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A Note on Premature Deindustrialization

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Industrialization has long been regarded as an engine of economic growth. Indeed, the countries that experienced rapid economic growth in the latter half of 20th century underwent significant economic structural change towards industrialization. In contrast, in the 21st century, latecomers might face difficulty realizing the industrialization required for economic growth because of a phenomenon called 'premature deindustrialization' taking place in those countries. This issue of premature deindustrialization, if it holds true, raises important questions, such as what its mechanism is, what its effects are, and what the alternative strategies for economic growth are. This paper, as a stepping stone to consider these issues, uses expanded samples to examine and confirm the occurrence of premature deindustrialization.

Keywords: premature deindustrialization, industrialization, economic growth
JEL classification: O11, O14, O47

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Introduction

Industrialization has long been regarded as an engine of economic growth. Indeed, structural changes that lead to industrialization and reflect its presence have been widely observed across countries that experienced rapid economic growth in the 20th century. In contrast, after the turn of the millennium, some latecomer countries seem to have experienced a 'premature deindustrialization,' meaning that the share of manufacturing employment and/or output begins to shrink at lower income levels compared with that of advanced countries. Premature deindustrialization may also sometimes include peaks in the shares of manufacturing employment and output that are lower for latecomers compared with those of advanced countries.

This issue of premature deindustrialization raises a number of questions, such as whether it is really taking place, what the mechanism is behind it, what its effects are, what the alternative strategies of economic growth are, and so on. In this paper, as a first step in examining these issues, we attempt to consider the occurrence of premature deindustrialization after surveying the literature regarding the role of industrialization and the onset of premature deindustrialization.

1. Background and literature survey

From the viewpoint of the widely known Petty-Clark law, the main interest of latecomer countries has continuously rested on how to realize the shift to the secondary sector from the primary sector, as described by the first part of the law.[1] In general, a developing country is characterized as having most of its labor force in the agricultural sector. In other words, industrialization is the main goal for developing countries striving for economic development.

In line with this pragmatic interest, industrialization has attracted great interest in academic circles. For example, ideas and keywords proposed by various early development economists such as 'unlimited supplies of labor' (Lewis 1955), 'deterioration in terms of trade' (Prebisch 1949), 'big push' (Rosenstein-Rodan 1943), 'balanced growth' (Nurkse1953), 'take-off' (Rostow 1960), 'advantages of backwardness' (Gerschenkron 1962), 'unbalanced growth/linkage effects' (Hirschman 1958), and 'flying-geese' (Akamatsu 1962), have been used in attempts to understand and recognize the mechanism of sectoral change in latecomer countries and/or to promote their industrialization. Based on these studies, both the potential for industrialization and the potential for underdevelopment equilibria have been established as major themes in development economics. Up to the 1970s, these ideas and theories more or less provided justification for the economic planning and trade protectionism, along with other more general industrial policies, that

[1] By dividing economic activities into primary, secondary, and tertiary sectors, Clark (1940) argues, by drawing on Petty from the 17th century, that as an economy grows, the major sector of the economy shifts from the primary to the secondary sector, and then from the secondary to the tertiary sector, not least in terms of the share of the labor force.

developing countries used to grow their nascent secondary sectors, not the least of which included the manufacturing sector.

Industrialization was widely observed in latecomer countries that experienced rapid income growth in the latter half of the 20th century. For example, latecomers such as South Korea and Taiwan in the 1970s, Malaysia and Thailand in the 1980s, and China and Vietnam in the 1990s, experienced rapid economic growth due to industrialization. While the role of the government or industrial policies in economic development remains highly controversial theoretically and empirically,[2] it is hard to deny that countries with such records of rapid growth have undergone structural change, especially industrialization.

In contrast, after the turn of the millennium, especially since the 2010s, the deindustrialization, rather than industrialization, of lower-income countries has attracted attention. Deindustrialization for advanced countries is described by the latter half of the Petty-Clark law, that is, the shift from the secondary sector to the tertiary sector in the main economic activities of a country. Most advanced countries started experiencing deindustrialization in the early 1970s, after their golden era of economic growth had ended. Observations of this dramatic structural change in advanced countries were widely discussed in the 1980s (Rowthorn and Wells 1987, Tregenna 2011). In the 2000s, some scholars found that deindustrialization seemed to have started taking place in the early stages of economic development in latecomer countries, which is the focus of this paper.

1.1 Finding and Refining the issue of premature deindustrialization

The term 'premature deindustrialization' is first used by Dasgupta and Singh (2007). Their research seems to have been inspired by the rapid economic growth of India in the 2000s, which was associated with the rapid growth of the service sector. This growth has often been characterized as 'jobless growth,' meaning that employment grew not in the formal manufacturing sector, but rather in the informal sectors. Thus, in the context of Indian economic growth, the question is whether this jobless and service-led growth is sustainable, and whether this is a departure from the experience of advanced countries, where industrialization had driven economic growth.

Dasgupta and Singh (2007) base their theorical framework on Kaldor (1967), who argues that the manufacturing sector is the engine of economic growth. Kaldor's key observations are that the manufacturing sector entails larger spillover effects (dynamic economies of scale) (Young)

[2] These experiences have triggered various academic and empirical debates over the mechanisms and causes of their economic growth, in terms of the role of the government and the market (and institutions), industrial and trade policy, and productivity and factor inputs. For details of the debate, see, for example, Stiglitz and Yusuf (2001) and Chang (2006).

and more ‘learning by doing’ (positive externalities) (Arrow) than other sectors. This forms the basis for what is known as Kaldor’s law, in which, first, the larger the positive gap between the growth rate of the manufacturing sector and that of GDP, the higher the growth rate of the economy as a whole; second, the productivity growth of the manufacturing sector is faster when its output growth rate is faster (increasing returns to scale) (Verdoorn’s law); and third, the productivity of the non-manufacturing sector positively correlates with the growth rate of the manufacturing sector.[3]

The key idea of Kaldor is that as the labor force shifts from the sector with decreasing returns to scale to the sector with increasing returns to scale, the economy as a whole should have a higher growth rate. The sector with decreasing returns to scale would also enhance its productivity by reducing its labor input. Considering the manufacturing sector as a sector with increasing returns, Dasgupta and Singh (2007) test Kaldor’s first law stating that the growth rate of the manufacturing sector should positively correlate with economic growth. Kaldor’s second law is indirectly examined by regressing the growth of the manufacturing sector and employment growth in the non-manufacturing sector on productivity growth.

Dasgupta and Singh (2007) examine data from 48 countries spanning the period 1990–2000 and affirm Kaldor’s laws, noting that the manufacturing sector was indeed the engine of economic growth. Interestingly, they suggest that the service sector could also be an engine of growth, or could at least complement that growth. Next, they distinguish two types of premature deindustrialization. One type concerns employment only, and the other shows a decrease in the share of the manufacturing sector both in terms of employment and value added. Their conclusions are that the future described by the first type would not be a cause for concern, while that described by the second type would be, implying that the negative consequences are a result of the second type of premature deindustrialization.

These findings are in line with the observation put forward by Rowthorn and Wells (1987), who study the experiences of advanced countries. They distinguish between two types of deindustrialization. Positive deindustrialization means a decrease in the share of manufacturing employment with an increase in manufacturing output, mainly due to rapid productivity growth in the manufacturing sector. In contrast, negative deindustrialization is defined as a decrease in the manufacturing share of both employment and output due to a decrease in demand for manufacturing sector outputs. Therefore, in order to use the word ‘premature,’ we need to make clear whether and how ‘premature’ deindustrialization in developing countries differ from

[3] Elaborating on Kaldor’s points, Singh (1977) shows the importance of manufacturing trade, noting that as the income elasticity of manufacturing goods increases in the early stage of economic development, the manufacturing sector in forerunner countries would benefit from an increase in imports of manufacturing goods from latecomer countries.

'negative' deindustrialization in general.

The next work on premature deindustrialization is put forward by Rodrik (2013, 2016), who argues that the manufacturing sector is the escalator of economic growth, having three major features. First, the manufacturing sector in latecomer countries tends to converge toward the frontier without conditions. Second, it tends to create or absorb more employment than other sectors. Third, the products of the manufacturing sector are easier to trade internationally than services or perishable items. Thus, the growth of the manufacturing sector pushes the economy as a whole toward the frontier. In other words, the problems of developing countries are a result of the slow or negative growth of their manufacturing sector.

While deindustrialization in advanced countries has been taking place in terms of employment share, their share of manufacturing sector output has not necessarily been decreasing. Thus, Rodrik also distinguishes between two types of deindustrialization: one with deindustrialization in terms of employment only and one in terms of both employment and output (value-added). In this regard, an important contribution of Rodrik (2016) is that it refines the meaning of 'premature' first, because the stage of development when deindustrialization sets in is lower in terms of income level compared with that of advanced countries, and second, because the peak of the manufacturing sector's share of employment and/or output is lower than that of advanced countries. Thus, premature deindustrialization in this sense is defined not only in terms of the manufacturing sector's share of employment and/or output, but also in terms of the level of national income at the peak of the share, and furthermore in terms of the level of the peak share.

