Premature deindustrialization risk in Vietnam

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Abstract

Purpose – This study aims to examine the premature deindustrialization risk in Vietnam.

Design/methodology/approach – This study uses a manufacturing-income relationship to conduct an empirical estimation. The latecomer index is adopted in the regression model to identify a downward shift of latecomer’s relationship.

Findings – The empirical analysis indicates that there is a risk of premature deindustrialization in the Northern Midlands and Mountain Areas. The provinces with low trade openness or foreign direct investment may experience risk of premature deindustrialization.

Practical implications – This study proposes technology diffusion as a policy direction to prevent premature deindustrialization. Furthermore, the Vietnamese government should improve the business environment in the Northern Midlands and Mountain Areas by promoting and attracting export-oriented foreign direct investment.

Originality/value – This study is the first to examine premature deindustrialization in Vietnam based on provincial-level data.

Keywords Premature deindustrialization, Vietnam, Technology diffusion, Latecomer index

Paper type Research paper

1. Introduction

Premature deindustrialization is an economic phenomenon in developing countries that occurs when manufacturing reaches a peak at a much lower income level and share than early industrializers in terms of employment and output (Dasgupta and Singh, 2007; Rodrik, 2016). According to Petty–Clark’s Law, deindustrialization and the transition to a service economy have been considered as proof of development (Clark, 1940). However, the recent premature deindustrialization in developing countries constrains their development by removing all the channels that accelerate economic growth, such as economies of scale, learning by doing and unconditional labor productivity convergence (Kaldor, 1967; Rodrik, 2013, 2016).

According to Dasgupta and Singh (2007), Latin American and African economies have experienced “pathological” deindustrialization. Additionally, Rodrik (2016) noted that Latin American and Sub-Saharan African countries have suffered from premature deindustrialization, while Asian countries with comparative advantages in manufacturing have been insulated from this trend. However, recent research has found that some Asian countries have been experiencing bad deindustrialization (Andriyani and Irawan, 2018; Islami and Hastiadi, 2020; Rasiah, 2011; Taguchi and Tsukada, 2022).

Among the Association of South East Asian Nations (ASEAN), the Vietnamese economy has performed well. The average GDP growth rate of Vietnam between 2011 and 2020 was
6.0%, which was lower than Lao PDR (6.8%), Myanmar (6.2%) and Cambodia (6.1%). However, it was the highest among the ASEAN-5 (Indonesia, Malaysia, the Philippines, Thailand and Vietnam). Over the last decade, per capita gross domestic product (GDP) increased from USD 1,525 to USD 2,786. This stable development has been brought about by the expansion of manufacturing, as shown by the increase in manufacturing output (12.4% in 2011 to 17.4% in 2020) and employment (13.9% in 2011 to 21.1% in 2020). Vietnam’s growth can be attributed to its manufacturing sector.

However, the question arises as to how seriously premature deindustrialization will affect Vietnam. From an economic perspective, Vietnam may lose its manufacturing advantage (for example, scale economies, learning by doing and unconditional convergence), and its growth may come to a halt. From a political perspective, Vietnam may face an increase in its social instability, as noted in Rodrik (2016). This poses a serious challenge to the country’s economy.

Although this study follows the concept and empirical framework of premature deindustrialization proposed by Rodrik (2016), it differs from previous studies. First, this study examines the risk of premature deindustrialization in Vietnam based on provincial-level data. It focuses on manufacturing output since output deindustrialization tends to occur more frequently in developing countries than in developed countries. However, this study does not consider employment, which is common in both categories. Second, during the early 2000s, Indonesia’s manufacturing ratio peaked, when its per capita GDP was approximately USD 1,000 (Andriyani and Irawan, 2018). Despite Vietnam’s per capita GDP being USD 2,786 in 2020, no study has yet been conducted on the premature deindustrialization risks in Vietnam. In the early stages of industrialization, it may be difficult to derive a clear inverted U-shaped curve in terms of the manufacturing ratio and per capita GDP (or GRP). In order to overcome this obstacle, this study uses the Latecomer Index (LAC Index) with reference to Taguchi and Tsukada (2022). The annual LAC Index is calculated by comparing a country or province’s GDP (or GRP) per capita with that of a benchmark country or province. The LAC Index’s adoption in empirical estimations can identify the downward shift of latecomers’ manufacturing–income relationship. This is the symptom of premature deindustrialization. Third, this study analyzes the premature deindustrialization risk and proposes a policy direction to mitigate or avoid it.

