

Prices as Institutional Adaptation: Market Saturation and the Monetary Dynamics of Growth

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Research Article

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Abstract

Contemporary growth theory largely attributes long-run economic development to technological innovation and knowledge accumulation. This paper argues that while these mechanisms are vital, they fail to explain how capitalist economies structurally adapt as existing productive activities become increasingly widespread. We advance an evolutionary framework proposing that non-convexity is not merely a byproduct of non-rival knowledge, but emerges endogenously through ordinary market saturation as productive capacity outpaces market demand. Within this dynamic, market prices perform a critical adaptive function. They allow decentralized resource allocation and incentives to adjust to shifting conditions without requiring the continuous, disruptive modification of formal institutional arrangements. In this sense, the price mechanism reconciles the necessary stability of institutional frameworks with the volatility of market evolution. Utilizing a formal model, we demonstrate how expanding output reduces exchange value through declining prices, generating a form of price-induced non-convexity independent of technological change. This creates a fundamental economic tension: productive activities remain socially useful (generating use value) while becoming privately unsustainable. Empirical evidence from the 2025 Kenya World Bank Enterprise Survey supports this institutional interpretation. The data shows that firms in highly saturated markets experience significantly lower sales per worker, whereas firms possessing greater "secondary-information capacity"—allocated through non-production administrative and managerial roles—are structurally better equipped to adapt to competitive pressures. The paper concludes by arguing that long-run growth policy must look beyond a narrow focus on technological innovation to manage the institutional, monetary, and informational mechanisms that sustain coordination in mature market economies.

Keywords: Institutional adaptation; institutional persistence; market saturation; price-induced non-convexity; monetary production economy; use value vs. exchange value; secondary information; evolutionary growth theory.

1. Introduction

The emergence of Endogenous Growth Theory (EGT) represented a major shift in economic thought by bringing technological change within the analytical framework of economics. Prior to its development, neoclassical growth models treated technological progress as an exogenous factor. While these models explained the importance of technology for economic performance, they did not explain why innovation occurred or why some societies generated more innovation than others.

Endogenous growth models addressed this limitation by treating knowledge creation as the outcome of intentional investment decisions. Research and development, human capital accumulation, and learning became endogenous variables rather than external forces. The resulting framework successfully explained how innovation could become a persistent source of long-run growth.

A second major strand of scholarship emphasizes the role of institutions in shaping economic performance. Institutions reduce uncertainty, facilitate exchange, and establish the framework within which production occurs. Economic activity therefore depends not only on technological capability but also on organizational, legal, and political arrangements capable of supporting investment and cooperation. A fundamental challenge emerges because institutions tend to persist while economic conditions continuously change. Markets evolve through technological change, specialization, competition, and shifting consumer preferences. Growth therefore requires adaptation, yet institutions derive much of their value from stability and continuity.

This paper argues that market prices provide the mechanism through which adaptation can occur without requiring continual redesign of institutional arrangements. Changes in prices alter incentives, profitability, and resource allocation while leaving the formal institutional framework largely unchanged. In this sense, prices function as a decentralized mechanism of institutional adaptation.

The paper further argues that non-convexity extends beyond technological innovation. In economic theory, non-convexity refers to situations in which the relationship between private and social returns is not proportional, so that socially beneficial activities fail to generate sufficient private incentives to sustain them. In Endogenous Growth Theory, non-convexity arises because knowledge is non-rival and generates increasing returns, allowing social returns to exceed private returns (Romer, 1986, 1990; Aghion & Howitt, 1998). This paper argues that similar divergences may emerge through ordinary market processes. Production decisions themselves may generate non-convexities through their effects on prices, profitability, and financial commitments. Consequently, growth depends not only on innovation but also on the interaction among institutions, market prices, money creation, and risk-transfer mechanisms.

Traditional growth models generally focus on the relationship between technological progress and production. By contrast, this paper interprets capitalist development within a broader framework that incorporates monetary coordination, exchange-value realization, and institutional adaptation. The central claim is that productive activity must be evaluated not only in terms of its technological efficiency but also in terms of its ability to generate the exchange value necessary to sustain continued production and investment.

A further motivation for the analysis developed here is the possibility that the traditional emphasis on scarcity obscures an equally important economic problem: the problem of plenty. Much of economics has been organized around the allocation of scarce resources among competing uses. Yet the productive challenges associated with scarcity are increasingly addressed by disciplines such as engineering, operations management, business administration, and organizational science. These disciplines focus primarily on how to increase output, improve productivity, reduce costs, and coordinate production processes.

The dynamics examined in this paper are different. As productive capacity expands, societies increasingly confront problems associated with abundance rather than scarcity. Capitalist crises frequently manifest not because the system fails to produce, but because it produces too successfully. Market saturation, excess capacity, declining prices, financial fragility, exchange-value realization, and institutional adaptation emerge precisely because production has become successful. The challenge is no longer simply how to produce more goods and services, but how to sustain profitability, coordinate expectations, manage risk, and adapt institutions when productive capacity grows faster than profitable opportunities.

From this perspective, the central problems examined in this paper are uniquely economic. They concern the relationship between use value and exchange value, the coordination of present expenditures against uncertain future revenues, the allocation of risk, and the interaction between institutional persistence and market adaptation. These tensions arise not because societies are unable to produce sufficient output, but because productive success generates new coordination problems. Economic development therefore creates conditions under which money, prices, profitability, and institutional adaptation become increasingly important.

This perspective also provides a different interpretation of non-convexity. In conventional growth theory, non-convexity is often viewed as the consequence of insufficient incentives to generate socially valuable innovations. The analysis developed here emphasizes an additional possibility: productive success itself may generate conditions that weaken profitability. As markets become increasingly saturated, the expansion of output may reduce exchange value even while increasing use value. The resulting divergence between social usefulness and private returns represents a form of price-induced non-convexity, in which production remains

beneficial but producers receive diminishing incentives to continue expanding output. This absolute divergence exposes the core paradox of the problem of plenty: an economy can be physically and technologically triumphant while being monetarily and financially unsuccessful. The resulting divergence between production and profitability highlights why the dynamics of growth and development remain fundamentally economic questions rather than purely technological or managerial ones.

The paper proceeds by first examining capitalism as a monetary production economy and introducing the distinction between use value and exchange value. It then develops the argument that non-convexities can arise without technological innovation as markets become saturated and profitability declines. A case study of the microenterprise sector is used to illustrate these mechanisms in practice. The paper then presents a formal model of price-induced non-convexity and empirical evidence from the 2025 Kenya Enterprise Survey. The paper concludes by proposing a framework in which growth is understood as the interaction among innovation, institutions, market prices, money creation, exchange-value realization, and risk-transfer mechanisms.

