World Price Shocks Pass-Through and Imperfect Competition in the Trading Sector: A CGE Assessment for Burkina Faso

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Abstract

Perfect competition in the trading sector is crucial for enhancing the efficient transmission of prices and the effectiveness of public policies. The presence of market power and imperfect competition may result in suboptimal outcomes and uneven responses to economic shocks. This study examines the influence of market structure in the trading sector on the transmission of international price shocks. To accomplish this, we construct a Computable General Equilibrium model for Burkina Faso, incorporating a trading sector characterized by imperfect competition (Cournot oligopoly with increasing returns to scale). We then assess the impacts of both an increase and a decrease in world prices. The findings indicate that the welfare effects are highly dependent on market concentration. Thus, our results underscore the significance of market structure in determining the efficacy of policy interventions. For example, countries that are net food importers may experience greater welfare losses in the face of world price increases, and the impact of policy measures such as tax or tariff exemptions may be reduced.

JEL Codes : C68 ; D43 ; L13 ; L81

Key Words: shocks passthrough, imperfect competition, CGE model

1. Introduction

The role of price theory is significant within the framework of neo-classical economics. Prices hold the power to influence the allocation of resources and the decision-making process regarding the mix of outputs by economic agents. Moreover, price transmission serves as a means to integrate markets both vertically and horizontally. This prompts economists who study market dynamics to show interest in the processes of price transmission. Particularly intriguing are the processes known as asymmetric, wherein the transmission of prices differs based on whether they are increasing or decreasing. In an extensive examination of 282 products and product categories, encompassing 120 agricultural and food items, Peltzman (2000) unveils a prevailing pattern of asymmetric price transmission rather than an exceptional one. This leads him to a resolute conclusion that the conventional economic theory of markets is flawed, as it fails to anticipate or elucidate the prevalence of asymmetric price adjustments (Peltzman, 2000).

The potential existence of asymmetric price transmission holds significant importance. Firstly, asymmetric price transmission raises questions about the gaps in economic theory, as highlighted by Peltzman (2000). If asymmetric price transmission becomes the norm, it challenges the satisfaction we derive from an economic theory that treats it as an exception. Secondly, asymmetric price transmission can have substantial implications for welfare and policy. It suggests that a certain group, whether buyers or sellers, is not benefiting from price changes to the extent they should. In a symmetric scenario, these changes would have occurred earlier or been more substantial. Hence, asymmetric price transmission leads to a different distribution of welfare compared to symmetry, altering the timing and magnitude of welfare changes associated with price fluctuations. Moreover, if asymmetric price transmission is indeed a manifestation of market

failure, such as the exercise of market power by monopolistic middlemen, it not only indicates redistribution but also entails net welfare losses. However, it's important to note that asymmetric price transmission does not always signify market failure.

Both the redistribution of resources and the potential net welfare loss present a compelling argument for policy intervention. In recent times, various public institutions in the EU, such as the EU Commission and DEFRA in the UK, have commissioned studies to investigate the existence of possible asymmetric price transmission in agri-food markets. Their motivation partially stems from concerns that consumers may not reap the expected benefits of liberal agricultural policy reforms if processors and retailers fail to pass on the resulting price reductions.

This study contributes to the existing literature by exploring both the impacts of a decrease in world prices resulting for example from a reduction in tariffs within the framework of the AfCFTA, and a surge in prices due, for instance, to an increase in global oil prices. This shift allows us to explore a novel domain, specifically the implications of price shocks that may lead to food crises. Utilizing a Computable General Equilibrium (CGE) model, we can comprehensively capture interactions and feedback effects, aspects not clearly delineated by econometric models. Consequently, our welfare measures remain unbiased.

Our methodology involves employing a single-country Computable General Equilibrium model calibrated to a 2017 Social Accounting Matrix (SAM) of Burkina extracted from GTAP 11 database, with the trading sector operating under imperfect competition (Cournot oligopoly with increasing returns to scale). Our findings reveal that the welfare effects of both an increase in world prices and productivity gains are highly sensitive to assumptions about market concentration. Furthermore, welfare exhibits greater sensitivity to higher market concentration than to lower market concentration.

The rest of the article is organized as follows: a literature review is the subject of the second section; Section 3 is dedicated to describing the methodological approach; the results are analyzed and discussed in Section 4; Section 5 concludes by highlighting the main implications of the study.

2. The review of the literature

2.1. The theoretical literature

The existing body of theoretical literature predominantly addresses two primary factors believed to be influential in driving asymmetric price transmission (APT): the presence of non-competitive markets and the associated costs of adjustments. Additionally, other variables, including political interference, information asymmetry, and inventory control, have been posited as potential contributors to asymmetric price transmission.