1.2 Examining the occurrence and causes of premature deindustrialization

As the concept of "premature deindustrialization" has become widely known especially after Rodrik (2013), various attempts have been made to identify instances of this phenomenon. For example, some studies, such as Felipe *et al*. (2014), Timmer *et al*. (2014), and Amirapu and Subramanian (2015), have attempted to confirm the role of the manufacturing sector and structural changes in premature deindustrialization in latecomer countries after the turn of the millennium. The results of these studies on whether deindustrialization has indeed been taking place are mixed, depending on the data and the time span of each study, although in general its occurrence has basically been confirmed By applying the growth decomposition method using input-output tables, Nayyar *et al*. (2018) also confirm that the share of manufacturing in employment and value added appears to hit the peak at lower levels of per capita income in selected emerging economies than earlier industrializers.

Rodrik (2016) finds that developing countries that can be regarded as manufacturing exporting countries (mainly in Asia) tend to show no deindustrialization in terms of output, while those regarded as non-manufacturing exporting countries (mainly in Latin America and Africa) tend to

exhibit the characteristics of deindustrialization in terms of both employment and output. More concretely, he found that the income level of latecomer countries tends to be lower when the peak of the share of manufacturing employment appears; for advanced countries this was around USD 14,000 (in 1990), while it was around USD 700 for India and African countries. In addition, it identified that the peaks of the share of manufacturing employment and that of manufacturing in GDP are also lower compared with those of advanced countries.

Country- or region-specific studies of premature deindustrialization have also been conducted. For example, Hamid and Khan (2015) analyze the performance of Pakistan's manufacturing sector and concluded that Pakistan is on the brink of premature deindustrialization due to the stagnation in manufacturing. Castilllo and Neto (2016) also examine changes in manufacturing employment in selected Latin American countries and found that premature deindustrialization was clearly occurring in Argentina, Brazil, and Chile, but was not obvious in Mexico.

For deindustrialization in advanced countries, the mechanisms or causes of structural change have been examined through changes in productivity and in price and income and how they affect supply and/or demand of labor directly and indirectly (Rowthorn and Wells 1987). Indeed, how labor is reallocated from the agricultural sector to the secondary sector and then shifts to the tertiary sector is often considered using this framework. For example, Dennis and İşcan (2009) examine this dimension of structural change from the agricultural sector to the secondary in the United States from 1820 to 2000 by identifying three causes. They find that the relatively low elasticity of demand for agricultural goods was the main driving force of decreasing agricultural employment up until around 1950, while from 1950 to 2000 a relatively faster increase in productivity and increasing capital investments in the agricultural sector further shifted laborers from agriculture to other sectors.

This study shows that both demand and supply sides should be examined for exploring the causes of structural change. Matsuyama (2009) clarifies, however, that the productivity-based explanation of structural change holds at the global economic level, but not at the national economic level.[4] For the mechanisms or causes of deindustrialization, productivity-based theories of decline in manufacturing employment imply that as the productivity of the manufacturing sector improves, manufacturing employment declines. At the national level, however, the effect of an increase in domestic manufacturing productivity on domestic manufacturing employment depends on the case, because the relative impacts of its effect on income (which tends to decrease domestic manufacturing employment) and its effect on trade (which tends to increase domestic manufacturing employment) differ according to the country and the circumstances. In contrast, the effect of an increase in the manufacturing productivity of

[4] The main point of Matsuyama (2009) is to criticize the use of closed-economy models for cross-country regression.

a given country on the manufacturing employment of another country would be negative because there is no effect on income on the foreign manufacturing sector, and its trade effects decrease foreign manufacturing employment.

While Dasgupta and Singh (2007) do not clearly examine the causes of premature deindustrialization, Rodrik (2016) provides certain analyses, taking into consideration these supply- and demand-side issues at the global economic level. He argues that deindustrialization in terms of employment in advanced countries can be explained by the pace of technological change or increases in productivity which are faster in the manufacturing sector than in others. Productivity growth often entails labor-saving technological progress, which in turn decreases the share of the sector in terms of employment, provided the increase in demand for manufacturing goods does not outweigh the speed of labor-saving effects.

In contrast, deindustrialization in developing countries cannot be explained by technological progress. Therefore, Rodrik (2016) points to international trade and globalization as possible causes. Because increases in manufacturing sector productivity in other countries reduce the manufacturing employment in developing countries, trade liberalization under the GATT/WTO regime might have reversed the import-substitution process of the manufacturing sector in developing countries, because latecomers tend to have no comparative advantage in that sector. In addition, developing countries also face changes in the relative pricing of manufacturing goods and non-manufacturing goods in advanced countries, which may have worsened the conditions for industrialization in developing countries.

1.3 Considering the effects of premature deindustrialization

Based on the survey above, three tasks remain regarding deindustrialization in developing countries. First, to answer whether deindustrialization has really been taking place, we need to further elaborate how we define and estimate deindustrialization, and how we set the time span of the study. Based on considerations of these points, data must be created or chosen.

Second, when deindustrialization in developing countries is identified, its causes and mechanism should be explored further. While globalization and international trade are plausible explanations of deindustrialization, there seem to be other factors that should also be examined, such as changes in the manufacturing sector itself, changes in the relationship between the manufacturing sector and other sectors, and changes in the major traded commodities. For example, some studies have pointed out that exporters of low value-added manufacturing might have suffered from declining terms of trade, especially since the 1990s, due to price reductions resulting from the strengthening and prevailing global value chain of production processes (Razmi and Blecker 2008, Milberg and Winkler 2013).

Third, if deindustrialization in developing countries is indeed taking place, its consequences

and effects on latecomer countries and the world economy as a whole should be examined theoretically and empirically. Rodrik (2016) suggests that the effects of premature deindustrialization would be harmful for countries that have experienced it. Because the manufacturing sector is the escalator of economic growth, the employment shift away from the manufacturing sector might have restrained the structural changes that tend to drive growth. He also argued that non-manufacturing sectors, such as the finance and ICT sectors, can hardly be escalators of growth, indicating a pessimistic view of the future for countries undergoing premature deindustrialization.

To identify alternative industries that could be escalators of economic growth, Amirapu and Subramanian (2015) examine the Indian economy and extract five features of escalator sectors: high level of productivity, dynamic productivity growth, expansion of the sector in terms of inputs, comparative advantages, and export possibility. They argue that possible alternative sectors such as finance, insurance, real estate, and construction have some of these features, but no sector has all of them, so it is difficult to consider that they can serve as alternative escalators to the manufacturing sector.

In contrast, Nayyar *et al*. (2018) argue that premature deindustrialization matters less than before because features of manufacturing such as increasing returns to scale, which were considered necessary for development, are increasingly shared by the services sector in developing countries.

The present work aims to reconsider the first question, because, first of all, it is necessary and important to discuss how deindustrialization in developing countries can be characterized. In addition, careful thought should be given to whether the understanding and presentation of the phenomenon as 'premature deindustrialization' is appropriate.

2. Empirical investigation of premature deindustrialization

This section empirically investigates the patterns of industrialization/deindustrialization by examining the relationship between manufacturing output/employment and income. In this paper, we basically follow analyses conducted by Rodrik (2016) that are straight forward and comprehensive, but include some differences in the use of expanded samples and classifications for different countries and time periods.

2.1 Measures and data sources

The share of manufacturing value added to total value added (both at current prices and at constant prices) is used as an indicator of manufacturing output. The value added share is calculated based on information from the United Nations (UN) database. Because the UN database does not contain information from before 1970, we also used the Groningen Growth and Development Center

(GGDC) database that includes data from 1950 to 2012 for 42 countries/regions.

The manufacturing employment share is calculated as the share of employment in manufacturing sector to total employment. The employment data was taken from GGDC databases.

Income is measured by GDP per capita evaluated against the 2011 international dollar. The data for GDP per capita is retrieved from the Penn World Table (PWT, version 9.0) which covers the period from 1950 to 2014. Data after 2015 is taken from the World Development Indicators (WDI) database compiled by the World Bank.

Finally, population data used as a control in regressions are obtained from WDI and PWT.

Further details (countries/regions and periods) are listed in Appendix 1 and a summary of the statistics derived from the data is presented in Appendix 2.

2.2 Historical trend of manufacturing shares

Here, we will briefly look at the historical trends regarding manufacturing shares. Figure 1 shows the changes in manufacturing shares over time for selected countries. The manufacturing share is calculated for three different measures: nominal value added, real value added, and employment. For developed countries such as Japan, the U.S., and the U.K., the downward trend in manufacturing share can be seen by measuring nominal value added and employment. For the U.K., there is also a downward trend in real value added, but the trend is not so obvious for Japan or the U.S. For developing countries such as Egypt, Argentina, India, Thailand, and China, it is hard to extract a common pattern. For Egypt and India, manufacturing shares are nearly constant across all measures. For Argentina, there seems to be a downward trend in nominal value added, but no significant increase or decrease can be seen for the other measures. In contrast, an upward trend in the manufacturing share can be seen in all measures for Thailand and China. These mixed results indicate the need for more comprehensive and rigorous analyses to identify the patterns of industrialization.

