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Integrating Equity into Equilibrium: A Pro Poor General Equilibrium Model for Inclusive Economic Policy

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Abstract

The persistent challenge of poverty amid economic growth has inspired numerous theoretical innovations to design macroeconomic models that promote both efficiency and equity. One such innovation is the "Pro Poor General Equilibrium" (PPGE) framework, which combines general equilibrium theory with distribution-sensitive approaches. This study emerges from the need to embed pro-poor considerations into the analytical structure of general equilibrium models to support more inclusive development policies. This paper aims to construct a conceptual and textual framework for Pro Poor General Equilibrium using qualitative, descriptive analysis. Drawing upon a diverse body of literature—including international economic theories, Indonesian scholarly discourse, and relevant Arabic economic concepts—the study develops a synthesis that highlights the importance of redistributive mechanisms and inclusive modeling in equilibrium analysis. Through rigorous literature integration and theoretical mapping, the study identifies three key areas where equilibrium modeling must evolve: incorporation of poverty indicators, redistribution-focused price mechanisms, and ethical considerations in utility functions. The results show that PPGE offers a transformative lens through which national policies can be calibrated for both growth and equity. The study contributes to the growing field of development economics by offering a theoretically grounded yet adaptable model for inclusive policy design. It underscores the need for equilibrium frameworks that go beyond neutrality, advocating for intentional equity outcomes in policy modeling.

Keywords

equity; equilibrium; pro poor; inclusive economic; distribution; redistribution

INTRODUCTION

The concept of general equilibrium (GE) has long served as a foundational framework in economics for understanding the complex interrelationships between markets, agents, and prices. Originating from Walrasian theory, GE assumes that economies naturally tend toward an optimal allocation of resources through market-clearing mechanisms (Debreu, 1959). However, traditional GE models operate under

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assumptions of representative agents, perfect competition, and income-neutral policy outcomes, thus largely neglecting income distribution and poverty dynamics (Arrow & Hahn, 1971). This theoretical omission poses challenges in applying GE frameworks to real-world contexts where structural inequality and chronic poverty prevail.

The persistent poverty in many developing nations, including Indonesia, necessitates the rethinking of equilibrium models to integrate distributive justice and social equity. Economic growth alone has not consistently led to poverty reduction, and the benefits of macroeconomic stability often fail to reach the poor (Ravallion, 2001). Indonesia's own post-crisis recovery and decentralization efforts have demonstrated the limitations of trickle-down growth policies (Suryahadi, Sumarto, & Pritchett, 2003). Moreover, empirical evidence suggests that inequality may hinder sustainable growth, making equity not only a moral imperative but also a pragmatic one (Birdsall, 2007).

In response, the discourse on Pro Poor Growth (PPG) emerged, focusing on strategies that ensure the poor benefit proportionately from economic progress (Kakwani & Pernia, 2000). However, PPG lacks a robust theoretical foundation that links poverty-focused objectives with market-wide modeling. This gap has prompted calls for a new paradigm: the Pro Poor General Equilibrium (PPGE). PPGE aspires to embed equity directly within the logic of general equilibrium, thereby enabling policymakers to simulate redistributive outcomes within a coherent economic model (Sadoulet & de Janvry, 1995: p. 112).

In the Indonesian academic context, efforts to merge Islamic economic values and equilibrium theory have further enriched the discussion. Concepts such as 'adālah ijtimā'iyyah (social justice) and tawāzun iqtisādī (economic balance) emphasize the ethical necessity of equity in resource allocation (Al-Ghazālī, 1990: p. 87). These principles align with the maqāṣid al-sharī'ah framework, which mandates the protection of wealth, life, and dignity, reinforcing the normative basis for a pro-poor analytical structure. This convergence of classical Islamic economics and modern GE theory forms a compelling basis for reconfiguring equilibrium with an ethical focus.

Despite growing recognition of the need for such integrative frameworks, several theoretical and methodological challenges persist. For instance, how can pro-poor parameters be systematically integrated into a general equilibrium framework without compromising analytical rigor? What mechanisms ensure that redistribution and poverty reduction become endogenous outcomes of the model, rather than exogenous interventions? How can policy simulations under PPGE reveal trade-offs between equity and efficiency, particularly in developing countries with weak institutional structures?

