993); n=206 (1994-2010); n=207 (2011-2013), including all merged and separated countries;
Income classification: WDI (2013), GNI per capita in US$ (Atlas methodology)

The case of employment requires a more nuanced interpretation. Employment concentration in developing countries rose up to the end of the 1980s according to both the Herfindahl index and Gini (see Figures 10-A and 10-B). This increasing concentration did not result in the decline of country average share (Figure 7-A), probably due to the rise in the share of manufacturing employment in total employment in developing countries as a whole during the first 20 years (Figure 7-B). From 1991 to 1998, while employment concentration increased in developing countries, the aggregate share did not change much. This combination is likely to have generated the declining trend of the county average share (Figure 7-A). Finally, from 1998 to 2010, the country average share was generally flat due to the decline in the concentration and in the aggregate employment share from 1998 to 2002, as well as to the increase in the concentration and in the aggregate employment share from 2002 to 2010.

Figure 10-A **Figure 10-B**



Shares calculation:
Country (j) manufacturing employment headcount /
Aggregate economy (i) manufacturing employment headcount;
Country j = For countries within economy i;
Economy i = {1, developed; 2, developing}

Source: Groningen Growth Development Centre (2012), Key Indicators of the Labour Market (2012), and ILOSTAT (2012);
n=109 (1970-1990); n=124 (1991-2012), including all merged and separated countries;
Income classification: WDI (2013), GNI per capita in US$ (Atlas methodology)

We also tested the above for developing countries, excluding all merged or separated countries, but there was no change in the result of steady and faster increases in the level of MVA concentration from the beginning of the 1990s and in the shifting pattern of employment concentration.

4. Conclusions

Despite recent assertions of shrinking opportunities for manufacturing development in developing countries and a decrease in the importance of manufacturing for their economic development, this study shows that there is no evidence supporting this argument. Even after 1990, the manufacturing sector in developing countries still meets the conditions to be described as a driver of economic development, especially to achieve high sustained growth while retaining at least the same size in GDP and total employment as in the period from 1970 to 1990. Thus, the declining MVA and manufacturing employment share in many developing countries has not been caused by changes in the development quality or quantity of manufacturing activities, but is mostly attributable to the failures of manufacturing development in a large number of developing countries against the backdrop of rapid development of the

manufacturing sector in a small number of countries, thus resulting in a concentration of manufacturing activities in developing countries.

China is an example of an exceptionally successful country. In recent years, China had MVA shares of more than 30 per cent both at current and at constant prices, while the average share of developing countries was around 11 per cent to 14 per cent. In the case of manufacturing employment, China has had a share of more than 15 per cent since the end of the 1980s and an 18 per cent to 19 per cent share since 2007 in comparison to an average share of 11 per cent and 12 per cent in developing countries for most of the 43-year period being studied. In terms of population, China's development is equivalent to that of the 38 average-sized countries that registered rapid simultaneous industrialization. Considering that China's population is greater than the total of all African countries together, China's industrialization can also be compared with the rapid industrialization of all African countries together (and more). Although our study did not look at a specific country, the results of this study may not be so counterintuitive given the rapid industrialization of some large developing countries in recent years. We do not assume that the trends observed in our analysis will continue in the future. However, given the recent claims about the diminishing significance of manufacturing or the increasing difficulty to pursue economic development by following the conventional path of industrialization, the evidence in our study, which shows that the significance of manufacturing remained unaltered in the two periods studied, i.e. 1970-1990 and 1990-2013, is a matter of significance. Successful emerging countries, particularly China, will reach their peak of industrialization soon, if they have not already done so, and are thereafter likely to follow the normal pattern of deindustrialization experienced by high income countries. Once this happens, there may be greater opportunities for current low income countries to pursue manufacturing activities; manufacturing would then perhaps become more, not less, important for them. Thus, the recommendation for developing countries is to not turn away from manufacturing and abandon the path of economic development through industrialization, but to emulate the experience of rapid industrialization that large populations across the globe, even in recent years, have undergone.