A common theme in studies investigating APT is the attribution of asymmetry to non-competitive market structures, particularly within the agricultural sector. Farmers and consumers often harbor suspicions that imperfect competition among middlemen in processing and retailing allows for the exploitation of market power. This is anticipated to yield a positive APT, wherein changes in input or output prices prompt faster and/or more pronounced adjustments in squeezed margins compared to stretched margins. However, the justification for this positive APT often lacks rigorous theoretical foundations. Contrary to intuitive expectations, the relationship between market power

and APT is not unequivocal. Ward (1982) suggests that market power can lead to negative APT if oligopolistic firms are hesitant to risk market share by raising output prices. Similarly, Bailey and Brorsen (1989) explore scenarios where firms face demand curves that are either convex or concave to the origin, resulting in either negative or positive asymmetry.

Several noteworthy studies have delved into the relationship between market power and asymmetry, focusing on specific markets. Borenstein et al. (1997) examine the vertical transmission of prices from crude oil to gasoline prices in an oligopolistic environment, concluding that positive asymmetry occurs. Imperfect information about competitors' prices leads to the existing output price becoming a natural reference point following changes in input prices. In an oligopolistic setting with downward stickiness in retail gasoline prices, cost decreases do not immediately translate into output price reductions. Firms maintain prices above the competitive level as long as sales remain above a certain threshold (Borenstein et al., 1997). Similarly, Balke et al. (1998), Brown and Yücel (2000) and Bonatti et al. (2016) discuss oligopolistic firms engaged in tacit collusion to preserve higher profits. Reputation plays a crucial role, leading to APT. For instance, when input prices rise, all firms swiftly adjust their output prices upward to signal commitment to collusion. Conversely, during a decline in input prices, firms delay lowering output prices to avoid signaling a breach of the unspoken agreement.

Some papers exploring the influence of market power have investigated asymmetry in APT driven by shifts in output demand rather than changes in input prices. Damania and Yang (1998) delve into imperfect information within a competitive duopoly, emphasizing the role of potential punishment as a driver of asymmetry. Their model assumes fluctuating demand between high and low states. In instances of suspected collusion undermining, firms facing low demand refrain from reducing prices, while during high demand phases, they can increase prices without fear of punishment. Kovenock and Widdows (1998) present a model of duopolistic competition without explicit collusion but with price leadership. They assume explicit collusion is impossible, resulting in a leader-follower price lower than the potential collusive price. In the case of an upward demand shock, the price leader adjusts prices to prevent the deviation of the old leader-follower price from the new potential collusive price. However, for a certain range of downward demand shocks, no reaction occurs since the old leader-follower price already aligns with the new potential collusive price.

In summary, multiple authors propose that market power can lead to APT, with most anticipating a positive relationship. While this idea seems plausible in the context of a pure monopoly, the more prevalent oligopoly setting suggests that both positive and negative APT can be conceivable, contingent upon market structure and behavior.

2.2. The empirical literature

APT emerges from adjustment costs when companies modify quantities and/or prices of inputs and/or outputs. Menu costs, recognized as adjustment costs for changes in prices, have been quantified in US retail markets (Dutta et al., 1999; Levy et al., 1997), constituting approximately 27% to 35% of net profit margins.

In the US beef market, Bailey and Brorsen (1989) illustrate that packers, facing substantial fixed costs, may reduce profit margins in the short term to maintain plant operations at or near capacity. This results in faster increases than decreases in farm prices (negative APT). In contrast, Peltzman (2000) argues for positive APT, contending that reducing inputs during output decrease is easier than recruiting new inputs during growth, incurring search costs and resulting in price premiums.

Retailers of perishable products may hesitate to raise prices due to concerns about reduced sales leading to product spoilage, resulting in negative APT (Ward, 1982). However, Heien (1980) challenges this, asserting that changing prices is less problematic for perishable products compared to those with a long shelf life. Heien's argument aligns with the menu cost hypothesis proposed by Barro (1972). Ball and Mankiw (1994) develop a model combining menu costs with inflation, leading to asymmetry. Positive nominal input price shocks are more likely to trigger adjustments in output prices compared to negative shocks. Buckle and Carlson (2000) find evidence supporting this through a business survey in New Zealand. Peltzman (2000) does not find evidence of a relationship between menu costs and APT but reports greater asymmetries in more fragmented supply chains.

