Int. j. adv. multidisc. res. stud. 2025; 5(6):1092-1100

Received: 15-10-2025
Accepted: 25-11-2025

International Journal of Advanced Multidisciplinary Research and Studies

ISSN: 2583-049X

Integrating Partial and General Equilibrium Perspectives in Modelling Demand Functions: A Comparative Analytical Framework

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Abstract

This paper aims to construct a conceptual and comparative analytical model that incorporates a Partial Equilibrium (PE) and General Equilibrium (GE) models in the modelling of demand functions. While PE and GE models share microeconomic foundations, they have developed as paradigms with divergent assumptions, scope of analysis and epistemological commitments. Partial equilibrium analysis gives in depth behaviour in the market which is isolated but fails to consider inter-market feedbacks and systemic interconnectedness. In contrast, general equilibrium models are able to attain consistency at the economy-wide level but tend to sacrifice empirical adaptability and behavioural realism. Drawing on a conceptual analysis approach, this study interrogates the theoretical foundations, methodological tensions, and complementarities between the two traditions. It proposes a continuum of equilibrium closure - a unifying framework that situates PE and GE models along a spectrum defined by the degree of endogeneity, feedback intensity, and market interdependence. This framework bridges the micro–macro divide by linking behavioural demand specifications with systemic feedback mechanisms, allowing analysts to model conditional equilibrium outcomes. Using illustrations from agricultural economics, the paper demonstrates how hybrid equilibrium modelling enhances policy relevance by capturing both sector-specific responses and economy-wide repercussions. The framework contributes theoretically by redefining equilibrium as a conditional construct, introducing feedback intensity as a measurable parameter, and formalizing comparative equilibrium diagnostics as a methodological tool. The study concludes that integrating partial and general equilibrium approaches is not only feasible but necessary for a more comprehensive understanding of demand dynamics and policy transmission in complex, interdependent economies.

Keywords: Partial Equilibrium (PE), General Equilibrium (GE), Demand Functions, Comparative Analytical Framework, Economic Modelling, Hybrid Modelling

1. Introduction

Demand function modelling has been the centre stage of economic analysis as it connects individual behaviour, market forces, and macroeconomic performance (Kirman, 2010; Hommes, 2013) [42, 38]. The history of the economic theory was marked by an ongoing conflict between the partial equilibrium (PE) and general equilibrium (GE) theories, which constitute two different epistemological and methodological traditions. The partial equilibrium model, which was developed in the Marshallian tradition, separates individual markets in order to examine the demand and supply changes under ceteris paribus (Colander, 1995; Dardi, 2003) [16, 19]. By contrast, the general equilibrium approach which was based on the Walrasian paradigm reflects interdependencies in multiple markets, taking into consideration systemic feedbacks and resource constraints (Bryant, 2009) [12]. Although the two schools of thought are both fundamental to an economic thought, they tend to work parallel and not to work in unison to each other, a departure, which has informed both theory and practice of economic modelling today.

Increasing complexities in the global economic systems including climate change, interdependencies in supply chains and policy shocks have increasingly questioned the sufficiency of isolated analytical methods in recent decades (Hynes *et al*., 2021) [39]. In practical applications, especially in agricultural economics, energy markets, and environmental policy, thedrawbacks of single-equilibrium frameworks have become more and more evident where the demand in one sector is directly linked to the demand in other sectors (Kuminoff *et al*., 2013) [43]. Partial equilibrium models are tractable and empirically specific, but in a way, they may miss systemic interactions which can have a significant impact on welfare outcomes. On the contrary, the general equilibrium models offer theoretical completeness at a cost of behavioural accuracy and empirical calibration. This mismatch creates analytical blind spots that impair the assessment of policy in a discerning way.

