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Revisiting industrialization in Asia's middle-income economies: The interplay of natural resources and institutional quality

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Abstract

This study examines the impact of natural resource dependence and institutional quality on manufacturing value added in middle-income Asian countries. We analyze panel data from 20 countries spanning 2006 to 2021 using the panel autoregressive distributed lag (ARDL) method to assess short- and long-term relationships. The findings indicate that, in the short term, natural resource rents do not significantly influence manufacturing value added, implying that resource dependence does not immediately affect industrial performance. In contrast, stronger control of corruption and greater trade openness have positive and significant effects on manufacturing development. Over the long term, the results support the resource curse theory, as natural resource rents have a significant negative impact on manufacturing value added. Measures of institutional quality, including control of corruption, political stability, and voice and accountability, also demonstrate negative long-term effects on manufacturing performance. These outcomes underscore the necessity for robust policy interventions in developing economies to mitigate the adverse consequences of heavy reliance on natural resources. Strengthening accountability, regulatory certainty, legal enforcement, and transparent governance is essential to attract investment and foster investor confidence in the industrial sector.

Keywords: Natural resource dependence; institutional quality; manufacturing value added

1. Introduction

Industrialization remains a central pathway for structural transformation and long-term economic development. The expansion of manufacturing has been closely associated with higher productivity, employment creation, and rising incomes, while countries that have been unable to diversify into manufacturing have faced greater difficulties in achieving sustained economic transformation. Manufacturing is therefore widely regarded as an important engine of development, particularly for economies seeking to move from middle- to high-income status and avoid prolonged periods of middle-income stagnation (Aiyar *et al.*, 2018; Felipe *et al.*, 2019; Ito, 2016; Szirmai, 2012). Although the structure of economic transformation is changing, with services increasingly contributing to productivity and growth, many developing economies continue to face constraints in building productive and competitive manufacturing sectors (International Monetary Fund. Research Dept., 2018; Rodrik, 2015). Consequently, strengthening manufacturing capacity remains relevant to the broader objectives of structural transformation and Sustainable Development Goal 9, which emphasizes industry, innovation, and infrastructure (UNIDO, 2025).

These challenges are particularly relevant for middle-income economies in Asia. The region has experienced substantial variation in the pace and pattern of industrialization despite the growing importance of Asian economies in global production and trade. Some economies, such as Singapore and Malaysia, have developed relatively strong manufacturing capabilities through export-oriented industrial policies, investment in infrastructure and human capital, as well as integration into global

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value chains. Other economies, including Indonesia, the Philippines, and Thailand, have experienced less consistent industrial development, partly reflecting challenges related to policy coordination, dependence on foreign investment, and limited domestic innovation. Such differences suggest that industrialization is not determined solely by a country's resource endowments or market conditions. The institutional environment in which economic resources are allocated may also shape an economy's capacity to develop manufacturing activities.

The share of global manufacturing attributed to high-income industrialized countries has gradually declined (see Figure 1). In 2000, these countries accounted for approximately 75.4 percent of total global manufacturing, but by 2024, their share is projected to decrease to about 48.7 percent, despite continued absolute growth in manufacturing value added. In contrast, low-income countries maintain a relatively stagnant share, accounting for only about 0.3 percent of global manufacturing. Middle-income countries display a similar stagnation in their share over the long term. These shifts in the distribution of global manufacturing activities highlight persistent inequalities in the progress of industrialization among countries.

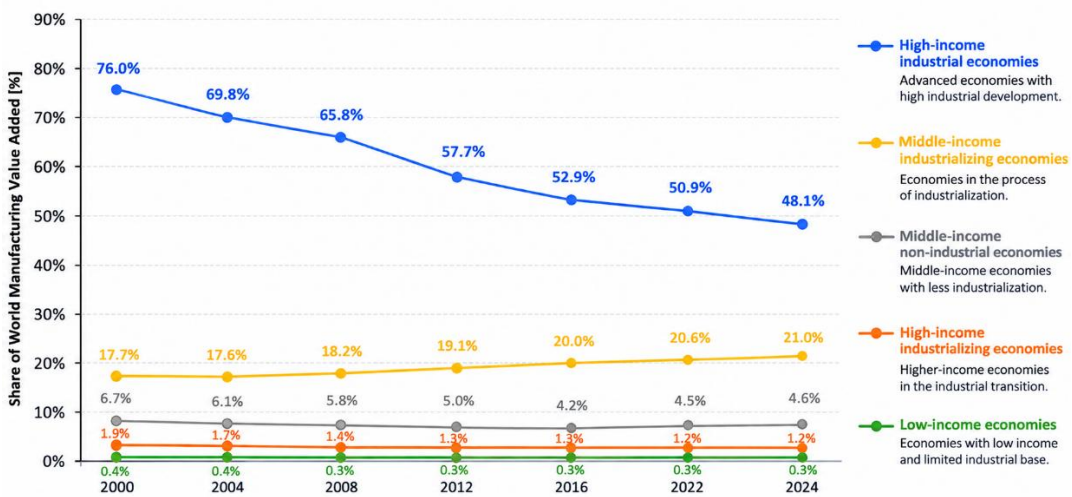

Figure 1. Share of world manufacturing value added between 2000 and 2024
Source: World Bank Group (2026)