Effective inventory management, such as FIFO (first in, first out) accounting methods, plays a crucial role in APT. Balke et al. (1998) demonstrate APT resulting from FIFO. Blinder (1982) develops a model where the nonnegative inventory constraint generates positive asymmetry. Reagan and Weitzman (1982) argue that firms prefer adjusting production quantities and increasing inventory during low demand periods, raising prices during high demand periods, leading to positive APT.

Other explanations for APT involve price support through floor prices, observed in the agricultural sector. Kinnucan and Forker (1987) argue that political interventions can lead to APT if wholesalers or retailers believe that a decrease in farm prices will be temporary due to potential government intervention, whereas an increase is more likely to be permanent. Psychological pricing thresholds may have a similar impact (Blinder et al., 1998).

Kinnucan and Forker (1987) and Cramon-Taubadel (1998) analyze APT within Gardner (1975) marketing margin model, establishing a relationship between farm-retail price differences and changes in retail-level demand and farm-level supply. APT manifests if one type of shift is predominantly positive or negative, skewing the distribution of demand and/or supply shifts. In European beef markets, negative shifts in retail demand have resulted in strong transmission of downward price movements.

Asymmetric information due to economies of scale may lead to APT. Bailey and Brorsen (1989) propose that APT can emerge from information asymmetry, with asymmetries in price series data caused by distorted price reporting processes. Institutional arrangements with committees quoting indicative prices may create 'artificial' APT.

Several studies have aimed to empirically investigate the relationship between market power and APT. In the agricultural context, subsequent to the foundational econometric studies by Enders and Granger (1998) and Enders and Siklos (2001) on asymmetric cointegration, economists investigating price transmission and market integration have emphasized that positive price shocks

are often transmitted with greater magnitude than negative ones (Abdulai, 2000; Goodwin & Piggott, 2001). The primary explanation for this asymmetry lies in the presence of market power arising from imperfect competition within the trading sector. This asymmetry in price transmission is observable both in the analysis of "vertical" price transmission (from global to domestic prices of the same commodity) and within individual countries. Traders tend to pass on price increases more rapidly than declines to safeguard their profit margins.

On the trade front, an extensive literature also exists on domestic market structure, trade liberalization, and import price shocks (Devarajan & Rodrik, 1989; Dostie et al., 1996; Harris, 1984; Harrison et al., 1994; Willenbockel, 1994). However, this body of literature primarily pertains to domestic firms competing with imports, not specifically the distribution and trading sectors. Nonetheless, certain authors have explored the role of the trading sector in price transmission. In a series of papers, Francois and Wooton (2010), along with Francois et al. (2010), have theoretically and empirically examined the interaction between changes in border prices (resulting from trade liberalization in goods and exchange rate movements) and market power within domestic trade and distribution sectors. If the domestic trading sector operates under imperfect competition, changes in tariffs would be partially absorbed by profit margins (markups), resulting in a lower tariff passthrough (TPT) than one.

The key takeaways underscore the significance of market structure in the retail and distribution sectors in influencing price transmission. Furthermore, it is argued that trade liberalization in goods should be accompanied by the liberalization of services sectors to enhance goods trade. Failure to do so could lead to a decline in goods trade if followed by Foreign Direct Investment (FDI) flows that concentrate on the service sector. In a notable paper, Atkin and Donaldson (2015) estimated passthroughs and demonstrated, across a range of developing and developed countries, that the majority of gains (surplus) from decreasing world prices are captured by intermediaries operating in an oligopolistic environment. Moreover, the share captured by intermediaries is higher in remote locations, suggesting that distant consumers derive only marginal benefits from the reductions in international trade barriers.

Using India's trade liberalization as a case study, De Loecker et al. (2016) find that while liberalization lowers factory-gate prices, the declines are small relative to the decreases in marginal costs, primarily due to input tariff liberalization. Firms, in response, offset reductions in marginal costs by increasing markups, demonstrating substantial heterogeneity in markups across firms and time. The results suggest that producers benefited relative to consumers, particularly immediately after the reforms. More recently, Chatterjee (2023) shows how the market power of intermediaries contributes to low farmer incomes in India. By examining a law restricting farmers to sell within their own state, he demonstrates that variations in market power under the law lead to price disparities ant that increasing spatial competition among intermediaries boosts farmer prices by 6.4%.

Our study contributes to this empirical literature by examining how fluctuations in the market power of commercial intermediaries can have diverse implications for household well-being in Burkina Faso in response to variations in international prices. We employ a computable general equilibrium model that incorporates a trading sector characterized by oligopolistic competition *à*

la cournot. The findings suggest that the effects of international price variations are contingent upon the market power of commercial intermediaries.

