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The Ambition Trap: Why Carbon Taxes Fail in High-corruption Regimes

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THE AMBITION TRAP: WHY CARBON TAXES FAIL IN HIGH-CORRUPTION REGIMES

ABSTRACT

Global technocratic consensus holds that carbon pricing is the most efficient instrument for climate mitigation. However, its economic viability in institutional environments characterized by systemic rent-seeking remains critically under-explored. While standard Computable General Equilibrium (CGE) models typically assume frictionless revenue recycling, this study argues that such assumptions may overestimate the "double dividend" in the Global South. We bridge this theoretical gap by developing a stylized CGE model that endogenizes "institutional leakage" (λ), allowing for a precise simulation of social welfare trajectories under varying degrees of governance inefficiency. Integrating empirical priors on corruption, our simulation identifies a critical tipping point at $\lambda \approx 0.35$. Below this threshold, revenue recycling neutralizes price shocks; beyond it, the policy enters an "Ambition Trap." In this regime, the regressive impact of energy prices is exacerbated by "fiscal hemorrhage," leading to a simultaneous contraction in both energy and service sectors. These findings suggest that in high-corruption regimes, institutional reform is not merely complementary but a prerequisite for aggressive climate policy.

Keywords: Carbon pricing; Institutional leakage; Double dividend; CGE model; Corruption; Global South.

A. Introduction

For over two decades, a global technocratic consensus championed by institutions ranging from the World Bank to the IPCC has consolidated carbon pricing as the most economically efficient instrument for climate mitigation (Carbone et al., 2022; Lemelin & Savard, 2022). The theoretical logic is elegantly persuasive: by internalizing the negative externalities of emissions into the price system, carbon taxes not only abate pollution but also generate substantial fiscal revenue (Zhu et al., 2018; Rizqi et al., 2025). Mainstream environmental economics literature frequently projects a "Double Dividend" scenario, wherein these revenues are recycled to reduce other distortionary taxes or transferred back to households, thereby creating simultaneous benefits for environmental quality and economic welfare (Mashhadi Rajabi, 2023; Garaffa et al., 2021; Asakawa et al., 2021).

To quantify the macroeconomic impacts of such policies, Computable General Equilibrium (CGE) models have established themselves as the methodological gold standard (An et al., 2023; Fabregat-Aibar et al., 2022). Recent scholarship has achieved remarkable levels of data sophistication. For instance, Li et al. (2021) developed a CGE model with highly detailed disaggregation of waste treatment sectors for China, while Hübler et al. (2024) integrated household microdata to map precise distributional impacts in Germany. These models have grown in complexity to capture cross-sectoral economic interactions and the incidence of policy (Carbone et al., 2022; Freebairn, 2018). However, beneath this granular sophistication lies a fundamental assumption that becomes problematic when applied to the Global South: the presumption of a benevolent government operating a frictionless fiscal transmission mechanism. The majority of CGE models treat the government as an efficient "black box," assuming that every unit of currency raised from carbon taxes is returned to the economy without leakage (Lemelin & Savard, 2022).

This modeling orthodoxy often overlooks the political economy realities prevalent in many developing nations, where systemic corruption and bureaucratic inefficiency act as significant transaction costs (Rafaty, 2018; Ibrahim et al., 2025). Cross-country empirical evidence by Best & Zhang (2020) explicitly identifies the "control of corruption" as a statistically significant determinant of carbon pricing efficacy. Further studies confirm that the quality of political institutions, including corruption levels and government effectiveness, significantly influences environmental policy outcomes (Omri & Boubaker, 2024; Davidovic, 2024; Levi et al., 2020). These findings indicate that in environments characterized by poor governance, market price signals are distorted by rent-seeking behaviors (Ardiwinata et al., 2022; Kálmán et al., 2024). Unfortunately, this mechanism of failure remains poorly mapped within existing CGE literature. Large-scale models are often too complex to isolate the specific impacts of institutional friction, thereby obscuring the risk of policy failure through data aggregation (An et al., 2023).