One important structural factor that may influence industrialization is dependence on natural resources. The resource curse hypothesis proposes that economies with substantial natural resource endowments may experience weaker long-term economic performance than less resource-dependent economies (Sachs and Warner, 1995). A key mechanism underlying this relationship is the Dutch disease effect. An expansion of natural resource exploitation can increase domestic income and demand, generate real exchange-rate appreciation, and raise the relative cost of producing non-resource goods. At the same time, labor, capital, and other productive resources may shift toward the more profitable resource sector. These mechanisms can reduce the international competitiveness of manufacturing and crowd out productive activities that are important for structural transformation (Papyrakis and Gerlagh, 2004). Empirical evidence, however, remains mixed. While some studies find no evidence of a resource curse or even identify positive long-term effects of natural resources, others document adverse effects on industrialization and economic performance across developing, resource-rich, and regional economies (Amiri *et al.*, 2019; Arin and Braunfels, 2018; Awoa Awoa and Ondoa, 2024; Nkemgha *et al.*, 2022).

The role of institutions provides a complementary perspective on this relationship. Institutional quality can influence the incentives facing firms and investors, the allocation of productive resources, and the effectiveness of economic policies. Previous studies have established a relationship between institutional quality and economic growth. Still, considerably less attention has been given to how specific dimensions of institutional quality affect industrialization and manufacturing development, particularly in Asian economies. This distinction is important because institutional quality is multidimensional. Political stability, control of corruption, and voice and accountability may influence manufacturing development through different channels, including the predictability of the business

environment, the effectiveness of public administration, and the incentives for private investment and productive activity. Evidence from Asian economies also suggests that differences in governance and policy coordination are associated with differences in manufacturing performance (Haraguchi *et al.*, 2019). Thus, examining institutional quality alongside natural resource dependence provides a more comprehensive perspective on the factors shaping industrial development.

Despite the growing literature on natural resources, institutions, and economic performance, an important empirical gap remains. Existing studies have examined the relationship between natural resource dependence and industrialization across various regions, including Sub-Saharan Africa, post-Soviet economies, Central Asia and Europe, and other developing countries (Awoa Awoa and Ondoa, 2024; Horváth and Zeynalov, 2016; Nkemgha *et al.*, 2022; Xue *et al.*, 2023). Similarly, institutional quality has been widely investigated in relation to economic growth, but fewer studies directly examine its role in manufacturing development. More importantly, limited evidence simultaneously considers both natural resource dependence and specific dimensions of institutional quality to explain manufacturing performance in middle-income Asian economies. The existing literature also provides insufficient evidence on whether these relationships differ between the short and long run. Addressing this gap is particularly important because the mechanisms associated with resource dependence and institutional quality may take time to influence manufacturing performance.

This study is theoretically positioned at the intersection of the resource curse hypothesis and the institutional perspective on industrial development. The resource curse framework suggests that excessive reliance on natural resource rents can weaken manufacturing development through Dutch disease and the crowding out of productive sectors. The institutional perspective, meanwhile, emphasizes that the quality of governance can shape the incentives and conditions under which firms invest, innovate, and participate in productive economic activities. Bringing these perspectives together allows the study to examine whether natural resource dependence constrains manufacturing development and whether institutional conditions are associated with differences in industrial performance. Rather than treating institutional quality as a single aggregate concept, the study examines three dimensions (control of corruption, political stability, and voice and accountability) to capture potentially distinct institutional channels.

Our study makes three main contributions to the literature. First, it extends the empirical literature on the resource curse by focusing specifically on manufacturing development in middle-income Asian economies, a setting that has received comparatively less attention than other resource-dependent regions. Second, it contributes to the literature on institutions and industrialization by examining specific dimensions of institutional quality rather than relying solely on broad governance measures. Third, by applying a panel autoregressive distributed lag (ARDL) framework, the study distinguishes between short-run and long-run effects, providing a more dynamic understanding of how natural resource dependence and institutional quality relate to manufacturing performance. These contributions help clarify the conditions under which resource endowments and institutional characteristics may support or constrain industrial transformation in middle-income Asian economies.

2. Literature review and hypothesis development

Natural resource dependence and manufacturing value added

The relationship between natural resource dependence and manufacturing development has attracted considerable attention in the literature on structural transformation and the resource curse. Manufacturing is generally regarded as an important component of structural transformation because it can facilitate productivity growth, employment creation, technological upgrading, and diversification away from primary production (Felipe *et al.*, 2019; Szirmai, 2012). For middle-income economies, the development of manufacturing is particularly important because sustained industrial upgrading can support the transition toward higher-productivity activities and help economies avoid prolonged middle-income stagnation (Aiyar *et al.*, 2018; Ito, 2016). Consequently, understanding the factors that constrain or facilitate manufacturing development is central to explaining differences in structural transformation across developing economies.

