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REGIONAL FOOD PRICE INFLATION TRANSMISSION

FRANCK CACHIA

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Regional Food Price Inflation Transmission

Franck Cachia
Associate Statistician, Statistics Division, FAO

Abstract

Understanding to what extent and speed agricultural commodity price changes on international markets are transmitted to consumers is key in assessing the vulnerability of households to price shocks. The importance of these transmission indicators is compounded, in developing countries, by the fact that consumers tend to spend a higher proportion of their income on food items. Regional estimates of food inflation transmission can also be used to predict consumer-level impacts of international price shocks, contributing to improve the information basis on which to base policy mitigation actions and to focus on the areas likely to suffer the most.

The aim of this paper is to provide estimates of the transmission of price changes from international commodity markets to consumers in different regions of the world, using monthly data from FAO's Food Price Indices and Regional Food Consumer Price Indices. This econometric analysis, which uses impulse response functions from error-correction models, is useful in establishing typologies of regions with respect to the extent and speed of price transmission processes.

Key words: Food price inflation transmission; Regional food consumer prices; Error-Correction Models

JEL codes: C32, Q11

1. Introduction

This paper provides statistical evidence on the extent and speed of the transmission to consumers of price fluctuations occurring on international food commodity markets, for a set of regions of the world. On the basis of these estimates, the regions and sub-regions most exposed to international shocks are identified and indications on the driving factors explaining cross-regional differences, such as market structures or policy mitigation measures, are also provided.

This analysis is useful in many regards: first, to our knowledge, consistent and up-to- date measures of food inflation transmission at regional level do not exist in the literature; second, the determination of a typology of regions with respect to their exposure to shocks on international food commodity markets contributes to better inform the design of food security policies; third, the estimated functional relationships linking food consumer prices to international commodity prices can be used to produce forecasts that can feed into early warning systems for food security.

The remaining sections of this paper are organized as follows: the second section describes the major determinants of food price transmission; the third section presents a range of econometric models that can be used to estimate food price transmission and the approach adopted in this paper. The fourth section presents the results of the estimations for selected regions and the factors explaining regional differences; the fifth and final section concludes and identifies possible improvements to the methodology. Annexes provide details on the data used and on the results of the transmission estimations and regressions.

2. Determinants of food price transmission

For this study, food price transmission is defined as the percentage change in food consumer prices resulting from a given change in the international market price of a basket of agricultural commodities. We propose here to directly measure the impacts of price shocks at the upstream or producer level on downstream consumer prices. These impacts are the result of a complex chain of factors, with both amplifying and mitigating effects, occurring at different levels of the value-chain. A succinct description of the main determinants is provided in this section.

a. Commodity imports

International food prices are first related to domestic food prices through commodity imports: directly, through purchases of goods from wholesalers on international output markets and indirectly, through purchases of agricultural inputs from producers on international markets (seed, feed, raw commodities, etc.), which affect production costs (Figure 1). In principle, the higher the share of commodity imports in domestic supply, the higher the correlation between international market prices and domestic prices.

b. Spatial arbitrage and the "law of one price"

When producers can arbitrate freely between selling their products on the domestic market or abroad, domestic producer prices and international market prices will tend to converge: domestic producers will sell their products abroad if the international price (net of transport and transaction costs) is higher than the domestic price, reducing the supply on the domestic market and therefore generating upward pressures on domestic prices. This process will continue until domestic producer prices are equal to international prices. This model, sometimes referred to as the "law of one price" is valid for homogeneous commodities traded in markets undistorted by export restrictions, trade barriers or price support policies and which benefit from perfect information (efficient markets). Ninot (2010) describes in detail the theoretical framework underpinning this approach. Rapsomanikis *et al*. (2003) also recall the "law of one price", in its weak and strong form, and identify its main implications for time-series modeling. The law of one price explains why prices tend to move in similar directions, especially when price changes on international markets reach certain thresholds. It may also explain the existence of a significant correlation between domestic and international prices in a country or region which is little dependent on food imports.

c. Market power

The extent to which shocks on international markets are transmitted to final consumers depends on the capacity of each market actor to pass-on price changes to their respective clients. The ability of each actor to fix prices, which is a reflection of their market power, in-turn depends on the structure of the markets and of the distribution chains. For example, producers will tend to partially absorb price shock to avoid losing market shares if wholesalers are in a dominant position. Conversely, price shocks will be more widely transmitted to wholesalers if the market structure is more competitive. In the latter case, producers may even tend to pass-on more completely price rises than price decreases. The existence of asymmetries in the price transmission process and their empirical implications are discussed in detail in Vavra and Goodwin (2005). The final transmission to consumers is the result of these complex market relationships at each level of the chain.

d. Transport and transaction costs

Costs incurred to ship imported commodities within the country's borders have to be distinguished from those incurred to distribute commodities, domestically produced or not, to domestic consumption hubs. The former negatively affect the demand for imports and tends to weaken the correlation between domestic and international prices. Regarding the latter, the final impact is less clear-cut: on the one hand, high domestic transport costs or, similarly, the lack of appropriate transport infrastructures, limits the ability of market intermediaries to ship at reasonable costs domestically produced commodities to the main consumption hubs. If production areas are close to the main consumption hubs and the latter are situated far from the country borders, domestic products might be favoured with respect to imported commodities. If the consumption centres are situated close to where imported goods arrive,

the effect might be opposite. Import parity prices (benchmark prices plus access cost tariff) are a key determinant of import demand. Its link to international reference prices may be loosened by the existence of high and variable transport and transaction costs.