This study is motivated by the need to answer these fundamental questions through a textual and conceptual exploration of PPGE. By drawing on diverse scholarly

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traditions—neoclassical, heterodox, Indonesian, and Arabic—it attempts to build a bridge between equity-centered policy design and macroeconomic modeling. The integration of poverty considerations into GE theory is not only timely but essential, especially in light of global calls for inclusive development.

In summary, this research is a response to the growing discontent with equilibrium models that assume away poverty. It argues that embedding pro-poor principles into general equilibrium is both theoretically necessary and policy-relevant. Through this study, we aim to construct a conceptual foundation for PPGE that is sensitive to local values, ethically grounded, and analytically coherent.

LITERATURE REVIEW

Over the past three decades, the literature on general equilibrium has expanded to accommodate a range of social objectives, yet the integration of pro-poor considerations remains underdeveloped. Classical GE models, rooted in the works of Walras and later formalized by Arrow and Debreu (1954), provide powerful tools for analyzing interdependencies across markets. However, these models often abstract from the realities of poverty and distributional conflict. As Stiglitz (1989) noted, equilibrium models that fail to incorporate informational asymmetries and market imperfections tend to overlook the poor, who are disproportionately affected by such constraints.

One strand of literature has attempted to resolve this through the development of Computable General Equilibrium (CGE) models, particularly in policy simulations for developing countries. Authors like Dervis, de Melo, and Robinson (1982) introduced CGE models that allowed for distributional analysis, though early models largely retained utility maximization assumptions without modifying welfare functions to reflect poverty concerns. Subsequent modifications, such as the integration of poverty elasticity measures and social accounting matrices (SAMs), have enabled better representation of household-level impacts (Löfgren, Harris, & Robinson, 2002: p. 141). However, these technical improvements still lack a normative foundation that centers the poor as primary agents in the modeling process.

Indonesian scholars have also contributed significantly to the theoretical discourse. For instance, Sadono Sukirno (2006: p. 231) emphasized the need for policy models that address structural unemployment and informal sector vulnerabilities, arguing that general equilibrium assumptions often mask the dualism inherent in the Indonesian economy. Meanwhile, studies like those by Arief Anshory Yusuf and Hermanto Siregar (2007) have employed microsimulation-CGE hybrids to assess the impact of fuel subsidy reforms on poverty, highlighting the critical role of price mechanisms in

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affecting poor households. These studies suggest that even marginal shifts in relative prices can have regressive consequences if not counterbalanced by redistributive policies.

In the Arabic economic tradition, classical scholars such as Ibn Khaldūn recognized the moral dimensions of economic exchange, advocating for a balance between state authority and individual well-being. His concept of 'umrān (social flourishing) and 'adl (justice) reflects an early appreciation of distributive equity within a dynamic economic system (Ibn Khaldūn, 1986: p. 278). Contemporary interpretations, such as by Khurshid Ahmad (1992: p. 114), further argue that Islamic economic systems must prioritize kaffālah ijtimā'iyyah (social protection) as a systemic goal, not merely a charitable obligation. These views resonate with the pro-poor orientation of modern heterodox models.

A growing interdisciplinary literature now advocates for blending ethics, welfare economics, and general equilibrium. Sen's (1985) "capability approach" has catalyzed debates around the inadequacy of income as a sole metric of welfare, urging economists to consider functionings and freedoms. This has led to explorations of how capabilities can be embedded into economic models (Comim, 2001), though these models often remain partial equilibrium in nature. The challenge remains to translate these ethical insights into full-scale equilibrium modeling that respects complexity while delivering equity.

Theoretical Framework

The foundation of the Pro Poor General Equilibrium (PPGE) framework lies in revisiting classical general equilibrium (GE) theory through a normative lens. Traditionally, GE models are grounded in the works of Léon Walras and later formalized by Arrow and Debreu (1954), where the existence and stability of equilibrium are guaranteed under specific assumptions—perfect competition, complete markets, and rational agents. The First and Second Welfare Theorems affirm the efficiency of market allocations, yet remain silent on distributional outcomes (Debreu, 1959: p. 74). In this regard, these models exhibit what Amartya Sen (1970) criticized as "distributional indifference," making them ill-suited to pro-poor analysis.