3. The methodology

3.1. The model

3.1.1. Main features

The CGE model utilized in this research is constructed upon PEP-1-1, a model developed by Decaluwé et al. (2013). It adheres to a standard framework, with the exception of the trading sector, which is modeled uniquely. The assumption is that firms operate under perfect competition, aiming to maximize profits or minimize costs based on their production technology constraints and prevailing prices for goods, services, and factors (exhibiting price-taking behavior).

The production technology is characterized by a nested structure. At the highest level, a Leontief function aggregates intermediate consumption and value added to ascertain sectoral output. At the second level, sectoral value added is determined through a Constant Elasticity of Substitution (CES) function, which aggregates a composite labor and a composite capital. At the lowest level, in terms of value added, a CES function combines different labor categories to yield the composite labor, and various capital categories to yield the composite capital. Concurrently, at the intermediate consumption level, various goods and services are combined through a Leontief function to determine intermediate consumption. It's noteworthy that PEP-1-1 allows a firm to produce multiple goods or services. In such instances, the aggregate output of the corresponding firm is determined by a Constant Elasticity of Transformation (CET) function for various outputs.

Domestic demand for commodities, whether domestically produced or imported, encompasses household demand, investment, public administrations demand, intermediate demand, and demand for trade margins. Producers allocate output to market outlets to optimize sales revenue. Aggregate output is divided between exports and domestic sales using a CET function. Buyer behavior mirrors that of producers, assuming local products are imperfect substitutes for imports (expressed by a CES aggregator function representing the heterogeneous goods hypothesis).

Households derive income from production factors (labor and capital) and transfers from other institutions. After tax payments and transfers to other institutions, disposable income is allocated to the consumption of goods and services, following a Linear Expenditure System function derived from the maximization of a Stone-Geary utility function.

3.1.2. Distinctive handling of the trading sector

Our primary contribution lies in the distinctive approach to the trading sector. In contrast to other sectors, the trading sector functions within the realm of imperfect competition. Given the homogeneity of the good or service in this sector, we adopt a Cournot oligopoly as the assumed market structure. Specifically, with a uniform product, opting for Bertrand competition would result in an outcome akin to perfect competition, as the optimal strategy for each firm is to price at marginal cost (Vives, 2001). Notably, an intriguing aspect emerges when firms encounter capacity constraints: the Bertrand model converges towards the Cournot model as constraints

become more significant (Kreps & Scheinkman, 1983; Maggi, 1996). The barriers to entry, in part, mirror these types of constraints.

We make the assumption that there are N identical firms, each possessing a market share denoted as $S_i = \frac{1}{N}$.

The Lerner equation, derived from the firms profit maximization for an oligopoly is given by:

$$\frac{P_i - MC}{P_i} = -\frac{S_i}{\varepsilon^{dm}} = -\frac{1}{N\varepsilon^{dm}}$$

Where P_i stands for the producer price, MC marginal cost and ε^{dm} the demand elasticity.

In order to compute the marginal cost, it is necessary to obtain the outcome of cost minimization by producers while adhering to the technology constraint. Assuming that the value added follows a Cobb Douglas function concerning aggregate capital and labor, and there is strict complementarity between aggregate intermediate consumption and value added in the production process, the optimization program is outlined as follows:

Min Total cost: $TC = w \cdot L_j + r \cdot K_j + \sum_i IC_{ij} \cdot PQ_i$

s/c : $$\begin{cases} ICT_j = \vartheta_j X_j \\ IC_{ij} = a_{ij} ICT_j \\ VA_j = v_j X_j \\ VA_j = A_j L_j^{\alpha} K_j^{1-\alpha} \end{cases}$$

The first order conditions of this program yield the optimal choices for capital K_j^* and labor L_j^*:

$$K_j^* = \left[\frac{(1-\alpha)w}{\alpha \cdot r}\right]^{\alpha} \cdot \frac{v_j X_j}{A_j} \quad \text{and} \quad L_j^* = \left[\frac{\alpha \cdot r}{(1-\alpha)w}\right]^{1-\alpha} \cdot \frac{v_j X_j}{A_j}$$

Replacing K and L by their optimal levels in the cost function and differentiating with respect to output (X_j), yield the marginal cost:

$$MC = \frac{1-\vartheta_j}{A_j}\left(\frac{w}{\alpha}\right)^{\alpha} \cdot \left(\frac{r}{1-\alpha}\right)^{1-\alpha} + \vartheta_j \cdot \left(\sum_i a_{ij} \cdot PQ_i\right)$$

3.1.3. Macro-closures

Closure rules play a crucial role as they significantly influence the outcomes. The model operates under three key closure rules: the private account closure, the government account closure, and the external account closure.