This study aims to bridge this theoretical gap by proposing a distinct methodological approach. Rather than pursuing the sectoral complexity of Li et al. (2021) or Hübler et al. (2024), we adopt a "Stylized CGE" framework that is deliberately simplified to endogenize the parameter of "institutional leakage" (λ). This parsimonious approach allows us to isolate the interaction between tax revenue and bureaucratic inefficiency (Freebairn, 2018; Kulmer & Seebauer, 2019), tracking its impact on aggregate welfare without the "noise" of extraneous exogenous variables.

The primary contribution of this research is the identification of the "Ambition Trap," a theoretical condition in which aggressive climate policy becomes counterproductive due to high fiscal leakage rates. By modeling this phenomenon, we challenge the unconditional optimism of standard models (Combet et al., 2025; Muth, 2023) and offer a more realistic evaluation framework for policymakers in nations grappling with institutional vulnerability (Baiardi & Scabrosetti, 2025; Ikazaki, 2025).

B. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

1. The Limits of Technocratic Modeling

The evolution of Computable General Equilibrium (CGE) modeling over the past two decades has been dominated by a race toward data granularity. Recent literature has made significant strides in mapping the technical and distributional impacts of climate policy (An et al., 2023; Carbone et al., 2022). Li et al. (2021), for instance, made a substantial methodological contribution by disaggregating waste treatment sectors within a China CGE model, enabling precise analysis of environmental tax impacts on specific pollutant sub-sectors. Conversely, Hübler et al. (2024) pushed the boundaries of distributional analysis by integrating household microdata into a macro CGE framework, providing deep insights into how carbon pricing affects income inequality in developed economies like Germany. Together with standard dynamic models such as Mashhadi Rajabi (2023), technology-based models by Castro et al. (2023), and multi-regional models like Gao et al. (2024) and Jia & Lin (2022), these studies form a "technocratic consensus": that market mechanisms, if designed with sufficient sectoral precision, will steer the economy toward an efficient green equilibrium (Fabregat-Aibar et al., 2022).

However, this granular sophistication conceals a fundamental weakness: naive institutional assumptions. The majority of these models, including those developed by Li et al. and Hübler et al., are built upon the neoclassical assumption of a government acting as a "benevolent planner"

with a frictionless fiscal transmission system (Lemelin & Savard, 2022; Freebairn, 2018). In these models, tax revenue is assumed to flow perfectly from taxpayers back into the economy through recycling mechanisms, with zero loss during bureaucratic processing (Zhu et al., 2018; Combet et al., 2025). While this assumption may hold valid for countries with strong governance (such as Germany in Hübler's study), it becomes fatal when applied to the Global South, where state capacity is often compromised (Malerba et al., 2021; Vu & Trinh, 2025). Consequently, these models tend to overestimate the potential for a "Double Dividend" by ignoring real-world political transaction costs (Kulmer & Seebauer, 2019; Garaffa et al., 2021).

2. The Empirical Reality of Institutional Friction

In sharp contrast to the optimism of simulation models, empirical literature provides robust evidence that institutional quality is a primary determinant of climate policy success (Omri & Boubaker, 2024; Sun et al., 2025). Comprehensive cross-country econometric studies by Best & Zhang (2020) found a statistically significant positive correlation between "control of corruption" and the effectiveness of carbon pricing. Their findings confirm that in nations with high corruption levels, carbon price signals fail to translate into efficient reductions in emissions (Rafaty, 2018; Levi et al., 2020). This is reinforced by recent findings from Malatyinszki et al. (2025), which show that corruption perception correlates negatively with green transition indicators, suggesting that corruption acts as an "implicit tax" that distorts green investment. Similar studies by Kálmán et al. (2024) confirm that environmental policy stringency and gross greenhouse gas emissions have significant adverse effects on corruption perception, while Ikazaki (2025) demonstrates that political corruption can destabilize long-term economic and environmental trajectories.

