Market Structure, Industrial Concentration, and Price Transmission

Ian Sheldon (Ohio State University)

Presentation for workshop on “Market Integration and Vertical and Spatial Price Transmission”, University of Kentucky, Lexington, KY
April 21, 2006

Introduction

- Doha Round of WTO is a “development round”, focus on increasing LDC access to DC markets
- Little attention paid to food marketing system in DCs in analyzing commodity exports of LDCs:
  - Vertical/horizontal structure
  - Increasing consolidation
- Who captures the benefits of trade reform when downstream markets are imperfectly competitive?

Structure of Food Marketing in Developed Countries

- Food manufacturing concentrated in US and EU, e.g., average 3-firm concentration of 67% in EU
- Food retailing concentrated at national level in EU, and at regional and local level in US
- Increasing consolidation via mergers and acquisitions
- Structure of *successive oligopoly/oligopsony*

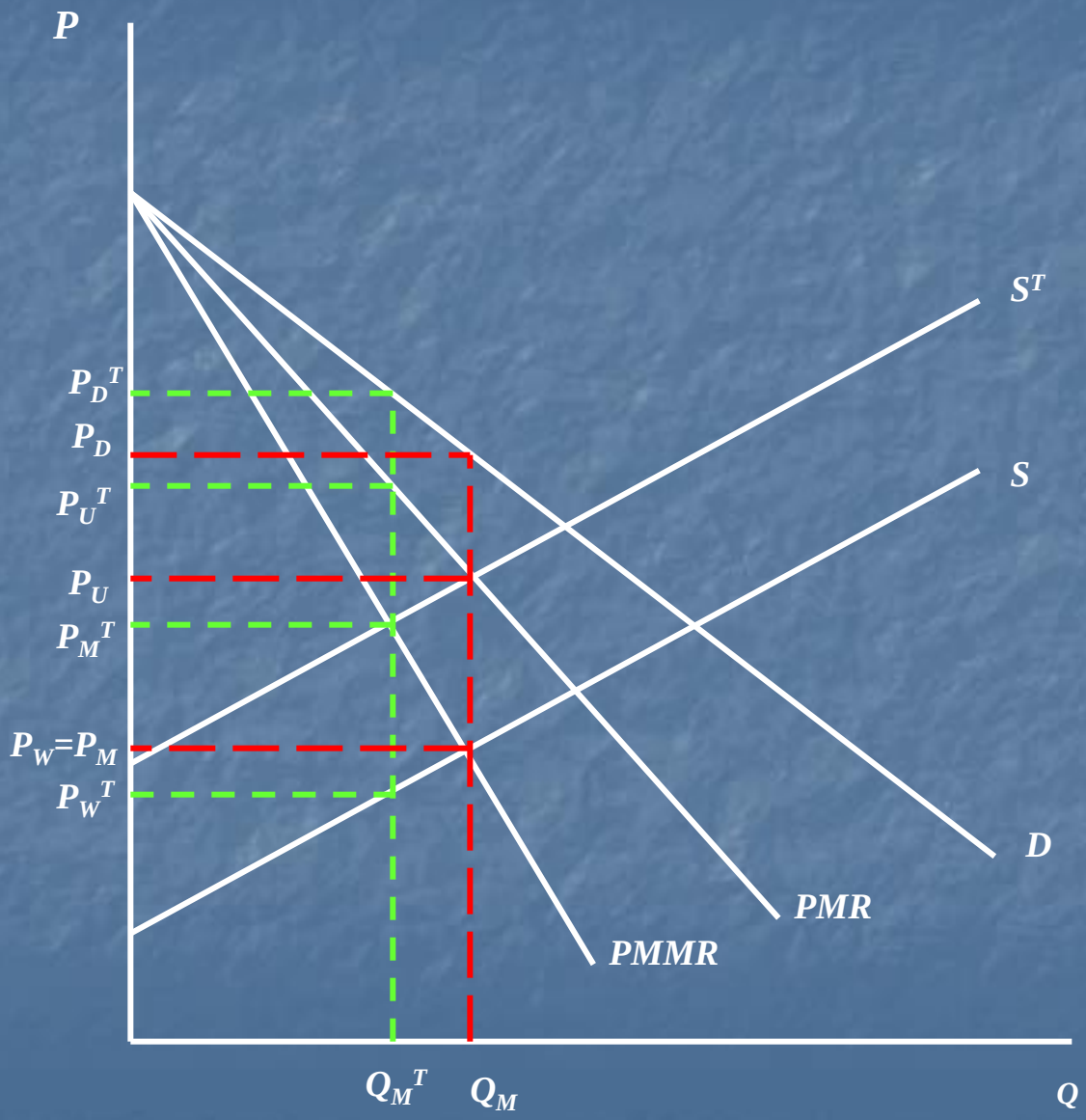
Market Structure Might Matter

- Declines in LDC commodity prices not necessarily passed through in lower consumer prices (Oxfam, 2001)
- LDCs do not necessarily gain full benefits of trade reform, e.g., Mozambique cashew nuts (McMillan, *et al*., 2002)
- Typical CGE analysis of Doha Round ignores downstream marketing system (Anderson and Martin, 2005; 2006)

