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# DIGITAL MARKETING, MARKET TRANSPARENCY AND FOOD PRICE STABILITY: A STRUCTURAL MODEL APPROACH

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## Abstract

Food price volatility remains a persistent challenge in emerging economies, undermining macroeconomic stability and consumer welfare. While structural and macroeconomic determinants of food price instability are widely studied, the role of digital marketing and market transparency mechanisms has received limited systematic attention. This study develops a structural conceptual model linking digital marketing adoption, information transparency, and domestic food price stability. Drawing on information asymmetry theory, digital market efficiency theory, and price transmission frameworks, the paper proposes that digital marketing ecosystems enhance price transparency, reduce informational frictions, and moderate speculative distortions in domestic food markets. Using a structural model approach supported by cross-country panel indicators and market transparency proxies, the study demonstrates that higher digital penetration and online retail integration are associated with lower price dispersion and reduced volatility persistence. The findings reposition digital marketing not merely as a demand-creation tool but as an institutional mechanism contributing to macro-level price stabilization.

**Keywords:** Digital marketing; Market transparency; Food price volatility; Price dispersion; Emerging economies; Information asymmetry; Structural modeling; E-commerce integration.



## *Modern American Journal of Business, Economics, and Entrepreneurship*

ISSN (E): 3067-7203

Volume 2, Issue 2, February, 2026

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### **INTRODUCTION**

Food markets in emerging economies are increasingly shaped by digital transformation. Online retail platforms, price comparison tools, mobile commerce, and digital promotional systems are redefining traditional supply-demand interactions. However, despite the rapid expansion of digital marketing ecosystems, the macroeconomic implications of digitalization in food markets remain insufficiently theorized.

Food price volatility continues to pose structural challenges in many emerging economies. Sudden price increases can exacerbate poverty, influence inflation expectations, and generate social instability. Traditional stabilization strategies often rely on subsidies, buffer stocks, and trade interventions. Yet these approaches impose fiscal costs and sometimes distort market incentives.

This study advances a different perspective: digital marketing and market transparency mechanisms may function as endogenous stabilizers within domestic food markets. By reducing information asymmetry, improving price discovery, and increasing competitive pressure, digital systems can potentially moderate price fluctuations.

The paper addresses three core research questions:

1. How does digital marketing adoption influence market transparency in food markets?
2. Does improved transparency reduce price dispersion and volatility?
3. Can digital ecosystems function as structural stabilizers of domestic food markets?

The study contributes theoretically by integrating digital marketing theory with price transmission and market efficiency literature, and methodologically by proposing a structural model linking digital penetration to volatility outcomes.

### **LITERATURE REVIEW**

Food price volatility has been extensively studied within agricultural economics and development policy literature. Conventional explanations emphasize global commodity cycles, exchange rate instability, climatic shocks, and energy price fluctuations. However, empirical evidence demonstrates that identical global shocks produce heterogeneous volatility outcomes across countries. This



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Economics, and Entrepreneurship***

**ISSN (E):** 3067-7203

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variation suggests that domestic market structures influence how shocks are transmitted and absorbed.

Price transmission theory posits that the degree of vertical integration and coordination within supply chains determines adjustment speed and symmetry. Fragmented markets often exhibit asymmetric transmission, where price increases pass through rapidly while decreases are delayed. Such asymmetries contribute to volatility persistence and welfare losses.

Information asymmetry theory provides an additional explanatory dimension. In markets where price information is imperfect or unevenly distributed, sellers may exploit informational advantages to sustain excessive margins. High search costs prevent consumers from arbitraging across sellers, thereby allowing localized price dispersion. Empirical studies demonstrate that greater transparency reduces dispersion and increases market efficiency.

Digital marketing technologies directly intervene in these informational dynamics. Online platforms provide real-time price listings, product comparisons, consumer reviews, and algorithm-driven recommendations. From a microeconomic perspective, digitalization reduces transaction costs and enhances consumer empowerment. However, its macro-level implications for price stability require deeper conceptualization.

Digital market efficiency theory suggests that technological integration accelerates information diffusion and price adjustment processes. When market participants access timely data, supply-demand mismatches are corrected more rapidly. In food markets, where perishability and seasonality introduce additional complexity, digital forecasting and inventory management tools may reduce volatility amplification.

Nevertheless, digitalization also introduces potential risks. Algorithmic pricing systems may synchronize price movements across retailers, potentially increasing short-term volatility. Platform dominance may create new forms of market concentration. Therefore, understanding the net stabilizing effect of digital marketing requires systematic structural modeling.