Furthermore, Malerba et al. (2021) highlighted the failure of social compensation mechanisms in a case study of Peru. They found that cash transfer schemes—which, in CGE theory, should mitigate the regressive impact of carbon taxes—often miss their targets due to administrative inefficiencies and embezzlement. Similar findings were reported in a Vietnam case study by Vu & Trinh (2025), showing that without targeted support for low-income households, carbon pricing policies can exacerbate income inequality. Zhao et al. (2022) and Li et al. (2025) also demonstrated that in China, carbon pricing without appropriate revenue recycling schemes significantly increases the Gini coefficient. A striking gap is evident here: empirical literature (Best & Zhang, 2020; Malatyinszki et al., 2025; Davidovic, 2024) has proven *that* corruption undermines policy, yet modeling literature (Li et al., 2021; Hübler et al., 2024; Jia & Lin, 2022) lacks the framework to explain *how* this destructive mechanism occurs structurally within a general equilibrium.

Additional evidence from diverse contexts strengthens this argument. Ardiwinata et al. (2022) found that environmental corruption and environmental politics negatively correlate with environmental sustainability ratings across 163 countries, while Ibrahim et al. (2025) showed that in West African nations, corruption diverts and misappropriates green funds, weakening environmental governance. Baiardi & Scabrosetti (2025) provided evidence that the effectiveness of environmental taxes on CO_2 emissions is significant only in countries with consolidated democratic institutions, high levels of civil society participation, and less corrupt governments. Anjarwi (2025) even found that both short-term and long-term corruption reduction significantly improves tax revenue collection efficiency in EAGLE countries.

3. Theoretical Framework: Justifying a Stylized Approach

This study aims to bridge the gap between this empirical evidence and modeling theory. Rather than replicating the sectoral complexity of large-scale models, which often act as a "black box" (An et al., 2023; Lemelin & Savard, 2022), this study adopts a "Stylized CGE Model" approach that prioritizes parsimony. This methodological choice is grounded in the need to isolate institutional variables without the "noise" of thousands of sectoral equations (Freebairn, 2018; Kulmer & Seebauer, 2019).

In this framework, we modify the government budget function by endogenizing the "institutional leakage" parameter (λ). Unlike standard models where Transfers (Tr) equal Tax Revenue (R_{tax}) (Zhu et al., 2018; Combet et al., 2025), our model introduces bureaucratic friction:

$$Tr = R_{tax} \cdot (1 - \lambda)$$

Where λ represents the proportion of revenue lost to rent-seeking or administrative inefficiency (Rafaty, 2018; Ikazaki, 2025), this approach aligns with Tu et al. (2020), who found that regulatory costs in high-polluting industries increase significantly due to institutional friction. This framework allows us to map the "Ambition Trap"—a theoretical phenomenon in which aggressive carbon tax policies become counterproductive when leakage exceeds a critical threshold (Muth, 2023) —a dynamic currently undetected by conventional CGE models (Carbone et al., 2022).

C. METHODOLOGY

1. Model Philosophy: The Case for a Stylized Approach

To investigate the distortionary effects of institutional quality on fiscal policy, this study departs from the tradition of large-scale Computable General Equilibrium (CGE) models prevalent in purely empirical literature (e.g., Li et al., 2021; Gao et al., 2024; Wang et al., 2024). Large-scale models, characterized by thousands of sectoral equations, often function as "black boxes" that obscure the specific transmission mechanisms between policy variables and economic outcomes (An et al., 2023; Lemelin & Savard, 2022). Instead, this study adopts a "Stylized General Equilibrium" approach that prioritizes parsimony (Freebairn, 2018; Carbone et al., 2022). This modeling philosophy is designed to dissect the logic of causality: how exogenous shocks (carbon taxes) interact with endogenous institutional friction (corruption) within a closed economic system (Kulmer & Seebauer, 2019). By simplifying the production structure into two representative sectors—the Energy Sector (carbon-intensive) and the Service Sector (low-carbon)—this model isolates substitution and income effects with a theoretical clarity that is often unattainable in complex aggregate models (Caron et al.,

