Price Transmission in Food Value Chains with Market Imperfections

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Stage 1: **Literature & data review**

Market power and **competition policy** has emerged as an important economic issue and a sensitive item on the policy agenda all around the world

Insights from the <u>literature</u>

Theory I: the simple argument

      High concentration → Market power → Inefficiency
- Buyer power: lower prices for suppliers
- Seller power: higher consumer prices

Theory II: some complications

While concentration is a useful first indicator of market power, high concentration does not necessarily translate into market power
- Asymmetries in size, cost or strategy may impede collusion (Compte et al, 2002; Kühn, 2002; Barla, 2000; Dobson et al, 2001)
- Vertical relationships matter (McCorriston & Sheldon, 2007)

Stage 1: Literature & data review (cont.)

Theory III: some more complications
… high concentration may enhance welfare if concentration :
- Increases scale economies
- Reduces transaction costs
- Secures return on investments in R&D
- Offsets market power of other agents supplier

Stage 1: Literature & data review (cont.)

Empirical Evidence

Empirical studies have focused mostly on *consumer* side

Diverging conclusions on the effects of retail concentration & modern retail growth on consumer prices:

OECD COUNTRIES

▪ <u>Positive correlation</u> :

Hall et al (1979), Lamm (1981), Marion et al (1993), Cotterill (1986), Cotterill and Harper (1995), Cotterill (1999)

▪ <u>Negative or insignificant correlation</u> :

Kaufman and Handy (1989), Newmark (1990), Binkley and Connor (1998), Binkley et al (2002)

DEVELOPING COUNTRIES

▪ <u>Lower prices</u> :

Reardon and Hopkins (2006), D'Haese and Van Huylebroeck (2005), Neven et al (2006)

▪ <u>Higher prices</u> :

Minten (2008)

Literature review: Empirical evidence (farm-level)

RICH COUNTRIES
Results vary and depend on variety of model assumptions :
▪ <u>Market power</u> :
Lloyd et al (2009)
▪ <u>No or weak</u> :
Dobson et al (2001)

TRANSITION & DEVELOPING COUNTRIES
Results vary :
▪ Competition enhances <u>farmer revenues & growth</u> :
Sadler et al (2007)
▪ <u>Strong benefits</u> for farmers with monopoly buyer :
Minten et al (2009), Maertens et al (2009)

Motivation of the paper

- Recent commodity price behaviour (price spikes) → renewed attention for price transmission issues
- Important irregularities in
  - Spatial price transmission
    - world → domestic mkts
  - Vertical price transmission
    - farm → consumer
    - consumer → farm
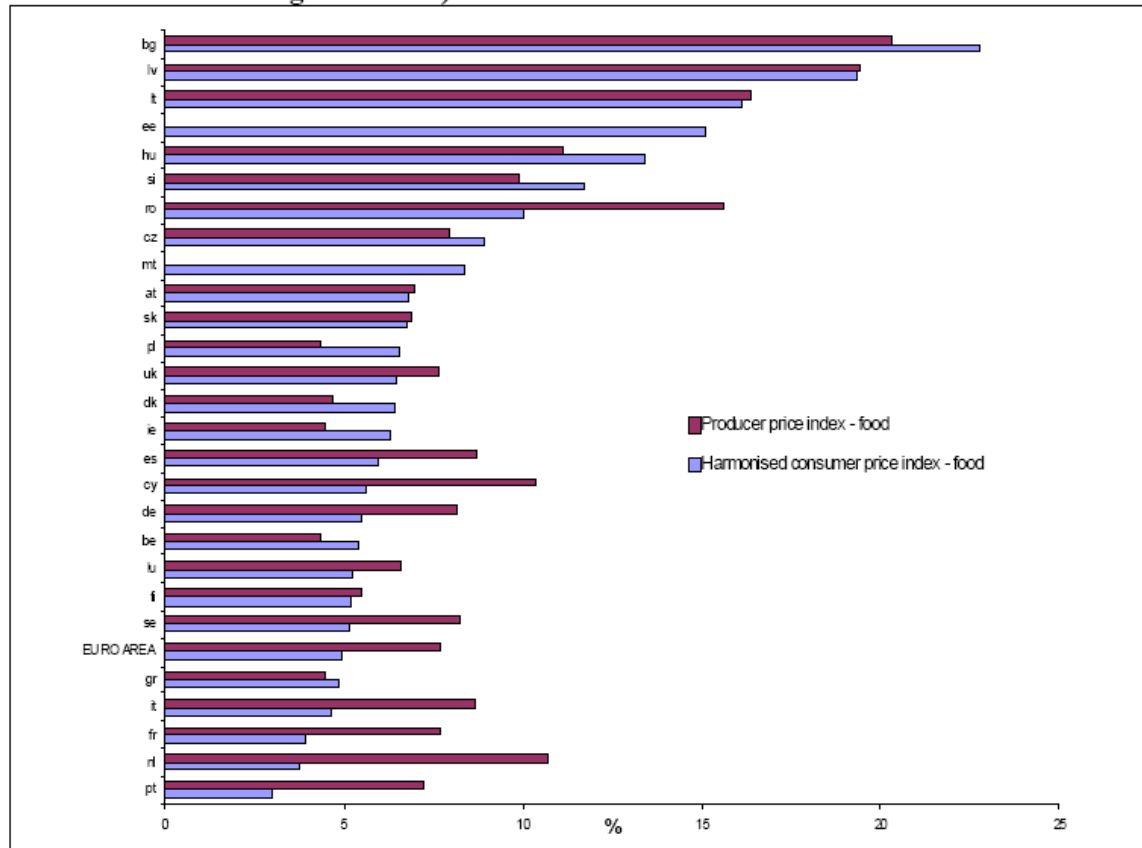 - In developing, emerging as well as developed economies