Natural resource dependence represents one potential constraint. The resource curse hypothesis argues that economies that rely heavily on natural resources may experience weaker structural transformation despite possessing substantial natural wealth (Sachs and Warner, 1995). In this context,

natural resource dependence is particularly relevant to manufacturing because resource-intensive growth may reduce the incentives and productive capacity needed to expand non-resource sectors.

A central mechanism linking natural resource dependence to manufacturing is the Dutch disease effect. An increase in natural resource exploitation can generate higher export revenues and domestic income, which may increase domestic demand and put upward pressure on the real exchange rate. Real exchange-rate appreciation makes domestically produced manufactured goods relatively more expensive in international markets, thereby reducing the competitiveness of manufacturing exports. At the same time, the expansion of the resource sector can attract labor, capital, and other productive inputs away from manufacturing because resource-related activities may offer higher returns. Increasing input costs and declining competitiveness can consequently weaken manufacturing production and investment (Papyrakis and Gerlagh, 2004). The relationship can also operate through a broader crowding-out mechanism. When natural resource rents become an important source of national income, governments and private investors may have weaker incentives to develop diversified productive sectors. Capital and policy attention may become concentrated in resource extraction rather than manufacturing, while firms outside the resource sector may face higher production costs and weaker investment incentives. Over time, such resource dependence may limit the development of domestic productive capabilities and reduce manufacturing's contribution to GDP.

However, the empirical evidence does not provide uniform support for a negative relationship. Some studies find that natural resources can contribute positively to economic performance, while others do not identify evidence of a resource curse (Arin and Braunfels, 2018). Other studies provide evidence that resource dependence can adversely affect economic performance and industrial development, including evidence from resource-rich economies, BRICS countries, West Africa, post-Soviet countries, and other developing economies (Amiri *et al.*, 2019; Asiedu *et al.*, 2021; Awoa Awoa and Ondoa, 2024; Horváth and Zeynalov, 2016; Li and Wu, 2023; Nkemgha *et al.*, 2022; Xue *et al.*, 2023). This divergence suggests that the effect of natural resource dependence on manufacturing should not necessarily be assumed to be homogeneous across countries. The mixed empirical evidence is particularly relevant when manufacturing value added is considered as the outcome. Resource dependence may generate substantial economic rents without necessarily producing a corresponding expansion of domestic manufacturing capabilities. Indeed, resource-rich economies may experience high revenues from primary commodities while facing weaker incentives to diversify and upgrade industry. The extent to which resource rents translate into manufacturing development may therefore depend on the economic and institutional conditions under which those rents are generated and allocated.

Institutional quality as a conditioning factor

The institutional environment provides an important explanation for why the relationship between natural resource dependence and manufacturing value added may differ across countries. Institutions influence how economic resources are governed, how policies are implemented, and how incentives for investment and production are created. Thus, natural resource abundance or dependence does not necessarily produce identical economic outcomes across countries. Its consequences may depend partly on the quality and effectiveness of institutions. The institutional perspective is particularly relevant to the resource curse because natural resource rents create substantial opportunities for rent-seeking and discretionary allocation of economic resources. Where institutions are weak, resource revenues may be associated with corruption, inefficient allocation, policy uncertainty, and reduced incentives for productive investment. These conditions can reinforce the crowding-out of manufacturing by directing resources toward activities that generate short-term rents rather than toward productive diversification. Conversely, stronger institutions may improve the management of resource revenues and create a more predictable environment for investment in manufacturing and other productive sectors.

Control of corruption is one important institutional dimension in this context. Corruption can increase transaction costs, distort resource allocation, and reduce the effectiveness of public policies. In resource-dependent economies, these effects may become particularly important because resource rents can provide opportunities for rent-seeking and the concentration of economic benefits. Stronger control of corruption may therefore improve the allocation of resource revenues and strengthen incentives for investment in productive sectors, including manufacturing. Political stability represents another

potentially important institutional condition. Manufacturing investment typically requires relatively long planning horizons, substantial fixed investment, and expectations of stable economic and regulatory conditions. Political instability can increase uncertainty and discourage firms from making long-term investments in productive capacity. In resource-dependent economies, instability may also intensify competition over resource rents, potentially diverting economic resources away from manufacturing development. Greater political stability can consequently provide a more predictable environment in which resource revenues and private investment can support broader structural transformation. Voice and accountability may also influence the resource dependence–manufacturing relationship. Greater participation, transparency, and accountability can strengthen the monitoring of public resource management and reduce the scope for inefficient or discretionary allocation of resource rents. These institutional mechanisms may increase the likelihood that resource revenues are directed toward productive investment, infrastructure, human capital, and other foundations of industrial development. Conversely, weak accountability may allow resource rents to be captured by narrow interests, reducing their contribution to broad-based economic transformation.

