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CONSEQUENCES OF MAXIMUM MARKUP REGULATION IN THE SUPPLY AND DISTRIBUTION CHAIN FOR AGRI-FOOD PRODUCTS

ABSTRACT

This study examines the consequences of maximum markup regulation on the supply and distribution chain for agri-food products considering three primary stakeholders: final consumers, producers, and retailers. Maximum markup policies are often implemented to protect consumers from excessive price increases. In practice, their aim is to ensure affordability in essential food items by limiting the allowable profit margin within the supply chain. However, this regulatory approach has complex and often negative consequences. For consumers, these regulations may lead to short-term price stability, but they can also reduce product variety because producers will try to cut costs to adapt to limited markups. For producers, the imposed markup cap often lead to reduced profitability, especially for small-scale farmers that cannot achieve economies of scale. As a result, some producers may be forced out of the market or constrained to low-cost, low-quality production practices. Retailers, while better equipped to absorb reduced markups, might respond by shifting costs onto suppliers. They also tend to limit supply chain diversity, which can affect market competition and alter consumers' choices. These dynamics suggest that while maximum markup regulation can mitigate price spikes for consumers, they may inadvertently compromise supply chain resilience and product quality. Finally, this study makes a case for a careful re-evaluation of such policies in order to better balance between consumer protection and supply chain sustainability.

Keywords: markup regulation; agri-food products; price spikes; supply chain resilience.

JEL Classification: M31, Q13.

1. INTRODUCTION

Regulation of maximum markup in agri-food supply and distribution chains are a policy tool that is increasingly adopted by governments all around the world. Their intended purpose is to protect consumers from soaring food prices and to limit inflation at macroeconomic level (De Blas & Russ, 2015). The rationale

behind this measure is simple and innate: by capping the allowable markups at different stages of the supply chain, policymakers aim to limit excessive prices on essential food items, thus ensuring that these products remain accessible to most consumers (Nair & Closs, 2006). However, while intended to stabilise food prices for consumers, the repercussions often extend beyond the grocery bill, affecting producers, distributors, and large retailers in complex and sometimes unintended ways. This article examines the multidimensional consequences of maximum markup regulation. The study focus is analysing the impact across the supply chain and integrating insights from Michael Porter's Five Forces model to understand the broader market dynamics.

The agri-food sector operates as a highly interdependent network where value is consequently added at each stage, from primary producers to processing and retail (Iakovou *et al*., 2016). Producers invest heavily in inputs such as seeds, fertilizers, and labour to bring their products to market. Distributors bear transportation and storage costs. Large retailers tend to operate in highly competitive environments, thus incurring overhead costs related to maintaining inventory, staffing, and customer service. In practice, maximum markup regulation tend to compresses profit margins across all these stages, therefore severely influencing how each player in the chain adapts to the capped revenue potential.

In order to understand these interactions comprehensively, this article leverages a framework designed to analyse the competitive pressures that shape industry behaviour, profitability, and decision-making (Porter's Five Forces model).

2. STATE OF KNOWLEDGE

The agri-food supply chain represents an interdependent network of agents that are responsible for the production, processing, distribution, and retail of food products (Handayati *et al*., 2015). These agents include primary producers (*e.g.*, farmers and agricultural firms), processors (*e.g.*, companies transforming raw agricultural products into consumer goods), distributors (*e.g.*, wholesalers and logistics providers), and retailers (*e.g.*, supermarkets and food stores). The relationships between these agents are defined by a combination of economic transactions, negotiated terms, and regulatory frameworks, all of which influence the availability, quality, pricing, and delivery of food products to end consumers (Ganesh Kumar *et al*., 2017).

Primary Producers and Processors
Primary producers are the initial agents in the agri-food supply chain. They are responsible for cultivating crops, raising livestock, or producing raw materials for food products. These producers interact with processors who convert raw agricultural materials into processed goods, that can be packaged and distributed to

retailers (Handayati *et al*., 2015). The relationship between producers and processors is characterised by price negotiations, quality standards, and sometimes contractual agreements that include quantities or delivery schedules (Ganesh Kumar *et al.,* 2017).