Spatial price transmission in developing countries
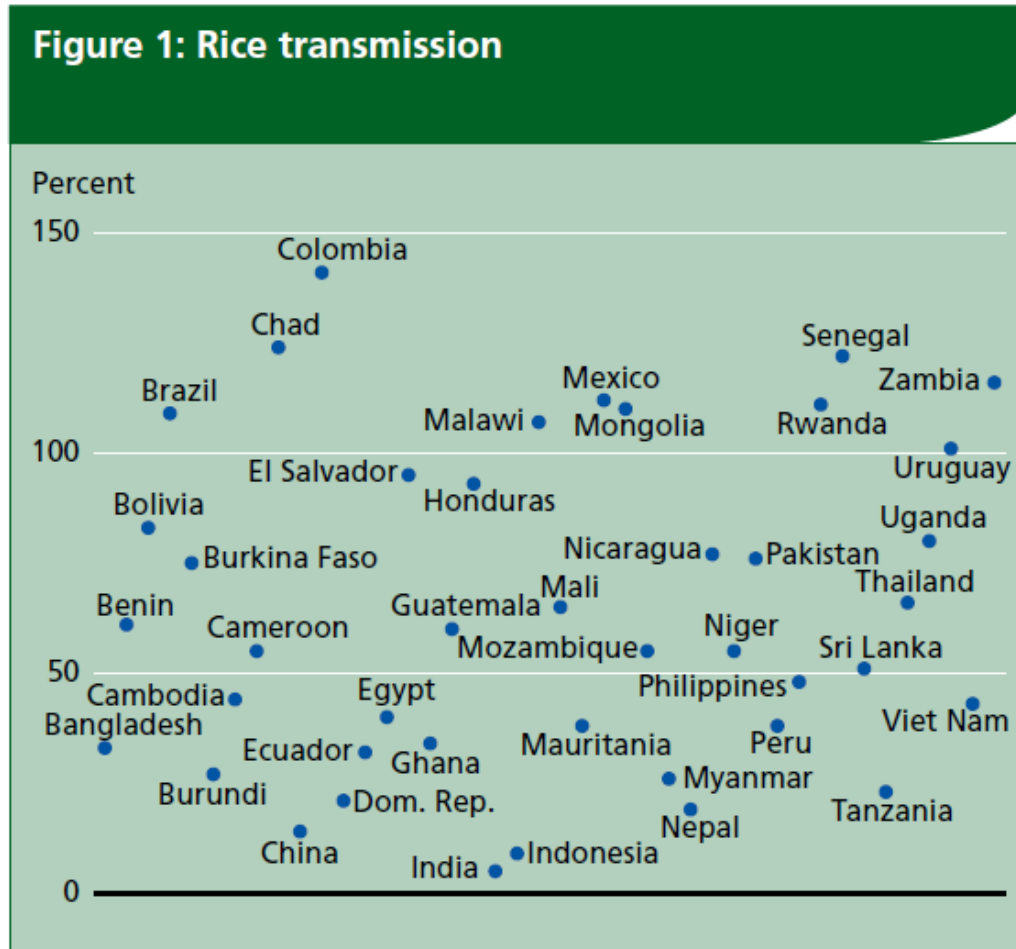
(Sharma, 2011)