2. Model Specification

The economy is modeled as a closed system comprising three primary agents: a Representative Household, Firms (Energy and Service sectors), and the Government (Lemelin & Savard, 2022; Yang et al., 2024).

a. Production and Factor Markets

The supply side consists of two sectors: Energy (E) and Services (S). Output in each sector (Y_i) is produced using labor (L) and capital (K) inputs via a Cobb-Douglas production function with Constant Returns to Scale (CRS) (Jia & Lin, 2022; Mardones & Ortega, 2023):

$$Y_i = A_i \cdot K_i^{\alpha_i} \cdot L_i^{1-\alpha_i} \quad \text{untuk } i \in \{E, S\}$$

Where α_i represents the capital share, consistent with the characteristics of developing economies (Malerba et al., 2021; Vu & Trinh, 2025), the Energy sector is assumed to be capital-intensive ($\alpha_E > \alpha_S$), while the Service sector is labor-intensive. Factor prices (wages w and capital rental rates r) are determined endogenously through market-clearing mechanisms, where factor demand equals inelastic supply (L_{supply} and K_{supply}) (Carbone et al., 2022)

b. Household Consumption and Welfare

The demand side is modeled by a representative household maximizing utility subject to a budget constraint (Caron et al., 2018; Fried et al., 2018). The utility function is defined as a nested Cobb-Douglas function:

$$U = C_E^{\beta} \cdot C_S^{1-\beta}$$

Where β is the preference parameter for energy. The household budget constraint consists of factor income plus government transfers (Tr) (Combet et al., 2025; Linden et al., 2025):

$$P_E C_E + P_S C_S \leq \left(w \cdot L_{supply} + r \cdot K_{supply}\right) + Tr$$

3. Endogenizing Institutional Leakage (The Core Innovation)

The primary novelty of this model lies in the modification of the government sector. In standard models, the government is assumed to be a passive intermediary that collects taxes and redistributes them without cost (Zhu et al., 2018; Garaffa et al., 2021). This study relaxes that assumption by introducing the parameter λ (Institutional Leakage) (Rafaty, 2018; Ikazaki, 2025).

Carbon tax revenue (R_{tax}) is calculated based on energy sector output and the ad-valorem tax rate (τ) (Mashhadi Rajabi, 2023; Li & Zhang, 2023):

$$R_{tax} = \tau \cdot P_E \cdot Y_E$$

However, the actual amount transferred back to households (Tr) is the residual revenue after deducting "fiscal hemorrhage" due to bureaucratic inefficiency or corruption (Best & Zhang, 2020; Davidovic, 2024):

$$Tr = R_{tax} \cdot (1 - \lambda)$$

$$\text{Dimana } 0 \leq \lambda \leq 1$$

The parameter λ is treated as an exogenous variable reflecting governance quality (as measured by the *Control of Corruption* index) (Best & Zhang, 2020; Baiardi & Scabrosetti, 2025). If $\lambda = 0$, the model reverts to the standard assumption of a benevolent government (Lemelin & Savard, 2022). If $\lambda > 0$, welfare leakage occurs (Muth, 2023). The leaked funds ($\lambda \cdot R_{tax}$) are assumed to exit the productive economic system (deadweight loss), representing elite consumption or capital flight that provides no utility to the representative household (Rafaty, 2018; Anjarwi, 2025). This specification is consistent with empirical findings that corruption reduces fiscal policy effectiveness (Omri & Boubaker, 2024; Ibrahim et al., 2025) and distorts resource allocation (Ardiwinata et al., 2022; Kálmán et al., 2024).

4. Calibration and Simulation Strategy

Given that the objective is to explore theoretical mechanisms applicable to the Global South (Malerba et al., 2021; Vu & Trinh, 2025), parameter calibration is not tethered to a specific country but instead utilizes "Stylized Facts" from development economics literature (Freebairn, 2018; Kulmer & Seebauer, 2019).