The remainder of this study is structured as follows. In Section 2, we review the literature on premature deindustrialization. Section 3 empirically analyzes the data to examine the risk of premature deindustrialization in Vietnam. Finally, Section 4 proposes policy directions, and Section 5 concludes the study.

2. Literature review and contribution
This section reviews the literature related to premature deindustrialization.

In the literature, premature deindustrialization is defined as an economic phenomenon in which developing countries transition into service economies without undergoing a comprehensive industrialization experience. In other words, premature deindustrialization is characterized by a reduced level of industrialization in developing countries, whereas the advanced countries have already been in the post-industrialization phase of development for decades (Dasgupta and Singh, 2007; Rodrik, 2016; Taguchi and Tsukada, 2022).

Dasgupta and Singh (2007) focused only on employment, not output, and noted that deindustrialization is not necessarily a pathological phenomenon. For instance, in India, the services related to information and communication technology (ICT) have been regarded as a new growth engine. Similarly, East Asian countries have avoided pathological deindustrialization through government support for science and technology to knowledge-based industries and services. In contrast, Latin America and Africa have been experiencing...
a pathological situation. It is because they have specialized in their current comparative advantage rather than their long-term dynamic comparative advantage.

Rodrik (2016) refined the argument of premature deindustrialization by describing it as the early contraction of manufacturing employment and output in developing countries through a theoretical model and empirical estimation. Rodrik (2016) presented a simple two-sector model, which divided the economy into manufacturing and non-manufacturing, resulting in a different outcome between a closed economy and a small open economy. He assumed net manufacturing exports (x) to be exogenous and manufacturing price ($P_m$) to be endogenous in a closed economy, whereas in a small open economy, which remains a price taker in the world market, $P_m$ to be exogenous and x to be endogenous. In this model, a closed economy is represented by advanced countries, and a small open economy is represented by developing countries that liberalize trade. Under globalization, all countries experience a decline in the relative manufacturing price ($P_m < 0$) when the global supply of manufacturers exceeds that of non-manufacturers with manufacturing-technological progress. In this case, price-takers with less technological progress in manufacturing (an increase in $\theta_m - \theta_n$ is smaller than a decrease in $P_m$) suffer declines in the manufacturing output share. Only countries with sufficient productivity growth in manufacturing to offset the relative price decline (having a comparative advantage in manufacturing) can avoid premature deindustrialization, as shown in Table 1.

Rodrik (2016) also provided empirical estimations and identified the following results. Late industrializers achieve lower peak industrialization levels (measured by the share of manufacturing employment and output) as compared to early industrializers, at lower income levels (the post-1990 peak income levels are around 40% of the pre-1990 ones). Latin American and Sub-Saharan African countries have been hit hard by premature deindustrialization among the developing countries. However, Asian countries with comparative advantages in manufacturing have managed to avoid this trend.

There have been several regional or country-specific studies on premature deindustrialization. For Latin America, Castillo and Neto (2016) argued that Argentina, Brazil and Chile faced premature deindustrialization due to their specialization in commodities, resource-based manufacturing and low productivity services. According to Imbs (2013), deindustrialization in Sub-Saharan Africa has been associated with the rising importance of extractive activities. These studies support the existence of premature deindustrialization and Dasgupta and Singh’s (2007) as well as Rodrik’s (2016) analysis.