Welfare economics attempts to bridge this gap by introducing social welfare functions and utility-based comparisons. However, as Sen (1979) argued, aggregative utility functions often fail to capture the multidimensional nature of poverty. To address this, the capability approach offers a richer theoretical base by emphasizing *what people* are able to be and do, thus shifting focus from mere income to human functionings (Sen, 1985). Integrating this into equilibrium modeling demands a reconsideration of

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objective functions, where utility maximization must coexist with indicators of deprivation, such as access to health, education, and basic services.

The PPGE framework draws inspiration from heterodox economic schools, including structuralist and post-Keynesian perspectives, which emphasize institutional rigidities, income distribution, and power dynamics. These schools reject the neutrality of money and assume disequilibria as a central feature of real-world economies (Taylor, 1991: p. 98). Within this context, the inclusion of redistributive fiscal tools, such as progressive taxation or targeted subsidies, becomes not just a policy choice but a structural requirement to sustain equilibrium that benefits the poor. Indonesian economists like Mubyarto (1989: p. 135) have echoed these concerns, calling for models that reflect socio-cultural realities and national development goals rather than abstract efficiency.

Islamic economic theory provides further reinforcement to PPGE, particularly through its emphasis on 'adālah ijtimā'iyyah (social justice), tawāzun iqtisādī (economic balance), and maslahah (public interest). Unlike neoclassical models that treat equity as a secondary consideration, Islamic economics embeds distributive justice within the objectives of economic activity (Chapra, 1992: p. 44). This implies a dual accountability—to markets and to ethical imperatives—which justifies the integration of zakat, waqf, and state interventions as intrinsic mechanisms of redistribution, rather than exogenous policy tools.

The theoretical framework of PPGE also benefits from developments in Social Accounting Matrices (SAM) and microsimulation techniques. These allow for the disaggregation of household behavior and income sources, making it possible to observe the impact of policy shocks on various income groups. Such tools support the construction of PPGE models by offering empirical calibration to the theoretical premises. Yusuf and Sumner (2005) demonstrated that microsimulation-CGE models are particularly effective in evaluating distributional outcomes, providing a methodological bridge between theory and policy application.

In conclusion, the theoretical architecture of PPGE is built on a fusion of neoclassical GE principles, welfare economics, heterodox critiques, Islamic ethical mandates, and applied modeling techniques. This synthesis is essential for constructing equilibrium models that do not merely accept existing distributions but actively aim to reshape them in favor of the poor.

Previous Research

One of the earliest attempts to apply general equilibrium analysis to development concerns was conducted by Adelman and Robinson (1978), who used a CGE model to

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analyze income distribution and growth in South Korea. Their model showed that policy-induced changes in trade and investment patterns could significantly affect the income of different social groups. While innovative, their work still assumed representative agents and did not explicitly address poverty as a modeling objective.

Following this, Dervis, de Melo, and Robinson (1982) introduced CGE modeling frameworks for developing countries. Their book became a foundational reference for CGE applications in poverty analysis. However, their models largely focused on efficiency and trade-offs without integrating redistributive goals directly into the structure (Dervis et al., 1982). The poor were represented primarily as factor owners, and the distributional consequences were analyzed post-simulation rather than built into the objective function.

In the Indonesian context, Mubyarto (1989: p. 122) criticized mainstream economic models for their lack of relevance to the realities of underdevelopment. He advocated for a *kerakyatan* (people-centered) economic model that would be rooted in local socio-cultural structures and prioritize equity. Though not a GE model, his conceptual framework called for structural reform that resonates with the core objectives of PPGE.

More recent empirical work by Sadoulet and de Janvry (1995: p. 139) introduced a household-focused CGE model with rural development implications. They incorporated household heterogeneity, credit constraints, and labor segmentation, showing how policy could differentially impact poor households. Yet their model did not structurally embed poverty reduction as an endogenous goal.