Existing empirical studies provide support for the importance of institutions in shaping economic performance. Research has established associations between institutional quality and economic growth, while studies of industrialization emphasize the importance of governance, policy coordination, and institutional conditions for successful manufacturing development (Arvin *et al.*, 2021; Boateng *et al.*, 2021; Haraguchi *et al.*, 2019). However, institutional quality should not be viewed only as a direct determinant of manufacturing value added. Its more theoretically relevant role in the present study is that it may condition the consequences of natural resource dependence. In other words, the impact of resource dependence on manufacturing may be weaker, stronger, or otherwise different depending on the institutional environment in which resource rents are managed. This perspective provides a potential explanation for the heterogeneous findings reported in the resource curse literature.

Heterogeneity in the natural resource dependence–manufacturing relationship

The coexistence of resource-dependent economies with very different industrial outcomes suggests that natural resource dependence alone may be insufficient to explain manufacturing performance. The resource curse should therefore be understood not simply as an automatic consequence of resource abundance but as a process whose economic consequences may depend on institutional and structural conditions. From this perspective, two economies with similar levels of natural resource dependence may experience different manufacturing outcomes because their institutions differ in their ability to regulate resource rents, allocate public revenues, protect productive investment, and maintain policy credibility. In countries with weak institutions, resource dependence may intensify rent-seeking, encourage inefficient allocation, increase uncertainty, and divert capital and labor away from manufacturing. These mechanisms would reinforce the negative effect of resource dependence on manufacturing value added. In countries with stronger institutions, by contrast, resource revenues may be managed more effectively and potentially directed toward infrastructure, investment, technological upgrading, and other activities that support manufacturing development.

This institutional heterogeneity also provides a possible explanation for the mixed empirical evidence on the resource curse. The absence of a uniform negative effect in some studies does not necessarily invalidate the resource curse hypothesis. Instead, it may indicate that the effect of resource dependence varies according to country-specific institutional conditions. The same resource rents can therefore generate different structural outcomes depending on the quality of governance and the capacity of institutions to convert resource revenues into productive investment. For middle-income Asian economies, this issue is particularly relevant. The region combines substantial natural resource endowments with considerable variation in institutional quality and industrial development. The coexistence of resource-rich economies and more diversified manufacturing economies provides an appropriate setting for examining whether institutional differences help explain heterogeneity in the relationship between natural resource dependence and manufacturing value added.

Accordingly, the theoretical framework of this study combines the resource curse hypothesis with an institutional perspective. The resource curse framework provides the basis for expecting a negative relationship between natural resource dependence and manufacturing value added through Dutch disease, resource reallocation, and crowding-out mechanisms. The institutional perspective provides a basis for expecting this relationship to vary across countries with the quality of governance.

The empirical analysis, therefore, focuses on natural resource rents as the primary explanatory variable and examines control of corruption, political stability, and voice and accountability as key institutional dimensions associated with manufacturing development.

Hypothesis development

The resource curse and Dutch disease mechanisms suggest that greater dependence on natural resource rents can reduce manufacturing competitiveness and productive capacity. Resource-sector expansion can appreciate the real exchange rate, increase domestic production costs, attract productive factors toward resource activities, and reduce incentives for economic diversification. These mechanisms imply that economies with greater dependence on natural resources may have lower manufacturing value added. Although previous empirical studies report mixed results, a substantial body of evidence identifies adverse effects of resource dependence on industrialization and manufacturing-related outcomes (Awoa Awoa and Ondoa, 2024; Horváth and Zeynalov, 2016; Nkemgha *et al.*, 2022; Xue *et al.*, 2023). Thus, the following hypothesis is proposed:
H1: Natural resource dependence has a negative association with manufacturing value added.

Institutional quality can affect manufacturing development by shaping investment incentives, reducing uncertainty, improving resource allocation, and strengthening the effectiveness of economic policies. Shikur (2024) found that institutional quality has a positive and significant impact in the short term but a negative and significant impact in the long term, except for political stability and the rule of law. The author argues that, although institutional improvements in the short term are shown to boost investment and manufacturing activity. However, long-term institutional changes often fail to improve the development of the manufacturing sector for several reasons. Alignment with the country's structural transformation, for instance, becomes one of the key factors influencing the impact of institutional quality on productivity and profitability. This reasoning leads to the second hypothesis as follows:
H2: Institutional quality has heterogeneous effects on manufacturing value added.

3. Method

Data and measurement of variables

The empirical analysis uses a balanced panel of 20 Asian countries covering the period 2006–2021. The country sample is based on the United Nations Industrial Development Organization (UNIDO) International Yearbook of Industrial Statistics 2025, particularly its classification of middle-income industrial economies and middle-income industrializing economies (UNIDO, 2025). This classification provides a relevant basis for identifying economies in which manufacturing remains an important component of structural transformation while industrial development is still ongoing. The use of the UNIDO classification is particularly appropriate for this study because the research focuses specifically on manufacturing development rather than industrial activity in a broader sense. Industrialization can encompass manufacturing, mining, construction, and utilities. However, manufacturing is generally considered a key driver of structural transformation due to its potential contributions to productivity growth, employment, technological upgrading, and economic diversification (Szirmai, 2012). Therefore, restricting the sample to economies identified by UNIDO as middle-income industrial or industrializing economies creates greater consistency between the sample definition and the study's dependent variable, manufacturing value added.