| Effects on | Technology shock | Trade shock | Domestic demand shock |
|------------|------------------|-------------|----------------------|
| (1) Closed economy | $\theta_m - \theta_n > 0$ | $dx < 0$ | $- -$ |
| Employment share | - | - | - |
| Real output share | + | - | - |

| Effects on | Technology shock | External price shock | Domestic demand shock |
|------------|------------------|----------------------|----------------------|
| (2) Small open economy | $\theta_m - \theta_n > 0$ | $P_m < 0$ | $- 0$ |
| Employment share | + | - | 0 |
| Real output share | + | - | 0 |

**Note(s):** $\theta_m$ and $\theta_n$: productivity of manufacturers and non-manufacturers, respectively; dx: Net exports of manufactured goods; and $P_m$: Prices of manufactured goods

**Source(s):** Rodrik (2016)
However, some studies identified the existence of premature deindustrialization in Asian developing countries. For instance, Rasiah (2011) confirmed that Malaysia has been experiencing negative deindustrialization. Furthermore, Andriyani and Irawan (2018) as well as Islami and Hastiadi (2020) reported premature deindustrialization in Indonesia. Additionally, Taguchi and Tsukada (2022) implied that there was a risk of premature deindustrialization in Asian countries, particularly in South Asian countries.

3. Empirical analysis on the risk of premature deindustrialization
This section illustrates an empirical analysis to verify the risk of premature deindustrialization in Vietnam.

3.1 Observation on trends in the share of manufacturing output by Vietnamese province
The observation covers 63 provinces in Vietnam. Figure 1 shows their manufacturing–income relationship, with nominal GRP per capita on the horizontal axis and the real manufacturing ratio on the vertical axis. The provincial data are retrieved from a statistical yearbook published by the General Statistics Office in Vietnam. Real GRP and real manufacturing output are converted to a single time series version (2010 constant price) according to the UN’s backcasting method for the National Accounts Main Aggregates Database. When time-series overlap for at least one year, the overlapping year is used to create a ratio that is applied backwards to the previous version of the time-series. Table 2 shows the data coverage for each province and regional classification.

Figure 1 shows that manufacturing–income trajectories vary by region and province. For example, as per capita GDP increases in the Red River Delta and Mekong River Delta provinces, the real manufacturing ratio also increases. In contrast, manufacturing–income trajectories in some provinces of Northern Midlands and Mountain Area as well as Central Highlands tend to shift downward. This implies the possibility of premature deindustrialization risk. Therefore, these shifting patterns need to be further assessed econometrically using the LAC index, controlling for income and demographic trends.

3.2 Econometric analysis: methodology
This subsection conducts an economic analysis to verify the risk of premature deindustrialization in Vietnam. The regression model is derived from Rodrik (2016) and Taguchi and Tsukada (2022) but modified for analytical reasons as follows:

\[
\text{man}_it = \gamma_0 + \gamma_1 \ln PCY_{it} + \gamma_2 (\ln PCY_{it})^2 + \gamma_3 \ln POP_{it} + \gamma_4 (\ln POP_{it})^2 + \varphi_1 LAC_{it} + \varphi_2 LAC_{it} \ast d00 + \varphi_3 LAC_{it} \ast d10 + f_i + f_t + \varepsilon_{it}
\]

where the subscripts \( i \) and \( t \) denote provinces and years, respectively; \( \text{man} \) stands for the real manufacturing ratio; \( PCY \) and \( POP \) show a province’s per capita GRP and population size, respectively; \( LAC \) denotes the Latecomer index; \( d00 \) and \( d10 \) represent time dummies for 2000–2018 and 2010–2018, respectively; \( f_i \) and \( f_t \) show a time-invariant province-specific fixed effect and a province-invariant time-specific fixed effect, respectively; \( \varepsilon_{it} \) denotes a residual error term; \( \gamma_{0..4} \) and \( \varphi_{1..3} \) stand for estimated coefficients and \( \ln \) shows a logarithm form.