The private account closure assumption pertains to the balance between savings and investment. The Neo-Classical PEP 1-t model we are utilizing maintains a constant marginal propensity to save, implying that changes in income result in variations in savings, subsequently influencing investment. As a result, the investment is driven by savings.

The government or public account closure focuses on how the public balance is impacted by shocks. Various assumptions could be considered, but in this context, we assume that real government expenditures are exogenous, and public savings adjust accordingly. In practical terms, this implies that negative shocks, leading to increased public deficits, result in a crowding-out effect on private investment.

The last closure rule, and arguably the most critical for our simulations, pertains to the external account (current account balance). This becomes particularly relevant when trade flows are anticipated to undergo significant changes following the simulated shock. In our model, we assume a fixed Current Account Balance (CAB), adjusting the real exchange rate to maintain this exogenous level. This conservative approach is justified for two main reasons. Firstly, any variation in the top part of the Balance of Payment (CAB) is offset by an equivalent change in the bottom (financial) part, even though CGE models do not explicitly represent the financial component. Therefore, maintaining it as exogenous is a prudent strategy. Secondly, not fixing the CAB can lead to misleading results, particularly concerning welfare changes. With an endogenous CAB, a country might significantly increase imports through foreign savings without limits. In contrast, with an exogenous CAB specification, any increase in imports must be financed by a corresponding increase in exports, facilitated by the flexible real exchange rate. Consequently, this allows for a proper and unbiased welfare analysis.

3.2. The Social Accounting Matrix and parameters

The model has been calibrated based on an original Social Accounting Matrix (SAM) constructed by the authors, reflecting the structure of the national economy in 2017. Key data for the SAM were sourced from the GTAP 11 database, supplemented by the 2016 Burkina Faso SAM to address missing data, particularly in disaggregating the household account based on residence zones (rural and urban) and poverty status (poor and non-poor). The resulting SAM comprises 93 accounts categorized into 33 economic activities, 43 commodity accounts, 2 factor accounts (labor and capital), 5 tax accounts (direct, indirect, sales, labor, and imports), 4 representative household categories (urban/rural and poor/non-poor), one margin account, a savings-investment account, one investment account, a firms' account, a government account, and an account representing the rest of the world.

The selection of (free) parameters utilized in the model is grounded in existing literature (Annabi et al., 2006). Table 1 provides the values for the primary parameters. Additionally, we conducted a sensitivity analysis, and interested parties can obtain the results by reaching out to the authors. The parameters associated with the trading sector are expounded upon in the subsection...

Table 1. value of main parameters of the model

Income elasticity		Armington elasticity	CET elasticity (Exports and Domestic sales)	Elasticity of substitution for primary factors (Value added)	Frisch Parameter
Agricultural goods	Other goods				
0.5	1.5	3.5	2	1.5	-3.5

3.3. Calibration of the trading sector

Three key parameters require calibration in the trading sector operating within imperfect competition: sectoral super-profit level, fixed costs, and the number of firms.

Careful consideration is needed in selecting the super-profit level, as it significantly influences outcomes. Lacking an empirical estimate for Burkina Faso, we utilized proxies from African cotton companies, particularly in Mali, where super-profits were found to average 15% of value added (CMDT, various reports).

To calibrate the fixed costs, we need a measure of returns to scales (scale elasticity). Without any empirical estimate, we start with a value of 1.10 and perform a sensitivity analysis. Once we have a measure of the scale elasticity θ, we can derive the level of fixed costs given the marginal cost MC, the average cost AC and the production level X, following the relationship: $\frac{1}{\theta} = \frac{MC}{AC}$. From this expression it is possible to calibrate the value of fixed costs as: $FC = MC(\theta - 1) * X$.

For the trading sector, once the fixed costs have been calibrated, the capital stock becomes:

$$K_i = KV_i + \overline{KF_i}$$

Where K_i stands for the total stock, KV_i the variable component and $\overline{KF_i}$ the fixed part.

The last variable to be calibrated is the number of firms and the markup. Starting with the Lerner equation, once the demand elasticity has been fixed, there are basically two ways to calibrate the number of firms. One can either derive residually the number of firms given the initial markup and the demand elasticity yielding the "Cournot equivalent" number of firms or given the knowledge of the exact number in the sector, introduce a parameter endogenously determined to reconcile data on markup and the demand elasticity. The latter refers to the so-called conjectural variations models of oligopoly (Dostie et al., 1996) . When performing a simulation with number of firms the two options yield the same results as long as only relative variations are simulated. In this paper we have worked with a number of 10 firms in the sector, reflecting the level of competition of the sector.

