

A Report on “Manufacturing  
Revolutions: Industrial Policy and  
Industrialization in South Korea” by  
Lane (2025)

Reviewer 2

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v1



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I am wiser than this person; for it is likely that neither of us knows anything fine and good, but he thinks he knows something when he does not know it, whereas I, just as I do not know, do not think I know, either. I seem, then, to be wiser than him in this small way, at least: that what I do not know, I do not think I know, either.

Plato, *The Apology of Socrates*, 21d

To err is human. All human knowledge is fallible and therefore uncertain. It follows that we must distinguish sharply between truth and certainty. That to err is human means not only that we must constantly struggle against error, but also that, even when we have taken the greatest care, we cannot be completely certain that we have not made a mistake.

Karl Popper, 'Knowledge and the Shaping of Reality'

## Overview

**Citation:** Lane, N. (2025). Manufacturing Revolutions: Industrial Policy and Industrialization in South Korea. *Quarterly Journal of Economics*. Vol. 140, No. 3, pp. 1683–1741.

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**Abstract Summary:** The study examines the effect of South Korea’s heavy and chemical industry (HCI) drive (1973 – 1979) using newly assembled data and a dynamic difference-in-differences strategy. It finds that HCI policies promoted the expansion and dynamic comparative advantage of targeted industries, with benefits persisting after the policy ended and indirectly benefiting downstream users through the input-output network.

**Key Methodology:** Dynamic difference-in-differences (DD) and triple differences (DDD) estimation strategies are applied to a newly assembled, harmonized industry-level panel data set (1967 – 1986) combined with digitized input-output accounts.

**Research Question:** What was the effect of South Korea’s heavy and chemical industry (HCI) drive (1973 – 1979) on industrial development and transformation?

## Summary

### Is It Credible?

This article evaluates the impact of South Korea's Heavy and Chemical Industry (HCI) drive (1973–1979) on the country's industrial development. Lane argues that this state-led intervention “promoted the expansion and dynamic comparative advantage of directly targeted industries” (p. 1684). The article presents striking quantitative evidence to support this, claiming that targeted industries expanded their output by “more than 100%” and labor productivity by “more than 15%” relative to non-treated manufacturing sectors (p. 1685). Furthermore, the author contends that the policy successfully cultivated a long-term export advantage, with targeted industries being “10 percentage points more likely to achieve comparative advantage in global markets after 1973” (p. 1686).

The credibility of the directional finding—that the policy successfully expanded the targeted sectors—is high, though the precise magnitude of the effects requires careful interpretation due to the study's research design. The primary analysis relies on comparing targeted industries to non-targeted ones. However, the author explicitly finds that this design violates the Stable Unit Treatment Value Assumption (SUTVA) because the policy generated positive spillovers for the control group. Specifically, non-treated industries with strong forward linkages to the targeted sectors expanded more robustly and enjoyed reduced input prices (pp. 1727, 1729). As the author notes, this contamination of the control group suggests the baseline estimates may be biased downward (p. 1732). Consequently, the claim of “more than 100%” output growth likely represents a conservative lower bound of the policy's gross impact on the treated sectors relative to a true no-policy counterfactual.

While the expansion of output and export shares is well-documented, the evidence regarding efficiency gains is more tentative. The article claims the policy had “pervis-

tent effects on plant-level, total factor productivity (TFP)” (p. 1685). However, the primary evidence presented in the main text for this is correlational, comparing TFP levels in the post-policy period (1980–1986) rather than estimating the causal impact of the policy introduction itself (p. 1707). The causal analysis of industry-level TFP appears in the supplementary materials, where the author acknowledges that estimates are “noisy and vary across TFP outcomes” and that aggregate data limits the ability to apply micro-level corrections (Online Appendix, p. 53). Therefore, while the policy clearly shifted resources and output toward heavy industry, the evidence that it drove fundamental productivity improvements is less robust than the evidence for raw expansion.

