Manufacturing in Sub-Saharan Africa: Deindustrialisation or a Renaissance?

By Zaakhir Asmal, Haroon Bhorat, Christopher Rooney, and François Steenkamp

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Abstract

Past empirical evidence suggests that industrialisation is key to a country's development trajectory. In Sub-Saharan Africa (SSA) a narrative has emerged that suggests the region has experienced premature deindustrialization (Rodrik, 2016). However, this narrative has been challenged in recent studies by Kruse, Mensah, Sen & de Vries (2022) and Nguimkeu & Zeufack (2019) who find evidence of a manufacturing renaissance in SSA. The comparability of these conflicting studies is limited due to differing country samples, estimation techniques, econometric specifications and time periods. In this study, we reconcile these conflicting results by using a common dataset over a defined period, 1990-2018, using two estimators and model specifications applied in the literature, to allow us to test whether the premature deindustrialization thesis is model dependent and time-specific. Our study finds that SSA's manufacturing sector has experienced deindustrialisation, or at best remained stagnant, over the 2000s and 2010s – thus confirming the more pessimistic Rodrik (2016) view of premature deindustrialisation in SSA. The implications of our results suggest that SSA countries may be required to seek alternative growth pathways to structurally transform their economies. More generally, our findings suggest that replicating the industrialisation experience of other regions is difficult. Not only is a detailed understanding of the factors which led to regions industrialising required, but a coherent implementation of policies for countries trying to replicate that success is necessary as well.

JEL codes:

O14, L16, N17, N67

Keywords:

Industrialisation, Manufacturing, Structural change, Africa

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Contents

1 Introduction

Historically, industrialisation has represented a pivotal moment in a country's economic development trajectory. Beginning in the mid-18th century in Europe and the United States, industrialisation structurally transformed these economies, generating large-scale job creation and productivity growth (Rodrik, 2016; Abreha *et al*., 2021). This experience was replicated in Asia in the latter part of the 20th century, most notably in China and South Korea (McMillan *et al*., 2014; Rodrik 2016). Rodrik (2016) notes that experience indicates that manufacturing is a growth escalator for three reasons. Firstly, the generation of high-productivity jobs is straightforward once sufficient technological absorption has materialised. Secondly, low and semi-skilled individuals could obtain jobs in manufacturing as such jobs did not require many skills. Thirdly, manufactured products could be exported across the world – firms were not constrained by low domestic demand. In addition, Rodrik (2013) noted that the manufacturing sector exhibits unconditional convergence in labour productivity. In other words, countries which are furthest away from the technological frontier grow the fastest, regardless of the initial level of education, geography or quality of the institutions in these economies. Given the theoretical and empirical evidence of the growth-enhancing features of manufacturing, the sector has become a key focus for Sub-Saharan African (SSA) policymakers, who hope that an expansion of the manufacturing sector could create jobs and reduce high levels of poverty.

Despite the intense focus on growing the manufacturing sector, however, a narrative has emerged that SSA has experienced premature industrialisation. Specifically, evidence showed that many SSA countries experienced a decline in manufacturing output and employment at lower levels of GDP per capita than the historical norm (Rodrik, 2016). These findings were confirmed by Atolia *et al.* (2019) and Felipe *et al*. (2019). However, several more recent studies have challenged this narrative with Nguimkeu and Zeufack (2019), Mensah (2020) and Kruse *et al*. (2022) finding that contrary to expectations, the employment share of manufacturing has continued to rise in many African countries. The conflicting results of the various studies can be attributed to various factors, including differing samples of countries, estimation techniques, specifications, and time periods. This makes it difficult to compare findings across studies.

In this paper, we contribute to the literature on deindustrialisation in SSA by using a common dataset over a defined period, 1990-2018, using two estimators and model specifications applied in the existing literature, thus allowing us to test whether the premature deindustrialisation thesis – or indeed the empirical challenges to it – are model dependent and time-specific. Using a common dataset and time period, we thus eliminate a source of heterogeneity which is present when comparing the results of the other aforementioned studies.

The remainder of the paper is structured as follows: Section 2 provides a brief overview of the deindustrialisation literature. Section 3 presents a summary of our dataset, and Section 4 explores industrialisation trends in Sub-Saharan Africa (SSA). Section 5 provides a cross-country empirical analysis of industrialisation in SSA, and Section 6 concludes.

2 Structural Transformation and Premature Industrialisation in Sub-Saharan Africa

The structural transformation of an economy, which involves the reallocation of productive resources – such as labour – from low productivity economic activities toward high productivity economic activities, drives sustained improvements in living standards, and is thus a key feature of the economic development process (McMillan *et al*., 2014). In Lewis' (1954) seminal paper, he argues that there is an abundance of surplus labour in the low-productivity agriculture sector, and if these unproductive workers could be better utilised in other sectors (such as manufacturing), this would initiate the process of economic development. The typical structural transformation pathway, followed by successful early industrialisers in Europe and North America, and more recently, certain East Asian economies such as South Korea and Singapore, involves the sectoral shift in economic activity from agriculture to manufacturing – industrialisation – and later services – or the process of 'tertiarisation' (Herrendorf *et* *al.*, 2014). Key to the rising productivity of an economy and higher income levels across its population, is the industrialisation of the economy.

Recent evidence, however, suggests that many developing economies, including those in SSA, are experiencing “premature deindustrialization” (Rodrik, 2016). Not only is the peak share of manufacturing employment and output lower when compared with countries that industrialised earlier, but this peak is occurring at lower levels of income per capita. Put simply, this new cohort of developing economies are running out of industrialisation opportunities earlier than their predecessors.[1] Rodrik (2016) shows that for countries that industrialised before 1990, the average peak manufacturing employment share was 21.5 percent, at an average GDP per capita of US$ 11 048 (1990 US dollars). For countries that industrialised after 1990, the average peak employment share was 18.9 percent, which was reached at a much lower aggregate level of GDP per capita of US$ 4 273 – a decline of over 60 percent. In terms of manufacturing output, the average pre-1990 peak value was 27.9 percent (achieved with an average GDP per capita of US$47 099), compared to a post-1990 peak value of 24.1 percent (achieved with an average GDP per capita of US$20 537).

Recently, however, the narrative of premature deindustrialisation in SSA has been challenged. It has been argued that one shortcoming in Rodrik’s (2016) analysis is that the conclusion of pre-mature deindustrialisation occurring in SSA is based off a relatively small sample of 11 SSA countries. Nguimkeu and Zeufack (2019) overcome this challenge by analysing a dataset of 41 SSA countries between 1960 and 2016. To better capture heterogeneity in pathways of structural change across the region, they group countries into four sub-regions: Central, East, Southern and West Africa. They find that no sub-region, besides Southern SSA, has experienced deindustrialisation over the period.[2] Furthermore, even though the Southern SSA sub-region experienced deindustrialisation, it was not premature. That is, deindustrialisation is not occurring at lower levels of GDP per capita than in previous decades.

Kruse, Mensah, Sen and de Vries (2022) analyse patterns of structural transformation for a sample of 18 SSA countries covering the period between 1990-2018. The key result that they find is that employment in the SSA manufacturing sector was around 1.9 percentage points higher in the 2010s compared to the 1990s. This amounts to a recovery of more than half of the downward shift in manufacturing employment in SSA between 1960 and 2010. SSA countries with notable increases in employment in the 2010s (relative to the 1990s) include Botswana, Kenya, and Senegal.

Therefore, the studies by Nguimkeu and Zeufack (2019) and Kruse *et al*. (2022) suggest that the conclusion that SSA economies are running out of industrialisation opportunities is in and of itself, perhaps, premature. Instead, their findings suggest that since 2010, SSA has experienced a manufacturing renaissance, which has important implications for the growth and development prospects of the region. These findings suggest that manufacturing could still act as an important lever for economic development, and thus should be included in the growth strategies and industrial policies of the countries that comprise the region.