The difficulty is how to make sense of the behavioural realism of the partial equilibrium models and the systemic coherence of the general equilibrium analysis. Although there have been a number of efforts to develop hybrid modelling including Computable General Equilibrium (CGE) models with micro-level of demand modules (Cockburn *et al*., 2014) [15] and dynamic Stochastic General Equilibrium (DSGE) models that capture sectoral level of heterogeneity (Nalban, 2018) [53], an overarching analytical framework that integrates the theoretical foundations of both paradigms systematically is yet to be developed. The methodological disconnection between localised market responses and economy-wide equilibria continues to hinder the capacity to model demand in a manner that is both empirically grounded and systemically consistent.

This article employs a conceptual analysis method to critically examine and reconcile the theoretical and methodological assumptions underpinning the partial and general equilibrium approaches to demand modelling. Conceptual analysis allows for the deconstruction of the foundational constructs - such as utility maximisation, market closure, and price adjustment mechanisms - and the exploration of their logical coherence across different equilibrium perspectives (Jackson, 2019) [40]. Rather than advancing a new computational model, this paper develops a comparative analytical framework that situates the two approaches within a unified conceptual space. This framework elucidates the complementary features, tensions, and possible pathways for integration, thereby addressing a critical gap in the literature: the absence of a formalised theoretical synthesis that bridges micro-market demand analysis with macro-systemic interdependence.

By engaging with this gap, the study makes two key contributions. First, it offers a structured conceptual framework that identifies the epistemological and methodological conditions under which partial and general equilibrium models can be coherently integrated. Second, it provides critical insights into how such integration can enhance demand modelling in policy-relevant sectors - particularly agriculture - where price, income, and substitution effects operate across multiple market layers. The analytical synthesis proposed herein is not merely of theoretical significance but also bears practical implications for the design of computable hybrid models capable of capturing both localised behavioural responses and systemic feedback effects.

The rest of this paper proceeds as follows: Section 2 provides a comprehensive literature review of partial and general equilibrium approaches in demand modelling, highlighting their evolution, assumptions, and empirical applications. Section 3 introduces the conceptual analytical framework and outlines the logic of integration of the two paradigms. Section 4 is a critical discussion on the implications of such synthesis to policy analysis and will use the example of agricultural demand modelling. Lastly, Section 5 states the research opportunities in future as there is the need to come up with empirically implementable hybrid models to operationalise the proposed framework.

2. Partial vs General Equilibrium: Theoretical Foundations and Applications

2.1 Partial Equilibrium (PE) Demand Modelling

One of the most persistent models of applied microeconomics and policy modelling is the Partial Equilibrium (PE) analysis. According to Tsakok (1990) [66], it attempts to model dynamics of prices and quantities in one market or a slightly defined group of interconnected markets and all other markets holding other macroeconomic variables as exogenous and constant. Theoretical development of this approach takes its origin in the tradition of Marshallian school of thought, in which the market equilibrium is attained where the demand and supply intersect and the external conditions remain constant (Colander, 1995) [16]. In this framework, demand can be represented in functional forms like the Marshallian demand curve or more general systems (like the Almost Ideal Demand System (AIDS), quadratic extension (QUAIDS) or the Constant Elasticity of Substitution (CES) demand system (Boysen, 2019) [10]. All of these systems enable analysts to measure unique consumer behaviour in non-linear substitution effects, income responsiveness and demographic heterogeneity.

The key advantage of PE framework is its analytical clarity and simplicity of operation. With a disaggregated segment of the economy, researchers are in a position to model disaggregated policy interventions which is also highly manageable. As an example, agricultural economists often use PE models to determine market reactions to trade liberalisation, the elimination of subsidies or market reactions to production shocks like droughts or pest epidemics (Van Tongeren *et al*., 2001) [67]. These models may give useful information on a change in consumer and producer surplus, price transmission along value chains as well as welfare distribution among market participants. As Ziv *et al*. (2020) [73] note PE approaches remain highly attractive for their transparency, their capacity to incorporate detailed commodity-level data, and their compatibility with econometric estimation of behavioural parameters.