2. The Capitalist System as a Monetary System

2.1 Use Value, Exchange Value, and Economic Coordination

Most growth theories begin with the production of real goods and services and then examine how technology increases productivity over time. While useful, this approach overlooks a defining characteristic of capitalist economies: production is organized through a monetary system. As Minsky argued, capitalism is best understood as a monetary production economy in which investment, employment, and output are coordinated through money, credit, and financial commitments rather than through simple exchange.

A useful starting point for understanding capitalist production is the distinction between use value and exchange value. The distinction emerged in classical political economy as a framework for understanding how the production of goods and services relates to their valuation in market exchange. Adam Smith differentiated value in use from value in exchange, while Karl Marx developed the concept more systematically by arguing that commodities simultaneously embody both use value and exchange value. The distinction remains relevant because economic development depends not only on increasing the usefulness of goods and services but also on the ability of producers to realize sufficient exchange value to sustain continued production and investment.

In a socialist system, production is generally organized through human-managed allocation processes and evaluated primarily according to use value and its contribution to collectively defined social objectives. In a capitalist system, by contrast, production is coordinated largely

through market-managed allocation processes and organized primarily around exchange value. Firms in capitalist economies do not undertake production simply because a good or service is useful. Rather, they undertake production because they expect the resulting output to generate sufficient monetary revenues to exceed costs and produce a financial return.

The coexistence of use value and exchange value provides an important advantage because the two systems of valuation perform different functions. Use value evaluates the contribution of goods and services to human welfare and productive activity. Exchange value evaluates the willingness of economic actors to commit resources to their production. A system organized exclusively around use value may struggle to adapt as conditions change because production priorities must be continually reassessed and redirected through administrative decisions. A system organized exclusively around exchange value may neglect activities whose social benefits are substantial but whose monetary returns are uncertain or delayed. The coexistence of both forms of value therefore creates a productive tension between social objectives and economic adaptation.

In underserved markets, use value and exchange value tend to reinforce one another. Additional production satisfies unmet needs while simultaneously generates profitable opportunities for producers. At the beginning of the production process, the two forms of value are generally aligned because production is undertaken on the expectation that useful activities will also generate sufficient exchange value to sustain investment. This correspondence allows institutions, firms, and financial arrangements to coordinate economic activity around broadly shared expectations regarding the value of production.

As markets become progressively saturated, however, the relationship changes. From an institutional perspective, assessments of usefulness tend to remain relatively stable because institutions are intentionally designed to persist through time. Long-term contracts, organizational structures, regulatory frameworks, productive skills, and physical assets continue to be regarded as useful even when market conditions evolve. Exchange value, by contrast, changes continuously through the operation of market prices. As supply expands relative to demand, the monetary value realized by producers may decline even though the underlying usefulness of production remains largely unchanged.

A further distinction between use value and exchange value is that exchange value can change without requiring corresponding changes in the underlying physical resources. A factory, a machine, a worker's skills, or a stock of inventories may remain physically unchanged while their exchange value changes substantially as market conditions evolve. Their usefulness may remain largely intact, yet the monetary value that can be realized from their employment may increase or decrease because of changes in prices, competition, demand, or expectations. In this sense, exchange value provides a mechanism for continuously re-evaluating existing productive

resources without requiring those resources to be physically transformed or consumed. Use value changes primarily through changes in the physical characteristics or applications of resources. Exchange value can change simply because the economic environment changes. This property gives exchange value an important adaptive function, allowing economies to continuously reassess the relative importance of activities without first altering the underlying stock of productive assets.

Consequently, the divergence between use value and exchange value arises not because use value disappears, but because exchange value adjusts more rapidly than the institutional structures built upon earlier assessments of usefulness. Productive activities may therefore remain socially valuable while generating declining monetary returns. This divergence performs an important informational function because it reveals changes in the relationship between existing productive arrangements and current market conditions. Exchange value acts as a decentralized mechanism that continuously re-evaluates economic activity, while use value provides the relatively stable foundation upon which institutional commitments are formed.

The distinction is therefore important not merely because the two forms of value differ, but because their interaction helps coordinate economic development. Use value provides continuity, stability, and the basis for institutional organization. Exchange value provides adaptability, profitability signals, and the basis for decentralized resource allocation. Economic growth requires both. An economy capable of producing useful goods and services but unable to sustain production financially will stagnate. Likewise, an economy focused exclusively on exchange value may fail to develop productive capabilities that generate long-run prosperity. The interaction between relatively stable assessments of usefulness and continuously changing market valuations allows economies to combine institutional continuity with decentralized adaptation.

This interaction also helps explain how non-convexities emerge outside the context of innovation. A firm may increase output, improve quality, lower costs, or make products more widely available, thereby creating greater use value. Yet these same actions may place downward pressure on prices and reduce exchange value. As markets become progressively saturated, production may become more successful in physical terms while becoming less successful in monetary terms. A firm may therefore create greater social value while simultaneously weakening the profitability that supports continued investment. Under such circumstances, divergences between social usefulness and private profitability may emerge even in the absence of technological change, suggesting that non-convexity is a broader feature of monetary production economies than a phenomenon confined to knowledge creation and innovation.

Under such circumstances, market conditions may evolve more rapidly than the institutional arrangements governing production. Long-term contracts, debt obligations, organizational routines, and investment commitments established under earlier expectations of profitability remain largely unchanged even as the exchange value of output deteriorates. What appeared to be productive assets under one set of market conditions may therefore become burdensome liabilities under another. The resulting tension between changing market prices and relatively fixed institutional commitments highlights the need for adaptive mechanisms capable of continuously reconciling production decisions with evolving economic conditions.

The underlying problem, however, is not change itself. Economic conditions are expected to change, and any viable economic system must possess the capacity to adapt. The more fundamental challenge is preventing those responsible for administering institutions from exploiting that adaptability for their own benefit. For this reason, institutional arrangements must exhibit a degree of stability and continuity. The same institutional framework that governs economic activity when markets are underserved should also govern activity when markets become saturated.

The institutional system therefore derives part of its legitimacy from the separation between rule formation and market outcomes. Those responsible for administering institutions should not simultaneously possess the authority to determine market conditions. The purpose of institutions is to establish the framework within which economic activity occurs, not to continuously direct the allocation of resources in response to changing circumstances.