In what follows, we attempt to make sense of this debate by harmonising the empirical approach to measuring for the presence of industrialisation. This is detailed in the methodology discussion to follow.

3 Methodology

This analysis is placed within a debate in the literature that finds contradictory evidence regarding the region's industrial performance post-2000. The seminal paper on the subject, Rodrik (2016), finds evidence of a trend of deindustrialisation in the region that emerges in the 1980s and continues into the first decade of the 2000s. Further, Rodrik (2016) argues that this pattern of deindustrialisation is premature. It is worth noting that the Rodrik (2016) study reaches this finding using data on a sample of 11 SSA region countries. Two more recent studies, with access to more recent data containing a broader set of SSA countries, put into question this pessimistic Rodrik (2016) view. Nguimkeu and Zeufack (2019) conduct a similar analysis to Rodrik (2016), but with a sample of 41 Sub-Saharan African countries spanning the period 1960 to 2016. Their results do not support the finding that SSA countries have begun to deindustrialise, but rather note sub-regional heterogeneity in industrial performance, with only the southern SSA sub-region experiencing deindustrialisation. A more optimistic view emerges from Kruse *et al.* (2022) who – using the GGDC/UNU-WIDER Economic Transformation Database with a sample of 18 SSA countries for the period 1990 to 2018 – find evidence pointing to an employment-led manufacturing renaissance in the region.

However, a key problem when comparing these analyses, and their divergent findings regarding industrial performance in SSA, is the fact that they employ different datasets comprising different country samples and time periods, different empirical specifications, and different estimation techniques. To navigate our way through these differences in empirical approach across these three key studies, and in so doing address the empirical question at the centre of this debate, we do the following: First, we employ a single dataset – the GGDC/UNU-WIDER Economic Transformation Database (ETD) – and thus remove the influence of different datasets being applied across the three studies.[3] Second, using this common dataset, we estimate the two main empirical specifications applied across these three studies – that used in Rodrik (2016) and that used in Kruse *et al*. (2022).[4] This allows us to reliably compare the Rodrik (2016) and Kruse *et al*. (2022) empirical specifications and the resultant outcomes to emerge from the estimation of these specifications. Third, we take cognisance of the econometric concerns detailed by Nguimkeu and Zeufack (2019) and thus apply their preferred estimation technique – the fixed effects fractional logit model – to both the Rodrik (2016) and Kruse *et al*. (2022) empirical specifications, again using a common dataset. We are thus able to essentially compare empirical 'apples with apples' and better discern an answer to this key empirical question regarding industrialisation in SSA.

Since the Rodrik (2016) paper is the central paper in the literature, the starting point for this analysis is to employ the econometric specification applied by Rodrik (2016). This basic econometric specification allows us to determine the pattern of industrialisation prevalent in SSA. The regression equation is specified as follows:

$$ManShare_{it} = \beta_0 + \beta_1 lnY_{it} + \beta_2 ln(Y_{it})^2 + \beta_3 lnP_{it} + \beta_4 ln(P_{it})^2 + \gamma PD_T + \alpha_i + \varepsilon_{it} \quad (1)$$

where $ManShare_{it}$ is the share of manufacturing employment or value-added for country i in time period t, lnY_{it} and lnY_{it}^2 are the natural logarithm of per capita income for country i in period t and its square value, lnP_{it} and lnP_{it}^2 are the natural logarithm of population size for country i in period t and its squared term, PD_T are decadal dummies, capturing each decade from 1990 until 2018.[5] Country fixed effects, denoted by α_i, are included to control for time-invariant country specific features, such as geography, endowments and history, that might generate a varying degree of industrialisation across countries relative to baseline conditions (Kruse *et al*., 2022).

Income and demographic trends are key factors impacting on the degree of industrialisation in the long run. During a country's initial stage of development – when income per capita rises – the demand for manufactured products is expected to rise, plateau, and then decrease, leading to an inverted U-shape curve; hence the inclusion of the quadratic income per capita squared term (Kruse *et al*., 2022). The size of a country's population is expected to follow a similar trend to that of income, as a larger population will result in an increase in product demand, including manufacturing goods, holding income constant (Kruse *et al*., 2022). The higher level of demand will lead to firms expanding supply and achieving economies of scale, ultimately resulting in a decrease in the price of the manufactured product (Kruse *et al*., 2022). However, beyond a certain point population growth can act as a constraint on manufacturing. For example, raw materials used in the production of manufactured goods might need to be diverted to other sectors of the economy – hence the inclusion of a population squared term.

The second econometric specification applied in this paper is that employed by Kruse *et al*. (2022). The regression equation is specified as follows:

$$ManShare_{it} = \beta_0 + \beta_1 lnY_{it} + \beta_2 ln(Y_{it})^2 + \beta_3 lnP_{it} + \beta_4 ln(P_{it})^2 + \gamma PD_T + \delta PD_t \times d_{i=c} + \alpha_i + \varepsilon_{it} \quad (2)$$

The Kruse *et al*. (2022) specification extends the Rodrik (2016) specification by including an interaction term between time periods (T) and countries (i). The coefficient of this term measures the variation of the period dummy by country, holding income and population effects constant.

The Rodrik (2016) specification, defined in equation (1), and the Kruse *et al*. (2022) specification, defined in equation (2), are the two main regressions that we estimate using a common dataset. These equations are estimated using a linear fixed-effects estimation technique.

Importantly, for the purposes of addressing one of our main research questions, there are two approaches to determining the pattern of industrialisation that persists in the region: The first approach applied by both Rodrik (2016) and Kruse *et al*. (2022) focuses on the decadal dummies (γPD_T). Decadal dummies account for unexplained (de)industrialisation after controlling for income and demographic trends. Rodrik (2016) noted that these dummies allow one to determine whether a pattern of (de)industrialisation has emerged in a given decade relevant to a past reference category decade. For example, a positive (negative) and statistically significant coefficient (γ) on a decadal dummy variable points to a pattern of employment or output industrialisation (deindustrialisation) relative to the prior base period.

The second approach, which is solely applied by Nguimkeu and Zeufack (2019), focuses on whether a non-linear – inverted u-shaped – relationship exists between income and manufacturing. An inverse u-shaped relationship between manufacturing and income – evidenced by positive and negative coefficient estimates for the income term (β_1) and its quadratic (β_2), respectively – points to an aggregate pattern of deindustrialisation within the region. Nguimkeu and Zeufack (2019), citing Lind and Mehlum (2010), argue that this criterion is too weak when testing for a U-shaped relationship. Specifically, when the true relationship between a dependent variable and independent variable is convex and monotonic, the quadratic term will erroneously provide an extreme point, implying a U-shaped relationship, when in fact, such a relationship does not exist. To confirm the existence of an inverted U-shaped curve, a test which can verify that the relationship between the dependent and independent variable is increasing on the left-hand side and/or decreasing on the right-hand side is required – we similarly follow the Lind and Mehlum (2010) test to confirm whether these conditions have been met.[6]

Nguimkeu and Zeufack (2019) note that a further challenge when estimating the parameters of the linear regression specified in equations (1) and (2), is that the dependent variable is bounded – it can only take on values between 0 and 1 (i.e. a fractional response variable). Papke and Wooldridge (1996) have identified several methodological issues that arise from using a standard linear model on this type of dependent variable: Firstly, the effect of an independent variable on the dependent variable is not constant throughout the possible range of values of the independent variable. Secondly, the predicted values of the dependent variable are not guaranteed to fit within the unit interval. As a result, a specific functional form specification is required which addresses these two issues.