Trade Liberalization and Industry Consolidation in a Vertically-Related Market

- If markets were competitive, ignoring vertical market structure would not matter
- Only recently have models examining optimal trade policy included imperfect competition (Ishikawa and Spencer, 1999; Sheldon *et al*., 2001)
- With imperfect competition, incidence of benefits of trade liberalization is important (Figure 1)
- Increasing consolidation in food marketing also affects share of value added received by LDC exporters

Figure 1: Trade Liberalization and the Vertical Marketing Chain



Vertical Markets Model

Inverse commodity export supply function:

$$p^a = u(X) \qquad (1)$$

Downstream:

$$c_i^d = k^d + p^u x_i \qquad (2)$$

$$p^d = \varphi(X) \qquad (3)$$

$$\frac{\partial(X - x_i)}{\partial x_i} = \alpha^d \left(\frac{X - x_i}{x_i} \right) \qquad (4)$$

$$p^d \left\{ 1 - \frac{(\alpha^d + (1 - \alpha^d) s_i^d}{\eta^d} \right\} = p^u, \; 0 \le \alpha^d \le 1 \qquad (5)$$

$$p^d\left(1-\frac{\gamma^d}{\eta^d}\right)-p^u=0,\ 0\le\gamma^d\le 1 \text{ and } \gamma^d=\alpha^d+[(1-\alpha^d)/n)] \quad (6)$$

$$\eta^d>\gamma^d,\ F^d>1-\frac{\eta^d}{\gamma^d}$$

$$\pi^d=(p^d-p^u)X-k^d n\ge 0 \quad (7)$$

Upstream:

$$c_j^u=k^u+p^a x_j \quad (8)$$

$$p^u=\theta(X|,\eta^d,\gamma^d) \quad (9)$$

$$p^u\left\{1-\frac{(\alpha^u+(1-\alpha^u)s_j^u}{\eta^u}\right\}=p^a,\ 0\le\alpha^u\le 1 \quad (10)$$

$$p^u\left(1-\frac{\gamma^u}{\eta^u}\right)-p^a=0,\ 0\le\gamma^u\le 1 \text{ and } \gamma^u=\alpha^u+[(1-\alpha^u)/m)] \qquad (11)$$

$$\eta^u>\gamma^u,\ F^u>1-\frac{\eta^u}{\gamma^u}$$

$$\pi^u=(p^u-p^a)X-k^u m\ge 0 \qquad (12)$$

Assume ($k^u=0, \gamma^u=1$) and $0\le\gamma^d\le 1$, i.e, $\partial p^u/\partial p^a=1$:

$$\frac{\partial p^d}{\partial p^u}=\frac{1}{\left(1-\frac{\gamma^d}{\eta^d}+\frac{F^d}{\eta^d}\right)}\begin{matrix}>\\=\\<\end{matrix}1 \text{ as } F^d\begin{matrix}<\\=\\>\end{matrix}1\ . \qquad (13)$$

For linear downstream demand:

$$\frac{\partial p^d}{\partial p^u} = \frac{1}{1+\gamma^d} \leq 1 \qquad (14)$$

Profit effects:

$$\frac{\partial \pi^d}{\partial p^u} = g_{p^d}\frac{\partial p^d}{\partial p^u} + g_{p^u} = \frac{-X\gamma\left[1 - \frac{1}{\eta^d} + \frac{F^d}{\eta^d}\right]}{1 - \frac{\gamma^d}{\eta^d} + \frac{F^d\gamma^d}{\eta^d}} < 0 \qquad (15)$$

iff $F^d > 1 - \eta^d$ **, where for linear downstream demand:**

$$\frac{\partial \pi^d}{\partial p^u} = \frac{-2\gamma^d X}{1+\gamma^d} < 0 \qquad (16)$$

Numerical Simulation (Sexton *et al*., 2003; 2006)

- Key market power parameters are γ^u, γ^d, λ^u, and λ^d – as these lie in range 0 to 1, simulate over entire unit interval