2.3 Relationship between manufacturing share and income

Because it is insufficient to examine deindustrialization only from simple historical observations regarding manufacturing shares, we also explicitly examined the relationship between manufacturing shares and income. Figure 2 plots the GDP per capita and the share of manufacturing. In Figure 2, the horizontal axis measures the log of GDP per capita and the vertical axis measures the share of manufacturing. In all three indicators, trend lines show an inverted U shape, that is, manufacturing shares rise as income increases and then falls after a certain level of income. This upward trend indicates that economic development accompanies the development of the manufacturing sector (industrialization). The downward trend in manufacturing shares after

a certain income level may reflect shifts from manufacturing to services (post-industrialization). Rodrik (2016) introduces several explanations, such as the shift in demand from goods to services and the productivity growth of manufacturing (Rodrik 2016, p.7).

In order to identify the peak level of manufacturing share and income, the following equation including population variables as a control was formulated.

$$(1)\quad mshare_{it} = \alpha + \beta_1 \ln(pop_{it}) + \beta_2[\ln(pop_{it})]^2 + \gamma_1 \ln(pcGDP_{it}) + \gamma_2[\ln(pcGDP_{it})]^2 + \sum_i \delta_i Country_i$$

Here, $mshare_{it}$ is the share of manufacturing of country i at year t and $Country_i$ is the dummy variable that captures the country fixed effect. The estimation results are shown in Table 1. Our main interest is in the sign of parameters of log real GDP per capita and its squares (γ_1 and γ_2). The signs of parameter estimates of log real GDP per capita are positive ($\gamma_1 > 0$) and those of its square are negative ($\gamma_2 < 0$); all three cases were statistically significant. This indicates that the relationship between income and manufacturing share can be drawn as a graph that takes the form of an inverted U shape and the manufacturing shares hit their peak at a certain level of income.

Figure 3 shows the projected manufacturing shares corresponding to each income level that are calculated from the parameter estimates listed in Table 1. As shown in Figure 3, the peak level of manufacturing shares and incomes differs across indicators. The projected peak level of manufacturing shares in terms of nominal value added is 19.4% when GDP per capita is $4,359. The projected manufacturing share at the peak level measured by real value added is 22.2% and the corresponding income is $23,389. The projected peak level employment share of manufacturing is 7.9% and the corresponding income is $4,024. The magnitudes of projected peak level of manufacturing shares and corresponding incomes are lower than the results by Rodrik (2016) and Rowthorn and Ramswamy (1999). This is attributable to the fact that our sample contains more developing countries compared with previous studies. However, general tendencies are consistent with Felipe *et al*. (2014) and Rodrik (2016), insomuch as the projected peak level of manufacturing share and the corresponding income are highest in real value added, followed by nominal value added and, finally, employment.

2.4 Empirical investigations of "Premature Deindustrialization"

2.4.1 Comparisons by country group

In premature deindustrialization, the peak levels of manufacturing share and income in developing countries are lower than those in developed countries. The simplest way to examine whether

premature deindustrialization is actually taking place is to examine the relationship between the peak level of manufacturing shares and corresponding incomes. Figure 4 plots the maximum manufacturing shares and corresponding incomes in our sample countries. As shown in Figure 4, there is a positive correlation between maximum manufacturing shares and corresponding incomes. This result may be evidence of premature deindustrialization because the peak level of manufacturing shares tends to become lower when income is lower. However, the results shown in Figure 4 are not sufficient evidence for premature deindustrialization because the manufacturing shares in Figure 4 are the "maximum" only during the observation period and the share could still rise in some developing countries in which industrialization is progressing.

To examine more rigorously the occurrence of premature deindustrialization, we estimated Equation (1) for different types of countries, that is, developed and developing countries. OECD member countries were selected to represent the developed countries and the non-OECD member countries that comprised the rest of the countries in our sample represented the developing countries.[5] Appendix 1 lists the countries included in each group. The sample mean of OECD countries' income in terms of real GDP per capita is $21,057 (2011 international dollars) and that of non-OECD countries is $3,722 (see Appendix 2).

Table 2 shows the results of regressions by country group. As shown in Table 1, the parameters of income variables show expected signs ($\gamma_1 > 0$ and $\gamma_2 < 0$) in all cases and thus it is confirmed that the relationship between income and manufacturing share shows an inverted U shape (i.e., the manufacturing share has the peak). Based on the estimates reported in Table 2, the projected peak level of the manufacturing share and the corresponding income were calculated. The results are presented in Figure 5 and Table 3. As reported in Table 3, the peak level of manufacturing shares measured by nominal value added is 35.1% for OECD countries and the corresponding income is $9,701, while those of non-OECD countries are 19.2% and $3,828, respectively, which is much lower than those for OECD countries. The same relationship, in which the peak level of the manufacturing share and the corresponding income of OECD countries are higher than those of non-OECD countries, was also observed for real value added and employment. Table 3 also reports the calculation results of 95% confidence intervals for projected peak level manufacturing shares and corresponding incomes. For both manufacturing shares and incomes, the intervals do not overlap between OECD and non-OECD countries. These indicate that the differences described above between OECD and non-OECD countries are statistically significant. The results may provide with an empirical support of the phenomenon of

[5] Same exercises are also conducted by using alternative classifications, i.e. "Advanced Economies" and "Developing Economies" defined by the International Monetary Fund (IMF) and "High-Income Economies" and "Non-High-Income Economies" presented by the World Bank. For both classifications, the same tendencies were observed as the case of OECD and non-OECD for nominal value added, but the results are little bit ambiguous for real value added and employment.

premature deindustrialization.

2.4.2 Trend of deindustrialization over time

Another approach for identifying the occurrence of premature deindustrialization is to investigate whether deindustrialization has continued in recent years. Subramanian (2014) examines the relationship between the employment share of the industry sector and income for the years 1988, 2000, and 2010 and finds that the projected peak level of employment share of the industry sector and corresponding income decline over time (Subramanian 2014, Grabowski 2017). Rodrik (2016) also finds that the peak level of manufacturing shares in terms of employment, real value added, and the corresponding income before the 1990s was lower than that after the 2000s. This is attributable mainly to the fact that both the peak level of the manufacturing employment share and the corresponding income of recent industrializers are lower than those of early industrializers (Rodrik 2016, p. 20).

To examine the trend of industrialization/deindustrialization over time, we can use the following equation, which is a modification of Equation (1), with interaction terms added between income variables and period dummies.

$$(2)\quad mshare_{it} = \alpha + \beta_1 \ln(pop_{it}) + \beta_2[\ln(pop_{it})]^2 + \gamma_1 \ln(pcGDP_{it}) + \gamma_2[\ln(pcGDP_{it})]^2 + \sum_l \delta_{1,l} \ln(pcGDP_{it}) \times PER_l + \sum_l \delta_{2,l}[\ln(pcGDP_{it})]^2 \times PER_l + \sum_i \theta_i Country_i$$

Here, PER_l is the dummy variable for three time periods (i.e., 1980s, 1990s, and post-2000s) $(2000s+)$ $(l = 1980s, 1990s, 2000s+)$. Using Equation (2) enables us to project the peak level of manufacturing shares and corresponding incomes for four periods (i.e., pre-1970s, 1980s, 1990s, and post-2000s). Estimation results of Equation (2) for three indicators are presented in Table 4. The signs of some parameter estimates of interaction terms between income and periods are inconsistent and some of the coefficients are statistically insignificant. Figure 6 shows the projected manufacturing shares corresponding to each income level calculated according to the parameter estimates listed in Table 4. Figure 6 demonstrates that, although the parameter signs are inconsistent, the graphs take the form of an inverted U shape and manufacturing shares have a peak in all periods.

Table 5 shows the projected peak level of manufacturing shares and corresponding incomes. As the case of projections by country group (Table 3), Table 5 also reports 95% confidence intervals for projected manufacturing shares and incomes to see if differences of projected values are statistically significant. It is clear that the peak levels of manufacturing shares as measured by industrial outputs have been dropping consistently over the decades. For nominal value added,

the projected share of manufacturing dropped from 22.8% before the 1970s to 17.0% after the 2000s. For real value added, the projected manufacturing share also dropped from 24.2% before the 1970s to 22.6% after the 2000s, though the decline is not as severe as that of nominal manufacturing value added. The projected incomes corresponding to the peak level of manufacturing share dropped continuously from before the 1970s to the 1990s in both nominal and real value added. However, it then began to increase in the post-2000s while the manufacturing share continued to drop. The projected manufacturing employment share shows a slightly different behavior compared with that of industrial outputs. The peak level of manufacturing employment share dropped from 12.4% before the 1970s to 5.8% in the 1990s. However, it increased to 8.6% after the 2000s. In contrast, the projected income corresponding to the projected peak level of manufacturing employment share consistently decreases throughout the observation period.