The sample period, 2006–2021, is determined by the availability and consistency of the variables required for the empirical analysis. The resulting panel contains 320 country-year observations, with indicators of manufacturing value added, natural resource rents, institutional quality, investment, income, trade openness, and innovation available for the selected countries over the study period. The relatively broad time dimension is important because the effect of natural resource dependence on manufacturing development may not occur immediately. Resource-related structural changes, investment responses, institutional adjustments, and changes in manufacturing competitiveness may take several years to materialize. The use of panel data, therefore, enables the analysis to capture both cross-country differences and changes over time.

The dependent variable is manufacturing value added (MVA), measured as a percentage of GDP. MVA captures the contribution of manufacturing activities to the overall economy and is used as

the principal indicator of manufacturing development. This measure is preferable to a simple manufacturing output measure because expressing manufacturing value added relative to GDP captures manufacturing's position within the overall economic structure and is therefore directly relevant to the study's focus on industrialization and structural transformation. The data are obtained from the World Bank's World Development Indicators (WDI).

Table 1. Variable explanations

Variable	Definition	Source
Dependent variable		
Manufacturing value added (MVA)	The percentage of manufacturing value added to GDP reflects the manufacturing sector's contribution to the economy.	World Bank – World Development Indicators (WDI)
Explanatory variable		
Natural resource rent (NRR)	The percentage of total revenues generated from the exploitation of natural resources (oil, natural gas, coal, minerals, and forests), net of production costs, relative to GDP.	World Bank – World Development Indicators (WDI)
Control of corruption (CC)	Measures the extent to which public power is exercised for private gain. The index ranges from −2.5 (weak) to +2.5 (strong).	World Bank – Worldwide Governance Indicators (WGI)
Political stability (PS)	Measures perceptions of political instability and/or politically motivated violence, including terrorism. The index ranges from −2.5 to +2.5.	World Bank – Worldwide Governance Indicators (WGI)
Voice and accountability (VA)	Reflects the extent to which citizens can participate in selecting their government, as well as their freedom of expression, freedom of association, and freedom of the press. The index ranges from −2.5 to +2.5.	World Bank – Worldwide Governance Indicators (WGI)
Control variables		
Gross fixed capital formation (GFCF)	The value of physical investment in fixed assets, such as machinery, buildings, and infrastructure, used for production as a percentage of GDP.	World Bank – World Development Indicators (WDI)
GDP per capita (GDPPC)	A country's total economic output (GDP) divided by its population represents average income. Measured in constant 2015 U.S. dollars.	World Bank – World Development Indicators (WDI)
Trade openness (TO)	The degree of a country's integration into the international economy is measured as the ratio of total exports and imports to GDP.	World Bank – World Development Indicators (WDI)
Patents (PATEN)	The number of patent applications filed by residents. Measured as the number of patent applications per year per one million inhabitants.	World Bank and World Intellectual Property Organization (WIPO)

The main explanatory variable is natural resource rents (NRR), measured as total natural resource rents as a percentage of GDP. The indicator captures revenues derived from the exploitation of natural resources net of production costs, relative to the size of the economy. Using resource rents as a share of GDP allows the analysis to capture the degree of an economy's dependence on natural resource-generated income rather than merely the absolute size of its resource endowment. This distinction is important because the theoretical concern of the resource curse is more closely related to the economic dependence on resource activities than to resource abundance alone. The NRR data are obtained from the World Bank's WDI.

Institutional quality is represented by three dimensions obtained from the World Bank's Worldwide Governance Indicators (WGI): Control of corruption (CC), political stability (PS), and voice and accountability (VA). The use of multiple institutional indicators is intended to recognize that institutional quality is multidimensional and cannot necessarily be captured by a single governance measure. Control of corruption measures the extent to which public power is exercised for private gain, ranging from −2.5 to +2.5, with higher values indicating stronger control. Political stability captures perceptions of the likelihood of political instability and politically motivated violence, including terrorism, and is also reported on a scale ranging from −2.5 to +2.5. Voice and accountability reflect the extent to which citizens can participate in selecting their government, as well as freedom of expression, freedom of association, and freedom of the press, with higher values representing stronger performance on these dimensions. The use of these three indicators could reduce the risk of treating institutional quality as a single, homogeneous concept, as different dimensions of governance may have different relationships with manufacturing development. This approach is particularly relevant to the study's theoretical argument that the consequences of natural resource dependence may vary according to the institutional environment in which resource rents are managed.