The LAC index represents the level of development in a particular province. In a given year, it is computed by the ratio of the GRP per capita of a certain province to that of the benchmark province (TP. Ho Chi Minh). The significance and sign of the LAC index (\( \varphi \)) coefficient are critical for identifying premature deindustrialization risk. A significantly positive \( \varphi \) may indicate the existence of a premature deindustrialization risk. It implies that a province’s later development is linked with a lower manufacturing ratio, which indicates a
downward shift of manufacturing–income relationship. This downward shift suggests that a manufacturing ratio of a latecomer province peaks at a lower income level than that of the benchmark province. The equation contains the LAC index cross-terms and time dummies for 2000–2018 (d00) and for 2010–2018 (d10) since the latecomer’s effect appears to be affected by globalization.

In general, the Hausman-test statistic is utilized to differentiate between a fixed-effect and a random-effect (Hausman, 1978). However, this study emphasizes the existence of
exogenously given province-specific and time-specific factors. For example, consider that geography, endowments and history differ across provinces and are correlated with manufacturing output ratios. Furthermore, consider the possibility that economic fluctuations due to external shocks affected manufacturing activity in Vietnam. Then, a specification that does not account for these effects would lead to an inefficient estimation. They should be controlled by equipping country-specific and time-specific fixed effects.

The descriptive statistics for the data are presented in Table 3.
| Region                                      | Province                     | Data coverage                                      |
|---------------------------------------------|------------------------------|---------------------------------------------------|
| Red River Delta                             | Hanoi                        | 2008–2013, 2017–2018                              |
|                                             | Vinh Phúc                     | 2004–2018                                         |
|                                             | Bạc Ninh                     | 1997–2018                                         |
|                                             | Quảng Ninh                    | 2015–2018                                         |
|                                             | Hải Dương                    | 2010–2017                                         |
|                                             | Hải Phòng                    | 2012–2018                                         |
|                                             | Hưng Yên                    | 2015–2018                                         |
|                                             | Thái Bình                    | 2010–2018                                         |
|                                             | Hà Nam                       | 1999, 2005–2018                                   |
|                                             | Nam Định                     | 2005–2018                                         |
|                                             | Ninh Bình                     | 1999, 2003–2018                                   |
|                                             | Vĩnh Phúc/C19                 | 2004–2018                                         |
|                                             | Bắc Ninh                      | 1997–2018                                         |
|                                             | Thừa Thiên-Huế                 | 2015–2018                                         |
|                                             | Phú Thọ                       | –                                                 |
|                                             | Đồ Sơn                       | 2016–2018                                         |
|                                             | Hòa Bình                     | 2011–2018                                         |
|                                             | Thanh Hóa                     | 2011–2018                                         |
|                                             | Nghệ An                       | 2015–2018                                         |
|                                             | Hà Tĩnh                       | 2006–2018                                         |
|                                             | Quảng Bình                     | 2017–2018                                         |
|                                             | Quảng Trị                      | 1995–2018                                         |
|                                             | Thừa Thiên-Huế                | 2015–2018                                         |
|                                             | Đà Nẵng                     | 2009–2018                                         |
|                                             | Quảng Nam                     | 2004–2018                                         |
|                                             | Quảng Ngãi                     | 2010–2018                                         |
|                                             | Bình Định                     | 2009–2018                                         |
|                                             | Phú Yên                       | 2015–2018                                         |
|                                             | Khánh Hòa                     | 2012–2018                                         |
|                                             | Ninh Thuận                    | 2010–2018                                         |
|                                             | Bình Thuận                    | 2002–2014                                         |
|                                             | Kon Tum                       | 2009–2018                                         |
|                                             | Gia Lai                       | 2007–2013                                         |
|                                             | Đắk Lắk                      | 2010–2018                                         |
|                                             | Đắk Nông                      | 2009–2018                                         |
|                                             | Lâm Đồng                     | 1999–2018                                         |
|                                             | Bình Phước                    | 2000, 2003–2005, 2007–2010, 2015–2018             |
|                                             | Tây Ninh                      | 2000–2014                                         |
|                                             | Bình Dương                     | 2002–2018                                         |
|                                             | Đồng Nai                      | 2010–2018                                         |
|                                             | Bà Rịa–Vũng Tàu               | 2007–2018                                         |
|                                             | TP. Hồ Chí Minh               | 1992–2018                                         |
|                                             | Long An                       | 2010–2013                                         |
|                                             | Tiền Giang                    | 2005–2018                                         |
|                                             | Bến Tre                       | 2015–2018                                         |
|                                             | Trà Vinh                      | 2014–2018                                         |
|                                             | Vĩnh Long                      | 2000–2012                                         |
|                                             | Đồng Tháp                     | 2000–2013                                         |
|                                             | An Giang                      | 2001–2018                                         |
|                                             | Kiên Giang                    | 2015–2018                                         |
|                                             | Cần Thơ                       | 2005–2018                                         |
|                                             | Hậu Giang                     | 2014–2018                                         |
|                                             | Sóc Trăng                      | 2005–2010, 2012–2018                              |
|                                             | Bạc Liêu                      | 2015–2018                                         |
|                                             | Cà Mau                         | 2011–2014                                         |