However, this analytical isolation that grants PE models their simplicity also embodies their most significant limitation. By design, PE frameworks abstract from the broader web of interdependencies that characterise real economies. Shocks in one market - such as a rise in feed grain prices - can transmit through multiple channels, influencing livestock costs, rural labour demand, or even macro-level price indices. Yet PE models, by treating non-target markets as fixed, systematically neglect such spillover and feedback effects. This limitation can lead to biased estimations of policy outcomes, particularly in economies where cross-sector linkages are strong or where markets adjust jointly.

Moreover, the theoretical basis of PE models is often based on restrictive functional form assumptions and in the state of a static equilibrium (Hertel, 1985) [36]. These simplifications could lead to misrepresentation of dynamic behavioural responses, including investment, technological adjustment, and intertemporal substitution. Practically, most PE applications do not use general equilibrium closure conditions, i.e. balancing of savings and investment, mobility of factors between sector, and government budget constraints, which are critical to consistency in analysis at the economy-wide level (Wickens, 2011) [71]. It has been claimed by critics of the applied modelling literature (Deaton and Muellbauer, 1980; Hertel *et al*., 1991) [24, 37] that these simplifications make PE outcomes context-sensitive and may be misleading when used in complex policy questions that have multi-sectoral or macroeconomic implications.

However, reductionism would be to ignore PE models because of limited scope. They are worthwhile in that they enhance the understanding on the dynamics of the sector, and they frequently form the empirical basis or validation method of wider general equilibrium designs (Berger & Troost, 2014) [7]. Actually, more recent methodological developments have aimed to fill the divide between PE and GE views - either by embedding partial models in general equilibrium paradigms or by connecting them in a cycle of mutual feedback (McDonald & McDonald, 2020) [49]. This dynamic hybridisation indicates a developmental awareness that whilst PE analysis provides sub-micro level accuracy, it is more likely to be effective when integrated into a general equilibrium framework, and the systemic coherence and policy relevance is also more likely to increase.

2.2 General Equilibrium (GE) / CGE Modelling of Demand

General Equilibrium (GE) analysis represents a more comprehensive theoretical framework, one that transcends the market-isolation principle of partial equilibrium by recognising the economy as an interconnected system of markets, agents, and institutions (Bryant, 2009) [12]. Rooted in the Walrasian tradition, GE theory posits that equilibrium is achieved when all markets for goods, services, and factors of production simultaneously clear - that is, when aggregate supply equals aggregate demand in every dimension of the economy (Walker, 2006; Bryant, 2009) [68, 12]. In this setting, prices serve as the coordinating mechanism ensuring that all individual decisions, across households, firms, and governments, are mutually consistent.

The intellectual foundations of GE trace back to Léon Walras and were formalised through Arrow and Debreu's *Existence of an Equilibrium for a Competitive Economy*, which established the conditions under which such an equilibrium could exist (Magill & Quinzii, 2002; Móczár, 2020) [46, 51]. Unlike PE models, which take external conditions as fixed, GE models endogenise them: income, factor prices, trade flows, and government balances are all jointly determined within the system (Robinson, 1991; Robinson, 2006) [58, 59]. This capacity to internalise inter-market feedbacks makes GE approaches particularly powerful for analysing policies or shocks with economy-wide implications such as tax reforms, trade liberalisation, or energy transitions -where indirect and second-round effects are as significant as direct ones.

In applied economic analysis, Computable General Equilibrium (CGE) models operationalise this theoretical framework using calibrated social accounting matrices (SAMs) to represent the circular flow of income and expenditure (Perali & Scandizzo, 2018) [55]. These models have become central tools in policy simulations across both developed and developing economies. For instance, in agricultural and trade policy contexts, CGE models capture the cascading effects of a commodity shock on related sectors, factor markets, and household welfare (Pradhan & Ghosh, 2019) [57]. They allow for a simultaneous consideration of substitution and income effects across all agents and commodities, thereby providing a systemic view of equilibrium adjustments.