The results in Table 5 indicate that premature deindustrialization may have progressed until the 1990s. Although the trends after the 1990s are ambiguous, both projected peak level manufacturing shares and corresponding incomes have continued to decline in recent years for all indicators compared with those before the 1970s. This implies that premature deindustrialization has indeed been taking place because the peak level manufacturing shares and corresponding incomes of late industrialized countries (developing countries) are lower than those of early industrialized countries (developed countries).

Summary and Conclusion

In this paper, we conducted a literature review to extract the issues that need to be addressed regarding premature deindustrialization. We conducted simple empirical exercises to determine whether premature deindustrialization really occurs. By comparing developed countries (OECD) and developing countries (non-OECD), we found that both peak level of manufacturing shares and corresponding incomes are lower in developing countries than in developed countries, suggesting that the phenomenon of premature deindustrialization has indeed been taking place. The phenomenon of premature deindustrialization is also implied from the results of a time-period analysis, which revealed that the peak level manufacturing shares and corresponding incomes of late industrialized countries (developing countries) tend to be lower than early industrialized countries (developed countries).

This study reconfirmed the trend of deindustrialization in certain developing countries for the covered time period in two senses, first in terms of decreases in the share of manufacturing employment and output at the lower level of economic development, and second in terms of lower peak levels of manufacturing share of employment and output. However, it should be noted that the grouping of OECD and non-OECD countries might not provide a sufficient basis for

comparison because the pattern of structural change differs according to the country. Also, the diluting trend of deindustrialization after the 2000s might suggest that development is conditioned by contemporary changes in the world economy. Therefore, to more precisely understand the occurrence, causes, and effects of deindustrialization in developing countries, a comparative analysis based on country-specific conditions should also be conducted. In doing so, it can be reconsidered whether deindustrialization in developing countries should be called 'premature.'

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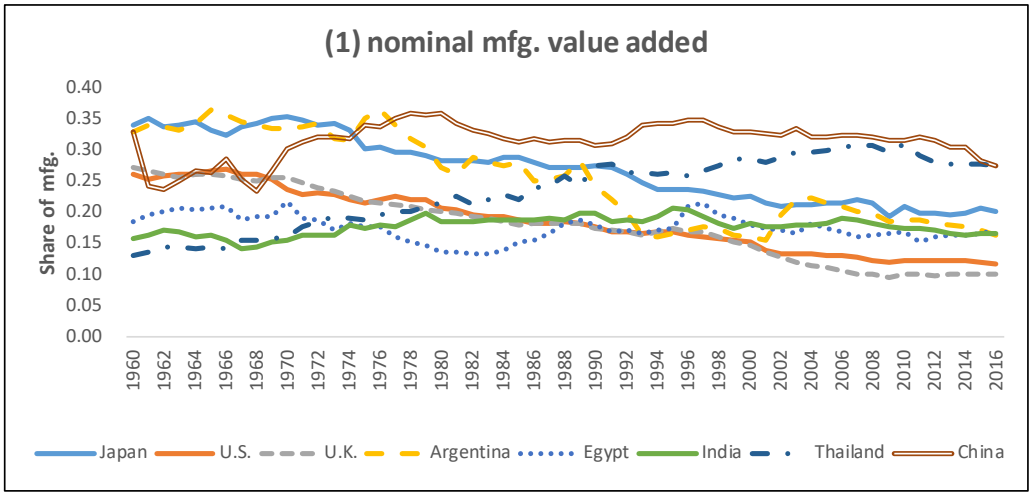
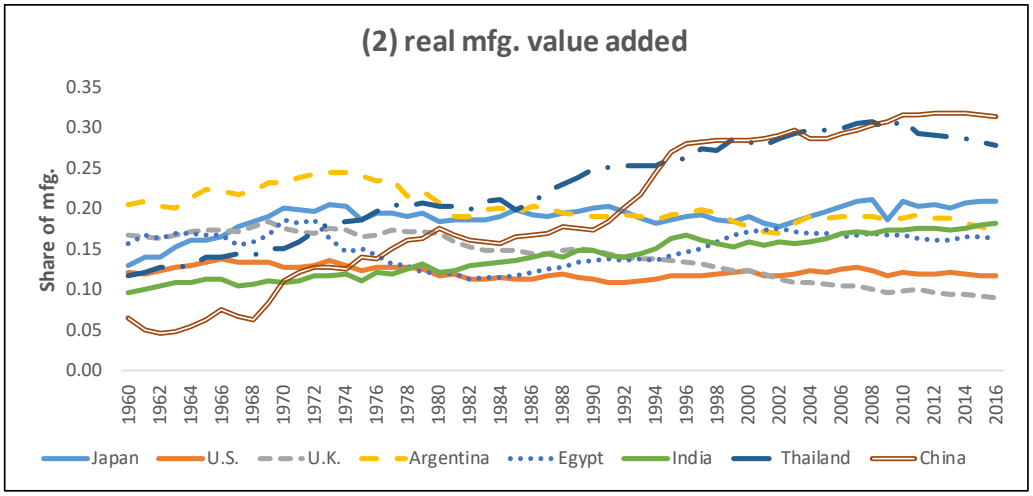
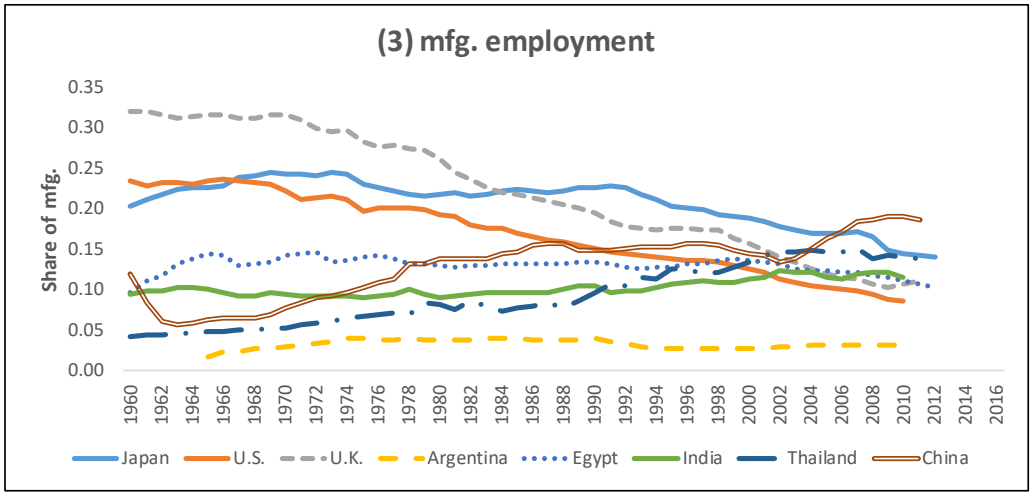
Figure 1 Historical trend of manufacturing shares for selected countries