Vertical price transmission in EU

Figure 5: Consumer and producer food price changes 2007:7 – 2008:8 (average annual growth rate)

Source: Eurostat

(Bukeviciute *et al.*, 2009)

Reasons for concern?

(I) DEVELOPING COUNTRIES

- When food prices were low for decades:
  - NGOs claimed this threatened food security as low food prices impede agricultural development and keep productivity low
- Now that food prices are high:
  - NGOs claim this threatens food security as consumer food bills are inflated
- See Swinnen (2011)
- But… what happens at the farm-level?
  - It is claimed by some that in many cases farm-level prices have remained flat (farmers sold harvest too early?)
  - Surprisingly little micro-level evidence

Reasons for concern?

(II) DEVELOPED COUNTRIES: THE EU

- – Price rises in 2007/08 passed on to consumers and caused hardship for consumers

- – Price drops in consequent years much less passed on to consumers → Demand recovery impeded→ hardship for farmers

- – Asymmetries in price transmission supposedly reflect "*structural weaknesses in the system, such as the number of intermediaries operating along the chain and the competitive structure*" and "*pervasive inequalities in bargaining power between contracting parties*"

- – January 2012: Establishment of Task Force Food within DG Competition to inquire into these issues

State of the art

- Price transmission has been studied extensively in the literature
  - Theoretically (e.g. Wohlgenant 2001, McCorriston, Morgan, and Rayner 2001)
  - Empirically (e.g. Goodwin and Holt 1999; Chang and Griffith 1998; von Cramon-Taubadel 1998; TRANSFOP papers Bonnet and Requillart 2012; Holm, Loy, and Steinhagen 2012; Davidson et al. 2012)
  - But mostly in a 'developed' world context, and mostly downstream transmission (from farm to retail) – impact on consumers

Our contribution (1)

- Study price transmission from consumers to farmers
  - Gap in the literature identified by Wohlgenant (2001)
  - Important in current context of rapidly transforming global agrifood systems with
    - Increasing vertical coordination
    - Increased importance of food quality standards
    - Increased consolidation at the buyer-level (agrifood processing firms, retailers)
    - Often very unequal power relations between buyers and suppliers
  - Farm-level welfare effects?

Our contribution (2)

- Most studies assume perfect factor markets, perfect contract enforcement institutions.

- We study <u>farm welfare</u> and <u>price transmission</u> in a context of
  - VC with contract-specific investments by buyer
  - Factor market imperfections
  - Imperfect contract enforcement institutions

- Contract-specific investments can take different forms (External inputs, Training, Monitoring costs, Search costs)

- Model results depend on the type of investment

- But in most cases: highest level of farm welfare does not necessarily coincide with highest degree of price transmission!

Conceptual difference between investment types

		Value outside of the contract	
		Value > 0	Value = 0
Frequency of investment	Annually	External inputs	Monitoring costs
	Once	Training costs	Search costs

- **Value outside of the contract:**
  - Suppliers can 'run away' with buyer's investment
    - Diverting external inputs/training to other uses
    - Sideselling high-quality product to alternative buyers
  - To make contract self-enforcing: buyer may offer an 'efficiency premium'
  - Suppliers will earn above-opportunity cost payoffs even in unequal bargaining positions
  - E.g. Swinnen & Vandeplas 2011 (focus on developing co)

Conceptual difference between investment types

		Value outside of the contract	
		Value > 0	Value = 0
Frequency of investment	Annually	External inputs	Monitoring costs
	Once	Training costs	Search costs

- **Frequency of investment:**
  - If only once, higher surplus generated in repeated contracting relationship than in new contract
  - To keep suppliers 'loyal' in long term → create win-win situation, with surplus above opportunity cost
  - Relational rather than transactional exchange (Geiger et al. 2012; Dwyer, Schurr, and Oh 1987)
  - Higher surplus share to suppliers?
  - E.g. Sexton (2012) (focus on developed co)