A linear probability model is unsuitable to test the relationship between a key independent variable – income – and the dependent variable – either manufacturing share of output or employment – because of the inclusion quadratic terms in our equation. Based on these two issues and the challenges faced using a linear probability model, we follow Nguimkeu and Zeufack (2019), and employ the same econometric technique that they use: the fixed effects fractional logit model, which is estimated as follows:

$$\mathbb{E}[Mshare_{it}|X_{it}\alpha_i] = \Lambda[\beta_0 + \beta_1 lnY_{it} + \beta_2 ln(Y_{it})^2 + \beta_3 lnP_{it} + \beta_4 ln(P_{it})^2 + \gamma PD_T + \alpha_i] \quad (3)$$

Equation (3) constrains the predicted value of the dependent variables – the share of manufacturing employment and value-added – to between 0 and 1, overcoming one of the main issues associated with the linear regression model applied by Rodrik (2016) and Kruse *et al*. (2022). In addition, the above equation does not suffer from the incidental parameters problem which is commonly associated with fixed effects non-linear panel models, such as the one used by Rodrik (2016).[7]

4 Data

The core dataset utilised is the GGDC/UNU-WIDER Economic Transformation Database (ETD), which is the successor to the GGDC 10-sector database (de Vries *et al*., 2021). [8] The ETD includes value added (in nominal and real terms) and employment data for 12 sectors between 1990 and 2018.[9] Employed persons includes both formal and informal workers – which is important considering the size of the informal sector in many SSA countries (Daniel, Danquah, Sacchetto & Telli, 2020). The ETD contains a total of 51 countries, although our focus will be on the sub-sample of 18 SSA countries.[10]

For the income and population data, we use the 2020 release of the Maddison Project Database (Bolt, Inklaar, de Jong & van Zanden, 2018). The database includes information on GDP per capita (2011 prices) and population size. The human capital index, which measures the stock of human capital in a country, is taken from the Penn World Tables version 10.0. Data on natural resource rents, foreign direct investment, and trade openness, is taken from the World Bank's World Development Indicators (World Bank, 2022).

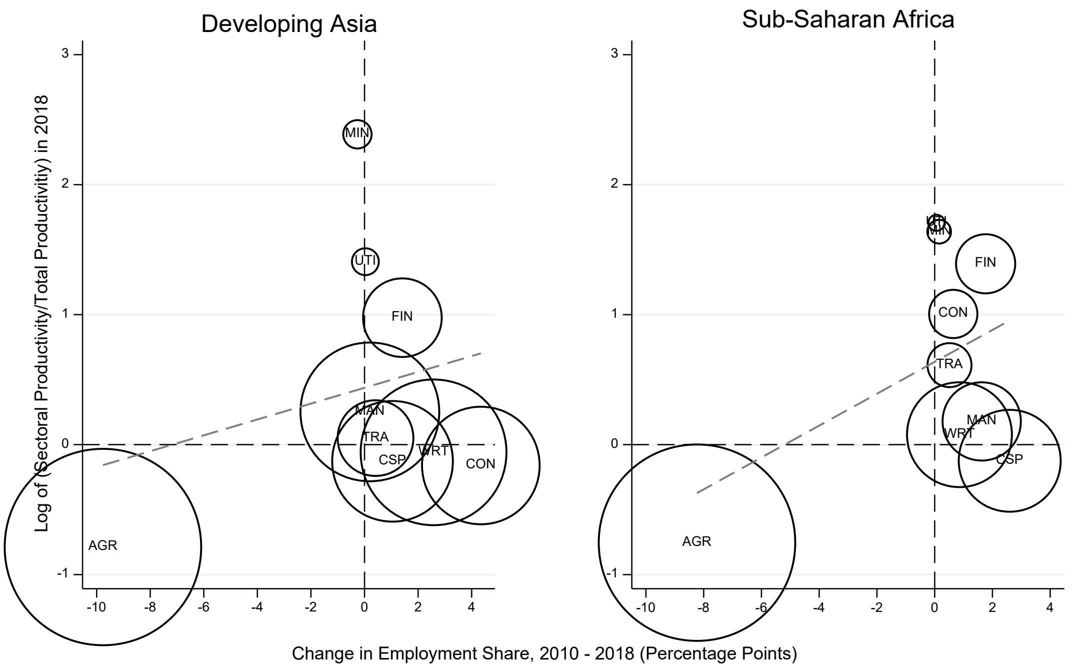
5 Descriptive Trends

In this section, we begin by comparing the structural transformation of the SSA region and compare it with that of the Developing Asian region between 2010 and 2018.[11] We focus specifically on the 2010 to 2018 period, as that is the period identified by Kruse *et al*. (2022) in which the manufacturing sector recovered in SSA. The Developing Asian region provides a useful reference point as it is an example of a developing region in which several of its constituent countries have undergone a shift to manufacturing–led industrialisation. We then turn our attention to highlighting the heterogeneity of industrialisation in SSA.

Following McMillan *et al*. (2014), in Figure 1, we provide an illustration of a shift in employment across sectors, which vary in relative labour productivity. Essentially, the graph depicts whether employment has moved into more or less productive sectors of the economy. Growing high productivity industries would be located in the top right quadrant, while declining low productivity industries would be represented in the bottom left quadrant. A positively sloped line indicates productivity enhancing structural change while a negatively sloped line indicates productivity reducing structural change.

The slope of the lines in both panels are weakly positive, suggesting that the structural transformation which occurred in Developing Asia and SSA was productivity-enhancing. [12,13] The sector with the lowest productivity – agriculture – experienced relatively steep declines in employment share between 2010 and 2018. Both regions also experienced virtually no employment growth in the two highest productivity sectors – mining and utilities. This was also the case for manufacturing in Developing Asia, which as described previously, mostly industrialised prior to 1990 and thus was not expected to experience manufacturing employment growth.[14] On the other hand, there is indeed some empirical confirmation that SSA might be experiencing a manufacturing renaissance, with a small increase in manufacturing employment, from 7.3 percent in 2010 to 8.4 percent in 2018.

Figure 1: Relative Productivity and Employment Changes in Asia and Sub-Saharan Africa, 1990-2018