However, the extended breadth of GE models is associated with complexity and massive dependency on data. Their practical application frequently involves a lot of calibration, which is normally done with input-output table or national accounts benchmark data (Shoven & Whalley, 1984) [64]. Although this does guarantee internal consistency, it also tends to give strict structural restrictions which might not be able to capture a detailed picture of behaviour or market failures. Moreover, the claim that the Walrasian tradition that there can be an instantaneous adjustment of the equilibrium may hide such short-run frictions as liquidity constraints, adjustment costs, or imperfect competition (De Vroey, 2002) [23]. Therefore, long-run comparative statistics in GE models are good, but they may not be so effective in dynamic, transitional, or disequilibrium models.

The normative assumptions inherent in GE structures, especially the use of representative agents and market clearing (Geweke, 1985) [28], are also pointed out by critics. The use of parameters of elasticity, most of which are borrowed or modified in other studies, is also a source of concern on the strength of the empirical side. Sensitivity analyses often indicate that minor changes in the estimates of elasticity can change significantly the results of models (De Kroon *et al*., 2000) [22], which makes it difficult to believe that policy suggestions based on such models are reliable.

Nonetheless, GE approaches cannot be ignored in harnessing macro-level interdependencies and systemic coherence that will not be realized in partial models. Recent methodological advances have further refined GE analysis. Dynamic CGE (DCGE) and recursive-dynamic models now incorporate capital accumulation, technological change, and intertemporal optimisation (Diao *et al*., 2012) [25], thereby extending the framework's applicability to growth and structural transformation studies. Hybrid models that couple GE systems with microsimulation or agent-based techniques also allow analysts to trace distributive and behavioural heterogeneity at the household or firm level (Bae *et al*., 2016) [4].

The relevance of GE modelling thus lies not merely in its theoretical elegance but in its potential to integrate complex economic structures into a coherent analytical system. Yet, as subsequent sections will argue, the rigid dichotomy between PE and GE frameworks is increasingly being questioned. Modern economic analysis increasingly favours integrative or comparative approaches that draw upon the strengths of both - precision and tractability from partial models, and systemic consistency and feedback capture from general equilibrium systems. The conceptual challenge, therefore, lies in designing hybrid frameworks that can model demand functions in a way that bridges micro-level behavioural realism with macro-level equilibrium interdependencies.

3. Integrating Partial and General Equilibrium Approaches: Toward a Comparative Analytical Framework

The analytical dichotomy between Partial Equilibrium (PE) and General Equilibrium (GE) models has long shaped the methodological orientation of demand analysis. While both traditions share a common microeconomic foundation - the optimisation behaviour of rational agents; their epistemological orientations and analytical boundaries diverge sharply. The partial equilibrium models provide a detailed examination of price, substitution and welfare impacts in a limited area (Mandler, 2002). General equilibrium models, in their turn, are the models that seek systemic coherence, putting all the individual markets in a jointly determined pattern of mutual interdependence (Perali & Scandizzo, 2018) [55]. Yet, this division, though historically productive, has also produced a persistent *methodological silo* that constrains the development of more integrated approaches to demand modelling.

3.1 The Need for Integration

The drive for integrating PE and GE perspectives arises from a fundamental recognition: real-world economic systems do not conform neatly to either abstraction. Economic agents operate in a setting where market-specific shocks trigger feedback mechanisms across production, income, and expenditure systems (Angeletos & Lian, 2018) [2]; yet, these adjustments often occur with temporal lags and varying degrees of market closure. Neither PE's isolationist precision nor GE's systemic completeness alone can capture this hybrid reality. The problem is, then, to devise a comparative analytical apparatus which has the empirical tractability and behavioural specificity of PE models, but can be integrated into the interdependence of the macro-structure peculiar to GE systems.

This tension has become especially evident in agricultural markets (Schnepf, 2008) [63]. In the example of maize, increased global prices of maise will not only impact on maize producers and consumers (PE perspective), but also on the costs of livestock feeds, choices of land allocation, rural labour market and balances in trade (GE dimension). The global food price crisis of 2008 strongly demonstrated the impact of localised commodity shocks in spreading through the global supply chains and changing the macroeconomic balances and welfare outcomes far outside the markets of origin (Mittal, 2009; Watson, 2017) [50, 69]. Such multi-market dynamics are therefore necessary to be modelled with the help of an integrated analytical framework, especially in economies like Nigeria in which agriculture holds a dominant structural position.