**Source(s):** General Statistics Office

**Table 2.**

Regional classification and data coverage in Vietnam.
| Region                                | Variables | Obs. | Median | Std. Dev. | Min. | Max. |
|---------------------------------------|-----------|------|--------|-----------|------|------|
| Whole Country                         | man(real, %) | 562  | 12.03  | 14.10     | 0.70 | 70.06|
|                                       | PCY(million VND) | 562  | 28.77  | 39.66     | 1.82 | 304.85|
|                                       | POP(thousand)   | 562  | 1162.80| 1427.49   | 294.60| 8598.70|
|                                       | LAC           | 562  | 0.30   | 0.46      | 0.17 | 5.79 |
| Red River Delta                       | man(real, %) | 103  | 25.14  | 15.20     | 7.67 | 70.06|
|                                       | PCY(million VND) | 103  | 35.88  | 34.88     | 3.18 | 155.43|
|                                       | POP(thousand)   | 103  | 1188.90| 1547.59   | 786.20| 7520.70|
|                                       | LAC           | 103  | 0.37   | 0.26      | 0.19 | 0.19 |
| North Central and Central Coastal Areas | man(real, %) | 124  | 11.22  | 11.80     | 1.11 | 51.88|
|                                       | PCY(million VND) | 124  | 30.65  | 18.45     | 1.82 | 93.83|
|                                       | POP(thousand)   | 124  | 1194.25| 746.48    | 534.90| 3544.40|
|                                       | LAC           | 124  | 0.29   | 0.19      | 0.19 | 0.19 |
| Central Highlands                     | man(real, %) | 74   | 17.83  | 17.48     | 15.93| 59.83|
|                                       | PCY(million VND) | 74   | 43.48  | 43.80     | 17.08| 8598.70|
|                                       | POP(thousand)   | 74   | 1730.80| 2595.49   | 74   | 8598.70|
|                                       | LAC           | 74   | 0.49   | 0.35      | 0.25 | 0.35 |
| South East                            | man(real, %) | 74   | 3.44   | 4.06      | 1.42 | 15.20|
|                                       | PCY(million VND) | 74   | 26.49  | 14.56     | 14.56| 354.90|
|                                       | POP(thousand)   | 74   | 2784.00| 2164.20   | 74   | 2784.00|
|                                       | LAC           | 74   | 0.20   | 0.12      | 0.30 | 0.12 |

Source(s): General Statistics Office

Table 3.
Descriptive statistics
3.3 Econometric analysis: results and discussions

Table 4 reports the estimation results. In all the cases, $\gamma_1 < 0$ and $\gamma_2 > 0$ holds significantly. This does not indicate the existence of an inverted U-shaped relationship between a country’s manufacturing output ratio and its GRP per capita. It may be because of the following two reasons. First, Vietnam is an emerging country classified as a lower middle income country and undergoing industrialization. Second, the sample periods for several provinces are too short to determine a clear inverted U-shaped pattern.

