

# Wheat Value Chains and Vertical Price Transmission in South Africa: A Nonlinear Autoregressive Distributed Lag Bound Analysis

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## Introduction

Wheat is a critical staple crop in South Africa, serving as a primary source of food for millions of people and as a vital input in various industrial processes. Understanding its value chain and the dynamics of price transmission along this chain is crucial for ensuring food security and market efficiency. The wheat value chain in South Africa is complex, involving multiple stages from production to consumption. It includes farmers, millers, wholesalers, retailers, and consumers, each playing a critical role in determining the flow of goods, services, and prices. Vertical price transmission, or the manner in which price changes at one level of the chain affect subsequent levels, is an important area of study, especially in the context of South Africa's evolving agricultural markets. Utilizing a Nonlinear Autoregressive Distributed Lag Bound Analysis provides valuable insights into these dynamics, capturing both linear and nonlinear relationships between variables over time.

Price transmission within the wheat value chain is influenced by several factors, including market structure, supply chain efficiency, government policies, and external shocks. In South Africa, the wheat market is characterized by a high level of concentration, with a few dominant players controlling significant portions of the milling and retail sectors. This concentration raises concerns about market power and its potential impact on price transmission. For instance, large millers and retailers may influence the extent to which changes in farm gate prices are passed on to consumers, potentially distorting market signals and reducing the efficiency of the value chain. The degree of asymmetry in price transmission whether price increases and decreases are transmitted at the same rate and magnitude is particularly important for understanding market dynamics and the distribution of economic benefits across the chain. The application of the NARDL bound approach is instrumental in analyzing these dynamics. Unlike traditional linear models, the NARDL framework allows for the detection of asymmetries in price transmission by

distinguishing between positive and negative changes in the independent variable. This is especially relevant in the context of the wheat value chain, where market participants may respond differently to price increases and decreases due to factors such as inventory management, pricing strategies, and contractual agreements. For example, retailers may be quicker to pass on price increases to consumers to protect their profit margins, while delaying price reductions to maximize revenues. Such asymmetries have significant implications for consumer welfare and market efficiency, making the NARDL approach a valuable tool for policy analysis and decision-making.

In South Africa, the wheat value chain begins with domestic production, which is supplemented by imports to meet local demand. Domestic wheat production is influenced by factors such as weather conditions, input costs, and government support programs. Price signals at the farm level are shaped by both local and international markets, as South Africa is a net importer of wheat. This reliance on imports exposes the domestic market to global price fluctuations, which can have a cascading effect on the value chain. For instance, an increase in international wheat prices due to supply disruptions in major exporting countries may lead to higher import costs, which are then transmitted to millers, retailers, and ultimately consumers. The extent and speed of this transmission depend on various factors, including the degree of competition, the presence of price controls or subsidies, and the elasticity of demand at each stage of the chain.

## Description

Millers play a critical role in the wheat value chain, as they transform raw wheat into flour and other processed products. The pricing behavior of millers is influenced by both input costs and market conditions, including the bargaining power of suppliers and buyers. In a concentrated market like South Africa's, large millers may have significant market power, enabling them to influence price

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transmission dynamics. For example, they may absorb some of the cost increases associated with higher wheat prices to maintain their market share, or they may pass on these costs to downstream actors, depending on their pricing strategies and competitive pressures. The NARDL bound analysis can capture these nuances by modeling the relationship between input and output prices as a nonlinear process, allowing for a more accurate representation of real-world dynamics.

Retailers and wholesalers are the next critical link in the wheat value chain. Retailers, in particular, are the primary interface between the value chain and consumers, making their pricing strategies a key determinant of consumer welfare. The degree of price transmission at the retail level is influenced by factors such as competition, branding, and consumer preferences. Retailers may use pricing strategies that exploit asymmetries in price transmission to maximize profits. For example, they might respond more quickly to wholesale price increases than to decreases, a phenomenon known as "rockets and feathers." The NARDL approach provides a robust framework for analyzing such asymmetries, helping to identify potential inefficiencies and areas for regulatory intervention. One of the challenges in studying price transmission in the wheat value chain is the presence of external shocks and policy interventions. External shocks, such as currency fluctuations, geopolitical tensions, and changes in global trade policies, can disrupt the value chain and influence price dynamics. For instance, a depreciation of the South African rand against major currencies can increase the cost of wheat imports, leading to higher prices across the value chain. Similarly, government policies, such as import tariffs, subsidies, and price controls, can affect the extent and nature of price transmission. The NARDL Bound Approach is well-suited for analysing these dynamics, as it accounts for both short and long-term relationships between variables, providing a comprehensive picture of price transmission under different scenarios.

The implications of vertical price transmission in the wheat value chain are far-reaching, affecting not only economic efficiency but also equity and welfare. For consumers, asymmetries in price transmission

can lead to higher food prices, reducing their purchasing power and exacerbating food insecurity. For farmers, inefficient price transmission may undermine their ability to respond to market signals, reducing their profitability and investment in wheat production. Addressing these challenges requires a multi-faceted approach, including enhancing market transparency, promoting competition, and supporting small-scale farmers through targeted interventions. Policymakers can use the insights generated from NARDL analyses to design policies that promote equitable and efficient price transmission, ensuring that the benefits of market reforms are shared across the value chain.

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## Conclusion

The wheat value chain in South Africa is a complex system influenced by a myriad of factors, including market structure, external shocks, and policy interventions. Vertical price transmission plays a crucial role in determining the efficiency and equity of this chain, making it a critical area of study for researchers and policymakers. The nonlinear autoregressive distributed lag bound approach provides a powerful analytical framework for understanding the nuances of price transmission, capturing both linear and nonlinear dynamics over time. By leveraging this approach, stakeholders can identify inefficiencies and asymmetries in the value chain, paving the way for interventions that enhance market performance and promote food security. As South Africa continues to grapple with the challenges of a globalized agricultural market, such analyses will be instrumental in shaping policies that ensure the sustainability and resilience of its wheat value chain.

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