3.2 Conceptual Basis of Integration

Conceptual integration between PE and GE approaches can be pursued through several pathways. One approach is *nesting* - embedding PE modules within a GE architecture (Bentler & Satorra, 2010) [6]. In this framework, detailed sectoral models (for instance, a crop or input market) are integrated into a larger economy-wide system. This allows the modeller to preserve micro-level behavioural detail where it matters most, while maintaining macro-level feedback consistency. This nested approach has been applied in hybrid models that link agricultural supply-and-demand systems to macroeconomic CGE frameworks (Hertel & Tsigas, 1997) [35].

Alternatively, integration can be *comparative* rather than structural. This involves juxtaposing PE and GE results to examine the sensitivity of policy conclusions to the scope of inter-market linkages. Comparative frameworks reveal where equilibrium assumptions drive divergence (Schlager, 2019) [62]. For example, this can be seen in the estimation of consumer surplus, welfare incidence, or terms-of-trade effects. In the analysis of trade liberalisation impacts, studies demonstrate that while PE models often predict strong gains for liberalised sectors, GE frameworks moderate these outcomes once factor market constraints and cross-sectoral feedbacks are incorporated (Gilbert & Wahl, 2002; Taylor & Von Arnim, 2007) [30, 65].

A third pathway involves *conceptual harmonisation* at the level of demand specification. Since both frameworks hinge on the functional form of demand systems, integrating them conceptually means identifying demand representations that are both theoretically consistent (in the GE sense) and empirically flexible (in the PE sense). Recent innovations, such as the nested CES - AIDS systems, or the incorporation of Stone-Geary preferences into CGE models, represent steps in this direction (Matsuyama, 2023; Sancho, 2024) [48, 61]. These crossbred models would allow the capturing of substitution patterns without sacrificing macro-consistency (Deaton & Muellbauer, 1980) [24].

3.3 Methodological and Epistemological Challenges

In spite of these developments as accounted, integration could be associated with serious methodological challenges. First, the issue of data inconsistency is a significant problem - PE models utilize micro-level survey or experimental data, whereas GE models are fitted to macro-level national accounts (Angeletos & Lian, 2018) [2]. The unification of such datasets requires either powerful aggregation hypotheses or requires intensive micro-simulation connections. Secondly, the knowledge bases of both frameworks are different. PE analysis is based on partial causality - it is aimed at determining the ceteris paribus effects - and GE analysis is holistic by its nature and aims to analyze the equilibrium of the system in its entirety (Dardi, 2006; Lawson, 2008) [20, 45]. The combination of these views therefore involves the reconciliation of quite different causal logics: the isolating and the interconnecting ones.

The other issue is the interpretation of the very notion of equilibrium. PE models usually characterize the case of the static equilibria, whereas GE systems usually have the long-run closure (Farrow & Rose, 2018) [27]. The real economies though are path-dependent and dynamic, by changing expectations, technology and institutional change (Martin & Sunley, 2006) [47]. This means that a genuinely integrative analytic system cannot rest on the static equilibrium, but instead take dynamic adjustment processes which acknowledge disequilibrium processes. The more recent advances in the Dynamic Stochastic General Equilibrium (DSGE) and agent-based computational economics indicate that this synthesis might be approached.

3.4 The Emerging Research Gap

The conceptual gap this article addresses lies precisely at this intersection - the lack of a coherent analytical framework that explicitly compares and integrates PE and GE approaches in modelling demand functions. While numerous studies employ either PE or GE techniques to estimate demand responses, very few systematically interrogate how the assumptions, elasticities, and feedback mechanisms of one framework translate into or conflict with the other. Moreover, the implications of these methodological choices for policy evaluation - especially in agriculture and resource-based economies largely remain under-explored.