Yusuf and Sumner (2005) used a micro-simulation CGE model to analyze the poverty impact of economic shocks in Indonesia. Their findings underscored the regressivity of certain macroeconomic policies, particularly in the absence of targeted compensatory mechanisms. While their model was sensitive to poverty dynamics, it remained a dual-layered structure with poverty assessment separate from the equilibrium framework.

In a study aligned with Islamic economic values, Chapra (1992: p. 76) argued for integrating ethical norms into economic planning. He proposed a model where state policy must proactively ensure minimum welfare standards for all citizens. While not a mathematical model, his work laid the philosophical groundwork for developing equilibrium models with justice as a central tenet.

Despite these contributions, a significant research gap remains in linking poverty-focused objectives directly within the equilibrium modeling framework. Most models treat equity as an outcome rather than an embedded goal. Even models that disaggregate households fail to modify the core assumptions of utility maximization and factor returns in favor of redistributive imperatives. Furthermore, few studies have

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explored the integration of Islamic economic principles and capability metrics into GE models, leaving a void that this paper aims to address.

RESEARCH METHODS

This study adopts a qualitative approach grounded in textual analysis to construct a conceptual model of Pro Poor General Equilibrium (PPGE). The data sources consist of secondary materials from peer-reviewed international journals, Indonesian scholarly publications (Sinta-Garuda accredited), classical Arabic economic texts, and economic development books published until 2012. The chosen sources offer a triangulated view—spanning neoclassical, heterodox, and Islamic economic thought—to ensure a multidimensional understanding of equity in equilibrium modeling. Arabic sources were selected in accordance with the Joint Decree No. 158/1987 and 0543b/U/1987, using standardized *Arabīyah* transliterations.

The data types in this research include conceptual frameworks, economic modeling structures, philosophical arguments, and policy applications extracted from these academic sources. These data are primarily qualitative in nature, comprising textual descriptions, theoretical explanations, and economic propositions. Special attention was paid to literature that links general equilibrium theory with distributive justice, social welfare functions, capability indicators, or Islamic ethical mandates. The use of diverse textual formats—from journal articles and government reports to classical Islamic manuscripts—enabled the researcher to capture both normative and empirical dimensions of PPGE.

Data collection involved systematic library research and digital database queries across multiple academic platforms, including JSTOR, ProQuest, Garuda, and DOAJ, limited to literature published until 2012. Arabic economic books and Indonesian publications were accessed through national repositories and institutional archives. All sources were reviewed for relevance, credibility, and citation integrity. To preserve academic rigor, a citation tracking technique was used to verify the original context of frequently cited theoretical contributions (Miles & Huberman, 1994: p. 52).

Data analysis was conducted using interpretive textual analysis and conceptual mapping. Texts were coded into thematic categories—such as distributive mechanisms, poverty simulation, equity indicators, and ethical assumptions—and examined for interrelations. The method follows the hermeneutic cycle, where textual meaning is built through recursive reading and contextual comparison (Gadamer, 1975: p. 278). This allowed the identification of theoretical intersections between classical equilibrium assumptions and pro-poor normative criteria. Conceptual synthesis was used to propose new analytical components within the general

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equilibrium framework, such as modified utility functions and social welfare prioritization.

The drawing of conclusions followed the grounded theory approach, where insights emerge from pattern recognition across coded themes (Strauss & Corbin, 1990: p. 98). The analysis was constantly compared with the theoretical literature to refine the logic of PPGE. The conclusion represents a convergence of textual evidence and normative reasoning, resulting in a framework that is both analytically sound and ethically responsive. This methodology ensures that the model is rooted in diverse intellectual traditions while offering practical relevance for policy analysis in developing countries.

RESULTS AND DISCUSSION

The conceptual reconstruction of the Pro Poor General Equilibrium (PPGE) model reveals that traditional general equilibrium models can be reconfigured to serve equity-oriented economic objectives. Three major insights emerged from the textual analysis. First, poverty and inequality are not just policy afterthoughts but can be formally integrated into the structure of equilibrium models. Second, equity-sensitive modifications—such as the inclusion of redistribution functions and poverty-adjusted social welfare functions—enhance the model's realism in developing country contexts. Third, integrating ethical-economic principles from Islamic and heterodox traditions provides a robust normative foundation for inclusive modeling.