- Production Parameters: $\alpha_E = 0.6$ (Capital-intensive Energy) and $\alpha_S = 0.4$ (Labor-intensive Services), aligning with the economic structure of developing nations (Li et al., 2019; Zhao et al., 2022).
- Consumption Parameters: $\beta = 0.3$ (Household energy expenditure share), consistent with consumption patterns in middle-income countries (Jové-Llopis & Trujillo-Baute, 2024; Westberg et al., 2025).
- Policy Scenario: The carbon tax rate is fixed at $\tau = 25\%$, and simulate a significant price shock (Mardones & Ortega, 2023; Yang et al., 2024).

The simulation strategy is conducted in a stepwise manner. The model is solved numerically using the Newton-Raphson algorithm (package nleqslv in R) to find the general equilibrium at various levels of λ, ranging from 0.0 (Perfect Institutions) to 0.8 (Failed State/Kleptocracy) (Jia & Lin, 2022). This simulation aims to track welfare trajectories and identify the tipping point at which carbon tax policy shifts from a beneficial to a detrimental instrument (Muth, 2023; Combet et al., 2025). This stepwise approach allows for the identification of threshold effects undetectable by static models (Kulmer & Seebauer, 2019; Rizqi et al., 2025).

While large-scale models (e.g., GTAP) offer sectoral granularity, they often obscure the specific mechanisms underlying institutional leakage because of their complexity. This simplified approach prioritizes causal clarity over descriptive precision, allowing us to isolate the λ effect.

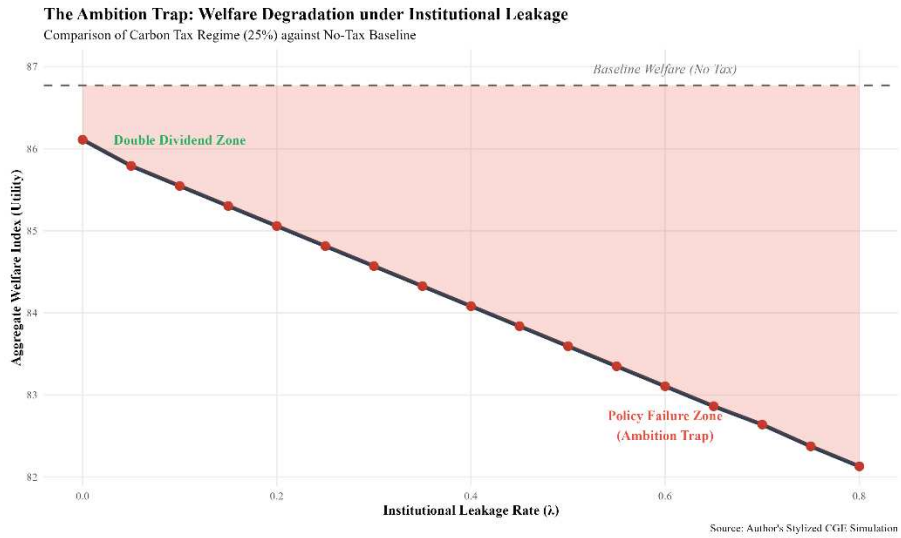
D. RESULTS AND DISCUSSION

This section presents numerical simulation results to evaluate the impact of institutional corruption on the effectiveness of the carbon tax. The analysis is structured across three dimensions: macroeconomic impacts on aggregate welfare, fiscal transmission mechanisms, and sectoral behavioral distortions (Carbone et al., 2022; Lemelin & Savard, 2022).

1. The Ambition Trap: Aggregate Welfare Analysis

The first analysis focuses on the trajectory of social welfare under a fixed carbon tax regime ($\tau = 25\%$) with varying degrees of institutional leakage (λ). As visualized in Figure 1, the simulation reveals a critical non-linear relationship (Kulmer & Seebauer, 2019; Combet et al., 2025).