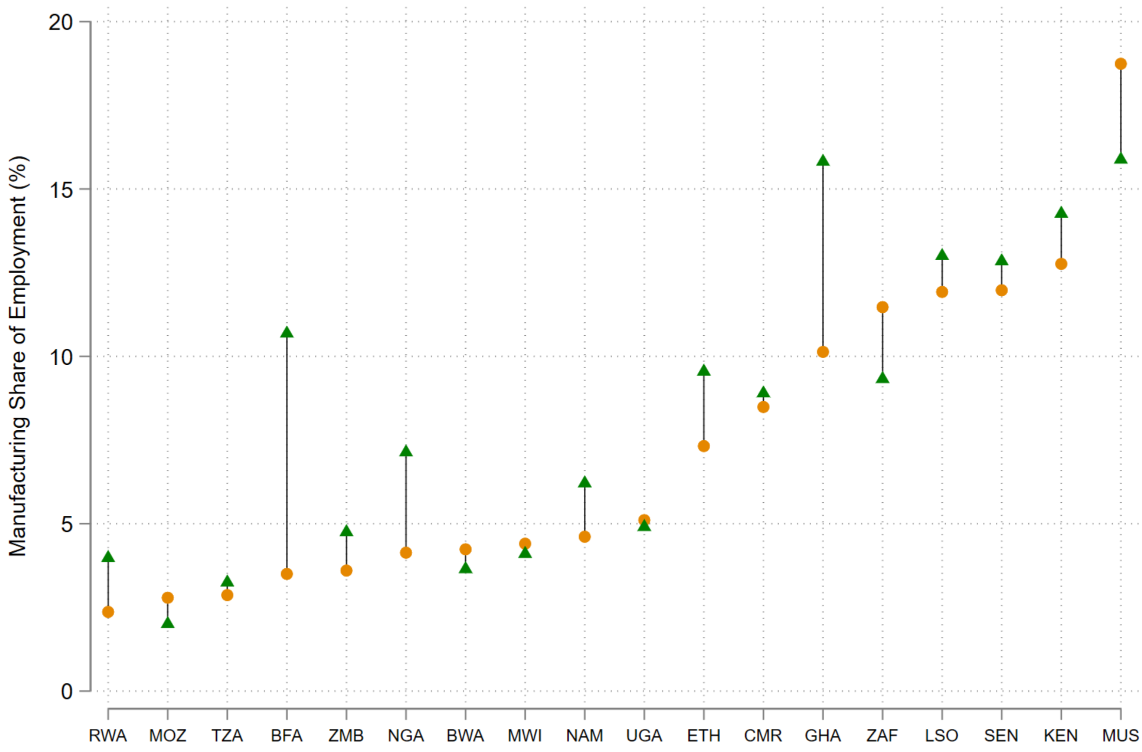


Source: de Vries *et al*. (2021), own calculations.
Notes: 1. List of countries by region is listed in Table A2 in the Appendix. 2. Sectors included are: AGR = Agriculture; MIN = Mining; MAN = Manufacturing; UTI = Utilities; CON = Construction; WRT = Wholesale and Retail Trade; TRA = Transport Services; FIN = Financial, business and real estate services; CSP = Community, social, personal and government services. 3. The size of the bubble is the employment share of that sector in 2018. 4. The slope of the line is the coefficient (β) in the regression: ln(p/P) = α+βΔ(Employment Share).

Even with the marginal increase in the manufacturing share of employment between 2010 and 2018 – from 6.6 percent to 8.2 percent – the overall performance of the manufacturing sector is poor and constrains the ability of many SSA countries to develop. One of the reasons that manufacturing is crucial to the development process of a country is the linkages that it has to other sectors of the economy: Upstream linkages from the production and processing of raw materials through to the downstream activities in the form of transportation, marketing and financing activities associated with the production of manufactured goods (Hirschman, 1958; Myint, 1980; Szirmai, 2009). Unfortunately, the linkages in SSA are weak, contributing to the poor manufacturing performance in SSA (Sundaram, Schwank & von Arnim, 2011; Signé & Johnson, 2018; Clarke, 2019). This poor performance is evident in the data, which shows that SSA's share of manufacturing gross value added has stagnated at 10.9 percent of GDP between 2010 and 2018.

Using the manufacturing share of employment as a proxy for industrialisation, we evaluate in Figure 2, the performance of the 18 countries in our SSA sample. We choose employment rather than output because the manufacturing activities that these unindustrialised economies will be shifting into are typically going to be labour-intensive basic manufacturing sectors such as textiles and apparel. The manufacturing share of employment in 2010 and 2018 is denoted by the orange circle and green triangle, respectively.

Figure 2: Manufacturing Share of Employment (%), 2010-2018



Source: de Vries *et al*. (2021), own calculations.

Within the SSA region, there is substantial cross-country heterogeneity in industrial experience, both in terms of level and performance. Two-thirds (12) of the countries experienced an increase in the manufacturing share of employment, while the remaining third (6) experienced a decrease in the manufacturing share of employment. The average increase in share of manufacturing employment was 2.2 percentage points. However, this was driven by high growth in two countries: Burkina Faso (7.2 percentage points) and Ghana (5.7 percentage points). The magnitude of the decrease in manufacturing employment shares for those that experienced a decline, was slightly smaller at -1.1 percentage points. Countries which experienced especially sharp declines in manufacturing employment were the relatively more industrialised Mauritius (-2.9 percentage points) and South Africa (-2.1 percentage points).

Examining the overall level of employment, one can classify countries into three distinct groups, presented in Table 1. In 2010, the manufacturing share of employment was below 5.0 percent in nine of our SSA countries, indicating the low levels of industrialisation across large parts of SSA. However, six SSA countries also had a manufacturing share of employment above 10.0 percent in 2010, demonstrating heterogeneity in the extent of industrialisation across countries within the region.

Table 1: Classification of SSA Countries by Manufacturing Share of Employment (%)

Manufacturing Share of Employment (%)	Classification	Number of Countries (2010)	Number of Countries (2018)
0.0 – 5.0	Low Industrialisers	9	7
5.0 – 10.0	Semi-Industrialisers	3	5
Above 10.0	Industrialisers	6	6

Source: de Vries *et al*. (2021), own calculations.

The table shows the net change of two between 2010 and 2018, which is a combination of three exits (Nigeria, Namibia and Burkino Faso), and one entry (Uganda); i.e. two countries shifted from the low industrialisers group to other relatively more industrialised groups. Nigeria and Namibia shifted to the semi-industrialisers group, while Burkina Faso went straight to the industrialisers group. Two countries were demoted: South Africa from an industrialiser to a semi-industrialiser, and Uganda from a semi-industrialiser to a low industrialiser. As a result of these shifts, in 2018, there were an equal number of countries across the three classifications, suggesting a slight shift towards industrialisation.

Indeed, this descriptive overview of structural trends in the SSA region, whilst alluding to a manufacturing sector that has experienced moderate growth off a small base – is arguably of too small a magnitude to significantly kick-start a process of employment-enhancing industrialisation in the region. Yet our data does suggest that overall, most countries in our SSA sample – 12 of the 18 – experienced an increase in their manufacturing share of employment. In addition, the aggregate magnitude of these increases in manufacturing employment shares was larger than the corresponding aggregate for those experiencing declining manufacturing shares – consistent with an overall picture of marginal levels of industrialisation across the region.

Given this initial evidence of industrialisation across the SSA region in the 2010s, albeit marginal in magnitude, we shift the empirical analysis to the multivariate level to gain a clearer understanding of the region's manufacturing trajectory over the past three decades.

6 Empirical Analysis

6.1.1 Main Results

Our baseline regression estimates are reported in Table 2 below. We show the Kruse *et al*. (2022) specification estimates – equation (2) – using a linear fixed effects estimator (column 1) and the fixed effects fractional logit estimator used by Nguimkeu and Zeufack (2019) (column 3). For each of the estimators, we also run a regression excluding Mauritius (columns 2 and 4). We do this because the exclusion of Mauritius from the sample resulted in significant changes in the results for both the Rodrik (2016) and Kruse *et al*. (2022) papers. In the case of the former, the pattern of deindustrialisation over multiple decades since the 1970s only emerged when Mauritius was removed from the sample. In the case of the latter, evidence for industrialisation in the 2010s only became statistically significant when Mauritius was removed from the sample.

Given the motivations regarding the use of the fixed effects fractional logit estimator detailed above, we consider this our preferred model. Similarly, we show the Rodrik (2016) estimates – equation (1) and our preferred specification – using a linear fixed effects estimator (column 5) and the fixed effects fractional logit estimator (column 7). As was the case with the Kruse *et al*. (2022) specification, we also exclude Mauritius when applying the Rodrik (2016) specification (columns 6 and 8). The dependent variable applied in the estimations reported in Table 2 is the employment share of manufacturing. This is our preferred dependent variable as the type of manufacturing activities that are present in our sample of SSA countries at this early stage of economic development, are typically more labour-intensive (we do however provide estimates when using the manufacturing share of value-added as the dependent variable below).

The estimates pertaining to the income variables in the Kruse *et al*. (2022) specification suggest an aggregate pattern of employment deindustrialisation in the SSA region. Column (1) of Table 2 shows positive and negative statistically significant coefficient estimates for the income variable and its quadratic, respectively. This indicates an inverse u-shaped relationship between the manufacturing share of employment and income in the region. This inverse u-shaped relationship is confirmed by the statistically significant estimate for the Lind and Mehlum (2010) test statistic.

While there is evidence of employment industrialisation after controlling for trends in income and demography in the Kruse *et al*. (2022) specification, this falls away when we estimate the specification using our preferred fixed effects fractional logit estimator. Specifically, in column (1), the 2010s period dummy is positive and statistically significant suggesting the region's manufacturing share of employment was 3.7 percent higher in the 2010s relative to the 1990s. However, this effect falls away in column (2) when using our preferred fixed effects fractional logit estimator. The exclusion of Mauritius from the sample does not substantially alter our results. In column (2), the magnitude, sign and statistical significance of the 2010s decadal dummy is very similar to the corresponding variable in column (1). In column (4), the sign on the 2010s decadal is positive (compared to the negative sign in column (3)), however, the coefficient is not statistically significant, as was the case in column (3).