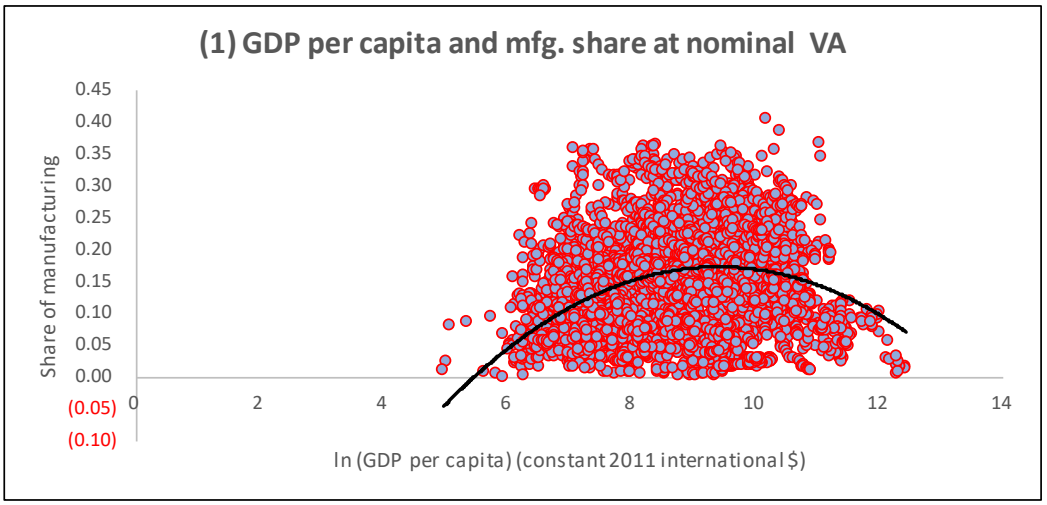


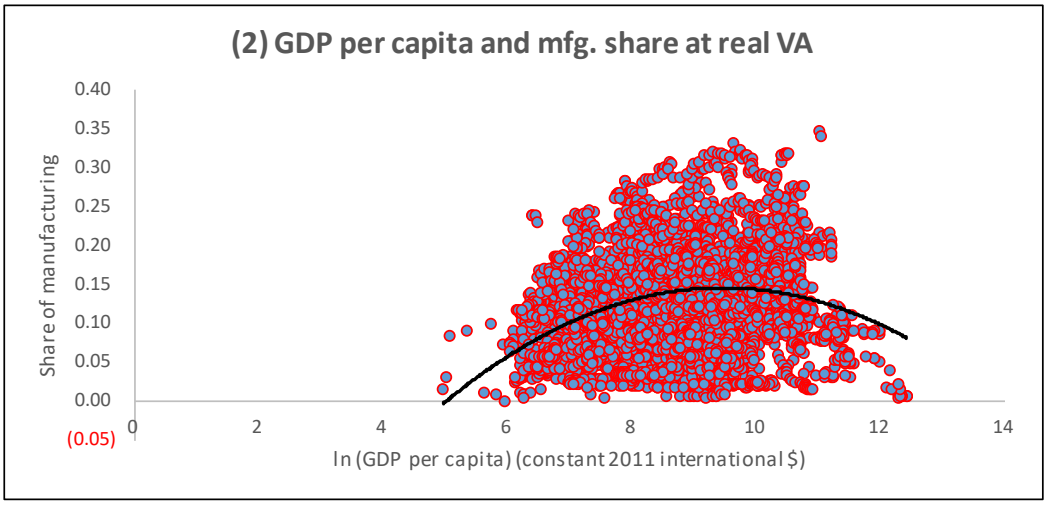


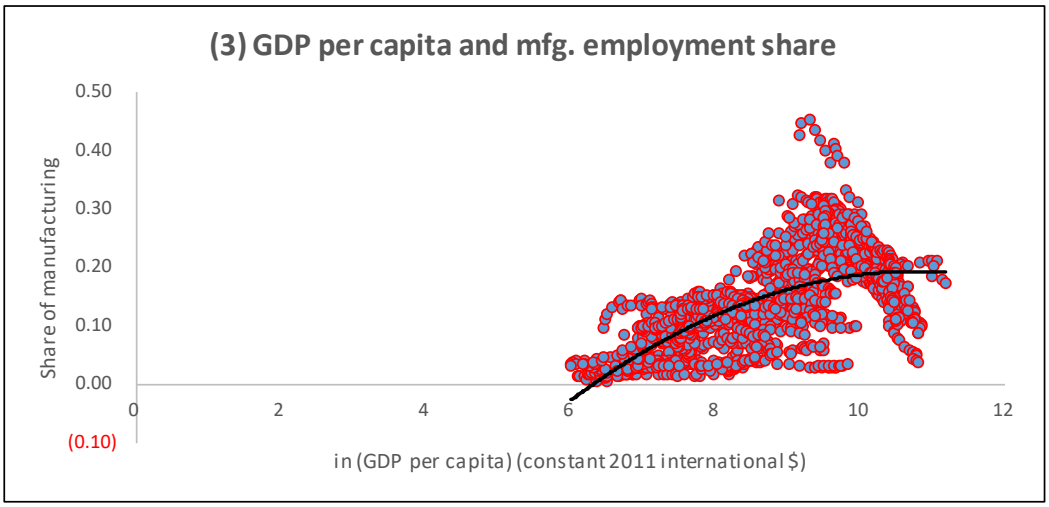


Source: Drawn based on the databases of UN and GGDC.

Figure 2 Relationship between manufacturing shares and income







Source: Drawn based on the databases of UN and GGDC.

Table 1 Results of regressions (World)

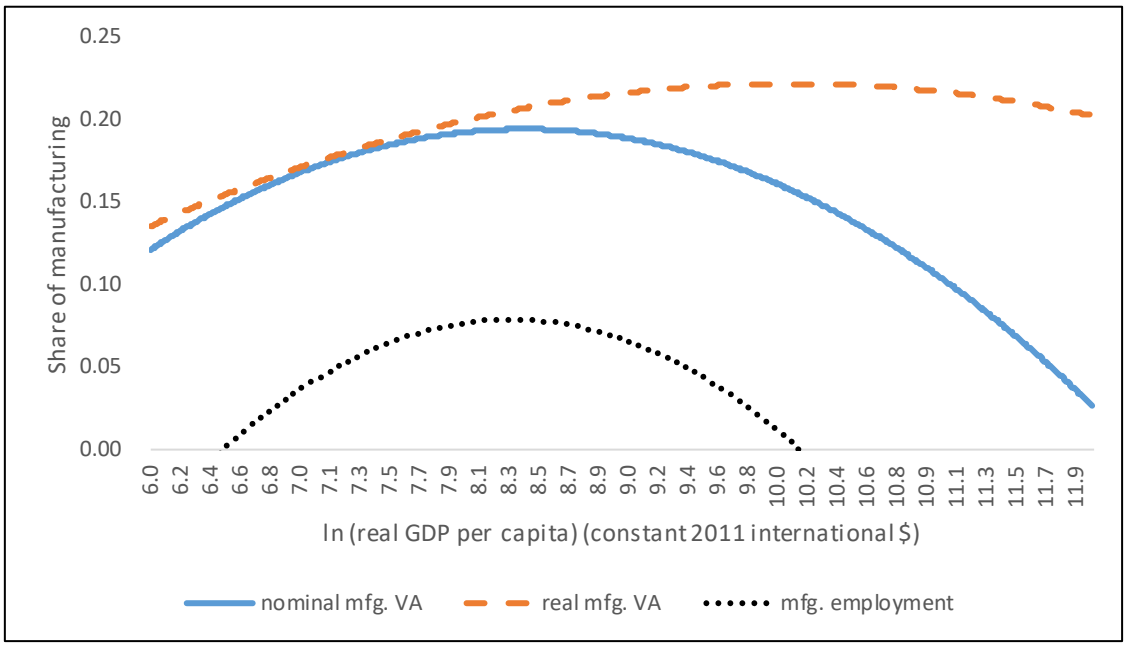
	nominal mfg. VA share	real mfg. VA share	mfg. employment share
Constant	-1.679 ***	0.101	-2.081 ***
	(0.113)	(0.096)	(0.261)
ln (population)	0.126 ***	-0.058 ***	0.046
	(0.013)	(0.011)	(0.029)
ln (population)^2	-0.004 ***	0.002 ***	-0.001
	(0.000)	(0.000)	(0.001)
ln (per capita GDP)	0.215 ***	0.105 ***	0.387 ***
	(0.008)	(0.007)	(0.013)
ln (per capita GDP)^2	-0.013 ***	-0.005 ***	-0.023 ***
	(0.000)	(0.000)	(0.001)
Country Dummy	Yes	Yes	Yes
Adjusted R^2	0.777	0.741	0.828
Number of countries	129	133	39
No. of Observations	6193	6409	1911

Source: Authors' calculations.

Notes: (1) Figures in parentheses are standard errors.

(2) "***", "**" and "*" indicate the significance level at 1%, 5% and 10%, respectively.