Figure 1: Welfare Trajectory under Varying Institutional Leakage



Source: Data Processed, 2026

Under clean institutional conditions ($\lambda < 0.2$), the welfare curve remains above the baseline. This confirms the "Double Dividend" hypothesis, commonly found in standard models such as those by Mashhadi Rajabi (2023), Garaffa et al. (2021), and Asakawa et al. (2021). In this zone, revenue recycling effectively compensates for the loss of consumer surplus (Zhu et al., 2018; Li & Zhang, 2023). However, our findings show a sharp divergence as the leakage parameter increases. We identify an "Ambition Trap" at the critical tipping point of ($\lambda \approx 0.35$). Beyond this threshold, the policy becomes counterproductive (Muth, 2023; Barrez, 2024).

These simulation findings provide a mechanistic explanation for the empirical evidence found by Best & Zhang (2020) and Levi et al. (2020). While Best & Zhang (2020) observed a negative statistical correlation between corruption and carbon pricing success, our model demonstrates *why* this occurs: at ($\lambda > 0.35$), the adverse income effect resulting from the loss of government transfers dominates the allocative efficiency benefits (Caron et al., 2018; Fried et al., 2018), dragging society into absolute welfare loss.

These results are consistent with Davidovic's (2024) finding that high corruption perceptions are associated with negative attitudes toward carbon taxes, even among those with pro-environmental value orientations. Similar findings are confirmed by Jagers et al. (2021), showing that perceptions of fairness—which are undermined by corruption—are a crucial mechanism linking revenue recycling to public support for carbon taxes in the US, Canada, and Germany.

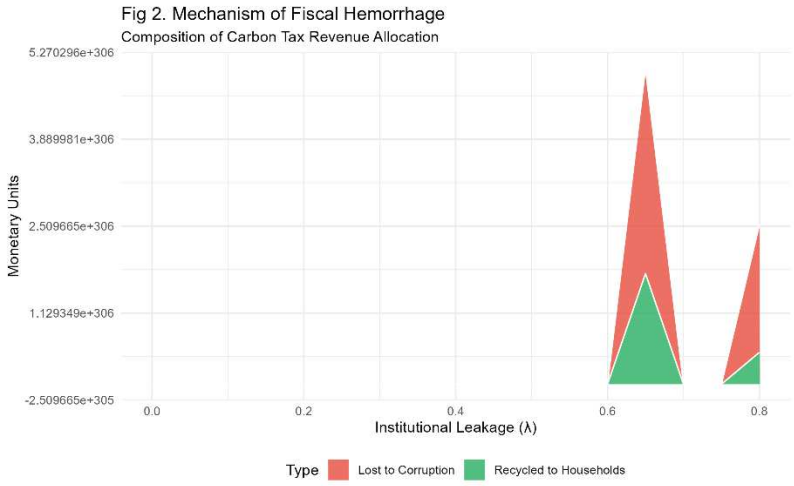
Furthermore, the threshold effect we identified ($\lambda^* \approx 0.45$) provides a quantitative benchmark hitherto absent in the literature. While Rafaty (2018) and Omri & Boubaker (2024) indicated that corruption weakens climate policy, they did not specify at what level of corruption the policy shifts from beneficial to harmful. Our model fills this gap by demonstrating the existence of an institutional tipping point that can be operationalized for policy evaluation (Ikazaki, 2025; Baiardi & Scabrosetti, 2025).

Although the tipping point is identified at ($\lambda \approx 0.35$) under current calibration, sensitivity analysis suggests the exact threshold may shift depending on the elasticity of substitution. However, the qualitative existence of the 'Ambition Trap' remains robust across parameter ranges.

2. Fiscal Hemorrhage Mechanism

To dissect this failure, Figure 2 illustrates the anatomy of the government budget. This graph visualizes what we term "Fiscal Hemorrhage." Unlike the frictionless transfer assumption in the model by Hübler et al. (2024), which assumes a smooth distribution to households, our model shows that at high corruption levels ($\lambda > 0.5$), more than half of the tax revenue is extracted out of productive economic circulation (red area) (Anjarwi, 2025; Tu et al., 2020).