Four additional variables are included as controls: gross fixed capital formation (GFCF), GDP per capita (GDPPC), trade openness (TO), and patents (PATENT). GFCF, measured as a percentage of GDP, captures investment in fixed productive assets such as machinery, buildings, and infrastructure. It is included because manufacturing development requires physical capital and productive infrastructure. GDP per capita, measured in constant 2015 US dollars, captures differences in economic development and income levels across countries. Trade openness, measured as the ratio of exports and imports to GDP, captures the degree of integration into international markets and is relevant because manufacturing development can be influenced by access to foreign markets, imported inputs, and international production networks. Finally, PATENT is measured as the number of resident patent applications per one million inhabitants and is included as an indicator of domestic innovation capacity and technological activity.

Model specification

Following Shikur (2024), the long-run (Eq.1) and short-run (Eq.2) panel ARDL equation model in this study are as follows:

$$Y_{i,t} = \sum_{j=1}^{q} \varphi_j^i Y_{i,t-j} + \sum_{j=0}^{p-1} \eta_j^i NRR_{i,t-j} + \sum_{j=0}^{p-1} \delta_j^i Ins_{i,t-j} + \sum_{j=0}^{p-1} \omega_j^i VK_{i,t-j} + \mu_i + \varepsilon_{i,t} \quad (1)$$

$$\Delta Y_{i,t} = \sum_{j=1}^{q-1} \beta_j^i \Delta Y_{i,t-j} + \sum_{j=0}^{p-1} \alpha_j^i \Delta NRR_{i,t-j} + \sum_{j=0}^{p-1} \varphi_j^i \Delta Ins_{i,t-j} + \sum_{j=0}^{p-1} \sigma_j^i \Delta VK_{i,t-j} + \lambda_i ECT_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

Whereas:

$Y_{i,t}$	= Manufacturing value added (% of GDP) of country i, year t
$NRR_{i,t}$	= Natural resources rents (% of GDP) of country i, year t
$Ins_{i,t}$	= Institutional quality of country i, year t
$VK_{i,t}$	= Control variables of country i, year t
$\beta i,t$	= Short-term parameter of the lagged dependent variable
$ai,t;\ \varphi i,t;\ \sigma i,t$	= Short-term coef. of NRR, institutional quality, and control variable
θi	= Coef. of long-term adjustment
γi,t	= Long-term speed of adjustment
Δ	= Lag
i	= Cross-section unit
t	= Time series
j	= Number of lags
p *and* q	= Number of lags
$\varepsilon_{i,t}$	= error term country i, year t

Table 1 shows considerable heterogeneity in levels of industrialization, natural resource dependence, institutional quality, investment, and innovation. The average contribution of the manufacturing sector to GDP (MVA) reached 15.37%, while dependence on natural resources (NRR)

is 10.72%, with very large variations. Institutional quality indicators, which include control of corruption, political stability, and voice and accountability, have a negative average value, indicating that institutional governance in most of the sample countries remains relatively weak. In addition, the average gross fixed capital formation (GFCF) is 27.41% of GDP, and the level of trade openness is 79.10%, indicating the importance of investment and international trade in these countries' economies. Meanwhile, the average GDP per capita is US$4,870.26, and the number of patents is 121.35 per million population, reflecting the gap in economic and innovation capacity between countries. Overall, these descriptive statistics indicate that middle-income countries in Asia have diverse economic characteristics, requiring an empirical approach capable of capturing both short- and long-term dynamics.

Table 2. Summary statistics

Variable	Obs.	Mean	Standard deviation	Min.	Max.
MVA	320	15.37	7.39	1.43	31.10
NRR	320	10.72	13.57	0.001	63.73
CC	320	-0.56	0.61	-1.46	1.62
PS	320	-0.70	0.93	-2.83	1.26
VA	320	-0.66	0.58	-1.75	0.46
GFCF	320	27.41	9.34	5.36	69.15
GDPPC	320	4870.26	4400.64	617.48	22819.20
TO	320	79.10	35.91	24.70	202.58
PATEN	320	121.35	72.99	1.00	255.00

4. Results and discussion

Short-run estimation result

The panel ARDL results indicate a significant error-correction mechanism in all three models (see Table 3). The error correction coefficients are −0.188, −0.106, and −0.259 in Models 1, 2, and 3, respectively, implying that approximately 18.8%, 10.6%, and 25.9% of deviations from the long-run equilibrium are corrected within one period. These results confirm the existence of a stable long-run relationship among manufacturing value added, natural resource dependence, institutional quality, and the control variables. At the same time, the different adjustment speeds indicate that manufacturing does not respond instantaneously to changes in its structural determinants. The most important short-run result concerns natural resource rents. NRR has a negative coefficient across all three models, but it is not statistically significant. This finding suggests that greater resource dependence does not immediately reduce manufacturing value added. Rather than contradicting the resource curse hypothesis, the result is consistent with the idea that the transmission mechanisms of resource dependence operate gradually. Papyrakis and Gerlagh (2004) emphasize that the resource curse can operate through several channels, including real exchange-rate appreciation, changes in domestic demand, and the reallocation of productive factors toward resource activities. These mechanisms require time to affect investment decisions, production structures, and manufacturing competitiveness.