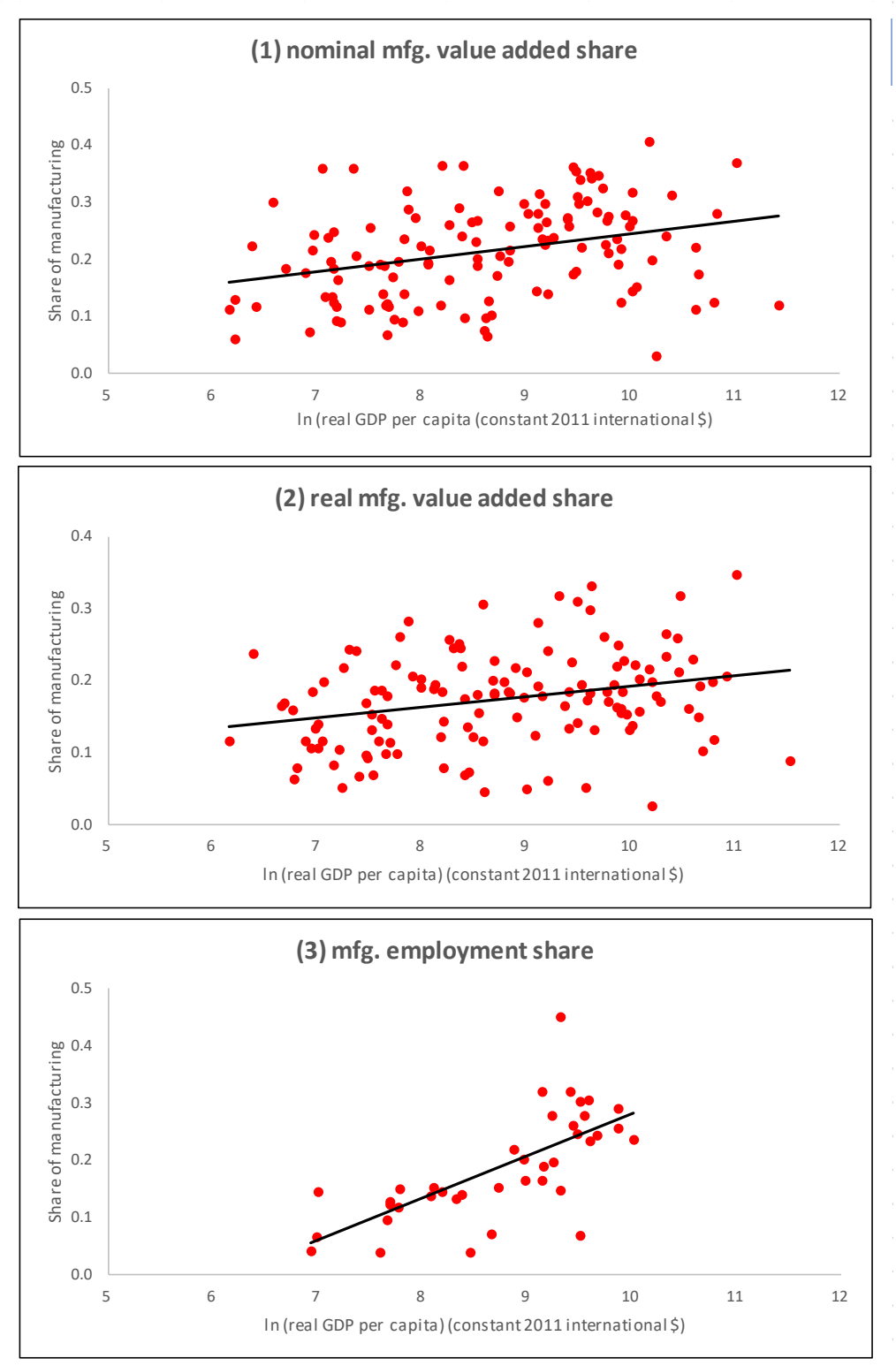
Figure 3 Projected manufacturing shares



Source: Authors' calculations based on estimates in Table 1.

Note: For projection, the median population is used in each sample (see Appendix 2).

Figure 4 Maximum values of manufacturing shares and corresponding incomes



Source: Drawn based on the databases of UN and GGDC.

Table 2 Results of regressions by country group

	nominal mfg. VA share		real mfg. VA share		mfg. employment share	
	OECD	non-OECD	OECD	non-OECD	OECD	non-OECD
Constant	-4.860 ***	-1.274 ***	2.909 ***	-0.092	2.122	-1.650 ***
	(0.562)	(0.119)	(0.468)	(0.101)	(1.488)	(0.289)
ln (population)	0.210 ***	0.116 ***	-0.551 ***	-0.036 ***	-0.754 ***	0.039
	(0.060)	(0.014)	(0.050)	(0.011)	(0.165)	(0.031)
ln (population)^2	-0.007 ***	-0.004 ***	0.014 ***	0.001 ***	0.021 ***	-0.001
	(0.002)	(0.000)	(0.001)	(0.000)	(0.005)	(0.001)
ln (per capita GDP)	0.780 ***	0.135 ***	0.473 ***	0.109 ***	1.085 ***	0.298 ***
	(0.028)	(0.009)	(0.023)	0.027	(0.027)	(0.018)
ln (per capita GDP)^2	-0.042 ***	-0.008 ***	-0.022 ***	-0.006	-0.059 ***	-0.018 ***
	(0.001)	(0.001)	(0.001)	(-12.424)	(0.001)	(0.001)
Country Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.719	0.765	0.683	0.759	0.838	0.782
Number of countries	35	94	35	98	11	27
No. of Observations	1602	4591	1649	4760	569	1289

Source: Authors' calculations.

Notes: (1) Figures in parentheses are standard errors.

(2) "***", "**" and "*" indicate the significance level at 1%, 5% and 10%, respectively.

Figure 5 Projected manufacturing shares (OECD and non-OECD)

Source: Calculated based on estimates in Table 2.

Note: For projection, the median population is used in each sample (see Appendix 2).

Table 3 Projected maximum values of manufacturing share and corresponding income

		nominal mfg. VA share	real mfg. VA share	mfg. employment share
OECD	max. mfg. share	0.351	0.250	0.242
	95% confidence interval	[0.347, 0.354]	[0.247, 0.253]	[0.237, 0.247]
	Income	9,701	37,421	9,509
	95% confidence interval	[9332, 10085]	[36012, 38887]	[8892, 10169]
non-OECD	max. mfg. share	0.192	0.215	0.073
	95% confidence interval	[0.189, 0.195]	[0.213, 0.217]	[0.068, 0.078]
	Income	3,828	15,994	4,024
	95% confidence interval	[3667, 3996]	[15338, 16679]	[3756, 4311]

Source: Authors' calculation from Table 3.

Table 4 Regressions with period dummies

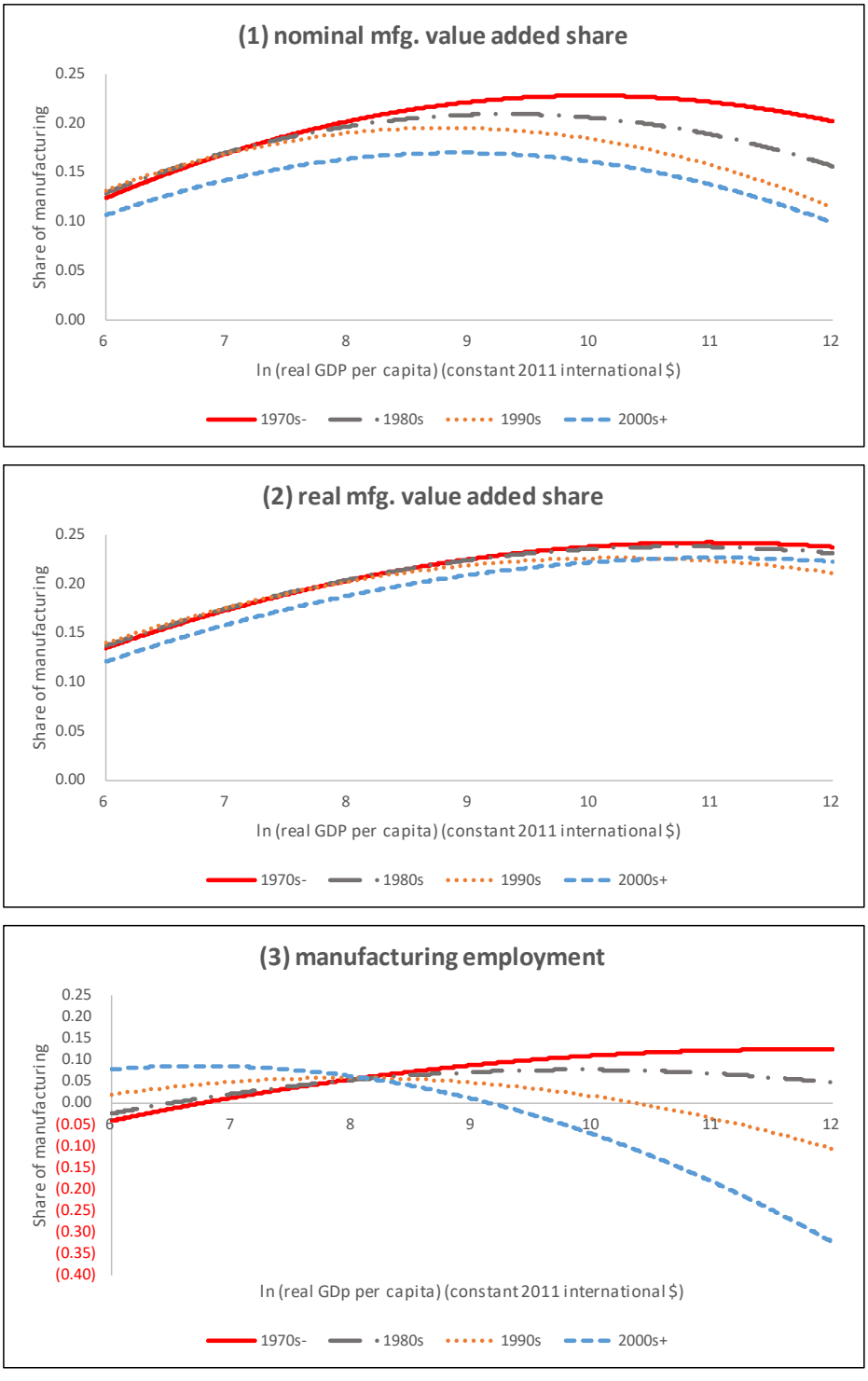
	nominal mfg. VA	real mfg. VA	mfg. employment
Constant	-1.985 ***	-0.004	-0.828 ***
	(0.108)	(0.096)	(0.247)
ln (population)	0.164 ***	-0.054 ***	0.020
	(0.013)	(0.011)	(0.027)
ln (population)^2	-0.004 ***	0.002 ***	-0.000
	(0.000)	(0.000)	(0.001)
ln (per capita GDP)	0.131 ***	0.095 ***	0.121 ***
	(0.009)	(0.008)	(0.018)
ln (per capita GDP)^2	-0.007 ***	-0.004 ***	-0.005 ***
	(0.001)	(0.000)	(0.001)
ln (per capita GDP) ×PER$_{1980s}$	0.006 ***	0.001	0.012 ***
	(0.001)	(0.001)	(0.002)
ln (per capita GDP) ^{2}×PER$_{1980s}$	-0.001	-0.000	-0.002 ***
	(0.001)	(0.000)	(0.000)
ln (per capita GDP) ×PER$_{1990s}$	0.010 ***	0.004 ***	0.027 ***
	(0.001)	(0.001)	(0.003)
ln (per capita GDP) ^{2}×PER$_{1990s}$	-0.001 ***	-0.001 ***	-0.003 ***
	(0.000)	(0.000)	(0.000)
ln (per capita GDP) ×PER$_{2000s+}$	0.003 **	-0.003 ***	0.038 ***
	(0.001)	(0.000)	(0.003)
ln (per capita GDP) ^{2}×PER$_{2000s+}$	-0.001 ***	0.000	-0.005 ***
	(0.000)	(0.000)	(0.000)
Country Dummy	Yes	Yes	Yes
Adjusted R^2	0.800	0.746	0.859
Number of countries	129	133	39
No. of Observations	6193	6409	1911