Shifting to our preferred Rodrik (2016) specification, we find mixed evidence for deindustrialisation in the SSA region. Column (5) of Table 2 shows a positive and negative statistically significant coefficient estimate for the income variable and its quadratic, respectively. The statistically significant estimate for the Lind and Mehlum (2010) test statistics confirms an inverse u-shaped relationship between the manufacturing share of employment and income in the region.[15]

However, this finding is attenuated by the result in column (6), which shows that when Mauritius is excluded from the Rodrik (2016) fixed effects estimator, the coefficient on the 2010s decadal dummy is positive and statistically significant, suggesting the beginnings of an African manufacturing renaissance, in line with Kruse *et al*. (2022). The coefficient on the 2010 dummy variable (0.019) is around 50.0 percent smaller than the coefficient on the Kruse *et al*. (2022) fixed effects estimator of 0.037.

In column (7), the income variable and its quadratic are both significant and with the expected signs. However, the 2010s decadal dummy is insignificant and the Lind and Mehlum (2010) test is inconclusive. These results are unchanged with the exclusion of Mauritius (column 8).

Table 2: Baseline regressions, manufacturing share of total employment

	Kruse *et al*. (2022) specification				Rodrik (2016) specification			
	Fixed effects estimator	Fixed effects estimator (excl. Mauritius)	Fixed effects fractional logit estimator	Fixed effects fractional logit estimator (excl. Mauritius)	Fixed effects estimator	Fixed effects estimator (excl. Mauritius)	Fixed effects fractional logit estimator	Fixed effects fractional logit estimator (excl. Mauritius)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln GDP per capita	0.229***	0.142***	0.297***	0.214**	0.323***	0.232***	0.327**	0.214**
	[0.042]	[0.038]	[0.076]	[0.069]	[0.040]	[0.032]	[0.139]	[0.069]
Ln GDP per capita^2	-0.015***	-0.009***	-0.019***	-0.014**	-0.022***	-0.017***	-0.023**	-0.014**
	[0.003]	[0.002]	[0.005]	[0.004]	[0.003]	[0.002]	[0.008]	[0.004]
Ln Population	0.054	0.176	0.183	0.289	-0.017	0.056	-0.002	0.289
	[0.123]	[0.117]	[0.232]	[0.184]	[0.080]	[0.073]	[0.211]	[0.184]
Ln Population^2	-0.001	-0.004	-0.004	-0.008	0.002	-0.001	0.002	-0.008
	[0.004]	[0.004]	[0.007]	[0.006]	[0.002]	[0.002]	[0.006]	[0.006]
2000s	-0.009**	-0.010**	-0.004	-0.003	-0.002	0.004*	0.002	-0.003
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.008]	[0.003]
2010s	0.037***	0.036***	-0.002	0.001	0.005	0.019***	0.012	0.001
	[0.011]	[0.011]	[0.006]	[0.006]	[0.006]	[0.004]	[0.014]	[0.006]
Lind & Mehlum (2010) U Test								
Slope at min Ln GDP per capita	0.032***	0.022***	0.048***	0.037***	0.030***	0.017**	0.026	0.012
Slope at max Ln GDP per capita	-0.069***	-0.039***	-0.079***	-0.054***	-0.121***	-0.097***	-0.128***	-0.102***
Lind & Mehlum (2010) Test Statistic	4.37	3.30***	3.40	2.65***	3.81***	2.17**	0.850	0.479
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Countries	18	17	18	17	18	17	18	17
Observations	522	493	522	493	522	493	522	493
R^2	0.974	0.952	--	--	0.894	0.836	--	--

Source: de Vries et al. (2021); Bolt et al. (2018)
Notes: 1. Marginal effects reported for the fixed effects fractional logit estimator estimates.

While the employment estimations do not provide strong evidence of deindustrialisation in the 2010s, they do not provide strong evidence for an African renaissance either. Out of the eight specifications considered, only three specifications provided evidence of an African manufacturing employment-measured renaissance, with two of those specifications being very similar; the only difference being the exclusion of a single country. The remaining five specifications lacked statistical significance on the 2010s decadal dummy variable, suggesting the evidence for an African renaissance remains weak.

6.1.2 Additional Estimations: Robustness Checks

Given the ambiguous findings of employment deindustrialisation in SSA, we conduct several additional estimations to test the robustness of this result. We begin by taking our preferred Rodrik (2016) specification, estimated using the fixed effects fractional logit estimator, and do the following: First, we restrict the sample of SSA countries to the same subset of 11 countries used in Rodrik (2016). [16] This allows us to determine whether the sample of countries influences the result. Second, following Nguimkeu and Zeufack (2019) we include additional controls that may shape differences in the patterns of industrialisation across SSA countries. Third, as done by both Rodrik (2016) and Kruse *et al*. (2022), we remove Mauritius – a strong manufacturing exporter – from the sample, for the reasons described above. We also consider additional estimates which replicate the estimations presented in Table 2, but with the manufacturing share of value-added as the dependent variable. This allows us to check whether there is corresponding evidence of output deindustrialisation in the region.

We find stronger evidence of deindustrialisation in SSA when the sample of countries changes, and additional control variables are included. The income variable and its quadratic in columns (1) and (3) in Table 3 show the expected signs and are statistically significant, thus suggesting an inverse u-shaped relationship between manufacturing share of employment and income. This inverse u-shaped relationship is confirmed by the statistically significant estimate for the Lind and Mehlum (2010) test statistic in the third specification. We find stronger evidence for deindustrialisation by examining the 2010s period dummy, which is negative and statistically significant across all three specifications.[17] In contrast to Table 2, our findings are clearer, providing strong evidence for deindustrialisation in SSA, aligning with the results of Rodrik (2016) and diverging from the African manufacturing renaissance narrative of Kruse *et al*. (2022).It is worth noting that none of the additional control variables explain differences in manufacturing performance across SSA countries, and we thus do not report on them.

Table 3: Additional Regressions, manufacturing share of total employment

	Rodrik (2016) specification		
	Rodrik (2016) countries	Additional controls	Additional controls excl. Mauritius
	(1)	(2)	(3)
Ln GDP per capita	0.203***	0.129**	0.830***
	[0.048]	[0.054]	[0.209]
Ln GDP per capita^2	-0.016***	-0.005	-0.050***
	[0.003]	[0.003]	[0.013]
Ln Population	-0.124	0.114**	0.178
	[0.114]	[0.046]	[0.168]
Ln Population^2	0.007**	-0.003**	-0.005
	[0.003]	[0.001]	[0.005]
2000s	-0.016***	-0.017***	-0.013
	[0.004]	[0.004]	[0.009]
2010s	-0.021**	-0.024***	-0.043**
	[0.008]	[0.005]	[0.016]
Southern Africa		-0.079***	0.088***
		[0.007]	[0.006]
West Africa		-0.002	0.033***
		[0.005]	[0.003]
Natural Resource Rents (% of GDP)		-0.002***	-0.001***
		[0.000]	[0.000]
Human Capital		[0.000]	0.036***
		-0.009	[0.005]
FDI Inflows (% of GDP)		-0.002***	-0.001***
		[0.000]	[0.000]
Trade Openness		-1.726***	0.000***
		[0.472]	[0.000]
Lind & Mehlum (2010) U Test			
Slope at min Ln GDP per capita			0.049***
Slope at max Ln GDP per capita			-0.117***
Lind & Mehlum (2010) Test Statistic			7.13***
Country FE	Yes	Yes	Yes
Countries	11	18	17
Observations	319	478	449
R^2	0.919	0.652	0.666

Source: de Vries *et al*. (2021); Bolt *et al*. (2018); WDI (2022)
Notes: 1. All regressions estimated using fixed effects fractional logit model. Marginal effects reported for these estimates.