The short-run finding is also consistent with the evidence of Ameer and Ahmad (2024), cited in the manuscript, who find that the effects of natural resource income on productive sectors emerge gradually. The absence of an immediate statistically significant effect can therefore be understood as reflecting the relatively slow adjustment of manufacturing capacity. Factories, production technologies, labor skills, supplier networks, and capital stocks cannot be rapidly transferred from manufacturing to resource-based activities. Consequently, an increase in resource rents may initially coexist with relatively stable manufacturing activity, even if persistent resource dependence eventually changes the economy's structure. This interpretation becomes particularly important when the short- and long-run estimates are considered together. The results show a transition from a negative but insignificant short-run coefficient to a consistently negative and significant long-run coefficient. The resource curse, therefore, appears to be primarily a cumulative structural phenomenon in the sample. Resource dependence may not immediately displace manufacturing, but sustained dependence can gradually alter relative returns across sectors, investment incentives, input costs, and international competitiveness.

This interpretation is consistent with the broader empirical literature, although it does not yield uniform conclusions. Arin Braunfels 2018, for example, find no evidence of a resource curse using Bayesian Model Averaging, whereas studies focusing on BRICS, West Africa, mineral-rich economies, and other developing countries report adverse effects of natural resources on economic performance or industrial development (Ampofo *et al.*, 2020; Arin and Braunfels, 2018; Asiedu *et al.*, 2021; Li and Wu, 2023). This divergence reinforces the importance of examining the timing and institutional context of the resource–manufacturing relationship rather than assuming that resource dependence produces an immediate and uniform industrial decline.

Table 3. Short-run panel ARDL regression result

Variable	Model 1 (CC)	Model 2 (PS)	Model 3 (VA)
ECT	-0,188**	-0,106***	-0,259***
	(0,091)	(0,447)	(0,076)
NRR	-18,999	-8,155	-4,960
	(18,966)	(8,118)	(4,934)
GFCF	0,054	0,052	0,040
	(0,103)	(0,721)	(0,066)
GDPPC	-0,0002	0,0006	0,0006
	(0,001)	(0,001)	(0,001)
TO	0,031*	0,036*	0,042**
	(0,019)	(0,019)	(0,021)
PATEN	0,003	0,002	-0,0001
	(0,004)	(0,004)	(0,656)
CC	2,648***		
	(1,127)		
PS		-0,378	
		(0,348)	
VA			0,605
			(1,094)
Constant	-0,694*	-0,657*	1,082*
	(0,540)	(0,453)	(0,656)

*The signs *, **, and *** indicate the levels of significance at 10%, 5%, and 1%, respectively. CC is control of corruption, PS is political stability, and VA is voice and accountability.*

Long-run estimation result

We report the results for the long-run ARDL panel regression in Table 4. The negative and significant NRR coefficients −0.219, −0.183, and -0.065 represent the central finding of the study. The consistency of the negative coefficient across all three models suggests that the adverse association between resource dependence and manufacturing is robust to alternative institutional specifications. This result is consistent with evidence reported by Awoa Awoa and Ondoa (2024), Chairul *et al.* (2025), Horváth and Zeynalov (2016), Nkemgha *et al.* (2022), and Xue *et al.* (2023). More importantly, the present findings help clarify why resource dependence can be detrimental to manufacturing. The Dutch disease mechanism implies that resource-sector expansion can appreciate the real exchange rate, increase domestic production costs, and reduce the international competitiveness of manufacturing. At the same time, higher returns in the resource sector can attract labor and capital away from manufacturing. Papyrakis and Gerlagh (2004) identify these transmission channels as central mechanisms through which natural resources can affect non-resource sectors.

The implication is that resource dependence does not necessarily harm manufacturing because resource extraction is intrinsically unproductive. Rather, the problem arises when resource extraction changes the relative incentives governing the allocation of capital, labor, and policy attention. Manufacturing typically requires long-term investment, technological learning, supplier development, and exposure to international competition. Resource activities can generate relatively rapid and concentrated returns. When the latter becomes dominant, an economy may find it increasingly difficult to maintain the incentives necessary for broad-based industrial diversification. This mechanism also helps explain why the effect becomes statistically significant only in the long run. A temporary increase

in resource rents may generate additional national income without immediately changing the production structure. Persistent dependence, however, can gradually influence investment allocation, exchange rates, labor markets, and industrial policy. The long-run coefficient, therefore, captures a cumulative process of structural reallocation rather than an immediate output response.

An unexpected result is that all three institutional indicators have negative long-run coefficients. Control of corruption (−6.527), political stability (−0.892), and voice and accountability (−4.240). These findings appear inconsistent with the conventional expectation that better institutions should promote manufacturing development. However, the results should not be interpreted as evidence that weaker institutions are beneficial for manufacturing. The more appropriate interpretation is that improvements in measured institutional quality do not automatically translate into manufacturing expansion, particularly in economies undergoing structural and institutional transition. This interpretation is supported by the broader literature showing that institutional quality matters for economic performance, but its effects depend on the economic and policy environment. Arvin *et al.* (2021), for instance, examine institutional quality in relation to economic performance in developing and South Asian economies. Shikur (2024) specifically examines economic freedom, institutional quality, and manufacturing development, providing further support for the importance of institutional conditions in understanding manufacturing performance.