Appendix 1: MVA database

This section describes manufacturing value added data over a course of 43 years. The main source of the sectoral-related production data is the National Accounts Main Aggregates Database (NAMAD, 2014)[22] of the United Nations Statistics Division. To avoid double counting, we revisited **country-specific mergers and separations**[23] to append the ex-ante series from the ex-post series within NAMAD (2014). Secondly, to construct a more balanced panel data set, we used the **comparative compatibility approach** to append the country-year observations[24]. All variables from NAMAD (2014) were obtained as levels[25], but transformed into shares over GDP and growth to exclude size effects and make the data comparable across countries. The same source was used for the sustained growth analysis of the agriculture, manufacturing and services sectors (see Table 2).

Table 2 Summary of manufacturing value added panel data

National Accounts Main Aggregates Database (2014)							
	All countries				Excluding all merged and separated countries		
Manufacturing value added	All countries	Developed	Developing		All countries	Developed	Developing
1970-1990	185	62	123		178	61	117
1991-1993	205	69	136		178	61	117
1994-2010	206	69	137		178	61	117
2011-2013	207	69	138		178	61	117

Income classification: GNI per capita US$ (Atlas methodology) (WDI, 2013). In the sustained growth analysis, we include countries for the pre-1990 sample that had a high income status

[22] Agriculture ISIC A-B, Manufacturing ISIC D and Services ISIC G-I (United Nations Statistics Division, 2015, last updated December 2014).

[23] The Union of Soviet Socialist Republics, Yugoslavia, Czechoslovakia, Ethiopia, Sudan and Yemen (See Table 4). Three economies, Ethiopia, Sudan and Yemen are identified to have duplicated country-year observations during the mergers and separations; the ex-ante series of Ethiopia (Former Ethiopia), for example, ended in 1993, however, the ex-post series of Ethiopia (Ethiopia and Eritrea) started in 1990. As there are three years of double counting for Ethiopia in the period 1990-1993, we append the ex-ante series from the ex-post series subsequent to the last observation of the ex-ante series. We take the same approach for the case of Sudan and Yemen.

[24] China's manufacturing production data (at current and at constant prices) in the NAMAD (2014) cover a short series from 2005 to 2013, and Azerbaijan's manufacturing production data (at constant prices) in the NAMAD (2014) cover a long series from 1992 to 2013. We obtain the percentage of manufacturing net output contribution to gross domestic production from the World Bank to append manufacturing value added, the long series from 1970 to 2004 for China and the short series in 1991 for Azerbaijan.

[25] Primary production data, gross value added used in this study. Gross value added is the value of output less the value of intermediate consumption. It is a measure of the contribution to GDP made by an individual producer, industry or sector. Gross value added is the source from which the primary incomes of the System of National Accounts (SNA) are generated and is therefore carried forward into the primary distribution of income account (UNSD, 2015, updated version as of December 2014).

between 1987-1989, but not in 1990 in the developed country group, including Cayman Islands, Turks Caicos Islands, American Samoa, Bahrain, Barbados, Malta, Puerto Rico, Guam, Isle of Man and Saudi Arabia. For the post-1990 sample, Hungary is included in the developed group as it was a high income country from 2008 to 2011.

Table 3 Merged or separated countries (1970 – 2013)

Ex-ante country	Ex-post country	Year
Czechoslovakia	Czech Republic, Slovakia	1990
Soviet Union (USSR)	Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan	1990
Yemen Democratic Rep. Yemen Arab Rep.	Yemen	1990
Yugoslavia	Bosnia-Herzegovina, Croatia, Macedonia, Montenegro, Serbia Slovenia	1990
Ethiopia	Ethiopia, Eritrea	1993
Sudan	Sudan, South Sudan	2010

In Table 2, the NAMAD (2014) database comprises 123 developing countries in the 1970-1990 period, 136 developing countries in the 1991-1993 period, 137 developing countries in the 1994-2010 period and 138 developing countries in the 2011-2013 period. The changes in the number of countries are due to mergers and separations of countries. For the robustness test, a balanced panel sample is constructed in which the geographical coverage of the groups of developing and developed countries remains the same throughout the sample period from 1970 to 2013. After excluding countries that experienced mergers or separations in Table 3, we identify 117 developing countries.