Processors often have significant bargaining power, particularly when they deal with small-scale farmers who may lack the leverage to negotiate favourable terms (Iakovou *et al.,* 2016). In such cases, processors can influence production practices by designating quality or compliance standards that producers are obliged to secure contracts. For example, milk processors may demand specific fat content levels or other quality metrics that dairy farmers must adhere to, often requiring investment in specialised feeding or milking practices. This relationship is generally more equitable for larger producers or cooperatives who can supply higher volumes, thereby gaining more negotiation leverage (Zhao *et al.,* 2020). However, dependence on processors can place small-scale farmers in vulnerable positions. This is especially largely encountered in cases such of market downturns or high price volatility, where processors may exert downward pressure on purchase prices (Ganesh Kumar *et al.,* 2017).

Processors and Distributors

The relationship between processors and distributors is crucial for ensuring that processed food products can reach a wide consumer base. Distributors are often responsible for the warehousing, transportation, and inventory management of food products. They serve as intermediaries in the market. They also bridge the gap between processors and retailers by consolidating products from multiple processors and managing logistical aspects of supply chain distribution (Ganesh Kumar *et al.,* 2017).

Contracts between processors and distributors are generally defined by volume commitments, quality controls, and transportation schedules in order to maintain product quality. In practice, distributors can negotiate bulk discounts with processors, which allow them to manage costs effectively while providing a steady supply to retailers (Zhao *et al.,* 2020). Conversely, processors rely on distributors to secure efficient and reliable access to markets, especially when those markets are geographically distant or challenging to reach. This relationship also hinges on the reliability and efficiency of the distributor's logistics networks. Delays or inefficiencies can disrupt supply continuity and affect product freshness, thereby impacting both brand reputation and customer satisfaction (Wicaksono & Illés, 2022).

Distributors and Retailers

Retailers are most often the key point of contact between the entire supply chain and end consumers. Most often, they play a critical role in influencing demand patterns or consumers' preferences (Wicaksono & Illés, 2022). This relationship between distributors and retailers is usually driven by a shared goal to ensure that products are available, competitively priced, and in sync with consumer

demand (Handayati *et al.,* 2015). Retailers heavily depend on distributors to provide consistent deliveries, manage stock levels, and anticipate demand surges (*e.g*. during a religious holiday).

In practice, retailers typically hold significant bargaining power over distributors. Particularly large-scale supermarkets and grocery chains can often dictate terms regarding product selection, pricing, and promotional strategies (Ganesh Kumar *et al.,* 2017). For example, large retailers can negotiate for extended payment terms, volume discounts, or even demand fees for shelf space and preferential exposure. Distributors, in turn, may seek to optimise their margins by consolidating shipments, reducing delivery frequency, or partnering with retailers in joint promotional campaigns. Retailers with large market shares can influence distributor strategies, often pressuring them to prioritize certain products or brands in order to reshape consumer perceptions and drive their preferences (Wicaksono & Illés, 2022).

Retailers and Consumers

The retailer-consumer relationship is perhaps the most visible link in the agri-food supply chain. This is basically the point where food products reach their final destination. Retailers shape consumer choices by determining product availability, prices, and promotional strategies that appeal to different consumer segments (Iakovou *et al*., 2016). Additionally, retailers play a critical role in practice by setting quality and safety standards for the products they sell (Fulponi, 2006). This is often done as a response to consumer demand for healthier, organic, or sustainably sourced options.

This relationship is influenced by economic conditions, regulatory policies, and constantly evolving consumer preferences. For example, the consumer demand for organic or locally-sourced food products can determine retailers to adjust their supply practices by placing a greater emphasis on suppliers that can meet these criteria. Moreover, due to economic uncertainty or high inflation, retailers may adjust their pricing strategies. As a result, they can offer discounts or prioritise value-based brands in order to foster consumers' loyalty. Therefore, retailers not only respond to consumers' needs in a reactive manner, but also establish trends that influence supply chain practices, thus effectively shaping the production and distribution landscape (Wicaksono & Illés, 2022).