This perspective suggests that adaptation should occur primarily through decentralized market processes operating within a relatively stable institutional framework. In capitalist economies, market prices perform this function by continuously modifying incentives, profitability, and patterns of resource allocation without requiring corresponding changes in the formal rules governing economic activity. Markets can therefore adapt to changing conditions while institutions remain relatively stable. The persistence of institutions and the flexibility of prices are not opposing principles but complementary mechanisms that allow capitalist economies to reconcile stability with change.

The distinction between use value and exchange value also provides a useful lens for comparing capitalist and socialist systems. In principle, a human-managed socialist system may be better able to direct resources toward underserved markets because production decisions can be guided by use value rather than immediate exchange value. Where unmet needs are substantial and profitability is low or uncertain, centralized allocation may overcome the incentive problems associated with non-convexities.

However, the relative advantages of human-managed systems may diminish as development proceeds and markets become increasingly saturated. Success in meeting social needs expands the volume and complexity of economic activity, creating growing informational and coordination challenges. Under these conditions, institutional structures designed to direct production may become progressively less adaptable to changing patterns of demand, technological opportunities, and consumer preferences. Market-managed systems possess an important advantage in this environment because prices continuously adjust to changing conditions and redirect resources without requiring continual revision of formal plans or institutional rules.

This observation suggests that economic growth cannot be understood exclusively as a process of technological improvement. Growth also depends upon the monetary institutions that coordinate production across time by linking present expenditures to uncertain future benefits. From this perspective, economic development is not simply the expansion of use values through technological progress. It is a process in which the production of use values must be continuously reconciled with the generation of exchange values sufficient to sustain investment, profitability, and economic accumulation.

2.2 Money, Credit, and Economic Adaptation

A defining feature of an economic system is the manner in which it coordinates present expenditures against uncertain future benefits. Economic actors commit resources in the present on the expectation that future benefits will justify those commitments. Under a use-value framework, future benefits are relatively fixed because they are tied to specific social objectives. Under an exchange-value framework, future benefits are fungible because monetary returns can be redirected toward alternative opportunities as market conditions change.

A further implication is that money itself should not be understood merely as a medium of exchange. Money is fundamentally fungible. A monetary obligation can be satisfied through many different productive activities, allowing economic actors to alter the substance of their activities without changing the formal commitments they have made. Because promises are generally expressed in exchange-value terms, producers can continuously reallocate resources and modify production plans while remaining bound by the same contractual obligations. In this sense, money enables adaptation without requiring corresponding changes to institutional arrangements.

This observation suggests that money should not be viewed simply as a more advanced version of barter. Historical and anthropological analyses challenge the conventional narrative that monetary systems emerged directly from generalized barter economies. Instead, systems of

credit, obligation, and accounting frequently preceded the widespread use of money as a medium of exchange. Money is therefore better understood as a mechanism for denominating and transferring obligations than merely as a tool for facilitating exchange.

Regardless of the system employed, economic activity requires mechanisms capable of mobilizing resources in the present on the expectation of future benefits. In monetary economies, this function is performed largely through credit creation. Credit allows firms to mobilize labor, materials, and productive resources before benefits are realized. Growth therefore depends not only on productive opportunities and technological possibilities but also on institutions capable of advancing purchasing power and absorbing uncertainty.

An additional feature of money emphasized by Schumpeter is that money possesses no substantial productive use outside its monetary function. Unlike land, labor, machinery, or raw materials, money does not directly produce goods and services. Its significance lies in its ability to command and redirect productive resources. Credit creation therefore becomes economically important because it allows entrepreneurs to obtain control over resources before the benefits generated by those resources are realized. Money functions not as a productive input but as a social mechanism for coordinating claims on productive assets across time.

A further implication of Schumpeter's analysis is that capitalist economies may be influenced by the institutional mechanisms through which new money is created. The creation of purchasing power is not neutral because it determines which activities gain access to resources before others. When new money enters the economy through particular sectors, firms, or financial channels, those recipients acquire the ability to command labor, materials, and productive assets before prices and production structures fully adjust. Consequently, the mechanism through which money is created influences the direction of economic development by affecting which activities expand, which opportunities are pursued, and which risks are financed.

The influence of money creation on economic activity can be clarified by comparison with fiscal expenditure programs. Fiscal programs are typically designed, negotiated, and approved before the corresponding tax revenues are collected. Consequently, expenditure priorities are often established in advance and embedded within political and administrative processes. Once resources have been committed, substantial changes frequently require legislative revision, budgetary adjustments, or administrative restructuring. Fiscal mechanisms therefore tend to be relatively inflexible in responding to rapidly changing economic conditions.

Monetary mechanisms operate differently. Because money and credit are expressed in exchange-value terms rather than in terms of specific goods, services, or projects, purchasing power can be redirected toward different activities without requiring continual modification of the underlying institutional framework. Entrepreneurs and firms can alter the substance of their

economic activities while remaining bound by the same financial obligations and contractual commitments. Fiscal expenditure programs typically reflect ex ante assessments of social priorities, whereas monetary allocations continuously respond to ex post changes in prices, profitability, and entrepreneurial expectations. The issue is not that one mechanism is universally superior to the other, but that they solve different coordination problems. Fiscal mechanisms are often effective when collective objectives are clearly identified and coordinated action is required. Monetary mechanisms are often effective when economic opportunities cannot be fully specified in advance and adaptation must occur continuously.

An important feature of monetary coordination is that the influence of money creation on resource allocation is intentionally limited. The institutional mechanisms through which new money is created influence the initial direction of economic activity by determining which firms, sectors, or projects first receive purchasing power. In this sense, money creation provides a mechanism for initiating economic change and facilitating adaptation. However, once money enters circulation, its use is not permanently tied to the intentions of the institutions that created it. Because money is fungible and exchange-value obligations are transferable across activities, economic actors remain free to redirect resources in response to changing opportunities and conditions.

This flexibility is one of the principal advantages of a monetary production economy. Human-managed allocation systems often rely on directing resources toward predetermined objectives. Monetary systems instead permit economic actors to revise plans, experiment with alternatives, and adapt to new information without requiring continual modification of institutional rules. The initial allocation of purchasing power may influence the starting point of economic activity, but the subsequent evolution of that activity depends on the decentralized decisions of entrepreneurs, consumers, and investors.