The coefficients for the LAC index (LAC) with the post-2000 dummies and without time-dummy are not significant. Only the LAC index coefficients with the post-2010 dummy are positive, but the level of confidence is 90%. These results indicate no sign of a premature deindustrialization risk in Vietnam. The subsequent estimations focus on the regional analysis.

Table 5 reveals the estimation results by dividing Vietnam’s provinces into six regions (Red River Delta, Northern Midlands and Mountain Areas, North Central and Coastal Area, Central Highland, South East and Mekong River Delta) based on the General Statistics Office classification. Essentially, this division is intended to observe the difference in premature deindustrialization risks across regions and indications of bad deindustrialization precisely.

According to the estimation results, in the Red River Delta and Central Highland, $\gamma_1 > 0$ and $\gamma_2 < 0$, hold significantly a 95% confidence level and a 99% confidence level, respectively. This indicates that an inverted U-shaped relationship exists between a province’s manufacturing output ratio and its GRP per capita. However, in the Northern Midlands and Mountain Areas, $\gamma_1$ is negative with a 95% confidence level, and $\gamma_2$ is positive without a confidence level. This indicates that an inverted U-shaped relationship does not exist in this region. This may be the case since Northern Midlands and Mountain Areas is the most emerging region as shown in Table 3 and in the process of undergoing industrialization.

The LAC index coefficients for the Northern Midlands and Mountain Areas are positive, with a 99% level of confidence. The level of confidence is only 90% in North Central and Central Coastal Areas. However, the Mekong River Delta is negative, with a 95% level of confidence. These results imply that premature deindustrialization risk in Vietnam varies across regions, and the Northern Midlands and Mountain Areas is highly exposed to the risk of premature deindustrialization.

The results of the analysis thus far can be summarized as follows. There is no reason to conclude that Vietnam is facing the risk of premature deindustrialization. However, that risk has become apparent in a few regions, especially in the Northern Midlands and Mountain Areas, where measures must be taken to promote industrialization.

| man | (1) | (2) | (3) |
|-----|-----|-----|-----|
| ln PCY | $-81.913^{***} (-3.526)$ | $-81.907^{***} (-3.521)$ | $-65.373^{***} (-2.622)$ |
| $(\ln \text{PCY})^2$ | $2.603^{***} (3.866)$ | $2.603^{***} (3.861)$ | $2.07^{**} (2.825)$ |
| ln POP | $325.189^{***} (4.348)$ | $324.822^{***} (4.123)$ | $320.691^{***} (4.079)$ |
| $(\ln \text{POP})^2$ | $11.229^{***} (-4.202)$ | $11.216^{***} (-3.973)$ | $11.089^{***} (-3.936)$ |
| LAC | $-1.375 (-0.993)$ | $-1.298 (-0.243)$ | $-0.748 (-0.140)$ |
| LAC*d00 | $-0.078 (-0.015)$ | $1.385 (0.264)$ |
| LAC*d10 | $3.343^{***} (1.810)$ |
| Province Fixed Effects | Yes | Yes | Yes |
| Period Fixed Effects | Yes | Yes | Yes |
| Number of Provinces | 62 | 62 | 62 |
| Number of Observation | 562 | 562 | 562 |

**Note(s):** ‘***’, ‘**’, ‘*’ denote the rejection of null hypothesis at the 99%, 95% and 90% level of significance in the coefficients. $T$-statistics are in parentheses.

**Source(s):** Author estimation

Table 4. Estimation results: real manufacturing output ratio and its GRP per capita.
According to Rodrik (2016), the primary cause of premature deindustrialization in developing countries was a lack of technological advancement in the manufacturing sector compared to advanced countries. This could only be prevented in countries with sufficient productivity growth. In developing countries, it can be challenging for local enterprises to promote technology advancement on their own. There is no alternative but to rely on technology diffusion from advanced countries. Previous studies have suggested that trade and foreign direct investment promote technology diffusion in developing countries (Blomström and Sjöholm, 1999; Chuang and Lin, 1999; Coe et al., 1997; Kokko, 1994; Sjöholm, 1998; Takii, 2005; Todo, 2008; Van Biesebroeck, 2005).