Transport and transaction costs incurred to import, market and distribute food commodities are often cited as one of the main sources of non-linearities in the price transmission process (Conforti, 2004). Sharp adjustments in market conditions may be triggered by a rise or fall in the international price of a given commodity beyond the limits within which it had been evolving since then. For example, if commodities on international markets trade significantly and persistently above domestic prices in a given country, importers might scale back their demand and/or be pushed to change the geographical origin of their products. Domestic producers have an incentive to align their prices to international prices and/or to re-orient their production towards exports. These reactions modify the market equilibrium and affect relative prices. The extent of the impact depends on the size of the initial shock or imbalance and on a range of factors related to the structure of the market as well as to policy conditions.

e. Exchange rates

Exchange rate fluctuations can absorb or amplify price changes on international markets, as the national currency appreciates or depreciates vis-à-vis the currency in which the commodities are traded.

f. Policy interventions

Policy interventions affect the degree of correlation between international market prices and domestic consumers prices. An extensive list of these instruments, along with a detailed description, has been prepared in the framework of a FAO-led project on the Monitoring of African and Agricultural Policies (MAFAP) .The main policy interventions relevant for price transmission analysis are listed and shortly described below.

Import tariffs By reducing the relative price competitiveness of foreign goods, they contribute to shelter domestic producers from foreign competition. Higher import tariffs translate into lower price transmission to the extent that tariffs reduce import demand.

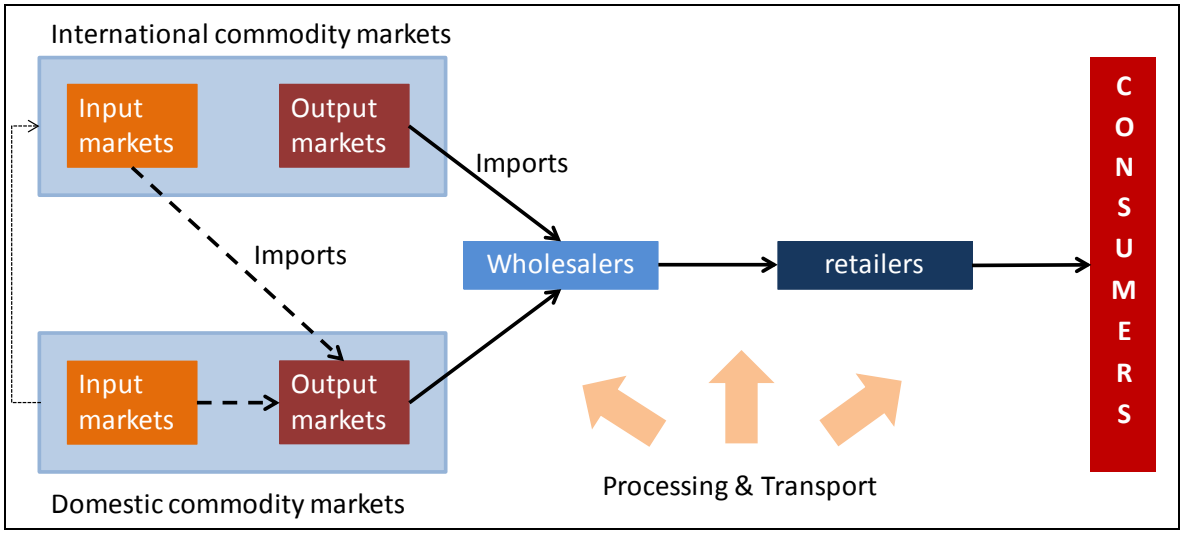
Export tariffs Their objective is generally to ensure that domestic producers sell a higher or minimal share of their products on domestic markets. Export tariffs may be temporarily raised to reduce tensions on domestic prices in situations where prices on international markets are considered as too high. Several countries adopted this approach during the 2007-2008 food price crisis. These policies may lead to adverse effects because they contribute to increase the uncertainty in global supply, especially if the country is a significant player in the market, and may in fact contribute to exacerbate price tensions.

Input subsidies They can take different forms, including direct subsidies based on the amounts of inputs purchased by the farm, tax deductions, subsidies based on quantities

produced or area harvested, etc. Their objective is to support the price competitiveness of domestic products on domestic and international markets by reducing production costs and allowing farmers to sell their products at a lower price than they would otherwise need to in a competitive environment. Similarly to import tariffs, all things being held equal, they contribute to increase the relative price of imported products, reduce import demand and, therefore, potential price transmission between international and domestic prices.

Production subsidies Subsidies based on quantities produced, area harvested, total land area, etc. affect the net revenue of the farm and therefore have similar impacts on import demand and price transmission than input subsidies.

Figure 1: *Transmission of shocks to domestic consumers*



Source: Author

3. Measuring Price Transmission

a. Succinct overview of the recent literature

There is a wide body of literature on the pass-through of international prices to domestic prices for individual commodities and countries. Rapsomanikis and Karfakis (2007) study spatial pricing in commodity markets in Tanzania. Ferrucci *et al* (2010) provide a review of