Based on these gaps, this paper proposes a *comparative analytical framework* which places PE and GE demand models in a continuum instead of a clear-cut dichotomy. Through this conceptualization - integration as both an analytical and epistemological tool, the framework will bring further insight on how demand systems behave within their respective settings, and how their various interaction leads to a unique insights into market adjustment processes, manner of welfare distribution as well as policy transmission processes.

4. Conceptual Analytical Framework and Discussion

4.1 Foundations of the Comparative Analytical Framework

Conceptually, to combine the perspectives of Partial Equilibrium (PE) and General Equilibrium (GE) one needs to set up an analytical framework where market-specific changes and system-wide interactions are viewed as complementary to each other, as opposed to being mutually exclusive paradigms. The suggested framework thus situates PE and GE analysis on a spectrum of equilibrium closeness and macro-systemic coherence. This continuum approach treats the demand function as an evolving construct that is context-dependent: when market shocks are small and spillover effects negligible, PE approximations suffice; when cross-sectoral linkages or income effects dominate, GE consistency becomes indispensable. In essence, the framework recognises that the analytical boundary between "partial" and "general" is not absolute but conditional on the magnitude, scope, and interconnectedness of economic shocks (Cooper, 1985; Rosser, 2013; Baqaee & Farhi, 2019) [18, 60, 5].

Conceptually, this model is grounded in three interrelated pillars:

Behavioural Micro-foundations - capturing consumer and producer responses through demand systems (AIDS, LES, CES, or Translog), allowing for heterogeneity in preferences and substitution elasticity (Pollak *et al*.,1984; Fan *et al*., 1995) [56, 26].

Structural Linkages - embedding these microfoundations within a network of interdependent markets (factor, product, and trade) to capture feedback mechanisms (Mueller, 2021) [52].

Equilibrium Closure Dynamics – specifying the temporal and institutional constraints that determine how equilibrium is achieved (e.g., short-run partial adjustment versus long-run macro closure).

By integrating these layers, the framework transcends the static dichotomy between "localised adjustment" and "systemic equilibrium" to construct a unified comparative model of demand behaviour.

4.2 Conceptual Synthesis: Linking Micro Behaviour and Macro Feedback

The central innovation of this framework lies in its *bidirectional causality*: whereas PE assumes exogenous prices and incomes, and GE assumes endogenous determination of all variables (Conrad, 2002) [17], the integrative model allows for partial endogeneity. This partial closure enables certain variables (such as input prices or sectoral incomes) to adjust within defined limits while others remain fixed. The resulting "semi-closed" system captures the reality of incomplete adjustment common in developing or segmented economies, where institutional constraints and imperfect mobility prevent full equilibrium realisation (Gilbert & Oladi, 2009) [29].

This conceptual structure also provides a bridge between *Marshallian* and *Walrasian* reasoning. From the Marshallian perspective, demand is driven by the marginal utility of consumption and constrained by income and prices (Biswas, 2012) [9]; from the Walrasian view, prices themselves are endogenous, determined by general market interactions (Katzner, 2006) [41]. The proposed framework synthesises these by linking marginal utility-based demand specification (PE logic) to general market-clearing conditions (GE logic). This linkage is achieved through the inclusion of feedback coefficients that quantify how changes in one market (say, agricultural output) reverberate through input, labour, and consumption networks.

An illustrative example can be found in the agricultural input–output chain (Heady & Schnittker, 1957; O'Donoghue *et al*., 2019) [33, 54]. A rise in fertiliser prices reduces crop supply, thereby increasing crop prices (a PE effect). But as farm incomes rise, rural demand for non-agricultural goods also increases, which feeds back into the wider economy through employment and wage channels (a GE effect). A purely PE model captures only the first transmission; the integrated framework captures both, providing a richer interpretation of welfare outcomes and income distribution.

4.3 Analytical Dimensions of the Framework

The comparative analytical framework can be structured along three dimensions:

Scope of Market Closure – PE assumes exogenous income and cross-market prices; GE endogenises all. The integrative framework defines *conditional endogeneity* through parameters that represent market openness or factor mobility (Brown *et al*., 1994) [11].