Table 6 reports the estimation outcomes based on Equation (1). This estimation categorizes provinces into three groups (upper, middle, and lower) based on their trade openness and foreign direct investment. Trade openness is calculated as the ratio of trade value (export plus import) to GRP. Human interaction is one of the main routes for technology diffusion. Therefore, foreign direct investment is measured as the number of investments per capita. Moreover, data on trade statistics and foreign direct investment are retrieved from the General Statistical Office and Vietnam Customs.

Based on the estimation results regarding trade openness and foreign direct investment, the coefficients for the LAC index (LAC) are negative in the upper 1/3 of provinces. Conversely, those in the lower 1/3 of provinces are positive with a 99% confidence level. According to Table 7, Northern Midlands and Mountain Areas are included in these lower 1/3 groups.

In light of these analyses, it appears that the provinces that receive more export-oriented foreign direct investment are less exposed to the risk of premature deindustrialization, while those that receive less export-oriented foreign direct investment are more at risk.
Perkins and Vu (2009) observed that industrial investment by foreign enterprises was concentrated in specific locations, specifically around the Hanoi–Haiphong area and Ho Chi Minh City, and this was attributed to weak transport infrastructure in Vietnam.

4. Policy direction

Based on the analyses and discussion in Section 3, the Vietnamese government should improve the business environment of the Northern Midlands and Mountain Areas to attract more export-oriented foreign direct investments and prevent premature deindustrialization. Both the soft and the hard aspects of the business environment should be improved. The soft side includes land access and tenure, time costs, as well as informal charges as improvement points, while the hard side includes not only the infrastructure that has been denoted by Perkins and Vu (2009), but also the development of industrial parks, as shown in Figures 2 and 3.

Although there are many mountainous regions in the Northern Midlands and Mountain Areas, some of these provinces border China. Therefore, the “China Plus One” movement can be a great opportunity for the Northern Midlands and Mountain Areas, specifically, and for Vietnam as a whole.

5. Conclusion

This study examined the risk of premature deindustrialization in Vietnam using provincial level data. Based on Rodrik (2016), the manufacturing–income relationship is estimated.