Price determination under imperfect factor markets and imperfect enforcement

- – Supplier invests labour l
- – Buyer invests capital k and can sell processed product quantity q at value p_h
- – Contract surplus is $S = p_h q - \gamma \bar{k} - \bar{l}$

- – Supplier may breach contract:
  - Input diversion: $Y_i = \bar{l} + \alpha \bar{k} - \varphi^f$
  - Sideselling: $Y_s = p_s - \varphi^f$

Price determination under imperfect factor markets and imperfect enforcement

- Then, two parties bargain over surplus – but outcome must satisfy supplier incentive compatibility constraints.

- The resulting contract (Y, Π):

$$\begin{cases} Y = \max[\bar{l} + \beta(p_h\, q - \gamma\bar{k} - \bar{l}); \ \bar{l} + \alpha\bar{k} - \varphi^f; \ p_s q - \varphi^f] \\ \Pi = p_h q - Y \end{cases}$$

  with Y farm income

  and Π buyer income

- The resulting producer price:

$$p = \frac{1}{q}\max[\bar{l} + \beta(p_h\, q - \gamma\bar{k} - \bar{l}); \ \bar{l} + \alpha\bar{k} - \varphi^f; \ p_s q - \varphi^f]$$

	Producer price	Price transmission
Baseline scenario	$p = \frac{1}{q}\left[\bar{l} + \overline{k_f} + \beta\left(p_h\, q - \bar{l} - \overline{k_f}\right)\right]$	$\dfrac{\partial p}{\partial p_h} = \beta$
VC with external input costs	$p = \frac{1}{q}\max\begin{cases}\bar{l} + \beta\left(p_h\, q - \bar{k_i} - \bar{l}\right); \\ \bar{l} + \alpha\bar{k_i} - \varphi^f; \\ p_s q - \varphi^f\end{cases}$	If term 1 binding: $\dfrac{\partial p}{\partial p_h} = \beta$ Otherwise: $\dfrac{\partial p}{\partial p_h} = 0$ Except: If term 3 binding: $\dfrac{\partial p}{\partial p_h} = \dfrac{\partial p}{\partial p_s}$
VC with training costs	$p = \frac{1}{q}\max\begin{cases}\bar{l} + \beta\left(p_h\, q - \bar{k_i} - \bar{l}\right); \\ \bar{l} + \alpha\bar{k_i} - \varphi^f; \\ p_s q - \varphi^f\end{cases}$	If term 1 binding: $\dfrac{\partial p}{\partial p_h} = \beta$ Otherwise: $\dfrac{\partial p}{\partial p_h} = 0$ Except: If term 3 binding: $\dfrac{\partial p}{\partial p_h} = \dfrac{\partial p}{\partial p_s}$
VC with monitoring costs	$p = \frac{1}{q}\left[\bar{l} + \beta\left(p_h\, q - \overline{k_m} - \bar{l}\right)\right]$	$\dfrac{\partial p}{\partial p_h} = \beta$
VC with search costs	$p = \frac{1}{q}\left[\bar{l} + \beta\left(p_h q - \gamma_s\overline{(k_s)} - \bar{l}\right)\right]$	$\dfrac{\partial p}{\partial p_h} = \beta$

Findings (1)

- If outside options (input diversion, sideselling) are binding:
  - Farmer gets a better price ('efficiency premium')
  - Price transmission is 0
- This applies to the cases of Training, External input provision
- Hence:
  - Weaker price transmission does not necessarily mean lower farm welfare
  - Degree of price transmission is not always informative on the process of price formation

Findings (2)

- The management literature suggests that if search costs become important, buyer-supplier relationships may transform from <u>transactional exchange</u> into <u>relational exchange</u>

- This could be reflected in an increase in β

- If so, apart from training and external input costs, search costs in high-value supply chains will also lead suppliers to earn above-opportunity cost incomes

- Further need to formalize this

Link with further work in WP6

- Price transmission depends on
  - **Sharing rule β**
  - **Effectiveness of contract enforcement institutions** (through φ, might be problematic especially for New Member States)
  - **Market structure and strength of vertical relationships** (through p_s)
    - Are there attractive outside options?
    - How large are switching costs ?