Urban Green Transformation in India: A CGE Analysis of Policy Impacts on Economic and Environmental Dynamics

Topic: CGE and Econometric Input-output Modelling (3)
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This study considers the interaction of economic development and environmental quality at the interface of major Indian urban centers, the effect of the currently prevailing environmental regulations (pollution control measures and green building standards) on the urban economic performance. No sophisticated, nameless model appear in this research (quite the contrary it is very complicated); instead, using an adaptive, multi sectoral Computable General Equilibrium (CGE) model, it captures the complicated interrelations between city level economic activities and environmental outcomes. The modelâ€™s modular design supports the direct integration of policy shocks for a specific environmental policy and evaluation of the direct and indirect economic sector impacts.

Research Gap:

Past studies more or less have examined economic performance and environmental quality in isolation, and there was a large literature gap on integrating economic performance and environmental quality within a unified framework. Most existing models fail to capture the dynamic feedbacks between real improvements in the urban environment and the urban economic performance, such as the health associated productivity gains from lowered SO2 levels. Furthermore, the lack of use of real time environmental data (pollutant concentration and emission records from Central Pollution Control Board (CPCB), â€¦) has hampered the accuracy of the impact evaluations for these policies. This paper fills these gaps by incorporating detailed environmental measurement within a CGE framework to refine our understanding of urban sustainability.

Research Question:

What is the economic impact of stringent pollution control and the adoption of green building standards, as far as environmental regulations are concerned, on the performance of major Indian cities over time?

Research Objective:

This research seeks to evaluate trade-offs of urban environmental regulations on economic and environmental levels in India.

Specifically, the study aims to: Try to quantify short-term adjustment costs and long-term benefits of implementing stricter environmental policies and measure the ripple consequences of positive environmental adjustments on work efficiency and general human health.

Methodology and Data:

Cities are simulated in an economic environment using an adaptive multi sectoral CGE model of Delhi, Mumbai and Bangalore. At first, the calibration is done using the data collected from the Ministry of Statistics and Programme Implementation and Census of India on sectoral output, employment rates and household consumption so that the model reflect the current economic conditions. Data related to environmental performance indicators such as the detail of the pollutant concentration and the emission is obtained from the CPCB and the data on urban infrastructures and real estate are obtained from local municipal bodies. First baseline simulations are run to replicate the current situation and then policy shocks that can account for the enhancement of pollution control measures and adoption of green building practices are introduced.

Key Findings and Policy Implications:

This paper's key contribution is in designing a CGE model that allows for easy tailored application to specific environmental data or policy scenarios. This flexibility allows the model to remain a useful tool for future aid and academic research. Based on preliminary simulation results, it is found that stricter environmental regulations may impose adjustment costs to some certain industrial sectors in a short period, however the longterm benefits resulting from regulatory improves urban public

health, labor productivity, and urban sustainability policies always exceed the transitional costs. The analysis demonstrates the main tradeoffs between immediate economic performance and long term environmental sustainability which can guide the decision makers in taking balanced decision regarding the costs and benefits of green urban policies. The results also emphasize the need to use the most current environmental data in such economic models so that future policy evaluations can be better and more timely.

Conclusion:

This research provides a transparent and replicable framework to understand the influence of urban economic growth on environmental sustainability in India by integrating detailed environmental measurements with a dynamic CGE model. In addition, the findings of this study are useful and important to academic literatures and as a valuable resource for the policy makers who are trying to find the sustainable solution of both industrial expansion and urban environmental quality. The model is also modular in its structure, that upon deeper research, it will allow the approach to continue to advance and incorporate with up to date data and new policy scenarios emerging within urban sustainability.