The contributions of this study are highlighted as follows. First, this study focuses on Vietnam, which has never been analyzed in the context of premature deindustrialization.
| Region                          | Province          | Trade openness | FDI number |
|--------------------------------|-------------------|----------------|------------|
| Red River Delta                | Hanoi             |                |            |
|                                | Vinh Phúc         |                |            |
|                                | Bác Ninh          |                |            |
|                                | Quảng Ninh        |                |            |
|                                | Hải Dương         |                |            |
|                                | Hải Phòng         |                |            |
|                                | Hưng Yên          |                |            |
|                                | Thái Bình          |                |            |
|                                | Hà Nam             |                |            |
|                                | Nam Định          |                |            |
|                                | Ninh Bình          |                |            |
|                                | Cao Bằng           | Lower          | Lower      |
|                                | Bắc Kạn            | Lower          | Lower      |
|                                | Tuyên Quang        | Lower          | Lower      |
|                                | Lào Cai            | Lower          | Lower      |
|                                | Yên Bái            | Lower          | Lower      |
|                                | Thái Nguyên         |                |            |
|                                | Lang Sơn           |                |            |
|                                | Bắc Giang          |                |            |
|                                | Phú Thọ            |                |            |
|                                | Điện Biên Phú      | Lower          | Lower      |
|                                | Lai Châu            | Lower          | Lower      |
|                                | Sơn La             | Lower          | Lower      |
|                                | Hòa Bình            |                |            |
| Northern Midlands and Mountain Areas | Hậu Giang         | Lower          | Lower      |
|                                | Cao Bằng           | Lower          | Lower      |
|                                | Bắc Kạn            | Lower          | Lower      |
|                                | Tuyên Quang        | Lower          | Lower      |
|                                | Lào Cai            | Lower          | Lower      |
|                                | Yên Bái            | Lower          | Lower      |
|                                | Thái Nguyên         |                |            |
|                                | Lang Sơn           |                |            |
|                                | Bắc Giang          |                |            |
|                                | Phú Thọ            |                |            |
|                                | Điện Biên Phú      | Lower          | Lower      |
|                                | Lai Châu            | Lower          | Lower      |
|                                | Sơn La             | Lower          | Lower      |
|                                | Hòa Bình            |                |            |
| North Central and Central Coastal Areas | Thanh Hóa          | Lower          | Lower      |
|                                | Nghệ An            | Lower          | Lower      |
|                                | Hà Tĩnh            | Lower          | Lower      |
|                                | Quảng Bình          | Lower          | Lower      |
|                                | Quảng Trị           | Lower          | Lower      |
|                                | Thừa Thiên Huế      |                |            |
|                                | Đà Nẵng          |                |            |
| North Central and Central Coastal Areas | Quảng Nam          | Lower          | Lower      |
|                                | Quảng Ngãi          | Lower          | Lower      |
|                                | Bình Định          | Lower          | Lower      |
|                                | Phú Yên            | Lower          | Lower      |
|                                | Khánh Hòa          |                |            |
|                                | Ninh Thuận         | Lower          | Lower      |
|                                | Bình Thuận         |                |            |
| Central Highlands              | Kon Tum            | Lower          | Lower      |
|                                | Gia Lai            | Lower          | Lower      |
|                                | Đắk Lắk          |                |            |
|                                | Đắk Nông           | Lower          | Lower      |
|                                | Lâm Đồng           | Lower          | Lower      |
|                                | Bình Phước         |                |            |
|                                | Tây Ninh           |                |            |
|                                | Bình Dương         |                |            |
|                                | Đồng Nai           |                |            |
|                                | Bà Rịa–Vũng Tàu   |                |            |
|                                | TP. Hồ Chí Minh    |                |            |

Table 7. Classification by trade openness and FDI number (continued)
| Region | Province | Trade openness | FDI number |
|--------|----------|----------------|------------|
| Mekong River Delta | Long An | Lower | Lower |
| | Tiên Giang | Lower | Lower |
| | Bên Tre | Lower | Lower |
| | Trà Vinh | Lower | Lower |
| | Vinh Long | Lower | Lower |
| | Đồng Tháp | Lower | Lower |
| | An Giang | Lower | Lower |
| | Kiên Giang | Lower | Lower |
| | Cần Thơ | Lower | Lower |
| | Hậu Giang | Lower | Lower |
| | Sóc Trăng | Lower | Lower |
| | Bạc Liêu | Lower | Lower |
| | Cà Mau | Lower | Lower |

Source(s): General Statistics Office, Vietnam Customs

Table 7.

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![Diagram showing the competitiveness index of provinces in Vietnam](image)

**Source(s):** PCCI

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![Graph showing industrial park risk in Vietnam](image)

**Source(s):** JETRO, Japan ASEAN Centre
Second, the LAC index, which in a given year is expressed as the ratio of a province’s GRP per capita relative to that of a benchmark province, is adapted in the estimation in order to allow identification of downwards shift in latecomers’ manufacturing–income relationship. Third, an approach to avoid premature deindustrialization is proposed from the perspective of technology diffusion.

The main findings from the empirical estimations are summarized as follows. First, the estimation results suggested that although it could not be concluded that Vietnam is facing premature deindustrialization risk, this risk is becoming apparent in the Northern Midlands and Mountain Areas. Second, provinces with a low level of trade openness or foreign direct investment are at a risk of premature deindustrialization. Several provinces in the Northern Midlands and Mountain Areas exhibit these characteristics. Third, to prevent premature deindustrialization, the Vietnamese government needs to improve both the soft and hard sides of business environment in the Northern Midlands and Mountain Areas and encourage export-oriented foreign direct investments.

This study provided an empirical analysis and several policy implications. In the future, it will be necessary to make more specific policy recommendations based on case studies in each of these regions.

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