From the CAG Team

A Haven for Growth, But for Pollution Too? ASEAN and the Pollution Haven Debate

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As production networks diversify away from China, ASEAN is increasingly emerging as the next major manufacturing hub, particularly for electronics and semiconductors, automotive and electric vehicles, machinery, textiles, and solar manufacturing. In 2023, roughly one-third of China's 76 billion USD in outbound manufacturing FDI went to Southeast Asia. This shift brings significant economic benefits to ASEAN countries, as firms relocate their production to more cost-competitive destinations across the region. However, it may also create environmental risks if more pollution-intensive activities move into countries with weaker enforcement of environmental regulations.

This risk is tied to the same factors that make the region attractive for manufacturing, such as lower labour and production costs. Despite being a key driver of industrial growth, the diversification towards Southeast Asia has been associated with higher greenhouse-gas emissions and air pollution, which contributes to climate change, thus raising concern over who bears the environmental costs of global production.

To better understand this concern, it is useful to distinguish between the pollution haven effect and the pollution haven hypothesis. The pollution haven effect occurs when firms in pollution-intensive industries shift production from countries with stricter environmental regulations to take

advantage of lower compliance costs. By contrast, the pollution haven hypothesis makes a broader macroeconomic claim: that free trade will continuously drive pollution-intensive industries to relocate, shaping which industries countries specialise in based on the stringency of their environmental rules. As such, countries with less stringent regulations are assumed to become more competitive in pollution-intensive industries, and vice versa.

With this distinction, ASEAN's experience likely reflects pollution haven effects rather than a broader pollution haven hypothesis. Uneven findings across sectors and Southeast Asian countries indicate that while weaker environmental regulations may influence some relocation decisions, they are not the main determinant of ASEAN's overall industrial specialisation. Environmental regulation matters, but only as part of a broader set of determinants. ASEAN's role in pollution-intensive production is also shaped by structural factors such as industrial capacity, production costs, FDI, and uneven enforcement of regulations across member states.

Assessing the Pollution Haven Hypothesis in the ASEAN Context

The main concern is not only whether pollution-intensive industries have shifted production to ASEAN to exploit weaker environmental regulations, but also whether differences in environmental rules help explain why the region specialises in those activities. This sets a higher bar than isolated pollution haven effects. It requires evidence of a consistent pattern in which weaker environmental regulations give countries a comparative advantage in pollution-intensive production, systematically linking to ASEAN's pattern of industrial specialisation. However, in ASEAN, the evidence for the pollution haven hypothesis remains incomplete.

At the country level, evidence from five ASEAN member states suggests that pollution haven effects are concentrated in specific country contexts rather than showing a uniform regional pattern. A study on pollution-intensive goods found that FDI significantly increases pollution-intensive exports in Indonesia, Malaysia, and Thailand, but not in the Philippines and Singapore. This difference partly reflects the sector-specific nature of FDI: foreign investment raises exports in some pollution-intensive industries but has negative or insignificant effects in others. These economies can also serve as competitive alternatives to China in some pollution-intensive sectors such as non-metallic mineral products and industrial chemicals.

Differences in environmental policy may contribute to this shift. For example, China's national emissions trading system (ETS) has expanded to regulate more than 3,300 companies, spanning power generation, steel, cement, and aluminium. By contrast, Indonesia's mandatory ETS remains concentrated in the power sector, while Thailand's national ETS is still under development. Such differences can affect the relative cost of pollution-intensive production and create incentives for firms to consider alternative locations in Southeast Asia. Yet the uneven country- and sector-level findings indicate that regulatory differences alone do not systematically determine industrial specialisation across ASEAN. Instead, the evidence points to pollution haven effects in particular countries and industries rather than a region-wide pollution haven hypothesis.

At the regional level, a broader look at industrial relocation in Southeast Asia supports a more cautious interpretation. Based on existing evidence from the region, rising emissions are not simply the result of weak environmental regulation. Patterns of industrial relocation in Southeast Asia also reflect other forces, including productivity growth and changes in emission intensity. While rising pollution burdens are consistent with pollution haven pressures, they do not by themselves indicate that weak environmental regulation is the main basis of ASEAN's comparative advantage.

At the firm level, evidence also implies that the pollution haven story is not straightforward. A case study of the Philippines shows that foreign firms are not drawn by weak environmental regulation. Many Japanese manufacturing Multinational Enterprises (MNEs) in the Philippines operated above local requirements, implying that stricter Philippine environmental rules would be unlikely to deter these types of investment. Rather, this hints at the possibility of a pollution halo effect, wherein foreign investors bring cleaner practices and stronger management systems. Although broader pollution haven pressures may still exist across ASEAN, the evidence shows that behaviour across firms is not uniform.

Another reason for caution is that relocating pollution-intensive production does not sufficiently explain changes in emissions. Trade affects the environment in several ways: a scale effect (larger production tends to increase emissions), a composition effect (shifts in the mix of industries can raise or lower them), and a technique effect (cleaner technologies can reduce environmental damage). As a result, rising pollution in a host economy cannot automatically be attributed to regulatory arbitrage. Much of the scholarship finds that the industrial structure often has limited effects, while technology effects matter more.

Environmental outcomes therefore depend not only on the relocation of pollution-intensive industries, but also on changes within industries, such as emission intensity, energy use, productivity, and firm behaviour.

Overall, regional findings do not clearly support the pollution haven hypothesis. Variations across countries, sectors, and firms are too great for regulatory stringency alone to explain the region's role in pollution-intensive production. This distinction matters because weak regulations are only one factor among many in investment decisions. ASEAN countries have the space and capacity to strengthen environmental enforcement while pursuing manufacturing growth.

Policy Implications for ASEAN

Although pollution haven effects in ASEAN are uneven and localised, they still warrant a policy response. While the "grow first, clean up later" approach may seem practical, there is little reason to support it: pollution-intensive industries are not a desirable foundation for growth. Instead, ASEAN should pursue cleaner industrial development by strengthening environmental governance, enforcing standards more effectively, and promoting the adoption of clean technologies.

ASEAN also needs a more differentiated policy approach to reflect where each economy stands in the industrialisation process. While some countries such as Indonesia, Malaysia, and Thailand are already attracting more pollution-intensive FDI and require stronger monitoring and enforcement practices, others, like Cambodia and Lao PDR, which are still building their industrial base, have an opportunity to establish stronger environmental guidelines. Although targeted national approaches are necessary, they must be paired with regional coordination. Narrowing regulatory gaps across member states through stronger environmental standards, closer coordination, and greener investment regulations would help ASEAN compete for manufacturing without undermining environmental protection.

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