The study highlights that poverty is not a peripheral outcome of market failure but an endogenous feature of many equilibrium outcomes under current assumptions. Thus, a general equilibrium model must embed corrective mechanisms—not only through policy variables like transfers and subsidies, but also in the very assumptions of utility, production, and income generation. Concepts such as 'adālah ijtimā'iyyah (social justice) and capability-based utility functions are essential for making poverty reduction a core modeling outcome rather than an externality.

How can pro-poor parameters be systematically integrated into a general equilibrium framework?

Pro-poor parameters can be introduced through modifications of household utility functions, social welfare functions, and production constraints. Traditional models assume individual utility maximization with fixed preferences and income, leading to equilibrium solutions that may ignore disparities in resource ownership. By redefining utility functions to account for basic needs thresholds—e.g., a capability-based

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approach as suggested by Sen (1985)—the model can assign higher welfare weights to consumption bundles that meet minimum subsistence or education levels.

One approach is to incorporate poverty indices, such as the Foster-Greer-Thorbecke (FGT) measure, into the social welfare function. This allows the model to assess equilibrium not only in terms of efficiency but also in terms of its impact on poverty incidence and intensity (Foster, Greer, & Thorbecke, 1984). Such adjustments transform the objective function of the model from pure aggregate utility to a balanced tradeoff between growth and poverty reduction.

On the production side, firm behavior can be adjusted to reflect labor absorption goals, especially for sectors employing the poor. For instance, incorporating labor-leisure trade-offs with minimum employment targets—particularly in agriculture and informal services—can generate pro-poor outcomes even within profit-maximizing assumptions. Sadoulet and de Janvry (1995: p. 128) proposed similar frameworks to analyze rural poverty interventions.

Redistributive mechanisms can also be embedded directly into equilibrium structure through endogenous transfers. A tax-transfer mechanism indexed to household poverty levels allows for progressive redistribution within the model itself. Indonesian CGE models, such as those by Yusuf and Resosudarmo (2005), showed that fuel subsidy reforms paired with compensatory cash transfers could minimize regressive shocks.

Further, Islamic economic principles such as *zakāt* and *infāq* can be formally modeled as obligatory and voluntary transfers that redistribute wealth. These are not simply fiscal instruments but represent structural institutions within the model that influence savings, investment, and household consumption (Chapra, 1992: p. 113). Incorporating such parameters enhances the ethical legitimacy of the PPGE framework.

In conclusion, the integration of pro-poor parameters necessitates a departure from neutrality. Equity must be structurally embedded through targeted utility functions, endogenous transfers, and redistribution-sensitive production behavior. Such changes elevate poverty reduction from an exogenous objective to an endogenous model outcome.

What mechanisms ensure that redistribution and poverty reduction become endogenous outcomes of the model?

To internalize redistribution within the model, several institutional and functional mechanisms must be included in the system of equations. First is the creation of fiscal institutions, such as progressive taxation and poverty-indexed transfers, that adjust

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automatically with income distribution. These institutions become part of the government's behavior in the model and influence disposable income directly.

Second, the wage formation process can be restructured to account for minimum living wages or fair wage mechanisms. In contrast to standard neoclassical assumptions of wage flexibility, a PPGE model may adopt fixed real wages for low-skilled labor, reflecting institutional or ethical constraints (Mubyarto, 1989: p. 138). This promotes income stability for vulnerable workers, affecting their household consumption and labor supply.

Third, SAM-based disaggregation permits granular tracking of income sources by decile or quintile, allowing poverty lines and consumption baskets to be specified per group. This is essential for simulating targeted policies. For instance, targeted subsidies or conditional transfers linked to school attendance can be represented as transfers that activate under specific household conditions.

Moreover, endogenous behavioral responses must be modeled to capture how poor households react to price changes. This includes elasticity constraints on food, fuel, and public services, as these goods dominate the consumption structure of the poor. By calibrating household demand systems to reflect subsistence behavior, the model becomes sensitive to inflationary shocks that disproportionately affect the bottom 40% income group.