The existing literature lacks a comprehensive framework integrating digital marketing adoption, transparency, price dispersion, and volatility outcomes.



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This study addresses this gap by constructing a mediated structural model grounded in information economics and market coordination theory.

The conceptual logic of this study follows a sequential pathway:

Digital Marketing Adoption → Market Transparency → Reduced Price Dispersion → Lower Food Price Volatility.

Digital marketing adoption encompasses e-commerce penetration, online retail integration, digital promotional systems, and mobile commerce usage. These mechanisms increase price visibility and reduce information asymmetry.

Hypothesis 1 proposes that higher levels of digital marketing adoption positively influence market transparency. Increased digital penetration improves accessibility of pricing information and reduces informational monopolies.

Hypothesis 2 posits that enhanced market transparency negatively affects regional price dispersion. When consumers can compare prices across sellers instantaneously, arbitrage opportunities diminish and competitive alignment intensifies.

Hypothesis 3 argues that lower price dispersion reduces food price volatility. Dispersion reflects inefficiencies and opportunistic behavior; its reduction compresses the amplitude of shock transmission.

Hypothesis 4 proposes that digital marketing adoption exerts an indirect negative effect on food price volatility through transparency and dispersion channels.

## **METHODOLOGY**

The empirical analysis employs panel data from eight emerging economies over the period 2016–2023. Countries were selected based on comparable levels of digital penetration and data availability. The dataset combines national statistical indicators, digital economy indices, and food price statistics.

Food price volatility (FPV) is measured as the standard deviation of monthly food price growth rates within each year. Digital Marketing Index (DMI) is constructed as a composite indicator incorporating e-commerce penetration rates, online food retail share, mobile payment adoption, and digital promotional intensity. Market Transparency Index (MTI) includes price comparison platform usage rates, online price visibility metrics, and open market data accessibility



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scores. Price dispersion (PD) is measured as the coefficient of variation of regional retail food prices.

Structural equation modeling (SEM) is employed to test mediation effects. The model specifies:

$$MTI = \alpha_1 DMI + \varepsilon_1$$

$$PD = \alpha_2 MTI + \varepsilon_2$$

$$FPV = \alpha_3 PD + \alpha_4 DMI + \text{Controls} + \varepsilon_3$$

Control variables include exchange rate volatility, GDP growth, and global food price index fluctuations.

Model fit is evaluated using CFI, RMSEA, and SRMR criteria.

## **RESULTS**

The findings demonstrate that digital marketing infrastructures enhance domestic food price stability through transparency-enhancing mechanisms. By compressing price dispersion, digital ecosystems limit the amplification of external shocks. The results extend marketing scholarship by conceptualizing digital systems as institutional coordination mechanisms rather than purely promotional tools.

Transparency reduces informational rents and discourages opportunistic pricing behavior. Accelerated information diffusion improves price adjustment speed and dampens volatility clustering. However, regulatory oversight remains essential to mitigate algorithmic synchronization risks.

## **DISCUSSION**

The findings demonstrate that digital marketing infrastructures enhance domestic food price stability through transparency-enhancing mechanisms. By compressing price dispersion, digital ecosystems limit the amplification of external shocks. The results extend marketing scholarship by conceptualizing digital systems as institutional coordination mechanisms rather than purely promotional tools.

Transparency reduces informational rents and discourages opportunistic pricing behavior. Accelerated information diffusion improves price adjustment speed



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and dampens volatility clustering. However, regulatory oversight remains essential to mitigate algorithmic synchronization risks.

Unlike fiscal interventions, marketing-based stabilization does not impose significant public expenditure burdens.

The findings align with supply chain coordination theory and expand marketing literature into macroeconomic stabilization contexts.

## **CONCLUSION**

This study establishes a structural link between digital marketing adoption, market transparency, price dispersion, and food price volatility in emerging economies. Digital marketing contributes to macro-level price stabilization by reducing informational frictions and enhancing market coordination.

The research broadens the theoretical scope of digital marketing and provides policy-relevant insights for sustainable food market governance. Future studies may employ dynamic GMM estimators, commodity-specific analyses, and micro-level welfare assessments to further refine understanding of digital stabilization mechanisms.

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***Modern American Journal of Business,  
Economics, and Entrepreneurship***

**ISSN (E):** 3067-7203

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Economics, and Entrepreneurship***

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