The study’s attribution of these effects to the HCI policy also faces challenges from the historical context. The treatment period (1973–1979) coincides precisely with global oil shocks, which would differentially affect the energy-intensive heavy industries targeted by the government. While the author controls for pre-existing industry characteristics (p. 1700), it is difficult to fully disentangle the policy’s effects from these major external shocks using industry-level variation alone. Furthermore, although the author provides compelling historical evidence that selection was driven by security concerns rather than economic picking-winners logic (p. 1688), the analysis cannot formally rule out that the government selected industries with unobserved latent growth potential.

Finally, it is crucial to distinguish between the policy’s potency and its economic efficiency. The article convincingly demonstrates that the HCI drive was effective in altering South Korea’s industrial structure and trade profile. However, the study does not evaluate the opportunity costs of this massive resource reallocation or its net effect on aggregate social welfare, a limitation the author explicitly states (p. 1734). Thus, the “success” described is one of implementation and sectoral growth, not necessarily of optimal resource allocation.

## **The Bottom Line**

Lane provides credible evidence that South Korea's industrial policy successfully expanded targeted heavy industries and cultivated a dynamic comparative advantage in global markets. The estimated growth effects are likely conservative, as the policy also indirectly benefited the non-targeted sectors used as a control group. However, evidence for productivity gains is weaker than for output expansion, and the study does not prove that the intervention improved the overall efficiency or welfare of the South Korean economy.

## Potential Issues

**Violation of a core research design assumption:** The study's primary research design, a difference-in-differences model, rests on the Stable Unit Treatment Value Assumption (SUTVA), which requires that the non-targeted industries (the control group) are unaffected by the policy intervention. However, one of the article's central findings is that this assumption is violated. The analysis of spillovers in Section VII demonstrates that non-treated industries with strong forward linkages to the targeted Heavy and Chemical Industry (HCI) sectors experienced significant positive effects, including more robust development and reduced output prices (pp. 1727, 1729). The author explicitly acknowledges this contradiction, stating that "the network effects of the policy may contaminate the control group by virtue of linkage spillovers, violating the stable unit treatment value assumption (SUTVA)" (p. 1732). This "contamination" means the control group does not represent a valid counterfactual. The author argues that because the spillovers are positive, the main estimates are biased downward and should be interpreted as a conservative lower bound. While this argument is logical, the violation of SUTVA complicates the interpretation of the quantitative estimates of the direct effects (e.g., "more than 100%" output growth, p. 1685), as they reflect the difference between the direct effect on treated firms and the indirect positive effect on control firms, rather than the absolute effect of the policy against a true no-treatment baseline.

**Potential confounding from concurrent global shocks:** The study's identification strategy attributes the divergence in outcomes between targeted and non-targeted industries after 1973 to the HCI policy. However, this period was also marked by the global oil shocks of 1973 and 1979. These shocks would plausibly have had a differential impact on the treated and control groups, as the targeted heavy industries (e.g., petrochemicals, steel) are generally more energy-intensive than the non-targeted light manufacturing industries. This raises the possibility that a sig-

nificant portion of the observed divergence could be driven by this major external shock rather than the industrial policy alone. While the study's specifications control for pre-1973 industry characteristics, including intermediate outlays (p. 1700), it is uncertain whether these controls can fully account for the specific timing and magnitude of a major, unanticipated shock that occurred after the pre-treatment period.

**Inability to empirically rule out endogenous selection:** The article argues that the selection of HCI sectors was driven by exogenous national security concerns, which mitigates the “picking winners” critique. The study supports this with historical evidence, noting that external observers like the World Bank believed South Korea “had no comparative advantage in the production of steel” (p. 1690). However, the analysis does not formally rule out the possibility that the government selected industries based on unobserved characteristics or latent growth potential that were not apparent to outside observers. The finding of parallel pre-trends provides some assurance against selection on pre-existing trends, but the potential for selection on unobserved, time-varying factors remains an inherent challenge to the causal interpretation of industrial policy evaluations.