Source: Authors' calculations.

Notes: (1) Figures in parentheses are standard errors.

(2) "***", "**" and "*" indicate the significance level at 1%, 5% and 10%, respectively.

Figure 6 Projected manufacturing shares (for periods)



Source: Calculated based on estimates in Table 4.

Note: For projection, the median population is used in each sample (see Appendix 2).

Table 5 Projected peak level of manufacturing share and corresponding income

		pre-1970s	1980s	1990s	post-2000s
nominal mfg. share	max. mfg. share	0.228	0.209	0.195	0.170
	95% confidence interval	[0.222, 0.234]	[0.204, 0.215]	[0.190, 0.200]	[0.166, 0.173]
	income	22,026	11,048	6,768	7,406
	95% confidence interval	[20418, 23761]	[10138, 12039]	[6172, 7422]	[6885, 7965]
real mfg. share	max. mfg. share	0.242	0.238	0.226	0.226
	95% confidence interval	[0.238, 0.246]	[0.234, 0.242]	[0.222, 0.230]	[0.223, 0.230]
	income	58,689	46,630	27,723	62,944
	95% confidence interval	[54531, 63163]	[42836, 50760]	[25325, 30347]	[58616, 67592]
mfg. employment share	max. mfg. share	0.124	0.077	0.058	0.086
	95% confidence interval	[0.115, 0.132]	[0.067, 0.087]	[0.049, 0.067]	[0.080, 0.092]
	income	112,420	19,536	2,864	837
	95% confidence interval	[101541, 124465]	[17091, 22331]	[2443, 3343]	[729, 962]

Source: Authors' calculations.

Appendix 1

Coverage of countries and available periods of data

OECD Countries

	nominal mfg. value added	**real mfg. value added**	**mfg. employment**	**Population**
Australia	1970-2016	1970-2016	-	1960-2016
Austria	1970-2016	1970-2016	-	1960-2016
Belgium	1970-2016	1970-2016	-	1960-2016
Canada	1970-2016	1970-2016	-	1960-2016
Chile	1960-2016	1960-2016	-	1960-2016
Czech Republic	1990-2016	1990-2016	-	1960-2016
Denmark	1970-2016	1970-2016	1960-2011	1960-2016
Estonia	1990-2016	1990-2016	-	1960-2016
Finland	1970-2016	1970-2016	-	1960-2016
France	1970-2016	1970-2016	1960-2011	1960-2016
United Kingdom	1960-2016	1960-2016	1960-2011	1960-2016
Germany	1970-2016	1970-2016	-	1960-2016
Greece	1970-2016	1970-2016	-	1960-2016
Hungary	1970-2016	1970-2016	-	1960-2016
Iceland	1970-2016	1970-2016	-	1960-2016
Ireland	1970-2016	1970-2016	-	1960-2016
Israel	1970-2016	1970-2016	-	1960-2016
Italy	1970-2016	1960-2016	1960-2011	1960-2016
Japan	1960-2016	1960-2016	1960-2012	1960-2016
Korea	1960-2016	1970-2016	1963-2010	1960-2016
Latvia	1990-2016	1990-2016	-	1960-2016
Luxemburg	1970-2016	1970-2016	-	1960-2016
Mexico	1960-2016	1960-2016	1960-2012	1960-2016
Netherlands	1970-2016	1960-2016	1960-2011	1960-2016
New Zealand	1970-2016	1970-2016	-	1960-2016
Norway	1970-2016	1970-2016	-	1960-2016
Poland	1972-2016	1970-2016	-	1960-2016
Portugal	1970-2016	1970-2016	-	1960-2016
Slovakia	1990-2016	1990-2016	-	1960-2016
Slovenia	1990-2016	1990-2016	-	1960-2016
Spain	1970-2016	1960-2016	1960-2011	1960-2016
Sweden	1970-2016	1960-2016	1960-2011	1960-2016
Switzerland	1970-2015	1970-2015	-	1960-2016
Turkey	1970-2016	1970-2016	-	1960-2016
United States	1960-2016	1960-2016	1960-2010	1960-2016

Non-OECD Countries

	nominal mfg. value added	**real mfg. value added**	**mfg. employment**	**Population**
Antigua and Barbuda	1970-2016	1970-2016	-	1960-2016
Algeria	1970-2016	1970-2016	-	1960-2016
Angola	1970-2016	1970-2016	-	1960-2016
Argentina	1960-2016	1960-2016	1965-2010	1960-2016
Bahrain	1970-2015	1970-2015	-	1960-2016
Barbados	1970-2016	1970-2016	-	1960-2016
Benin	1970-2016	1970-2016	1960-2011	1960-2016
Bahamas	1970-2016	1970-2016	-	1960-2016
Belize	1970-2016	1970-2016	-	1960-2016
Bolivia	1960-2016	1960-2016	1960-2010	1960-2016
Botswana	1964-2016	1964-2016	-	1960-2016
Brazil	1970-2016	1960-2016	1960-2011	1960-2016
Brundi	1970-2016	1970-2016	-	1960-2016
Brukina Faso	1970-2016	1970-2016	-	1960-2016
Central Afr. Rep.	1970-2016	1970-2016	-	1960-2016
Cabo Verde	1970-2016	1970-2016	-	1960-2016
Chad	1970-2016	1970-2016	-	1960-2016
China	1960-2016	1960-2016	1960-2011	1960-2016
Cameroon	1970-2016	1970-2016	-	1960-2016
Colombia	1960-2016	1960-2016	1960-2010	1960-2016
Comoros	1970-2016	1970-2016	-	1960-2016
Costa Rica	1960-2016	1960-2016	1960-2011	1960-2016
Cote d'Voire	1970-2016	1960-2016	-	1960-2016
Djibouti	1970-2015	1970-2015	-	1960-2016
Dominican Rep.	1970-2016	1970-2016	-	1960-2016
Ecuador	1970-2016	1970-2016	-	1960-2016
Egypt	1960-2016	1960-2016	1960-2012	1960-2016
El Salvador	1970-2016	1970-2016	-	1960-2016
Equatorial Guinea	1970-2016	1970-2016	-	1960-2016
Ethiopia	1961-2016	1961-2016	1961-2011	1960-2016
Gabon	1970-2016	1970-2016	-	1960-2016
Gambia	1970-2016	1970-2016	-	1960-2016
Ghana	1960-2016	1960-2016	1960-2011	1960-2016
Grenada	1970-2016	1970-2016	-	1960-2016
Guatemala	1970-2016	1970-2016	-	1960-2016
Guinea-Bissau	1970-2016	1970-2016	-	1960-2016
Guinea	1970-2016	1970-2016	-	1960-2016
Haiti	1970-2016	1970-2016	-	1960-2016