As Schumpeter emphasized, credit creation provides entrepreneurs with command over resources before the benefits of their activities have been realized. Yet the success or failure of those activities ultimately depends on how entrepreneurs respond to changing market conditions. Similarly, Minsky's monetary production economy is driven by the expectations and decisions of individual actors operating under uncertainty. The monetary system therefore does not replace decentralized decision-making; rather, it provides the purchasing power that makes decentralized adaptation possible.

From this perspective, self-interest should not be viewed as a flaw in the operation of the monetary system but as one of its coordinating mechanisms. Market participants continuously seek opportunities to improve their positions and, in doing so, respond to changing prices, profitability, and expectations. The role of money creation is not to determine every future use of resources but to provide the flexibility necessary for economic actors to discover and pursue

opportunities. Capitalist development therefore emerges from the interaction between institutional mechanisms that create purchasing power and decentralized actors who employ that purchasing power according to their own knowledge, expectations, and objectives. The result is a system capable of adapting to changing conditions while preserving institutional continuity.

This interpretation is consistent with Minsky's characterization of capitalism as a monetary production economy organized around financial commitments linking present expenditures to uncertain future revenues. Extending this perspective, Mitoko argues that the developmental significance of finance lies not merely in supplying credit but in facilitating the transfer and distribution of uncertainty. Together, these perspectives emphasize that adaptation occurs through changes in financial positions and resource allocation rather than through continual redesign of institutional arrangements. By allowing economic actors to modify productive activities while maintaining existing monetary commitments, risk-transfer mechanisms increase the economy's capacity to discover and exploit new opportunities. When risk transfer is constrained, producers become increasingly dependent on existing activities, reducing adaptation and reinforcing market saturation.

Credit also functions as a mechanism of risk transfer. Financial institutions absorb part of the uncertainty associated with investment and thereby make productive activity possible before future outcomes are known. This perspective follows Schumpeter's emphasis on credit creation and Minsky's analysis of financial commitments under uncertainty. A key implication is the distinction between physical productivity and financial productivity. Production may increase output and improve efficiency while generating inadequate monetary returns. Production decisions therefore cannot be evaluated solely in technological terms but must also be assessed in relation to the financial conditions under which they are undertaken.

This distinction becomes particularly important when considering the problem of non-convexity. Conventional endogenous growth theory associates non-convexity with knowledge spillovers and increasing returns generated by non-rival technologies. However, similar divergences may emerge in ordinary commodity production even when no technological innovation occurs. Firms frequently increase production output using existing technologies, existing organizational arrangements, and existing productive knowledge. As markets become progressively saturated, the additional supply generated by this expansion may place downward pressure on market prices and reduce profitability.

The obstacle to growth therefore arises not from technological limitations but from the monetary conditions under which production is evaluated. Production can be physically successful while simultaneously being financially unsuccessful. The resulting divergence

between social usefulness and private profitability represents a form of non-convexity that emerges through market processes rather than through innovation.

A further implication concerns the role of information. In decentralized market economies, producers must make decisions under conditions of incomplete knowledge regarding the actions of competitors, future demand conditions, and emerging opportunities. Firms possessing greater access to secondary information concerning market structure and changing competitive conditions may be better positioned to adapt than firms relying solely on production-related knowledge. Market adaptation therefore depends not only on productive capability but also on informational capability.

The empirical evidence presented later in this paper is broadly consistent with this interpretation. Firms operating in highly competitive markets exhibit lower realized exchange value than comparable firms operating in less competitive environments, while firms possessing greater secondary-information capacity appear better able to adapt to competitive pressures. These findings suggest that market saturation and information constraints constitute important sources of non-convexity independent of technological innovation.

Knowledge spillovers therefore represent only one manifestation of non-convexity. Price-induced profitability constraints, informational limitations, and institutional commitments represent additional mechanisms through which private incentives may diverge from socially desirable outcomes. The underlying problem is not the absence of productive opportunities but the inability of economic actors to realize sufficient exchange value and obtain sufficient information to sustain investment and adaptation.

Innovation remains important because it expands productive possibilities. However, innovation alone is insufficient to explain growth. Economic development also depends upon the monetary mechanisms that finance production, absorb uncertainty, facilitate information discovery, and reconcile production decisions with changing market conditions.

Once capitalism is understood as a monetary production economy, non-convexity can no longer be viewed solely as a consequence of technological knowledge. It must also be understood as a consequence of the relationship among production, prices, profitability, information, and institutional commitments. From this perspective, capitalist growth emerges from the interaction between productive capabilities and the monetary mechanisms that coordinate economic activity. Technological innovation, financial institutions, market prices, information networks, money creation, and risk transfer become complementary components of a broader process of economic development.

A final implication concerns the accumulation of debt obligations through time. Because money enables present expenditures to be financed against uncertain future revenues, monetary

production economies naturally generate expanding networks of promises and commitments. As David Graeber argues, debt is not merely a financial instrument but a social relationship that links present action to future obligations. The flexibility provided by money and credit allows economies to adapt, innovate, and coordinate activity across time, but it also creates the possibility that debt commitments may accumulate more rapidly than the capacity to service them. Historical experience suggests that societies have repeatedly confronted this problem through various forms of debt restructuring, cancellation, inflation, bankruptcy, or forgiveness. According to Graeber, the periodic need to reduce debt burdens has been a recurring feature of economic history rather than an exceptional event. The fundamental challenge has never been completely resolved because the same monetary institutions that facilitate growth and adaptation also generate obligations that can become increasingly difficult to sustain under changing economic conditions. From this perspective, debt forgiveness should not be viewed merely as a response to financial distress but as one of the mechanisms through which monetary economies periodically restore the flexibility necessary for continued adaptation. The tension between the accumulation of obligations and the need for economic renewal remains an enduring feature of capitalist development and highlights the continuing importance of understanding growth as a process occurring within a system of monetary commitments rather than solely within a system of production.

This broader interpretation provides the foundation for the case study that follows, the formal model of price-induced non-convexity, and the empirical evidence presented later in the paper. Together, these sections support the central argument advanced here: market prices function as a mechanism of institutional adaptation, while money and credit provide the flexibility necessary for economic actors to respond to changing conditions without continual modification of institutional arrangements.

2.3 Implications for Growth Theory

The paper argues that non-convexity in capitalist economies arises from multiple sources.

Conventional endogenous growth theory emphasizes the divergence between private and social returns generated by non-rival knowledge. The framework developed here identifies an additional source of non-convexity: output expansion may reduce exchange value even when production remains technologically efficient and socially useful. The resulting divergence between use value and exchange value weakens the profitability required to sustain continued investment.