The Five Competitive Forces model and the supply chain

The Five Competitive Forces model was developed by Michael Porter. This model provides a strategic framework for analysing an industry's competitive landscape from a deterministic perspective. It identifies five forces as strategic gestalts that drive relations between competitors: threat of new entrants, bargaining power of suppliers, bargaining power of buyers, threat of substitutes, and industry rivalry (Grundy, 2006). In practice, these forces influence market competition, profitability, and decision-making.

Understanding these forces is essential for supply chain management because each of these forces heavily impacts the relationships, operations, and strategies between supply chain agents.

1. **Threat of New Entrants**: New competitors in a market often disrupt existing supply chains by increasing competition and reducing profitability. In this context, new entrants such as innovative producers or technology-enabled logistics companies can pressure established players by introducing alternative products, faster delivery methods, or lower costs (Lee *et al*., 2012). In practice, high entry barriers, such as capital requirements or regulatory compliance, can effectively protect existing supply chains from this type of pressure.

2. **Bargaining Power of Suppliers**: Suppliers' power is crucial in determining input costs, quality, and overall supply continuity. When only a few suppliers dominate a market, they often can exert a considerable control over pricing and negotiated terms, thus impacting downstream players' cost structures (Rachapila & Jansirisak, 2013). In supply chains with high supplier power, buyers (*e.g*., processors and retailers in agri-food markets) may face higher input prices. To mitigate suppliers' power, retailers can diversify sources, establish long-term contracts, or invest in supplier partnerships that secure reliable and cost-effective supplies (Ganesh Kumar *et al*., 2017).

3. **Bargaining Power of Buyers**: Buyers' ability to influence prices and terms can have a significant effect upon supply chain pricing strategies and profitability. For example, in the agri-food sector, large retailers usually exert a significant bargaining power that allows them to push for lower prices or volume discounts. To counteract buyers' power, suppliers can differentiate their products, heavily invest in branding, or target niche markets where buyers have considerably less influence (Ganesh Kumar *et al.* 2017).

4. **Threat of Substitutes**: The availability of substitute products can drive supply chains to innovate and maintain competitive pricing. For example, in food supply chains, demand for plant-based substitutes can sometimes challenge in practice traditional meat suppliers. As a result, supply chain actors have to adapt by diversifying product offerings, reduce production costs, or invest in quality improvements in order to retain customers that might otherwise switch to substitutes (Ganesh Kumar *et al.,* 2017).

5. **Industry Rivalry**: The level of rivalry within any industry shapes overall supply chain dynamics by product variety and profit margins via pricing. High rivalry can often lead to price wars, increased operational costs, and difficulties to maintain competitiveness. In such turbulent environments, supply chains often seek collaborative approaches, such as shared logistics or cooperative purchasing in order to reduce costs and increase resilience (Zhao *et al.,* 2020).

Each of the above forces has a direct impact on supply chain strategies. By understanding and addressing these forces, supply chain managers can make informed decisions to enhance resilience, cost efficiency, and competitive advantage.

3. MATERIAL AND METHOD

This study uses Michael Porter's Five Forces model for assessing the implications of maximum markup regulation on the agri-food supply chain. The analysis focuses on how each of these five competitive forces is influenced by markup regulation and subsequently impacts supply chain dynamics, profitability, and resilience. In the initial phase, each force is analysed individually to determine its sensitivity to markup regulation and its resulting impact on the agri-food supply chain.

By analysing factors like the cost structures, market saturation, and economies of scale required to enter the market under markup constraints, we evaluate whether tougher regulation discourages or enables new entrants. To analyse supplier power, we examine how markup limits affect upstream producers, focusing in particular on small-scale farmers and suppliers. The analysis includes evaluating their cost structures, profit margins, and ability to negotiate prices in a regulated environment. Buyer power is assessed by examining the impact of markup regulation on downstream players, with a special focus on large retailers who hold significant power over pricing. This force is analysed by investigating how price ceilings affect retailers' ability to negotiate terms with suppliers, including their strategies for offsetting reduced margins. The methodology also examines how markup regulation can affect the availability and attractiveness of substitute products. Finally, to measure the impact of markup regulation on competition within the agri-food supply chain, this study examines indicators of rivalry, such as price wars, promotional efforts, and market share distribution. The analysis considers whether markup regulation exacerbates or reduces competition among established players, especially in price-sensitive segments. As a result, in the final phase of the study, a detailed list of strategic advantages and disadvantages related to markup limitation is provided for each stakeholder in the supply chain.