**Weakness of evidence for productivity gains:** The article's evidence for one of its key findings—that the policy led to productivity gains—appears less robust than for other outcomes like output and exports. The primary evidence for Total Factor Productivity (TFP) presented in the main text is a post-policy correlation showing that targeted plants had higher TFP *levels* in the 1980–1986 period (Table I, p. 1707), which cannot on its own establish a causal link to the 1973–1979 policy. The author notes this is a “correlational” result (p. 1708). The causal difference-in-differences analysis of TFP is located in the Online Appendix, where the author describes the results as “noisy and vary across TFP outcomes” and notes that the pre-policy trend for targeted industries was “stagnant, perhaps even declining” (Online Appendix, p. 53). Furthermore, the study applies TFP estimation methods designed for firm-

level microdata to aggregated industry-level data, a methodological limitation the author acknowledges by stating that “Aggregate data precludes some micro-level corrections” (Online Appendix, p. 53). This suggests that conclusions regarding TFP should be interpreted with more caution than those for other outcomes.

**Limited scope of policy evaluation:** The study demonstrates that the HCI policy was effective in promoting the growth of targeted industries and shifting the country’s comparative advantage, but it does not assess the policy’s overall net impact on the South Korean economy. The analysis does not measure the opportunity cost of the massive reallocation of capital and labor, nor does it evaluate whether the policy improved aggregate allocative efficiency or social welfare. This limitation is explicitly stated in the conclusion: “Nor have I examined the aggregate or allocative consequences of the episode. I leave those questions to future quantitative and empirical work” (p. 1734). While this is a clearly defined boundary of the research, it means the study provides evidence on policy *potency* but not on its overall economic *efficiency*, which is a central question in the debate over industrial policy.

**Limited external validity:** The study’s findings are derived from a unique historical context: an authoritarian military dictatorship facing a direct and severe national security threat. The author notes that this context meant industrial policies were “binding and coherent” and less subject to clientelism (p. 1694). This high degree of state autonomy and capacity is not present in many other countries, particularly democratic ones. The author acknowledges this limitation in the conclusion, suggesting that “successful industrial policy likely hinges on bureaucratic capacity and political incentive compatibility” (p. 1734). This unique setting may limit the direct transferability of the article’s lessons to other political and economic contexts.

**Ambiguity in the “black box” treatment variable:** The study operationalizes the entire HCI policy—a complex bundle of directed credit, tax incentives, and trade policies (pp. 1691–1693)—as a single binary treatment variable. This “black box” approach is effective for estimating the net effect of the overall program but can-

not disentangle which specific policy instruments were most responsible for the observed outcomes. The author acknowledges this, stating that “observing an explicit effect of these policy levers is challenging” because “Industrial statistics rarely capture such policy details” (p. 1715). This limits the study’s ability to provide granular, actionable advice for contemporary policymakers on which specific tools are most effective.

**Presentation and transparency issues:** Several minor issues related to presentation and transparency may hinder full replication and verification. The article does not report standard diagnostic tests (e.g., for common support) for the double-robust estimator used in the robustness checks (p. 1709). The description of the industry-level TFP estimation notes that some sectors were combined to improve statistical power but does not specify which sectors or the criteria used (Online Appendix, p. 53). The definition of the “Experience” variable used in the learning-by-doing analysis does not explicitly state how the cumulative stock was initialized (p. 1720). Finally, the supplementary materials contain some editorial errors, such as the duplication of Table VII and Table VIII in both the main text and the appendix (pp. 1728–1729, 50–51) and inconsistent labeling of appendix tables, which can create confusion for readers attempting to verify specific claims.

## Future Research

**General equilibrium welfare analysis:** Future work could incorporate the causal estimates of direct effects and linkage spillovers into a quantitative general equilibrium model. This would allow researchers to calculate the aggregate welfare implications of the HCI drive, accounting for the opportunity costs of capital and labor reallocation, which this study explicitly leaves unaddressed.

**Unpacking the policy black box:** Future research could exploit granular administrative data to disentangle the effects of specific policy instruments within the HCI bundle. By separately identifying the impacts of directed credit, tax incentives, and trade protection, researchers could provide more actionable guidance on which specific levers drive industrial development versus those that merely transfer rents.

**Micro-level productivity dynamics:** Future work could utilize recovered historical firm-level microdata from the pre-1979 period to rigorously estimate Total Factor Productivity (TFP) dynamics. This would overcome the limitations of aggregate industry data and post-policy correlations, providing a clearer test of whether infant-industry protection led to genuine learning-by-doing and efficiency gains during the critical intervention phase.

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