Appendix 2: Manufacturing employment database

Table 4 Sources by step

Step	Source
1	ILOSTAT (1970 – 2012) • Labour force surveys (aggregate), excluding those with limited geographical/ demographic scope and other skewed definitions (e.g. unreported sectors). • Official estimates • Comparison with population censuses, household surveys via www.ilo.org/ilostat/ GGDC (Groningen Growth & Development Centre) • African Sector Database (1960 – 2012) • 10 Sector Database (2014 version, 1950 – 2012) • WIOD (1995 – 2012) via http://www.rug.nl/research/ggdc/data/ KILM (Key Indicators of the Labour Market, 1980 – 2012) • Dataset 4: employment by sector • Merged ISIC 2, 3 and 4 digits • Note: excludes observations with geographical/demographic limitations and unreported sectors. Via http://www.ilo.org/empelm/what/WCMS_114240/lang--en/index.htm
2	ADB (Asian Development Bank) • Statistical Database Survey (1988 – 2012) • ADB Key Indicators Yearbook (edition 1999, 1981 – 1998) • Issues: certain industries are merged together; sector-specific numbers are provided for *agriculture*, *industry* or sometimes *mining* and *manufacturing*, and *services* or more often *other than agriculture, mining and manufacturing*. These are segregated using (extrapolated) shares from (i) other databases in comparative years, (ii) comparative countries. via http://www.adb.org/publications/series/key-indicators-for-asia-and-the-pacific and https://sdbs.adb.org/sdbs/ CEPED (Centre Population et Développement, Inventaire des Recensements et des EnquêtesDémographiquesenAfrique) via http://www.ceped.org/ireda/inventaire/ NSO (National Statistical Office) via country-specific sources United Nations • CEPAL (UN Economic Commission for Latin America): Statistical Yearbooks

	(1975 – 2012) • UNECE (UN Economic Commission for Europe) WB-HPE (World Bank publication: Historically Planned Economies) • Industrial sector was segregated into its non-manufacturing and manufacturing components (see ADB procedures). via http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/1999/10/14/000178830_98101911114539/Rendered/PDF/multi0page.pdf Miscellaneous • EU publications: Jordan, Libya, Tajikistan • ILO publications: Mauritania, Uganda • IMF publications: Kuwait • OECD Statistics • Princeton University – Iran Data Portal • UNCTAD database • UNU-Merit publication: Sudan • UNDP publications: Sudan • World Bank publications: Macedonia
3	-
4	Total Economy Database (1950 – 1912) • Note 1: Separation of Serbia and Montenegro • Note 2: Merged West- and East-Germany via https://www.conference-board.org/data/economydatabase/ Idiosyncratic databases (see steps 1 and 2) for the countries of: • Botswana, Cuba, El Salvador, Haiti, Honduras, Libya, Mauritius, Mongolia, Nicaragua, Panama, Paraguay, Puerto Rico, Rwanda

Table 5 Summary of manufacturing employment panel data

GGDC (2012), KILM (2012) and ILOSTAT (2012)							
	All countries				Excluding all merged and separated countries		
Manufacturing employment	All countries	Developed	Developing		All countries	Developed	Developing
1970-1990	109	43	66		106	42	64
1991-2012	124	48	76		106	42	64

Income classification: GNI per capita US$ (Atlas methodology), WDI (2013)

Table 6 Merged or separated countries (1970 – 2012)

Ex-ante country	Ex-post country	Year
Czechoslovakia	Czech Republic, Slovakia	1990
Soviet Union (USSR)	Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan	1990

In Table 5, the manufacturing employment data comprises 66 developing countries in the 1970-1990 period and 76 developing countries in the 1991-2012 period. Unlike NAMAD, the employment database is constructed from various sources. Among merged and separated economies in Table 3, only Czechoslovakia and the USSR (with balanced panel data from 1970 to 2012) are included in Table 6. For the robustness test, after excluding countries that experienced mergers or separations in Table 6, 64 developing countries were identified in the balanced sample of employment.