Figure 2: Fiscal Revenue Decomposition: Productive Transfer vs. Institutional Leakage



Source: Data Processed, 2026

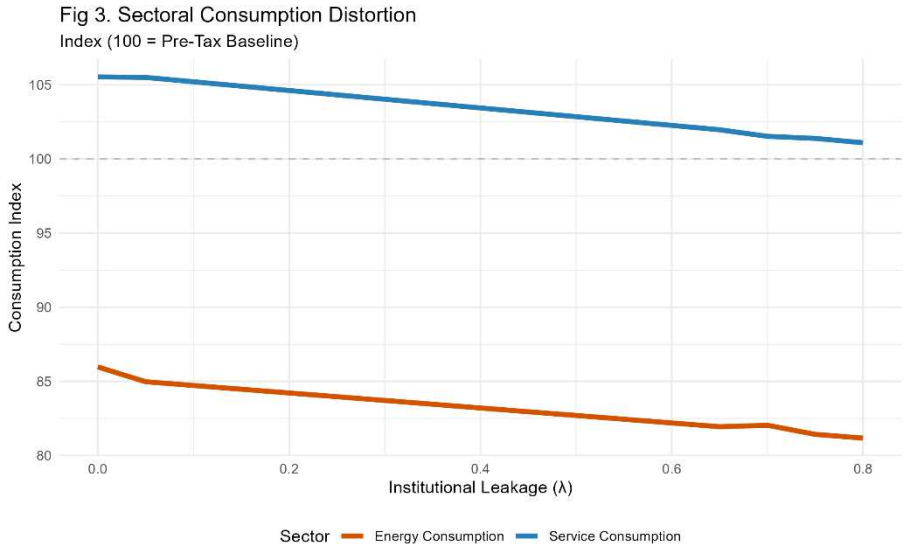
This condition creates a "fiscal sterilization" effect. Money withdrawn from the public does not circulate back into the economy to stimulate demand (Combet et al., 2025; Linden et al., 2025). This explains why, in developing nations, carbon taxes are often perceived as an impoverishment tool rather than a market-correction instrument (Malerba et al., 2021; Vu & Trinh, 2025). Corruption transforms the nature of the tax from a Pigouvian Tax (correcting externalities) into a tool for bureaucratic rent extraction (Rafaty, 2018; Ardiwinata et al., 2022), confirming the concerns of Malatyinszki et al. (2025) and Kálmán et al. (2024) regarding the role of corruption as a significant barrier to the green transition.

This fiscal hemorrhage mechanism also elucidates the failure of social compensation schemes documented by Malerba et al. (2021) in Peru and Zhao et al. (2022) in China. Both studies found that cash transfers failed to reach their targets due to administrative inefficiencies—a phenomenon explicitly captured by our λ parameter. Furthermore, Ibrahim et al. (2025) showed that in West Africa, corruption diverts green funds, thereby weakening environmental governance, which in our model is represented as deadweight loss ($\lambda \cdot R_{tax}$). Khan et al.'s (2022) findings that institutional quality interacts positively with financial development to reduce carbon emissions also support our argument that fiscal effectiveness is highly contingent on institutional quality.

3. Distorted Sectoral Transformation

The final analysis highlights the impact on the fundamental economic structure (Figure 3). Here, the advantage of the stylized model becomes evident compared to complex sectoral models such as those of Li et al. (2021) and Gao et al. (2024). While Li et al. (2021) might observe detailed shifts between waste sub-sectors, our model captures a more fundamental macro phenomenon: Dual Sectoral Recession.

Figure 3: Sectoral Consumption Dynamics under Carbon Tax with Institutional Leakage



Source: Data Processed, 2026

Theoretically, a carbon tax should trigger substitution from the energy sector to the service sector (green growth) (Castro et al., 2023; Gao et al., 2024). However, our graph reveals an anomaly: at high leakage levels ($\lambda > 0.5$), service-sector consumption (blue line) also contracts below pre-policy levels. This occurs due to "Aggregate Demand Destruction" (Caron et al., 2018). Because compensation funds leak, households lack the purchasing power to switch to the service sector (Westberg et al., 2025; Jové-Llopis & Trujillo-Baute, 2024).