We now consider an alternative measure of industrialisation: manufacturing share of value-added. In the context of SSA, we consider this measure of (de)industrialisation somewhat less important than the share of manufacturing employment, due to the labour-intensive nature of SSA manufacturing activities. Nevertheless, it is worth checking whether the region is also experiencing output (de)industrialisation.

We consider two measures for manufacturing output: share of value added in constant (Table 4) and nominal (Table 5) prices. Overall, the estimates in Table 4 point to output deindustrialisation in the region, and the evidence for this pattern of deindustrialisation is marginally stronger than that for employment deindustrialisation. For example, the income variable and its quadratic show the expected signs – positive and negative, respectively – and are statistically significant across all four specifications in Table 4.[18] However, the Lind and Mehlum (2010) test statistic is statistically significant in only two of the sets of estimates (columns 2 and 3). The 2010s decadal dummy is negative in our preferred Rodrik (2016) specification, but not statistically significant. Taking a more tentative stance, the estimates in Table 4 may not point strongly to output deindustrialisation, but they certainly do not indicate an African manufacturing renaissance, and are thus consistent with the overall finding of employment deindustrialisation across the region.

Table 4: Baseline regression, manufacturing share of value added (constant prices)

	Kruse *et al*. (2022) specification		Rodrik (2016) specification	
	Fixed effects estimator	Fixed effects fractional logit estimator	Fixed effects estimator	Fixed effects fractional logit estimator
	(1)	(2)	(3)	(4)
Ln GDP per capita	0.221***	0.229**	0.188***	0.178
	[0.058]	[0.116]	[0.046]	[0.146]
Ln GDP per capita^2	-0.015***	-0.016**	-0.014***	-0.013
	[0.004]	[0.008]	[0.003]	[0.009]
Ln Population	0.270*	0.270	0.291**	0.221
	[0.147]	[0.330]	[0.101]	[0.289]
Ln Population^2	-0.008*	-0.008	-0.008**	-0.006
	[0.004]	[0.010]	[0.003]	[0.009]
2000s	0.009*	0.005*	0.001	0.004
	[0.005]	[0.003]	[0.003]	[0.008]
2010s	-0.003	0.004	-0.002	0.002
	[0.007]	[0.008]	[0.005]	[0.009]
Lind & Mehlum (2010) U Test				
Slope at minimum Ln GDP per capita	0.007	0.094***	0.019**	0.002
Slope at maximum Ln GDP per capita	-0.085***	-0.069*	-0.084***	-0.089
Lind & Mehlum (2010) Test Statistic	0.84	1.41*	1.75**	0.06
Country Fixed Effects	Yes	Yes	Yes	Yes
Countries	18	18	18	18
Observations	522	522	522	522
R^2	0.957	--	0.865	--

Source: Source: de Vries *et al*. (2021); Bolt *et al*. (2018)
Notes: 1. Marginal effects reported for the fixed effects fractional logit estimator estimates. 2.

Table 5 provides far stronger evidence for output deindustrialisation than Table 4.[19] Both the income and its quadratic show their expected signs – positive and negative, respectively – and are statistically significant across the first three specifications. These two variables were not statistically significant in our preferred specification (column 4). However, the 2010 decadal dummy is negative and statistically significant across all four specifications. The degree of output deindustrialisation ranges from -1.1 percent (column 2) to -4.8 percent (column 4), which is quite a substantial difference. Nonetheless, the most important takeaway is that all specifications showed a deindustrialisation trend. The Lind and Mehlum (2010) test statistic was only statistically significant for the Rodrik (2016) fixed effects estimator (column 3). Overall, the evidence points to a similar conclusion to that of Table 4: some evidence of deindustrialisation, and no suggestion of a manufacturing renaissance in SSA.

Table 5: Baseline regression, manufacturing share of value added (nominal prices)

	Kruse *et al*. (2021) specification		Rodrik (2016) specification	
	Fixed effects estimator	Fixed effects fractional logit estimator	Fixed effects estimator	Fixed effects fractional logit estimator
	(1)	(2)	(3)	(4)
Ln GDP per capita	0.196**	0.193**	0.203***	0.152
	[0.090]	[0.098]	[0.052]	[0.112]
Ln GDP per capita²	-0.014**	-0.014**	-0.013***	-0.011
	[0.006]	[0.006]	[0.003]	[0.007]
Ln Population	0.215	0.206	0.488***	0.471**
	[0.165]	[0.179]	[0.093]	[0.229]
Ln Population²	-0.007	-0.007	-0.015***	-0.015**
	[0.005]	[0.005]	[0.003]	[0.007]
2000s	-0.001	0.000	-0.010***	-0.007
	[0.006]	[0.003]	[0.003]	[0.004]
2010s	-0.029***	-0.011*	-0.031***	-0.025***
	[0.008]	[0.006]	[0.005]	[0.004]
Lind & Mehlum (2010) U Test				
Slope at minimum Ln GDP per capita	0.008	0.004	0.029***	0.014
Slope at maximum Ln GDP per capita	-0.087***	-0.093***	-0.060***	-0.058**
Lind & Mehlum (2010) Test Statistic	0.45	0.21	2.51***	0.600
Country Fixed Effects	Yes	Yes	Yes	Yes
Countries	18	18	18	18
Observations	522	522	522	522
R^2	0.947	--	0.842	--

Source: Source: de Vries *et al*. (2021); Bolt *et al*. (2018)
Notes: 1. Marginal effects reported for the fixed effects fractional logit estimator estimates. 2.

We provide a summary of our main findings in Table 6. The focus is on the sign and significance of the 2010s decadal dummy variable, as this was the variable that Kruse *et al*. (2022) used to identify a potential African renaissance. As can be observed, the three specifications which have a positive and statistically significant coefficient on the 2010 decadal dummy are specifications (1), (2) and (5) when the dependent variable is the manufacturing share of employment. Specifications (1) and (2) are very similar, with the only exception being the reduction in sample size from 18 countries to 17 countries. The magnitude of the 2010s coefficient on specification (5) is around half that of specifications (1) and (2).

Table 6: Summary of 2010 decadal dummy variable coefficient estimates

	Kruse *et al*. (2022) specification				Rodrik (2016) specification						
	Fixed effects estimator	Fixed effects estimator (excl. Mauritius)	Fixed effects fractional logit estimator	Fixed effects fractional logit estimator (excl. Mauritius)	Fixed effects estimator	Fixed effects estimator (excl. Mauritius)	Fixed effects fractional logit estimator	Fixed effects fractional logit estimator (excl. Mauritius)	Rodrik (2016) countries	Additional controls	Additional controls excl. Mauritius
	(1)	(2)	(3)	(4)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Manufacturing share of employment	0.037***	0.036***	-0.002	0.001	0.005	0.019***	-0.010	0.001	-0.021**	-0.024***	-0.043**
Manufacturing share of real value added	-0.003	--	0.004	--	-0.002	--	-0.017	--	-0.011*	-0.020***	-0.004
Manufacturing share of nominal GDP	-0.029***	--	-0.011*	--	-0.031***	--	-0.048***	--	-0.030***	-0.051***	-0.041***

Source: Source: de Vries *et al*. (2021); Bolt *et al*. (2018)
Notes: 1. Marginal effects reported for the fixed effects fractional logit estimator estimates. 2.