4. Results and discussion

The model described above is employed to investigate the impacts on welfare, consumption, trade, and growth resulting from a 10 percent decrease in world prices (scenario 1) and a 10 percent increase in world prices (scenario 2). These analyses are conducted under four distinct assumptions of market concentration within the trading sector. The summarized scenarios are outlined in table 2.

Initially, the existing number of firms in the trading sector is maintained while simulating the scenarios of lower and higher world prices. Subsequently, both scenarios are examined with the assumption of lower market concentration, entailing a 50 percent increase in the current number of firms. Thirdly, changes in prices are explored with an even lower level of market concentration, involving a doubling of the current number of firms. Finally, the same price scenarios are simulated with the assumption of higher market concentration, incorporating a reduction of the current number of firms by 50 percent.

The subsequent result tables present the outcomes in terms of welfare, consumption, trade, and growth, indicating percentage changes from the relevant base-run values in response to the two simulated changes under various market concentration assumptions.

Table 2. Summary of the Scenarios

Scenario 1	Decrease in world prices (-10%)
Assumption 1.1	Current number of firms in the trading sector maintained
Assumption 1.2	Increase in the number of Firms (+50%)
Assumption 1.3	Increase in the number of Firms (+100%)
Assumption 1.4	Decrease in the number of Firms (-50%)
Scenario 2	Increase in world prices (+10%)
Assumption 2.1	Current number of firms in the trading sector maintained
Assumption 2.2	Increase in the number of Firms (+50%)
Assumption 2.3	Increase in the number of Firms (+100%)
Assumption 2.4	Decrease in the number of Firms (-50%)

Table 3 presents the results in terms of well-being. In the scenario of a decrease in world prices, while maintaining the current number of firms, an increase in well-being is observed for poor rural residents (+1.69%), non-poor rural residents (+2.52%), poor urban residents (+2.15%), and non-poor urban residents (+2.26%).

Increasing the number of firms by 50% yields more favorable outcomes, reflecting improved living conditions in both rural and urban areas. Indeed, the well-being gain is +2.98% for poor rural residents, +3.98% for non-poor rural residents, +2.87% for poor urban residents, and +3.13% for non-poor urban residents.

When doubling the number of businesses, the level of well-being is even higher. Well-being increases to +3.57% for poor rural residents, +4.66% for non-poor rural residents, +3.19% for poor urban residents, and +3.53% for non-poor urban residents.

Reducing the number of businesses by 50%, however, results in a decline in well-being. This decline is more pronounced among rural residents than urban residents. Specifically, the well-being loss is -3.62% for poor rural residents, -3.39% for non-poor rural residents, whereas it is only -0.82% for poor urban residents and -1.30% for non-poor urban residents.

In the scenario of an increase in world prices, household well-being deteriorates with the current market concentration. This deterioration in well-being increases with market concentration and decreases as competition rises in the trading sector.

These results demonstrate that changes in world prices have significant impacts on well-being and depend on the level of competition in the trading sector. When the market is weakly concentrated, it is challenging for commercial intermediaries to significantly influence prices. Conversely, when the market is highly concentrated, intermediaries capture a significant portion of the gains from the reduction in world prices and amplify the negative impacts associated with the increase in world prices.

Table 3. Welfare Impacts – Equivalent Variation (percent)

	10% decrease in world prices				10% increase in world prices			
	A1	**A2**	**A3**	**A4**	**A1**	**A2**	**A3**	**A4**
Rural poor	1,69	2,98	3,57	-3,62	-1,97	-0,95	-0,50	-6,57
Rural non-poor	2,52	3,98	4,66	-3,39	-2,67	-1,57	-1,08	-7,58

Urban poor	2,15	2,87	3,19	-0,82	-2,16	-1,59	-1,34	-4,73
Urban non-Poor	2,26	3,13	3,53	-1,30	-2,26	-1,60	-1,31	-5,28

Notes: A1: Assuming the current number of firms; A2: Increasing the number of firms by 50 %; A3: Doubling the number of firms; A4: Reducing the number of firms by 50 %

Source: Author's simulations from PEP-1-1 model and 2017 SAM for Burkina Faso

Table 4 provides insights into the impacts on the real household consumption budgets. A decrease in world prices benefits all households under the assumption of maintaining the current number of commercial enterprises. There is indeed a real increase in the consumption budget of poor rural households by +2.50%, non-poor rural households by +2.95%, poor urban households by +2.99%, and non-poor urban households by +2.86%.