Through this methodology, Porter's Five Forces model provides a comprehensive framework for assessing the impacts of markup regulation on the agri-food supply chain. It allows the identification of critical implications for competitive dynamics, stakeholder relationships, and supply chain resilience. This structured approach offers both a theoretical and practical basis for understanding and responding to the complex effects of pricing regulations on an essential industry.

4. RESULTS AND DISCUSSIONS

Threat of New Entrants

In the context of maximum markup regulation, the agri-food industry's threat of new entrants (typically new producers, distributors, or retailers) can be weighty impacted. New entrants generally face barriers related to economies of scale, high capital investment, and access to adequate distribution networks. All the above barriers can be further strained by maximum markup constraints. By limiting profitability, maximum markup policies may dissuade new entrants who are unable to sustain operations under regulated profit margins. In the long term, this could lead to reduced competition, thus creating a more concentrated market that primarily benefits large players who can offset low margins with high volumes and diversified product lines. Consequently, while this regulation aims to curb prices for consumers, it can also severely restrict market entry, hold back innovation and limit consumers' choices.

Bargaining Power of Suppliers

In the agri-food supply chain, suppliers are typically primary producers like farmers. They supply raw and low value products to distributors and retailers. Maximum markup regulation affects the bargaining power of these suppliers by sharply capping the final price of goods. This issue can seriously compress margins along the entire chain. Therefore, a domino effect is thus created as an aftermath of maximum markup regulation that can collapse the entire market or at least small farmers. For small-scale suppliers, who often operate with limited financial buffers, this regulation can severely erode profitability. In the long term, this will compel small and medium farmers to accept lower prices or to implement cost-cutting measures that will reduce product quality. Large retailers that command a significant market influence, in the best-case scenario, may leverage their bargaining power to pass down the pressure of reduced margins to suppliers. Over time, this dynamic will handicap smaller producers, potentially driving them out of the market and resulting in further market consolidation that can further reduce competition and product diversity. In the worst-case scenario, large retailers will simply dump small suppliers due to operating costs optimisation.

Bargaining Power of Buyers

One of the primary motivations behind maximum markup regulation is to protect the end consumer from price gouging. This regulation seeks to enhance the bargaining power of consumers by making essential goods more affordable, particularly during periods of inflation or economic instability. In the short term, consumers may indeed benefit from lower prices or at least from more stable

pricing on agri-food goods. However, as large retailers adjust their strategies to manage reduced profitability, they may limit product offerings, promote lower-cost items, or reduce services to offset margin constraints. In reality, such responses can inadvertently reduce consumer choice and may compromise the quality of available products, illustrating a trade-off between affordability and product diversity.

Threat of Substitute Products

In practice, the threat of substitutes in the agri-food sector comes from alternative products or brands that consumers might switch to if prices or quality deteriorate. When maximum markup regulation limits the profitability of higher-quality or specialty products, producers will shift focus towards more standardised, lower-cost goods, thereby reducing the availability of premium substitutes. This shift can be particularly evident in fresh products, dairy, and meat sectors. These are sectors in which organic or locally-sourced products often carry higher markups due to production costs. As a result, consumers may find fewer alternatives in the market, which restricts their choices to lower-cost, lower-quality items. Over time, this could lead to a more homogenised product market, diminishing the perceived value.

Industry Rivalry

Finally, Porter's model addresses the competitive rivalry within an industry. This rivalry will intensify under maximum markup regulation. Retailers and distributors in the agri-food sector, particularly large supermarket chains, operate in a fiercely competitive environment. For them, pricing, product variety, and brand loyalty are critical for maintaining market share. Maximum markup regulation forces these players to find new ways to maintain competitiveness. In practice, this will induce cost-cutting strategies, supply chain optimisations, and an increased dependence on larger suppliers that can deliver goods at lower costs. While large retailers may be able to leverage these strategies effectively, smaller retailers will severely struggle to maintain market share, especially if they cannot absorb reduced margins as easily. This pressure will lead to market consolidation. As a result, a few large retailers will dominate, thus potentially reducing competitive pricing benefits for consumers in the long run.