Non-OECD Countries (Continued)

	nominal mfg. value added	real mfg. value added	mfg. employment	Population
Hong Kong	1970-2016	1970-2016	1974-2011	1960-2016
Honduras	1970-2016	1970-2016	-	1960-2016
Indonesia	1966-2016	1960-2016	1971-2012	1960-2016
India	1960-2016	1960-2016	1960-2010	1960-2016
Iran	1970-2016	1970-2016	-	1960-2016
Iraq	1970-2016	1970-2016	-	1960-2016
Jamaica	1970-2016	1970-2016	-	1960-2016
Jordan	1970-2016	1970-2016	-	1960-2016
Kenya	1960-2016	1964-2016	1969-2011	1960-2016
Lao PDR	1970-2016	1970-2016	-	1960-2016
Lebanon	1970-2016	1970-2016	-	1960-2016
Lesotho	1970-2016	1970-2016	-	1960-2016
Liberia	1970-2016	1970-2016	-	1960-2016
Madagascar	1970-2016	1970-2016	-	1960-2016
Malaysia	1970-2016	1970-2016	1975-2011	1960-2016
Mauritius	1960-2016	1970-2016	1970-2011	1960-2016
Mongolia	-	1970-2016	-	1960-2016
Mali	1970-2016	1970-2016	-	1960-2016
Malta	1970-2016	1970-2016	-	1960-2016
Malawi	1960-2016	1966-2016	1966-2010	1960-2016
Mozambique	1970-2016	1970-2016	-	1960-2016
Morocco	1970-2016	1960-2016	1960-2012	1960-2016
Mauritania	1970-2016	1960-2016	-	1960-2016
Montenegro	-	1990-2016	-	1960-2016
Myanmar	-	1970-2016	-	1960-2016
Namibia	1970-2016	1970-2016	-	1960-2016
Nepal	1970-2016	1970-2016	-	1960-2016
Nigeria	1960-2016	1960-2016	1960-2011	1960-2016
Niger	1970-2016	1970-2016	-	1960-2016
Nicaragua	1970-2016	1970-2016	-	1960-2016
Oman	1970-2015	1970-2015	-	1960-2016
Pakistan	-	1970-2016	-	1960-2016
Panama	1970-2016	1970-2016	-	1960-2016
Paraguay	1970-2016	1970-2016	-	1960-2016
Peru	1960-2016	1970-2016	1960-2011	1960-2016
Philippines	1970-2016	1970-2016	1971-2012	1960-2016
Qatar	1970-2016	1970-2016	-	1960-2016
Rwanda	1970-2016	1970-2016	-	1960-2016

Non-OECD Countries (Continued)

	nominal mfg. value added	real mfg. value added	mfg. employment	Population
South Africa	1960-2016	1960-2016	1960-2011	1960-2016
Sao Tome and Pr.	1970-2016	1970-2016	-	1960-2016
Saudi Arabia	1970-2016	1970-2016	-	1960-2016
Senegal	1970-2016	1970-2016	1970-2010	1960-2016
Seychelles	1970-2016	1970-2016	-	1960-2016
Sierra Leone	1970-2016	1970-2016	-	1960-2016
Singapore	1970-2016	1960-2016	1970-2011	1960-2016
Sri Lanka	1970-2016	1970-2016	-	1960-2016
Suriname	1970-2016	1970-2016	-	1960-2016
Syrian Arab Rep.	1970-2015	1970-2015	-	1960-2016
Thailand	1960-2016	1960-2016	1960-2011	1960-2016
Togo	1970-2016	1970-2016	-	1960-2016
Trinidad and Tobago	1970-2016	1970-2016	-	1960-2016
Tunisia	1970-2016	1970-2016	-	1960-2016
United Arab Emirates	1970-2016	1970-2016	-	1960-2016
Uganda	1970-2016	1970-2016	-	1960-2016
Uruguay	1970-2016	1970-2016	-	1960-2016
Venezuela	1960-2014	1960-2014	1960-2011	1960-2016
Vietnam	1970-2016	1970-2016	-	1960-2016
Yemen	1989-2016	1989-2016	-	1960-2016
Zambia	1960-2016	1965-2016	1965-2010	1960-2016
Zimbabwe	1970-2016	1960-2016	-	1960-2016

Appendix 2

Summary Statistics

	Obs.	Mean	Median	Max.	Min.	S.D.
Full Sample						
nominal manufacturing VA share						
Share of manufacturing.	6193	0.149	0.149	0.407	0.000	0.075
Log real GDP per capita	6193	8.686	8.692	12.409	4.959	1.276
Log population	6193	15.783	15.901	21.044	10.889	1.861
real manufacturing VA share						
Share of manufacturing.	6409	0.129	0.130	0.348	0.000	0.060
Log population	6409	8.668	8.677	12.409	4.959	1.266
Log real GDP per capita	6409	15.812	15.923	21.044	10.889	1.864
manufacturing employment share						
Share of manufacturing.	1911	0.140	0.133	0.453	0.006	0.074
Log real GDP per capita	1911	8.742	8.824	11.182	6.011	1.138
Log population	1911	17.106	17.191	19.550	13.272	1.526
OECD						
nominal manufacturing VA share						
Share of manufacturing.	1602	0.198	0.194	0.407	0.053	0.057
Log real GDP per capita	1602	9.983	10.058	11.475	7.067	0.602
Log population	1602	16.408	16.170	19.594	12.228	1.534
real manufacturing VA share						
Share of manufacturing.	1649	0.155	0.152	0.348	0.033	0.045
Log real GDP per capita	1649	9.955	10.025	11.475	7.067	0.605
Log population	1649	16.406	16.171	19.594	12.228	1.517
manufacturing employment share						
Share of manufacturing.	569	0.204	0.201	0.322	0.083	0.050
Log real GDP per capita	569	9.867	9.984	10.854	7.169	0.621
Log population	569	17.488	17.774	19.550	15.337	1.089
Non-OECD						
nominal manufacturing VA share						
Share of manufacturing.	4591	0.132	0.123	0.366	0.000	0.073
Log real GDP per capita	4591	8.234	8.162	12.409	4.959	1.130
Log population	4591	15.566	15.691	21.044	10.889	1.915
real manufacturing VA share						
Share of manufacturing.	4760	0.120	0.117	0.319	0.000	0.062
Log real GDP per capita	4760	8.222	8.137	12.409	4.959	1.122
Log population	4760	15.606	15.716	21.044	10.889	1.929
manufacturing employment share						
Share of manufacturing.	1289	0.111	0.113	0.453	0.006	0.067
Log real GDP per capita	1289	8.233	8.253	11.182	6.011	0.960
Log population	1289	16.970	17.001	21.019	13.272	1.679

Appendix 2 (Continued)

	Obs.	Mean	Median	Max.	Min.	S.D.
pre-1970s						
nominal manufacturing VA share						
Share of manufacturing.	1487	0.160	0.162	0.407	0.0030	0.084
Log real GDP per capita	1487	8.338	8.292	12.409	6.113	1.135
Log population	1487	15.611	15.657	20.692	10.889	1.919
real manufacturing VA share						
Share of manufacturing.	1580	0.126	0.128	0.332	0.0048	0.062
Log population	1580	8.356	8.320	12.409	6.113	1.134
Log real GDP per capita	1580	15.715	15.779	20.692	10.889	1.912
manufacturing employment share						
Share of manufacturing.	666	0.148	0.133	0.453	0.006	0.087
Log real GDP per capita	666	8.391	8.442	10.292	6.113	1.020
Log population	666	16.889	16.997	20.692	13.272	1.521
1980s						
nominal manufacturing VA share						
Share of manufacturing.	1231	0.156	0.164	0.359	0.0062	0.077
Log real GDP per capita	1231	8.499	8.292	12.272	6.205	1.170
Log population	1231	15.602	15.657	20.835	11.055	1.868
real manufacturing VA share						
Share of manufacturing.	1261	0.129	0.133	0.304	0.0071	0.058
Log real GDP per capita	1261	8.473	8.436	12.272	6.205	1.170
Log population	1261	15.629	15.746	20.835	11.055	1.871
manufacturing employment share						
Share of manufacturing.	390	0.147	0.146	0.412	0.015	0.080
Log real GDP per capita	390	8.647	8.700	10.497	6.533	1.025
Log population	390	17.029	17.183	20.835	13.781	1.530
1990s						
nominal manufacturing VA share						
Share of manufacturing.	1290	0.153	0.159	0.363	0.0003	0.073
Log real GDP per capita	1290	8.636	8.727	11.549	4.959	1.287
Log population	1290	15.774	15.910	20.949	11.108	1.827
real manufacturing VA share						
Share of manufacturing.	1330	0.130	0.132	0.299	0.0004	0.056
Log real GDP per capita	1330	8.611	8.679	11.549	4.959	1.281
Log population	1330	15.782	15.910	20.949	11.108	1.837
manufacturing employment share						
Share of manufacturing.	390	0.140	0.136	0.322	0.014	0.067
Log real GDP per capita	390	8.870	8.990	10.725	6.011	1.186
Log population	390	17.205	17.354	20.949	13.873	1.513

Appendix 2 (Continued)

	Obs.	Mean	Median	Max.	Min.	S.D.
post-2000s						
nominal manufacturing VA share						
Share of manufacturing.	2185	0.136	0.134	0.370	0.0032	0.066
Log real GDP per capita	2185	9.058	9.244	11.982	6.179	1.322
Log population	2185	16.008	16.132	21.044	11.304	1.812
real manufacturing VA share						
Share of manufacturing.	2238	0.131	0.131	0.348	0.0037	0.062
Log population	2238	9.032	9.208	11.982	6.179	1.308
Log real GDP per capita	2238	16.001	16.126	21.044	11.304	1.826
manufacturing employment share						
Share of manufacturing.	465	0.124	0.124	0.288	0.023	0.051
Log real GDP per capita	465	9.215	9.315	11.182	6.179	1.162
Log population	465	17.383	17.514	21.019	13.987	1.493