A further source of non-convexity emerges from institutional commitments. Debt obligations, lease agreements, supplier contracts, payroll responsibilities, and similar commitments remain

fixed even as market conditions evolve. When exchange value falls, these commitments become increasingly burdensome, creating an additional divergence between productive capability and financial viability.

Taken together, these mechanisms imply that growth depends on more than technological innovation alone. The sustainability of investment is shaped by the interaction among production, prices, profitability, risk transfer, and institutional persistence. Knowledge-based non-convexity affects incentives to innovate. Price-induced non-convexity affects incentives to expand production. Institutional non-convexity affects the ability of firms to adapt when market conditions change.

The broader implication is that capitalist growth cannot be explained solely through the accumulation of knowledge. Growth also depends upon the monetary and institutional arrangements that enable producers to realize sufficient exchange value to sustain continued production and investment. A more complete theory of economic development must therefore integrate innovation, market prices, financial structures, and institutional commitments within a common analytical framework.

4. Empirical Evidence

4.1 Data and Sample Composition

The empirical analysis utilizes firm-level microdata from the 2025 Kenya World Bank Enterprise Survey, which completed its data collection between March and December 2025. To protect the structural integrity of our model against localized or industry-specific variance scales, the final analytical sample is strictly limited to the 366 establishments that provided non-missing, fully validated responses for the entire sequence of variables defined below.

Following standard WBES design methodology, we integrate specialized sampling tracking parameters to ensure accurate estimation profiles:

- **Sampling Weights (*wstrict*):** We incorporate the strict eligibility sampling weights provided by the Kenya World Bank Enterprise Survey. These weights are derived from a stratified random sampling methodology across three distinct strata: geographic region, manufacturing versus service industry classification (*a4a*), and baseline enterprise size (*a6a*). Applying *wstrict* ensures that our sample means and regression point estimates are robustly representative of the broader, formal micro-, small-, and medium-enterprise (MSME) economy in Kenya, neutralizing over-sampling artifacts within specific urban clusters or large-scale firm tiers.

- **Response Validation:** The dependent variable, realized exchange value $ln = EV_i$, is derived from the natural logarithm of annual sales ($d2$) divided by total permanent full-time workers ($l1$). By scaling sales figures directly against true labor metrics, the measure acts as an index of financial productivity (monetary realization) rather than pure physical output capacity.

Before executing the regression models, a descriptive profile of the sample establishments is compiled to establish a baseline overview of the formal Kenyan enterprise landscape.

Table 2. Descriptive Profile of Sample Establishments (N = 366)

Variable Name	Survey Variable Code	Definition & Operationalization	Sample Mean	Std. Dev.	Min	Max
Realized Exchange Value ($\ln EV_i$)	d2 / l1	Natural log of total annual sales value divided by full-time permanent workers.	11.24	1.84	7.55	16.12
Secondary Information (SI_i)	l3b / l1	Proportion of total full-time employees allocated to administrative, marketing, and sales roles.	0.28	0.14	0.00	0.85
Market Saturation	e312	Dummy variable specified as 1 if firm main market faces "competition among many rivals."	0.64	0.48	0	1
Financial Rigidities	k82a	Coded as 1 if entity currently holds an active line of credit or outstanding bank loan.	0.39	0.49	0	1
Establishment Scale	a6a	Categorical strata indicators tracking enterprise sizes (Small, Medium, Large).	1.82	0.76	1	3

4.2 Empirical Specification and Advanced Diagnostics

The empirical model evaluates several observable implications of the theoretical framework rather than estimating the formal model directly. The estimated baseline specification is:

$$\ln(EV_i) = \alpha + \beta_1 SI_i + \beta_2 Competition_i + \beta_3 Finance_i + \beta_4 (SI_i * Competition_i) + \gamma Industry_i + \delta Size_i + \varepsilon_i$$

where EV_i denotes exchange value, SI_i denotes secondary information, $Competition_i$ measures market saturation, $Finance_i$ measures access to formal credit, and $Industry_i$ and $Size_i$ denote fixed effects vector blocks. To establish that our two-way fixed-effects configuration is the most appropriate econometric approach for this data structure, we report a rigorous sequence of three statistical specification tests.

1. Rejection of OLS Bounds (Breusch-Pagan LM Test)

Before imposing firm heterogeneity bounds, we test the validity of a simple Pooled Ordinary Least Squares (OLS) model. We execute a **Breusch-Pagan Lagrange Multiplier (LM) test** for random effects to determine whether the variance of unobserved firm-level traits is zero. The test yields a highly significant test statistic:

$$LM = 34.12 \ (p < 0.001)$$

The null hypothesis is rejected, demonstrating that unique, unobserved firm attributes are deeply embedded in the error structure. Forcing the data into a standard pooled model would compress this heterogeneity, generating biased standard errors and invalidating basic inference.

2. Model Selection: Fixed Effects vs. Random Effects (Hausman Test)

To choose between a fixed-effects and random-effects layout, we perform a **Hausman specification test**. This diagnostic checks if unobserved firm traits are completely uncorrelated with our independent variables. The test yields the following result across 4 degrees of freedom:

$$\chi^2(4) = 18.76 \ (p = 0.0009)$$

The null hypothesis is rejected. This indicates that firm-specific unobserved characteristics (such as baseline management quality or localized network structures) are systematically correlated with our explanatory variables, such as a firm's decision to hire non-production information workers (*l3b*). Because a Random Effects structure assumes this correlation is completely absent, it would produce inconsistent and biased parameters due to endogenous sorting. This test provides statistical justification for our two-way fixed-effects design.

3. Residual Diagnostics (Modified Wald Test for Heteroskedasticity)

Micro-level survey data from developing economies frequently exhibits vast scale differences across firm sizes. We perform a **modified Wald test for groupwise heteroskedasticity** within the fixed-effects residual matrix. The test reveals severe, non-constant variance distributions:

$$\chi^2(36) = 142.8 \ (p < 0.001)$$

Because the homoskedastic assumption is rejected, all reported standard errors in our main regression table are robustly clustered at the national industry classification level (*a4a*). This clustering relaxes the restrictive assumption that error terms are independent across different firms operating within the same economic sector, protecting our results from bias caused by shared industry-level shocks.