This finding refutes the optimistic narrative that carbon taxes will automatically trigger service-sector growth in developing countries (Alsagr, 2023). Without institutional improvements, this policy risks deindustrializing the economy as a whole (Li et al., 2019; Yang et al., 2024). This phenomenon aligns with findings by Castro et al. (2023) in the context of integrated assessment modeling, which showed that implementing carbon taxes without adequate institutional infrastructure can lead to significant negative impacts on sectoral growth.

Furthermore, this sectoral distortion provides a structural explanation for Hedegaard & Kongshøj's (2024) finding that public attitudes toward revenue recycling are highly diverse and cannot be reduced to a single preference. In countries with high institutional leakage, the public perceives negative impacts on both sectors (energy and services), thereby increasing skepticism toward climate policy (Levi, 2021; Davidovic, 2024). Muth's (2025) study on the case of Irish carbon tax reform also confirms that revenue recycling must be designed with extreme caution to prevent political backlash. This necessity becomes increasingly crucial when institutional leakage is high.

These results also align with Oyewo et al. (2024) regarding the significant impact of country governance mechanisms on the carbon-emission performance of multinational entities. In the context of our model, weak governance (high λ) not only undermines domestic fiscal effectiveness but also distorts incentives for cross-sectoral green investment (Alsagr, 2023; Omri & Boubaker, 2024), creating a vicious cycle between corruption, carbon lock-in, and economic stagnation.

E. CONCLUSION AND POLICY IMPLICATIONS

1. Conclusion

This study challenges the neoclassical orthodoxy of climate policy by formally integrating institutional friction into a CGE framework. Our stylized simulation confirms that the success of carbon taxation in generating a "Double Dividend" is not automatic but depends on the integrity of the fiscal system (Malerba et al., 2021; Combet et al., 2025). We identify a specific "Ambition Trap" when institutional leakage exceeds the critical threshold of 35% ($\lambda > 0.35$).

In this high-corruption zone, the interaction between carbon pricing and systemic rent-seeking creates a "Double Punishment" mechanism: high energy prices depress household purchasing power. At the same time, bureaucratic leakage impedes effective revenue redistribution. Instead of fostering a green transition, an aggressive carbon tax in a corrupt environment precipitates a "dual sectoral recession"—simultaneously contracting both energy and service sectors. Ultimately, without governance safeguards, corruption transforms a Pigouvian tax from an instrument of market correction into an instrument of impoverishment (Rafaty, 2018; Ardiwinata et al., 2022).

2. Policy Implications

Based on these findings, we propose a strategic reorientation for climate policy in the Global South:

1. Policy Sequencing: Institutional reform must precede, or at a minimum accompany, carbon pricing. Implementing high tax rates on a "leaky" bureaucratic infrastructure is economically detrimental. Policymakers must prioritize closing fiscal loopholes before pursuing aggressive tax rates.

2. Revenue Ring-fencing: To mitigate "fiscal hemorrhage," carbon tax revenues should be earmarked through transparent digital transfer mechanisms (e.g., Direct Benefit Transfers or Blockchain-based ledgers). Bypassing traditional bureaucratic channels is essential to ensure direct and leakage-free compensation to households.

3. Adaptive Ambition: Climate ambition should be calibrated to "institutional readiness." Developing nations with weak governance scores should prioritize moderate tax rates focused on behavioral signaling rather than aggressive revenue generation until leakage is curbed

3. Limitations

This study utilizes a stylized static model to isolate the mechanism of corruption, a methodological choice that prioritizes theoretical clarity over sectoral granularity. Consequently, it limits the ability to predict specific long-term GDP values compared to large-scale dynamic models. Future research should extend this framework into a dynamic setting to capture inter-

temporal adjustments and utilize panel data to empirically estimate country-specific leakage parameters (λ) across different governance regimes.

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