Elasticity Interaction Matrix – By constructing a cross-market elasticity matrix, the framework quantifies substitution and income effects within and across markets, allowing the modeller to trace indirect demand shifts (Berry & Haile, 2014) [8].

Feedback Intensity Coefficients – Representing the strength of feedback from one market to another (e.g., agricultural to manufacturing), these coefficients quantify the degree to which GE feedbacks alter PE outcomes (Goldberg & Knetter, 1999) [31].

This structure allows analysts to compare how varying assumptions about closure, elasticity, and feedback alter demand function estimates - effectively transforming demand modelling into a spectrum of analytical choices rather than a binary methodological commitment.

4.4 Implications for Agricultural Policy Modelling

The agricultural sector provides an ideal empirical setting for applying this comparative framework. Agriculture operates within a complex nexus of input, output, and factor markets, where shocks are rarely contained within a single segment (O'Donoghue *et al*., 2019) [54]. For example, an input subsidy aimed at fertiliser use may have clear partial effects on crop yields and prices; yet, its general equilibrium consequences - on rural wages, land rents, and intersectoral trade balances can be substantial. Empirical study by Anderson *et al*. (2023) [1] reveal that ignoring these interdependencies often leads to overestimation of welfare gains or misidentification of beneficiaries.

Through the integrated framework, such policies can be simulated under varying degrees of equilibrium closure. An example of this could be that analysts might model short-run results (capital held constant) with a PE subsystem, and then add GE feedbacks across a longer time frame to explain factor reallocation and expenditure responses. This multi-layered instrument would improve the predictive and explanatory capacity of demand analysis, becoming a superior instrument of evidence-based policymaking in the field of agriculture and resources management.

4.5 Critical Discussion: Strengths and Limitations

From a critical perspective, the framework suggested is a methodological trade-off between completeness and tractability. Its advantage is in its flexibility, the capability to model the systems at various levels of integration based on the availability of data and the relevance of policies. Nevertheless, flexibility also brings problems as determining the degree of closure and the calibration of feedback is both empirically challenging and theoretically controversial. Too much endogeneity risks overfitting and circular reasoning; too little negates the integrative intent.

Moreover, the framework's conceptual pluralism (Weiskopf, 2009) [70], merging partial and general equilibrium reasoning - may face resistance from purists within each camp. Traditional general equilibrium theorists may question its theoretical purity, while applied partial modellers may see it as unnecessarily complex. However, this is actually the tension that provides the framework with its innovative advantage: it represents a dialectical synthesis in economic modelling, which recognizes complexity as a reality of realistic analysis and not as a nuisance to be abstracted (Gupta, 2023; Arkhipov *et al*., 2023) [32, 3].

5. Conclusion and Implications for Future Research

This paper has conceptually explored the integration of Partial and General Equilibrium perspectives in modelling demand functions, proposing a comparative analytical framework that bridges the methodological divide between micro-structural precision and macro-systemic coherence. The literature review indicated that PE models are best at behavioural specificity and empirical tractability but their isolationism means that they cannot be relevant in environments where inter-market interactions and systemic feedbacks are significant (Chen *et al*., 2018) [13]. On the other hand, General Equilibrium (GE) models represent the complete interdependence of markets at the cost of empirical realism and behavioural sensitivity. The continued disaggregation of these models has thus limited the development of a single theory of demand modelling that can capture the inter-dependence nature of market behaviour as well as the complexity of macroeconomic interrelations (Chudik & Straub, 2010) [14].

The conceptual framework advanced here challenges this dichotomy by situating PE and GE models along a *continuum of equilibrium closure* (Herings, 1998) [34]. This approach recognises that equilibrium is not a static or binary condition but a dynamic process that evolves as shocks propagate through interconnected markets (Day, 1984) [21]. The framework thus establishes a methodological middle ground - a space where demand systems can be analysed under varying degrees of endogeneity, feedback, and closure. In doing so, it provides a theoretical basis for reconciling micro-level behavioural functions with macro-level equilibrium consistency.