For the other seven specifications, the estimates shown in Table 6 indicate that manufacturing employment has either remained stagnant or decreased over the past few decades. Manufacturing employment stagnation is apparent irrespective of the approach that we adopt, whether it be Nguimkeu and Zeufack (2019), which focuses on the inverse u-shaped relationship between manufacturing income, or the approach used by Rodrik (2016) and Kruse *et al*. (2022), which focus on the decadal dummies. We find strong evidence of employment deindustrialisation when we change our sample or additional control variables are included. As SSA countries are typically producing non-complex manufacturing products which are labour intensive, we place more importance on estimates using the share of manufacturing employment as a dependent variable. Nevertheless, we also employ the real and nominal manufacturing share of value-added as measures of industrialisation. In the case of the former, while the estimates do not strongly point to output deindustrialisation, they certainly do not point to an African manufacturing renaissance. However, in the case of the latter measure, the evidence of output deindustrialisation is robust, with the 2010s decadal dummy statistically significant across all specifications.

Therefore, our main findings of a stagnant or decreasing level of manufacturing employment in SSA is not consistent with more recent work by Kruse *et al*. (2022) and Nguimkeu and Zeufack (2019) that both suggest an African manufacturing renaissance taking place. Instead, our main finding is more aligned with the pessimistic view espoused by Rodrik (2016). Our main findings are further supported by our manufacturing output results, which show either a stagnant or declining manufacturing sector in SSA. Ultimately, our findings suggest that the SSA manufacturing has not experienced an African renaissance. and that the current SSA manufacturing sector growth trajectory, if it continues, will be unable to generate the number of jobs hoped for by African policymakers.

7 Conclusion

This paper explored industrialisation trends in SSA between 1990 and 2018 using the new ETD database. Our descriptive statistics demonstrated the heterogeneity of the industrialisation experience in SSA over the period, with some countries experiencing rapid growth in manufacturing employment, others seeing more steady growth, and a minority finding the share of manufacturing employment has decreased.

Drawing on recent studies by Rodrik (2016), Nguimkeu and Zeufack (2019) and Kruse *et al*. (2022), we reconsider the evidence for deindustrialisation in SSA by reconciling the empirical approaches applied across these studies, and by using a common dataset. We use three measures of deindustrialisation – manufacturing share of total employment, and real, and nominal, manufacturing share of GDP – to provide a comprehensive picture of the state of the manufacturing sector in SSA.

The balance of evidence with our preferred dependent variable – the manufacturing share of total employment – indicates that SSA's manufacturing base has remained stagnant or has experienced deindustrialisation between 1990 and 2018. This result was confirmed when we use manufacturing output as a dependent variable. These findings are inconsistent with more recent work by Kruse *et al*. (2022) and Nguimkeu and Zeufack (2019) that both suggest an African manufacturing renaissance. Rather, our main findings align with the more pessimistic view that emerges from Rodrik (2016), that points to the ongoing process of premature deindustrialisation in Sub-Saharan Africa.

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Appendix

Table A1: List of sectors

Sector Name	ISIC Rev. 4 Description
Agriculture	Agriculture, forestry, fishing
Mining	Mining and quarrying
Manufacturing	Manufacturing
Utilities	Electricity, gas, steam and air condition supply; water supply; sewerage; waste management and remediation activities
Construction	Construction
Trade Services	Wholesale and retail trade, repair of motor vehicles and motorcycles; accommodation and food services
Transport Services	Transportation and storage
Business Services	Information and communication; professional, scientific and technical activities; administrative and support service activities
Financial Services	Financial and insurance activities
Real Estate	Real Estate activities
Government Services	Public administration and defence; compulsory social security; education; human health and social work activities
Other Services	Arts, entertainment and recreation; other service activities; activities of households as employers; undifferentiated goods- and services-producing activities of households for own use; activities of extraterritorial organisation and bodies

Source: de Vries *et al*., (2021).

Table A2: List of sample countries

Countries	Region
Japan, Korea (Rep. of), Singapore, Chinese Taipei (Taiwan), Hong Kong, Israel	Advanced Asia
Bangladesh, Cambodia, China, India, Indonesia, Lao PDR, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Turkey, Vietnam	Developing Asia
Botswana (Southern), Burkina Faso (West), Cameroon (West), Ethiopia, (East), Ghana (West), Kenya (East), Lesotho (Southern), Malawi (East), Mauritius (East), Mozambique (East), Namibia (Southern), Nigeria (West), Rwanda (East), Senegal (West), South Africa (South), Tanzania (East), Uganda (East), Zambia (East)	Sub-Saharan Africa

Source: de Vries *et al*., (2021).

Table A3: Definitions

Variable	Description	Source
MAN_{it}	Manufacturing Share of GDP (%)	GGDC/UNU-WIDER ETD
$TSER_{it}$	Traditional Services Share of GDP (%)	GGDC/UNU-WIDER ETD
$MSER_{it}$	Modern Services Share of GDP (%)	GGDC/UNU-WIDER ETD
$MEXP_{it}$	Manufacturers exports (% of merchandise exports)	World Development Indicators
$MIMP_{it}$	Manufacturers imports (% of merchandise imports)	World Development Indicators
TO_{it}	Total Trade (% of GDP)	World Development Indicators
HC_{it}	Human Capital Index	Penn World Table V10.0
$GFIC_{it}$	Gross Fixed Capital Formation (% of GDP)	World Development Indicators

Table A4: Additional regressions, manufacturing share of value-added (constant prices)

	Rodrik (2016) specification		
	Rodrik (2016) countries	Additional controls	Additional controls excl. Mauritius
	(1)	(2)	(3)
Ln GDP per capita	0.254***	0.148***	0.351***
	[0.051]	[0.041]	[0.029]
Ln GDP per capita^2	-0.017***	-0.007**	-0.023***
	[0.003]	[0.002]	[0.002]
Ln Population	0.409***	0.299***	0.397***
	[0.114]	[0.042]	[0.031]
Ln Population^2	-0.012***	-0.009***	-0.012***
	[0.004]	[0.001]	[0.001]
2000s	-0.012***	-0.009**	-0.003
	[0.003]	[0.003]	[0.003]
2010s	-0.011*	-0.020***	-0.004
	[0.006]	[0.004]	[0.003]
Southern Africa		-0.026***	0.092***
		[0.005]	[0.008]
West Africa		0.033***	0.056***
		[0.004]	[0.003]
Natural Resource Rents (% of GDP)		-0.002***	-0.001***
		[0.000]	[0.000]
Human Capital		-0.054***	-0.024***
		[0.007]	[0.006]
FDI Inflows (% of GDP)		-0.002***	-0.001**
		[0.000]	[0.000]
Trade Openness		0.001***	0.001***
		[0.000]	[0.000]
Lind & Mehlum (2010) U Test			
Slope at minimum Ln GDP per capita	0.032***	0.062	0.055***
Slope at maximum Ln GDP per capita	-0.081***	0.018	-0.097***
Lind & Mehlum (2010) Test Statistic	3.07***	N/A	7.74***
Country Fixed Effects	Yes	Yes	Yes
Countries	18	18	17
Observations	319	478	449
R^2	0.902	0.699	0.762

Source: de Vries *et al*. (2021); Bolt *et al*. (2018); WDI (2022)

Notes: 1. All regressions estimated using fixed effects fractional logit model. Marginal effects reported for these estimates.