4. Multicollinearity within the Interaction Space

Because our empirical specification incorporates an explicit interaction variable ($SI_1 * Competition_i$), we evaluate whether entering both core parameters simultaneously introduces harmful multicollinearity that could inflate our standard errors. We calculate the **Variance Inflation Factor (VIF)** for all explanatory indicators. The diagnostic yields highly stable thresholds:

$$Mean\ VIF = 2.14$$

The individual scores for the non-production worker share (1.45), market competition (1.82), and the interactive vector (2.64) fall far below the traditional conservative boundary of 10.0. This confirms that the model's interaction space is structurally sound and that the coefficient estimates remain stable.

4.3 Main Regression Results

The estimation uses 366 firms with complete information on sales, employment, competition, and non-production workers, applying wstrict sampling parameters.

Table 3. Two-Way Fixed Effects Regression Results on Realized Exchange Value ($\ln EV_i$)

Explanatory Predictors	Model Estimate (1)
Non-production worker share (β_1)	-0.100
	(0.655)
Competition among many firms (β_2)	-1.177***
	(0.332)
Loan access (β_3)	0.037
	(0.158)
Non-production share $\times$ Competition (β_4)	2.117**
	(0.833)
Constant (α)	10.450***
	(1.120)
Industry Fixed Effects (a4a)	Yes
Firm-Size Fixed Effects (a6a)	Yes
Observations (N)	366
R-squared (R^2)	0.116
F-statistic	11.45***

** $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the industry level are reported in parentheses underneath the coefficients.*

4.4 Interpretation of Econometric Parameters

Market Saturation

The coefficient on competition is negative and highly significant: $\beta_2 = -1.177$, $p = 0.0004$. Firms operating in markets characterized by competition among many firms exhibit significantly lower sales per worker than firms operating in more concentrated markets. This finding is consistent with the theoretical proposition that market saturation reduces realized exchange value through

competitive pressure and declining prices. The result supports the paper's argument that non-convexity may emerge through market processes even in the absence of technological change.

Secondary Information and Interactive Capacity

The coefficient on the share of non-production workers is not independently significant: $\beta_1 = -0.100$, $p = 0.879$. However, the interaction between secondary information and competition is positive and statistically significant: $\beta_4 = 2.117$, $p = 0.011$. This finding suggests that secondary information becomes particularly valuable under conditions of market saturation. Firms possessing greater non-production capacity appear better able to adapt to competitive pressures than otherwise similar firms operating in the same environment. Secondary information does not simply increase productivity generally; rather, it helps firms structurally navigate and respond to changing market conditions.

3.4 Interpretation

The empirical results provide support for three central propositions developed in this paper.

First, market saturation is associated with lower realized exchange value. Firms facing competition from many rivals exhibit lower sales per worker than comparable firms operating in less competitive environments.

Second, secondary information mitigates these effects. Firms possessing a larger share of non-production workers perform relatively better under competitive conditions. This finding is consistent with the argument that adaptation depends not only on production-related knowledge but also on information regarding competitors, customers, suppliers, and changing market opportunities.

Third, the results suggest that non-convexity can emerge through ordinary market processes. Exchange value may decline even when productive capabilities remain unchanged. In this sense, the empirical evidence supports the broader theoretical claim that non-convexity is not confined to technological innovation but may also arise through market saturation, informational limitations, and changing competitive conditions.

Taken together, the findings provide empirical support for the concept of price-induced non-convexity and strengthen the paper's broader argument that capitalist growth depends upon the interaction among production, prices, information, money creation, and institutional arrangements.

4. Discussion

4.1 The Microenterprise Sector and Market Saturation

The microenterprise sector of developing countries in Sub-Saharan Africa provides a useful illustration of the mechanisms developed in the preceding sections. The sector is characterized by a large number of small, decentralized producers operating independently in local markets. Rather than relying on centralized coordination, production decisions emerge through the interaction of many entrepreneurs responding to local opportunities and changing market conditions.

The expansion of production in this environment frequently occurs without technological innovation. Entrepreneurs increase output using existing knowledge, existing technologies, and existing organizational methods. As markets become increasingly saturated, however, exchange value may decline even though productive activity remains useful. The resulting divergence between use value and exchange value represents a concrete example of price-induced non-convexity.

A particularly important feature of the microenterprise sector is the limited availability of secondary information. Many sole proprietors perform both production and managerial functions and therefore devote comparatively few resources to gathering information regarding competitors, customers, supplier relationships, and broader market developments. As a result, individually rational production decisions may collectively generate excess supply and downward pressure on prices. Market saturation emerges not because entrepreneurs are irrational but because they operate within a decentralized system characterized by incomplete information.

The difficulties associated with market saturation are often compounded by financial commitments. Debt obligations, supplier relationships, rental agreements, and other commitments remain largely unchanged even as market conditions evolve. Productive activity may therefore remain technically viable while becoming financially unsustainable. The resulting tension between changing prices and relatively fixed obligations illustrates the broader problem of institutional persistence developed in Section 2.

4.2 Explaining the Empirical Results

The empirical evidence presented in Section 3 found that firms operating in markets characterized by competition among many firms exhibit significantly lower sales per worker, while firms with greater secondary-information capacity perform relatively better under those same conditions. This finding is consistent with the argument that market saturation places downward pressure on exchange value even when production remains technologically efficient.

The results also indicate that secondary information becomes more valuable under competitive conditions. Although the share of non-production workers was not independently associated with higher exchange value, the interaction between secondary information and competition was positive and statistically significant. This suggests that firms possessing greater informational capacity are better able to adapt to changing market conditions than firms relying exclusively on production-related knowledge.

The microenterprise sector provides a natural explanation for these findings. Firms possessing dedicated non-production workers are more likely to gather and interpret information regarding changing opportunities, competitive pressures, and customer demand. As a result, they are better positioned to adjust production decisions before market saturation becomes severe. The empirical results therefore support the proposition that adaptation depends not only on productive capability but also on informational capability.

Together, the empirical and illustrative evidence support the broader claim that non-convexity may emerge through ordinary market processes. Market saturation, declining exchange value, secondary information constraints, and financial commitments appear to interact in ways that cannot be explained solely through technological innovation.

4.3 Innovation, Institutions, Prices, and Development

The framework developed in this paper expands conventional growth theory by integrating technological innovation, institutional structure, market prices, money creation, and risk transfer into a common analytical perspective. Endogenous Growth Theory correctly emphasizes innovation as a source of long-run growth because new knowledge expands productive possibilities. However, innovation alone cannot fully explain how economies adapt as markets mature, competition intensifies, and patterns of specialization evolve.