Table 4. Long-run panel ARDL regression result

Variable	Model 1 (CC)	Model 2 (PS)	Model 3 (VA)
NRR	-0,219***	-0,183***	-0,065***
	(0,020)	(0,035)	(0,013)
GFCF	0,235***	0,210***	0,999***
	(0,017)	(0,029)	(0,010)
GDPPC	0,0006***	0,0004***	0,0006***
	(0,0002)	(0,0002)	(0,0001)
TO	0,056***	0,071***	0,104**
	(0,005)	(0,007)	(0,004)
PATEN	0,017***	0,039***	0,003**
	(0,006)	(0,006)	(0,002)
CC	-6,527***		
	(0,587)		
PS		-0,892*	
		(0,673)	
VA			-4,240***
			(0,385)
Cons	-0,694*	-0,657*	1,082*
	(0,540)	(0,453)	(0,656)

*The signs *, **, and *** indicate the levels of significance at 10%, 5%, and 1%, respectively. CC is control of corruption, PS is political stability, and VA is voice and accountability.*

One possible explanation is that institutional improvement can involve transition and adjustment costs. Stronger control of corruption, greater accountability, and institutional reform may disrupt existing arrangements through which firms and resource-related sectors previously operated. In resource-dependent economies, where economic rents can be concentrated among particular groups, stronger governance may alter established patterns of rent allocation before the benefits of improved governance appear in manufacturing productivity. A second explanation is that institutional quality is an enabling condition rather than a sufficient condition for industrialization. Better governance can improve predictability and resource allocation, but it does not by itself create factories, infrastructure, skilled labor, technological capabilities, or international market access. The positive and significant coefficients for GFCF, trade openness, GDP per capita, and patents reinforce this interpretation. Manufacturing development requires institutions to be complemented by productive investment and capability accumulation. A third possibility is that the institutional variables may capture broader structural differences across the sample. Countries with relatively stronger governance may also be economies that have already moved further away from traditional manufacturing or are experiencing

structural shifts toward services and higher-value activities. The negative coefficient could therefore partly reflect differences in the stage and composition of structural transformation rather than a causal negative effect of stronger institutions on manufacturing. This interpretation is particularly relevant because the present models estimate institutional quality as a direct explanatory variable rather than as an interaction with natural resource dependence. Thus, the results demonstrate an association between institutional indicators and MVA, but they do not formally establish that institutional quality moderates the NRR–MVA relationship.

5. Conclusion

This study examined the relationship between natural resource dependence, institutional quality, and manufacturing development in 20 middle-income Asian economies over 2006–2021 using the panel ARDL approach. The results reveal an important distinction between short-run and long-run dynamics. Natural resource rents have no significant short-run effect on manufacturing value added but exert a consistently negative and significant effect in the long run. This suggests that the resource curse operates primarily as a cumulative structural process, whereby persistent resource dependence gradually affects sectoral incentives, factor allocation, production costs, and manufacturing competitiveness. The findings further show that gross fixed capital formation, GDP per capita, trade openness, and innovation are positively associated with manufacturing value added in the long run. These results indicate that sustained industrialization depends on the accumulation of physical capital, technological capabilities, the expansion of economic capacity, and integration into international markets. Trade openness is also significant in the short run, suggesting that international market integration can provide relatively immediate opportunities for manufacturing development. Overall, the findings indicate that natural resource dependence is not necessarily an immediate constraint on manufacturing, but persistent dependence can weaken manufacturing development over time. Conversely, investment, trade, and innovation provide important foundations for building a more diversified and sustainable industrial structure.

The results for institutional quality are more nuanced. Control of corruption, political stability, and voice and accountability exhibit negative long-run coefficients, while only control of corruption is positive and significant in the short run. These findings should not be interpreted as evidence that weaker institutions promote manufacturing. Rather, they suggest that improvements in institutional quality do not automatically translate into stronger industrial performance and may occur alongside broader processes of structural and institutional adjustment. The findings, therefore, highlight the importance of considering institutional conditions when examining resource dependence and industrialization. However, because the current models do not include interaction terms, they do not provide a formal test of whether institutional quality moderates the effect of natural resource dependence on manufacturing.

Theoretically, the study contributes to the resource curse and structural transformation literature by showing that the adverse effect of resource dependence on manufacturing is predominantly a long-run phenomenon. It also highlights that resource dependence should be considered alongside productive capabilities, including investment, innovation, and trade integration, rather than as an isolated determinant of industrialization. The results further suggest that institutional context may help explain differences in manufacturing outcomes across resource-dependent economies, providing a basis for future research that uses interaction or threshold models to formally examine institutional heterogeneity.

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