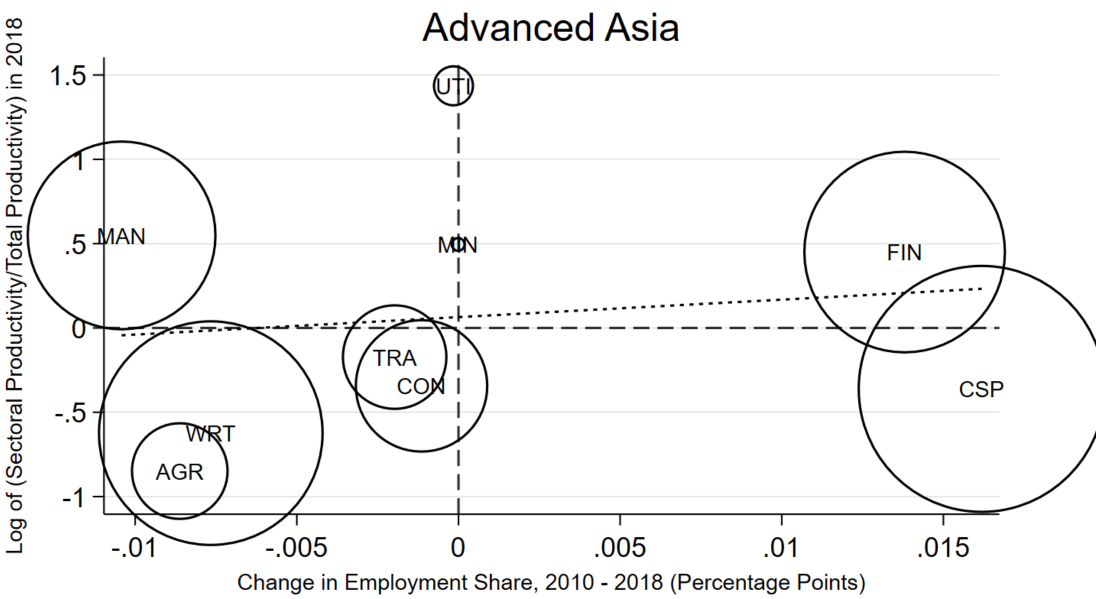
Table A5: Additional regressions, manufacturing share of value-added (nominal prices)

	Rodrik (2016) specification		
	Rodrik (2016) countries	Additional controls	Additional controls excl. Mauritius
	(1)	(2)	(3)
Ln GDP per capita	0.270^{***}	-0.031	0.149^{***}
	[0.053]	[0.040]	[0.037]
Ln GDP per capita^2	-0.017^{***}	0.004^{*}	-0.010^{***}
	[0.003]	[0.002]	[0.002]
Ln Population	0.457^{***}	0.459^{***}	0.539^{***}
	[0.099]	[0.037]	[0.028]
Ln Population^2	-0.015^{***}	-0.013^{***}	-0.016^{***}
	[0.003]	[0.001]	[0.001]
2000s	-0.015^{***}	-0.023^{***}	-0.019^{***}
	[0.003]	[0.003]	[0.003]
2010s	-0.030^{***}	-0.051^{***}	-0.041^{***}
	[0.006]	[0.004]	[0.004]
Southern Africa		-0.025^{***}	0.069^{***}
		[0.005]	[0.008]
West Africa		0.033^{***}	0.050^{***}
		[0.004]	[0.003]
Natural Resource Rents (% of GDP)		-0.003^{***}	-0.002^{***}
		[0.000]	[0.000]
Human Capital		-0.051^{***}	-0.029^{***}
		[0.006]	[0.005]
FDI Inflows (% of GDP)		-0.002^{***}	-0.002^{***}
		[0.000]	[0.000]
Trade Openness		0.001^{***}	0.001^{***}
		[0.000]	[0.000]
Lind & Mehlum (2010) U Test			
Slope at minimum Ln GDP per capita	0.049^{***}	0.026	0.024^{***}
Slope at maximum Ln GDP per capita	-0.064^{***}	0.056	-0.040^{***}
Lind & Mehlum (2010) Test Statistic	3.56^{***}	N/A	2.99^{***}
Country Fixed Effects	Yes	Yes	Yes
Countries	18	18	17
Observations	319	478	449
R^2	0.910	0.620	0.712

Source: de Vries *et al*. (2021); Bolt *et al*. (2018); WDI (2022)

Notes: 1. All regressions estimated using fixed effects fractional logit model. Marginal effects reported for these estimates.

Figure A1: Relative Productivity and Employment Changes in Advanced Asia, 2010-2018



Source: de Vries *et al*. (2021), own calculations.
Notes: 1. List of countries by region is listed in Table A2 in the Appendix. 2. Sectors included are: AGR = Agriculture; MIN = Mining; MAN = Manufacturing; UTI = Utilities; CON = Construction; WRT = Wholesale and Retail Trade; TRA = Transport Services; FIN = Financial, business and real estate services; CSP = Community, social, personal and government services. 3. The size of the bubble is the employment share of that sector in 2018. 4. The slope of the line is the coefficient (β) in the regression: ln(p/P) = α+βΔ(Employment Share).

Endnotes

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[1] Haraguchi *et al*. (2017) contend this assertion and state that the declining manufacturing value-added and manufacturing employment share in many developing countries is not due to changes in the sector's development potential, but rather a concentration of manufacturing activities is a small set of developing countries.

[2] This result is based off using only the manufacturing share of output as the dependent variable.

[3] We choose the ETD for the following reasons: First, it offers the most recent cross-country panel data on sectoral employment and value-addition, which is important given our interest in the most recent industrial performance of the SSA region. Second, since employment industrialisation is relatively more important in the early phases of industrialisation – a phase of development in which many SSA countries find themselves placed – we choose the ETD because it offers the greatest scope of SSA countries with sectoral employment data (although Nguimkeu and Zeufack (2019) have 41 countries in their sample, they only have 11 for their employment estimations). Further, these sectoral employment data account for both formal and informal employment, the latter of which is important in the SSA case.

[4] The empirical specification employed by Nguimkeu and Zeufack (2019) is similar to that applied by Rodrik (2016).

[5] Using the ETD there are three decadal dummies: 1990-1999, 2000-2009, and 2010-2018. The former is the reference category upon which the latter two are compared.

[6] The test's null hypothesis (H_0) is that the curve is monotone or U-shaped, while the alternative hypothesis (H_1) is that the shape of the curve is an inverted U-shape. If the Lind and Mehlum (2010)

test statistic is statistically significant, we reject the null hypothesis (H_0) and conclude and inverse u-shaped relationship between manufacturing and income and that deindustrialisation has occurred.

[7] The incidental parameters problem refers to the issue, where as the number of observations increase, the estimates of the parameters become biased and inconsistent.

[8] We are using the version of the ETD released on 15th July 2021.

[9] See Table A1 in the Appendix for the list of sectors.

[10] See Table A2 in the Appendix for the list of countries.

[11] We focus on this period because this is the period that Kruse *et al*. (2022) describe as being a period of industrial renaissance for a number of SSA countries.

[12] The "Change in employment share" variable was insignificant at the 5 percent level for both Developing Asia and Sub-Saharan Africa.

[13] The structural transformation of Advanced Asia is located as Figure A1 in the Appendix.

[14] Although there is a degree of heterogeneity with some developing Asia countries experiencing relatively strong manufacturing growth from the 1990s onward.

[15] Nguimkeu and Zeufack (2019) do not find the same evidence for employment deindustrialisation as found in this paper – despite employing the same estimation technique. This may be explained by the fact that the ETD dataset has a more diverse set of SSA countries (18) compares to the dataset used by Nguimkeu and Zeufack (2019) in their employment estimations (11). This provides further motivation for employing the ETD.

[16] The Rodrik (2016) sample of SSA countries include: Botswana, Ethiopia, Ghana, Kenya, Malawi, Mauritius, Nigeria, Senegal, South Africa, Tanzania, and Zambia.

[17] It is worth noting that our estimates for the 2010s period dummy, after the exclusion of Mauritius, is consistent with the pattern observed in Rodrik (2016) where the exclusion of this country from the sample shifts the results toward deindustrialisation. However, we observe a pattern of deindustrialisation that is stronger with the exclusion of Mauritius from the sample, and thus our key finding is not as sensitive upon the sample of countries used, as is the case with Rodrik (2016) and Kruse *et al*. (2022).

[18] The equivalent estimates to Table 3 but using real value-added share of manufacturing as the dependent variable are reported in Table A4 in the Appendix.

[19] The equivalent estimates to Table 3 but using nominal value-added share of manufacturing as the dependent variable are reported in Table A5 in the Appendix.

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