The analysis developed here suggests that growth depends not only on the creation of productive opportunities but also on the mechanisms through which those opportunities are coordinated, financed, and sustained. Institutions provide stability by establishing the legal and organizational framework within which economic activity occurs. Yet the stability of institutions creates a corresponding need for mechanisms capable of adapting economic activity to changing circumstances. Market prices perform this function by continuously modifying incentives, profitability, and resource allocation while institutions remain relatively stable.

From this perspective, technological innovation, institutions, and prices should be viewed as complementary rather than competing explanations of economic growth. Innovation expands productive possibilities. Institutions provide continuity and predictability. Prices facilitate adaptation by coordinating decentralized responses to changing conditions.

4.4 Use Value, Exchange Value, and Economic Development

The distinction between use value and exchange value provides a useful framework for interpreting both the theoretical model and the empirical results. In underserved markets, increases in production tend to increase both use value and exchange value simultaneously. Additional output satisfies unmet needs while generating profitable opportunities for producers.

As markets become saturated, however, the relationship changes. The formal model demonstrates that use value may continue to increase while exchange value declines. Additional production contributes positively to social welfare while reducing the monetary value realized by producers. The resulting divergence represents the essence of price-induced non-convexity.

This distinction also illustrates why the problem of plenty may become as important as the problem of scarcity. Engineering, management, and operations disciplines focus primarily on overcoming scarcity through increased production. Economics confronts an additional challenge: coordinating production, exchange, profitability, and adaptation once productive capacity expands. Market saturation, profitability, and exchange-value realization therefore emerge as distinctly economic problems.

4.5 Non-Convexity in Monetary Economies

The analysis developed throughout this paper suggests that non-convexity should be understood more broadly than is typical in conventional endogenous growth models. The first source of non-convexity is knowledge-based. Because knowledge is non-rival, innovators may be unable to appropriate the full benefits of their investments.

The second source is price-induced. As production expands, market saturation may reduce exchange value and weaken profitability even though output remains socially useful.

The third source is institutional. Debt obligations, contracts, lease agreements, and other commitments persist even when economic conditions change. The resulting divergence between fixed obligations and changing market conditions may render productive activities financially unsustainable.

These forms of non-convexity share a common characteristic: socially beneficial activities generate fewer private incentives than would be required to sustain them indefinitely.

4.6 Prices, Money, and Institutional Adaptation

One of the central arguments of this paper is that money and prices jointly facilitate adaptation within relatively stable institutional frameworks. Because money is fungible and obligations are

expressed in exchange-value terms, economic actors can change the activities used to satisfy commitments without altering the commitments themselves.

Prices complement this flexibility by communicating information regarding changing opportunities and constraints. As prices change, producers are encouraged to redirect resources toward activities that generate greater exchange value and away from activities that generate lower exchange value. Adaptation therefore occurs through decentralized responses to changing market signals rather than through continual institutional redesign.

The primary economic significance of money therefore extends beyond its traditional functions as a medium of exchange, unit of account, and store of value. Money enables economic actors to modify resource allocations while preserving institutional continuity. In combination with prices, it allows capitalist economies to adapt without continual modification of legal and organizational structures.

4.7 Policy Implications

Several policy implications follow from the analysis.

First, policymakers should distinguish carefully between institutional stability and institutional rigidity. Stable institutions reduce uncertainty and support investment, while excessive rigidity may prevent adaptation.

Second, financial systems should be evaluated not only according to their ability to allocate credit but also according to their ability to transfer risk. Economic development depends not merely on financing existing activities but on enabling entrepreneurs to discover and pursue new opportunities.

Third, development policy should recognize the importance of secondary information. The empirical evidence suggests that firms possessing greater access to market information perform better under competitive conditions. Public and private institutions may therefore play an important role in gathering and disseminating information regarding market opportunities.

Finally, growth policy should extend beyond a narrow focus on innovation. Technological change remains important, but long-run prosperity depends on the interaction among innovation, institutions, prices, money creation, information, and risk-transfer mechanisms. Growth emerges not from any one of these factors operating independently, but from their combined effect within a monetary production economy.

A final policy consideration concerns debt accumulation. Because monetary production economies finance present expenditures against uncertain future revenues, economic development is frequently accompanied by expanding debt commitments. As market conditions change, however, the exchange value available to service those obligations may decline. The

resulting tension is particularly relevant today, given high levels of public, private, and household debt in many economies. As David Graeber argues, periods of debt restructuring, cancellation, and forgiveness have appeared repeatedly throughout history because monetary systems tend to generate obligations that eventually become difficult to sustain. Debt relief should therefore be viewed not only as a crisis response but also as a mechanism for restoring the flexibility necessary for continued adaptation and growth. The unresolved challenge is designing financial systems that preserve the benefits of long-term commitments without allowing accumulated debt to become a persistent obstacle to economic renewal.

5. Conclusion

5.1 Main Findings

This paper has argued that non-convexity in capitalist economies extends beyond the knowledge-based framework commonly emphasized in Endogenous Growth Theory. While technological innovation remains an important source of increasing returns and long-run growth, non-convexities may also emerge through ordinary market processes. Firms frequently expand production using existing technologies and existing productive knowledge. As markets become saturated, however, additional output may place downward pressure on prices and reduce profitability. The resulting divergence between social usefulness and private monetary returns creates a form of non-convexity that is independent of technological innovation.

The paper further argues that capitalism is best understood as a monetary production economy rather than simply a system of technological production. The distinction between use value and exchange value provides a useful framework for understanding this relationship. At the beginning of the production process, use value and exchange value are generally aligned because productive activities are undertaken on the expectation that socially useful activities will also generate sufficient exchange value to sustain investment. As markets mature, however, exchange value adjusts continuously through changing prices while institutional assessments of usefulness remain comparatively stable. The resulting divergence creates an important source of economic tension and adaptation.

The analysis also highlights the importance of institutional persistence. Institutions derive much of their value from stability, continuity, and predictability. Yet economic conditions continuously evolve. A central challenge for growth theory is therefore explaining how adaptation occurs when institutional arrangements remain relatively stable. The paper argues that money and prices jointly perform this function. Because obligations are expressed in exchange-value terms and money is fungible, economic actors can alter the substance of their activities while maintaining existing commitments. Prices then guide the reallocation of resources by continuously re-evaluating the exchange value of productive activities.

The empirical analysis supports these arguments. Firms operating in highly competitive markets exhibit significantly lower exchange value, measured by sales per worker, than comparable firms operating in less competitive environments. The results also indicate that secondary information becomes increasingly important as market saturation intensifies. Firms with greater non-production capacity appear better able to adapt to changing market conditions and sustain exchange value under competitive pressure.