Appendix 3

	MVA shares at current prices							
	All developing countries				Excluding all merged and separated countries			
	Country average share		Aggregate share		Country average share		Aggregate share	
	1970-1990	1990-2013	1970-1990	1990-2013	1970-1990	1990-2013	1970-1990	1990-2013
	Share of MVA to GDP	Share of MVA to GDP	Share of MVA to GDP	Share of MVA to GDP	Share of MVA to GDP	Share of MVA to GDP	Share of MVA to GDP	Share of MVA to GDP
Year	0.000330	-0.001144***	-0.002866***	-0.000254	0.000387	-0.000710***	-0.000008	0.000160
	(1.233)	(-5.908)	(-10.712)	(-1.617)	(1.464)	(-3.691)	(-0.021)	(1.498)
Constant	-0.525068	2.410271***	5.928230***	0.712577**	-0.641184	1.536329***	0.217740	-0.116742
	(-0.991)	(6.218)	(11.190)	(2.264)	(-1.223)	(3.990)	(0.278)	(-0.545)
Observations	2583	3274	21	24	2457	2808	21	24
R-squared	0.001	0.011	0.858	0.106	0.001	0.005	0.000	0.093

t-statistics in parentheses, * p<0.1, ** p<0.05, *** p<0.01

Source: United Nations Statistics Division (2015, last updated December 2014);

Income classification: GNI per capita in US$ (Atlas methodology), WDI (2013);

All developing economies: n=123 (1970-1990); n=136 (1991-1993); n=137 (1994-2010); n=138 (2011-2013);

All developing economies (excluding all merged and separated countries): n=117 (1970-2013)

Appendix 4

MVA shares at constant prices				
	All developing countries			
	Country average share		Aggregate share	
	1970-1990	1990-2013	1970-1990	1990-2013
	Share of MVA to GDP	Share of MVA to GDP	Share of MVA to GDP	Share of MVA to GDP
Year	0.000408	-0.000492***	0.001012***	0.001317***
	(1.610)	(-2.723)	(6.946)	(18.649)
Constant	-0.694180	1.099719***	-1.827871***	-2.439718***
	(-1.383)	(3.039)	(-6.335)	(-17.260)
Observations	2583	3274	21	24
R-squared	0.001	0.002	0.717	0.941

t-statistics in parentheses, * p<0.1, ** p<0.05, *** p<0.01

Source: United Nations Statistics Division (2015, last updated December 2014);

Income classification: GNI per capita in US$ (Atlas methodology), WDI (2013);

All developing economies: n=123 (1970-1990); n=136 (1991-1993); n=137 (1994-2010); n=138 (2011-2013)

Appendix 5

Manufacturing employment shares				
	All developing countries			
	Country average share		Aggregate share	
	1970-1990	1990-2012	1970-1990	1990-2012
	Share of MEMP to total EMP	Share of MEMP to total EMP	Share of MEMP to total EMP	Share of MEMP to total EMP
Year	0.000393	-0.000357*	0.001650***	0.000621***
	(1.299)	(-1.718)	(12.188)	(3.487)
Constant	-0.668423	0.823263**	-3.137002***	-1.109564***
	(-1.115)	(1.979)	(-11.700)	(-3.115)
Observations	1386	1738	21	23
R-squared	0.001	0.002	0.887	0.367

t-statistics in parentheses, * p<0.1, ** p<0.05, *** p<0.01

Source: Groningen Growth Development Centre (2012), Key Indicators of the Labour Market (2012), and ILOSTAT (2012);

Income classification: GNI per capita in US$ (Atlas methodology), WDI (2013);

All developing economies: n = 66 (1970-1990); n = 76 (1991-2012)

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UNITED NATIONS
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