Policy making implications and evaluation

In terms of policy making limited markups is frequently proposed as a strategy to manage food affordability and enhance accessibility. Such a policy can serve as a strategic tool for governments seeking to stabilise food markets and protect consumer purchasing power. From a strategic standpoint, this type of policy making has some advantages, but can encompass some serious disadvantages. A comprehensive list resulting from a strategic evaluation using the five competitive forces model for each supply chain stakeholder is presented in Table 1.

Table 1

Advantages and disadvantages

Supply chain stakeholder	Advantages	Disadvantages
Primary Producers and Processors	• Greater availability of niche markets, making them easier to serve; • Enhanced ability for small producers to form alliances and operate independently.	• Shifting of logistics and marketing costs onto producers and processors; • Potential pressure from retailers to lower prices in order to align with specific markup thresholds; • Increased revenue instability for producers and processors; • Necessity for cost reductions; • Diminished bargaining power; • Stocking refusals and a shift toward Just-In-Time (JIT) inventory; • Decrease in investment levels; • A shift in power dynamics that may further favour retailers; • Potential compromises in product quality and overall economic sustainability; • Increased tension within the supply chain; • Small producers and processors may face disproportionate impacts from elevated production costs.
Distributors and Retailers	• Increased competition; • Improvement in overall operational efficiency; • Transfer of logistics and marketing costs to producers and processors.	• Reduced profitability; • Heightened pressure on cost management; • Market entry of dubious producers or suppliers; • Reduced product variety; • Quality issues, leading to a shift toward lower-quality products; • Limited support through services; • Retailers may need to seek alternative suppliers.
Final Consumers	• Potentially lower prices for consumers; • Access to certain products for individuals with lower incomes, leading to shifts in consumption patterns towards luxury goods; • Increased competition among producers.	• Significant compromises in quality; • Limited choices that often fail to align with consumer preferences; • Short-term disruptions in supply and demand; • Frequent stock shortages; • Low sustainability due to insufficient investment in consumer education.

Source: Author's strategic analysis for supply chain dynamics using the "Five Competitive Forces model".

5. CONCLUSIONS

In summary, while maximum markup regulation aims to safeguard consumer purchasing power, it exerts significant, often unintended pressures throughout the agri-food supply chain. Through the application of Porter's Five Forces framework, this analysis examines how such regulation impacts market entry, supplier relationships, consumer choices, product substitutes, and the intensity of competition. By investigating these dynamics, this article seeks to provide a nuanced perspective on the repercussions of maximum markup regulation, thus offering valuable insights into the delicate balance between consumer protection and industry sustainability.

Moreover, the interactions among agents in the agri-food supply chain are shaped by complex economic, logistical, and regulatory interdependencies. Each actor, from producers to retailers, fulfils in practice a distinct and dynamic role in the supply chain. These relationships between supply chain actors directly influences product availability, pricing, and quality for the end-consumer. The interdependence of these agents highlights the intricate nature of the agri-food supply chain, emphasising the importance of collaborative strategies and supportive regulatory frameworks to uphold food security, affordability, and resilience amongst multiple market and environmental challenges.

In conclusion, while capping markups on agri-food products may yield strategic benefits by enhancing affordability and potentially promoting efficiency within the supply chain, it also presents risks to producer viability, product diversity, and overall market balance. Policymakers must weigh these strategic trade-offs by carefully balancing short-term consumer gains with the long-term economic sustainability of the agricultural sector and the overarching stability of food supply chains.

From a strategic perspective, limited markups can contribute to social stability by mitigating food-related hardship and stabilising consumer spending. Furthermore, imposing markup limitations could encourage retailers to pursue operational efficiencies, thus fostering a more cohesive and streamlined agri-food supply chain. In order to remain viable under capped markups, retailers may invest in supply chain optimisation, minimise waste, and adopt innovations in logistics. These improvements in efficiency have the potential to create a more resilient and cost-effective food system, thereby benefiting the market as a whole.

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