Increasing competition in the commercial sector leads to growing positive impacts on real consumption. The decrease in world prices in a context of low market concentration (indicating high competition) results in a reduction in local prices and consequently provides additional gains to households. This situation benefits non-poor households in rural areas (+4.66%) as well as in urban areas (+4.12%) due to a higher reliance on the market for their consumption compared to poor households, which have a higher proportion of self-consumption.

Results are even more favorable with a doubling of the number of enterprises. The decrease in world import prices in a context of low market concentration leads, thanks to increased competition among commercial enterprises, to a more significant decrease in local prices. This benefits consumers who see their consumption budgets grow in real terms.

However, a halving of the number of commercial enterprises results in a deterioration of purchasing power for all categories of households despite the decrease in world prices. Poor rural households (-2.79%) and non-poor rural households (-3.16%) experience a stronger decline compared to urban households. This situation is explained by the fact that urban households partly benefit from the increase in super profits of enterprises, distributed in the form of dividends.

In the scenario of a 10% increase in world prices, the deterioration in purchasing power is evident and intensifies with the degree of market concentration. Increasing the number of commercial enterprises helps mitigate the negative impacts of a surge in world prices. High market concentration is more detrimental to rural households than to urban households.

Table 4. Change in Real Household Consumption Budget (percent)

	10% decrease in world prices				10% increase in world prices			
	A1	**A2**	**A3**	**A4**	**A1**	**A2**	**A3**	**A4**
Rural poor	2,50	3,94	4,60	-3,52	-2,79	-1,64	-1,14	-8,05
Rural non-poor	2,95	4,66	5,44	-4,05	-3,16	-1,84	-1,26	-9,16
Urban poor	2,99	3,98	4,43	-1,17	-3,06	-2,26	-1,91	-6,77
Urban non-Poor	2,86	4,12	4,69	-2,39	-3,05	-2,04	-1,60	-7,69

Notes: A1: Assuming the current number of firms; A2: Increasing the number of firms by 50 %; A3: Doubling the number of firms; A4: Reducing the number of firms by 50 %

Source: Author's simulations from PEP-1-1 model and 2017 SAM for Burkina Faso

Table 5 shows that, in response to a decrease in world prices, sales on the domestic market decrease for non-essential products, while they increase for basic food products (+0.11%). Stronger

competition, compared to the current situation, significantly mitigates the decline in domestic sales of non-essential products. With increased competition, the sale of livestock products is on the rise, while the increase in sales of food products becomes substantial. Conversely, when competition weakens, the economy responds to a decrease in world prices by reducing domestic sales of all products. The scenario of an increase in world prices shows an increase in domestic sales for cash crops and forestry products and a decrease in food and livestock products. Stronger competition leads to an increase in domestic sales for all products, while weaker competition results in a reduction of these sales.

Table 5. Changes in Real Domestic Demand by Commodity Group (percent)

	10% decrease in world prices				10% increase in world prices			
	A1	**A2**	**A3**	**A4**	**A1**	**A2**	**A3**	**A4**
Food crops	0,11	0,67	0,93	-2,33	-0,41	0,10	0,32	-2,78
Cash crops	-1,15	-0,83	-0,69	-2,68	0,69	1,05	1,21	-1,07
Livestock	-0,02	0,05	0,09	-0,38	-0,03	0,05	0,08	-0,42
Forestry	-0,46	-0,29	-0,21	-1,34	0,30	0,49	0,57	-0,69
Non-agr	-0,59	-0,51	-0,48	-1,02	0,35	0,45	0,49	-0,18

Notes: A1: Assuming the current number of firms; A2: Increasing the number of firms by 50 %; A3: Doubling the number of firms; A4: Reducing the number of firms by 50 %

Source: Author's simulations from PEP-1-1 model and 2017 SAM for Burkina Faso

As expected, the results presented in Table 6 indicate that imports increase in response to a decrease in world prices. When competition increases in the commercial sector, import increases are amplified. Opposing adjustments apply when competition decreases. Similarly, an increase in world import prices leads to a significant decrease in the volume of imports. Increased competition reduces the magnitude of the decrease in import volumes associated with an increase in import prices, while lower competition increases this magnitude.