5.1 Theoretical Contributions

From a theoretical standpoint, this synthesis contributes in three key ways. First, it redefines equilibrium analysis as a *conditional construct*, dependent on the strength and scope of inter-market linkages rather than on fixed assumptions of exogeneity or endogeneity. This reconceptualisation allows demand modelling to move beyond the rigid PE-GE divide, opening avenues for hybrid modelling techniques that adjust the degree of system closure according to empirical context.

Second, it formalises the notion of *feedback intensity* as a measurable dimension of economic interdependence. By quantifying how strongly one market's demand function responds to shocks in another, analysts can compare policy impacts across different equilibrium settings - revealing, for instance, whether agricultural subsidies primarily affect farm households or ripple through labour and manufacturing markets.

Third, it promotes a comparative equilibrium diagnostics in which the results of PE and GE models may be compared systematically and the strengths of policy inferences are assessed. This diagnostic comparison promotes reflexivity in model choice after which researchers and policy makers can be made aware of the direction of the models' results and structural assumptions that the results are based upon.

5.2 Practical and Policy Implications

The integrated equilibrium framework has the benefit of increasing the accuracy and validity of policy analysis, in applied contexts, especially those associated with an agricultural and resource-based economy. The agricultural sector is the symbol of a set of complicated interdependences: the input price shocks, the output demand shocks or the trade flows have both direct and indirect welfare impacts in the economy (Winters *et al*., 1998; Kwon & Koo, 2009) [72, 44]. With the comparative framework, and by simulating the short and long-run sectoral performance of PE modules and GE linkages respectively, policymakers have the ability to see a multi-temporal and multi-sectoral image of how a policy affects the macroeconomy.

An example is the analysis of the effect of subsidies on fertilizers, a PE model can reflect the effect of yield and prices in the farm level whereas a GE extension can explain the effect of increment in agricultural income on the consumption pattern, rural-urban migration, and resource allocation in the sector. These combined understandings are essential towards formulation of balanced interventions which would not have unintended distributional implications. Moreover, in the context of global climate and trade shocks, hybrid equilibrium frameworks provide a more significance tool for scenario analysis - allowing for differential responses across sectors and income groups.

5.3 Directions for Future Research

The conceptual integration proposed here remains a theoretical blueprint that invites further empirical development. Future research should aim to operationalise this framework through formal mathematical modelling and simulation. Three research frontiers appear especially promising:

Hybrid Model Construction: Developing operational models that embed detailed sectoral PE modules within GE structures, particularly using computable frameworks calibrated to social accounting matrices.

Dynamic and Stochastic Extensions: Incorporating temporal and uncertainty dynamics through recursive or stochastic general equilibrium models, to better capture disequilibrium processes and adjustment lags.

Empirical Validation in Agriculture: Using the framework on real world data such as the Nigerian agricultural markets or trade linkages in sub-Saharan Africa to see how integrated equilibrium analysis changes policy outcomes compared to standard PE or GE models.

Also, future research could discuss the epistemological consequences of integration - how the integration of partial and general perspectives can change not only the outputs of models, but also the understanding of the concept of market adjustment and interdependence of policies.

5.4 Concluding Reflection

Finally, the combination of PE and GE is not a technical or methodological process; it is a paradigm shift in the way economists think of market behaviour and policy interaction. The comparative analytical framework advanced in this paper underscores that economic systems are neither entirely fragmented nor perfectly coherent - they are hybrid structures where partial and general forces coexist, interact, and evolve. By embracing this hybridity, researchers can move toward a more realistic and reflexive form of demand modelling, one capable of informing policy decisions in increasingly complex and interdependent economies. The paper thus concludes with a call for renewed dialogue between the partial and general equilibrium traditions. In an era of globalised markets, systemic shocks, and nonlinear policy effects, such integration is not optional - it is an intellectual necessity for advancing both the theory and practice of economic analysis.

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