Finally, Islamic fiscal instruments like *bayt al-māl* and *waqf* can be formalized as redistributive agents with their own behavioral equations and budget constraints. These mechanisms serve not merely as financial flows but as embedded institutional actors within the economic system, designed to stabilize inequality and promote welfare (Ibn Khaldūn, 1986: p. 296).

Endogenizing redistribution transforms the equilibrium concept itself—from marketclearing as a neutral state, to equilibrium as a socially desirable configuration that balances growth and justice.

How can PPGE simulations reveal equity-efficiency trade-offs in policy design?

A PPGE framework is uniquely suited to reveal the trade-offs between equity and efficiency by simulating various policy scenarios under ethical and distributive constraints. One method is to run comparative statics with and without redistribution mechanisms—such as simulating VAT hikes versus targeted cash transfers. The resulting equilibria can show not just GDP effects but also poverty incidence and Gini coefficients.

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Efficiency losses—often cited as a cost of redistribution—can be assessed in terms of output reduction or labor supply disincentives. However, empirical simulations (Yusuf & Sumner, 2005) often reveal that moderate redistribution yields negligible efficiency costs while delivering significant welfare gains. By simulating utility levels by income group, the model can demonstrate whether marginal losses among the rich translate into meaningful gains for the poor.

Another trade-off emerges in resource allocation. For instance, infrastructure investment may be more growth-inducing in the long run, but short-term poverty alleviation may require social protection spending. PPGE models can be used to evaluate optimal policy mixes by including utility-based multipliers and discount factors in the welfare function (Taylor, 1991: p. 113).

In Islamic contexts, zakāt-funded redistribution may be compared to deficit-financed transfers. The former has lower efficiency costs since it doesn't distort market behavior but relies on moral obligations. Simulations can help policymakers see how religiously mandated redistributive flows affect poverty without burdening the state budget.

Ultimately, PPGE simulations provide policymakers with a transparent analytical tool to weigh the moral and economic dimensions of trade-offs. Instead of treating equity and efficiency as mutually exclusive, the model shows how they can be jointly optimized under thoughtful policy design.

CONCLUSION

This study has introduced and analyzed the Pro Poor General Equilibrium (PPGE) model as a transformative alternative to conventional macroeconomic frameworks. Rather than treating equilibrium as a purely allocative mechanism, PPGE reimagines it as a distributive tool capable of addressing real-world poverty and inequality. By altering its assumptions, objectives, and institutional parameters, the model becomes responsive to ethical concerns and social realities, particularly within the context of developing economies like Indonesia.

The PPGE framework advances a significant conceptual shift: it integrates poverty as an endogenous variable and positions redistributive institutions—such as progressive fiscal policy and Islamic social finance—as structural elements within the system of equations. This approach allows equity to emerge not as an external add-on, but as a built-in modeling outcome. Consequently, the model transitions from abstract utility maximization toward a more inclusive and justice-oriented representation of well-being.

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Furthermore, the incorporation of moral and ethical imperatives—drawn from Islamic economics, welfare economics, and heterodox traditions—demonstrates that normative values can be methodologically formalized. This enriches the analytical depth and cultural relevance of the model, allowing it to bridge the gap between theoretical rigor and socio-political context. PPGE thereby becomes not only a technical tool for simulation but also a strategic framework for ethical policy design.

The findings also reveal that trade-offs between equity and efficiency are not binary. Simulations within the PPGE structure make it possible to visualize complex policy paths that achieve inclusive growth. This is especially vital for nations grappling with structural poverty, where traditional models often overlook distributional consequences. In this sense, PPGE is not just a theoretical innovation—it is a practical response to systemic injustice.

In totality, the Pro Poor General Equilibrium model represents a paradigm shift in economic modeling. It challenges the discipline to move beyond technocratic abstractions and to embrace ethical engagement and societal relevance. By placing justice at the heart of equilibrium analysis, PPGE offers a powerful framework for designing macroeconomic policies that are both economically sound and socially equitable. It invites scholars, policymakers, and development practitioners to rethink the foundational assumptions of their tools—and to build economies that reflect the lived realities and aspirations of the poor.

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