Table 6. Changes in Imports by Commodity Group (percent)

	10% decrease in world prices				10% increase in world prices			
	A1	**A2**	**A3**	**A4**	**A1**	**A2**	**A3**	**A4**
Food crops	42,59	48,62	51,48	20,48	-28,97	-26,60	-25,52	-38,73
Cash crops	11,85	14,66	15,94	0,40	-11,41	-9,25	-8,29	-21,09
Livestock	34,11	44,23	49,06	-1,43	-27,61	-22,33	-19,87	-47,58
Forestry	6,07	23,70	32,34	-48,63	-14,57	-0,54	6,19	-60,60
Non-agr	10,28	11,39	11,92	6,09	-8,57	-7,94	-7,66	-11,25

Notes: A1: Assuming the current number of firms; A2: Increasing the number of firms by 50 %; A3: Doubling the number of firms; A4: Reducing the number of firms by 50 %

Source: Author's simulations from PEP-1-1 model and 2017 SAM for Burkina Faso

The results presented in Table 7 provide a summary of the observed changes in export markets in response to changes in world prices. Clearly, an increase in world prices leads to an expansion of exports in staple food products, cash crops, and livestock. However, the magnitude of this increase decreases in times of increased competition for basic food products and cash crops, while exports of livestock products decrease with rising competition.

In response to a decrease in world prices, exports of staple food crops and cash crops react with a decline. However, there is an increase in exports for livestock products, forestry products, and non-agricultural goods. In this context, the magnitude of export expansion decreases with more intense competition, while the magnitude of export contraction increases. The reduction in competition results in an increase in exports for all products. This observation highlights the significant impact of competition on export dynamics, with different implications depending on the types of products considered.

Table 7. Changes in Exports by Commodity Group (percent)

	10% decrease in world prices				10% increase in world prices			
	A1	**A2**	**A3**	**A4**	**A1**	**A2**	**A3**	**A4**
Food crops	-0,59	-1,13	-1,38	1,57	0,63	0,20	0,00	2,62
Cash crops	-1,28	-2,07	-2,44	1,50	0,92	0,43	0,21	2,93
Livestock	0,39	-1,32	-2,08	8,37	0,63	-1,08	-1,82	9,33
Forestry	6,29	2,68	1,15	25,99	-3,25	-6,40	-7,71	15,27
Non-agr	0,93	0,65	0,52	1,94	-1,00	-1,17	-1,24	-0,28

Notes: A1: Assuming the current number of firms; A2: Increasing the number of firms by 50 %; A3: Doubling the number of firms; A4: Reducing the number of firms by 50 %

Source: Author's simulations from PEP-1-1 model and 2017 SAM for Burkina Faso

Finally, Table 8 indicates how competition influences growth outcomes in scenarios of world price variations. The GDP reduction effect of a 10% increase in world prices amplifies when competition decreases and diminishes when competition increases. Once again, the positive effect on growth associated with a decrease in world prices slightly increases under higher competition, while it significantly decreases under lower competition.

Table 8. Changes in Real GDP (percent)

Scenarios	**A1**	**A2**	**A3**	**A4**
10% decrease in world prices	4,27	4,31	4,33	3,91
10% increase in world prices	-3,85	-3,79	-3,76	-4,32

Notes: A1: Assuming the current number of firms; A2: Increasing the number of firms by 50 %; A3: Doubling the number of firms; A4: Reducing the number of firms by 50 %

Source: Author's simulations from PEP-1-1 model and 2017 SAM for Burkina Faso

5. Conclusion and policy implications

The aim of this article was to assess the impacts on well-being, consumption, and growth resulting from changes in world prices, considering various assumptions about market concentration in Burkina Faso's commercial sector. To achieve this, we employed a single-country computable general equilibrium model, with a specific approach to the commercial sector operating in a context of imperfect competition (Cournot oligopoly with increasing returns to scale). Our findings indicate that an increase in world prices leads to a decline in well-being, while a decrease in world prices results in an improvement in well-being. However, the deterioration in well-being due to an increase in world import prices intensifies with a reduction in market competition. Similarly, the well-being improvement associated with a decrease in world prices intensifies with an increase in market competition.

This study highlights issues raised by several authors (Francois et al., 2010; Francois & Wooton, 2010), demonstrating that market power in domestic trade has significant implications for the transmission of world prices. A key message to remember is that, on the one hand, policies aimed at international or regional trade liberalization, including the implementation of the AfCFTA, may not succeed in improving household well-being and consumption in a context of limited competition in the commercial sector. On the other hand, surges in world prices can exacerbate negative impacts on household well-being in a context of weak competition in the commercial sector.

Statements and Declarations

All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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