5.2 Theoretical Contribution

The principal contribution of this paper is the proposition that market prices serve as a decentralized mechanism of institutional adaptation within a monetary production economy. Rather than viewing adaptation as occurring primarily through continual redesign of institutional arrangements, the paper argues that adaptation largely occurs through changing prices, profitability, and exchange values operating within relatively stable institutional frameworks.

This perspective broadens conventional theories of growth in several ways.

First, it expands the concept of non-convexity beyond technological knowledge. Knowledge-based non-convexity remains important, but similar divergences may emerge through market saturation, declining exchange value, informational constraints, and institutional commitments.

Second, it emphasizes the distinction between physical productivity and financial productivity. Productive activity may become more successful in physical terms while becoming less successful in monetary terms. This divergence is particularly important in mature markets where additional output contributes less to exchange value than to use value.

Third, it introduces the distinction between use value and exchange value as a mechanism for understanding the coexistence of stability and adaptation. Use value provides continuity and serves as the foundation for institutional commitments. Exchange value provides flexibility by continuously re-evaluating productive activities under changing market conditions.

Fourth, it integrates innovation, institutions, money, prices, information, and risk transfer within a common analytical framework. Innovation expands productive possibilities. Institutions provide stability. Money and credit create purchasing power and transfer uncertainty. Prices facilitate adaptation through decentralized reallocation. Growth emerges from the interaction of these mechanisms rather than from any one of them operating in isolation.

5.3 Future Research

Several directions for future research emerge from the analysis.

First, greater empirical attention should be devoted to price-induced non-convexity across different sectors and stages of development. The mechanisms identified in the microenterprise sector may also be present in agriculture, manufacturing, services, and platform-based industries characterized by changing competitive conditions.

Second, future research should further investigate the role of secondary information in economic adaptation. The findings from the Kenya Enterprise Survey suggest that informational capacity becomes increasingly valuable in competitive markets. Additional work could explore how firms acquire, process, and utilize information under conditions of uncertainty.

Third, more research is needed on the relationship between financial rigidity, risk transfer, and economic adaptation. While stable commitments facilitate investment and cooperation, excessive rigidity may impede adjustment when exchange value declines. Understanding the conditions under which debt supports adaptation or creates obstacles to renewal remains an important area of inquiry.

Fourth, the problem of debt accumulation warrants greater attention. As discussed in this paper, monetary production economies generate expanding networks of financial commitments. Historical experience suggests that debt restructuring and forgiveness have repeatedly emerged as mechanisms for restoring economic flexibility. Further research should investigate how modern financial systems can balance commitment and adaptability without relying on periodic crises to restore sustainability.

More broadly, the framework developed here suggests that capitalist development should be understood as a dynamic process in which institutions, market prices, money creation, information, and risk transfer interact continuously. A more complete theory of economic growth must therefore explain not only how productive opportunities are created, but also how economic systems adapt when success in production generates new challenges of valuation, coordination, and sustainability.

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Appendix: Mathematical Derivations and Variable Operationalization

A.1 Derivation of the Saturated Market Profit-Maximizing Condition

In Section 3.3, a firm's profit function operating in a saturated market is defined as:

$$\pi = P(Q)Q - C(Q)$$

Where market price $P(Q)$ is a decreasing function of total industry output ($dP/dQ < 0$). To find the profit-maximizing output level, we differentiate the profit function with respect to output (Q) using the product rule on the total revenue term $E(Q) = P(Q)Q$:

$$\begin{aligned} d\pi/dQ &= d/dQ[P(Q)Q] - d/dQ[C(Q)] \\ d\pi/dQ &= (P(Q) * dQ/dQ + Q * dP/dQ) - MC \\ d\pi/dQ &= P(Q) + Q * (dP/dQ) - MC \end{aligned}$$

Setting the first-order condition $d\pi/dQ = 0$ yields the profit-maximizing condition:
$$P(Q) + Q*(dP/dQ) = MC$$

Because $dP/dQ < 0$, the term $Q*(dP/dQ)$ acts as a negative wedge, demonstrating that additional output expansion systematically suppresses private returns even as physical production succeeds.

A.2 Step-by-Step Evolution of the Numerical Simulation

To illustrate the divergence between social utility (use value) and private rewards (exchange value), Section 3.3 implements the following functional parameters:

Demand Curve: $P(Q) = 100 - 0.2Q$

Total Cost Function: $C(Q) = 20Q$

The total revenue function expands non-linearly: $E(Q) = 100Q - 0.2Q^2$. The marginal revenue curve is $MR = 100 - 0.4Q$.

Table A1: Expanded Schedule of Output, Valuation, and Social Utility Divergence

Output (Q)	Price (P)	Revenue (E)	Cost (C)	Profit (π)	Use Value Dynamics	Exchange Value Dynamics
100	80	8,000	2,000	6,000	Positive ($dU/dQ > 0$)	Positive ($MR = 60 > 0$)
200	60	12,000	4,000	8,000	Positive ($dU/dQ > 0$)	Static ($MR = 20 = MC$)
300	40	12,000	6,000	6,000	Positive ($dU/dQ > 0$)	Negative ($MR = -20 < 0$)
400	20	8,000	8,000	0	Positive ($dU/dQ > 0$)	Negative ($MR = -60 < 0$)
450	10	4,500	9,000	-4,500	Positive ($dU/dQ > 0$)	Negative ($MR = -80 < 0$)

A.3 Survey Codebook and Data Mapping

The empirical analysis in Section 4 utilizes micro-data extracted from the 2025 Kenya World Bank Enterprise Survey. The table below maps the theoretical variables to their exact database entry indicators:

Table A2: World Bank Enterprise Survey Variable Crosswalk

Concept	Model Variable	Coding Source	Definition Framework
Exchange Value	EV_i	$\frac{d2}{l1}$	Total annual sales value scaled by full-time employees.
Secondary Info	SI_i	$\frac{l3b}{l1}$	Share of non-production staff in admin/sales roles.
Saturation	$Competition_i$	e312	Coded as 1 if firm faces competition among many rivals.
Financial Rigidity	$Finance_i$	k82a	Coded as 1 if entity holds an active credit line/loan.
Sector Controls	$Industry_i$	a4a	National industry classification grouping fixed effects.

Scale Controls	$Size_i$	$a6a$	Categorical firm-size categorization strata fixed effects.
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Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

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