- Consider equal departures from competition, e.g., in case of successive oligopsony and downstream oligopoly, $\lambda^u = \lambda^d = \gamma^d$

- Farm share of revenue under no tariff competitive equilibrium set at f = 0.5 – when f is small, diminishes impact of oligopsony

- Per-unit tariff at competitive equilibrium set at T=0.2

- Price elasticity of farm supply and downstream demand evaluated at no-tariff competitive equilibrium, $\varepsilon^a = \eta^d = 1$

Figure 2: Change in Export Price from Trade Liberalization

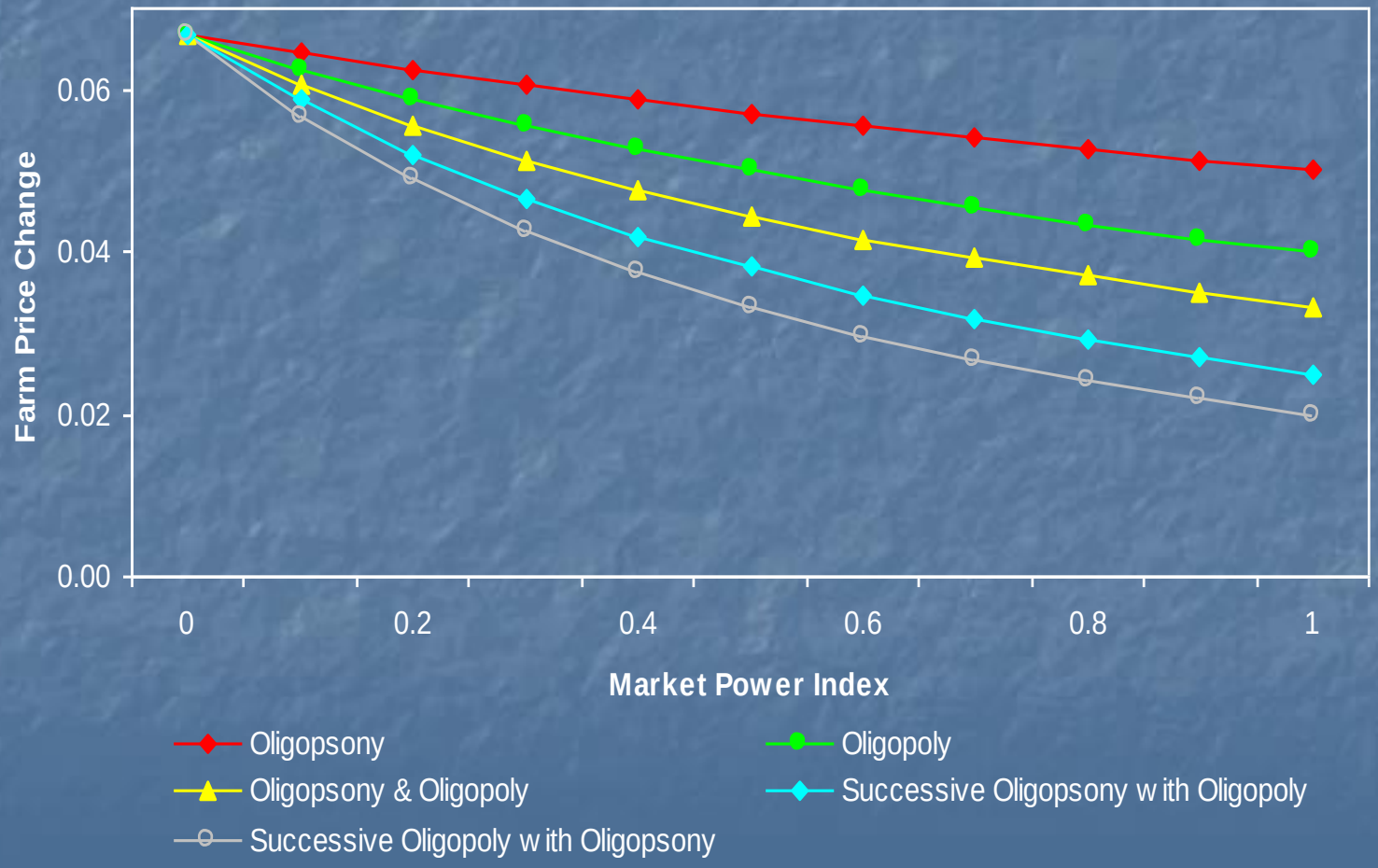


Figure 3: Change in Producer Surplus from Trade Liberalization

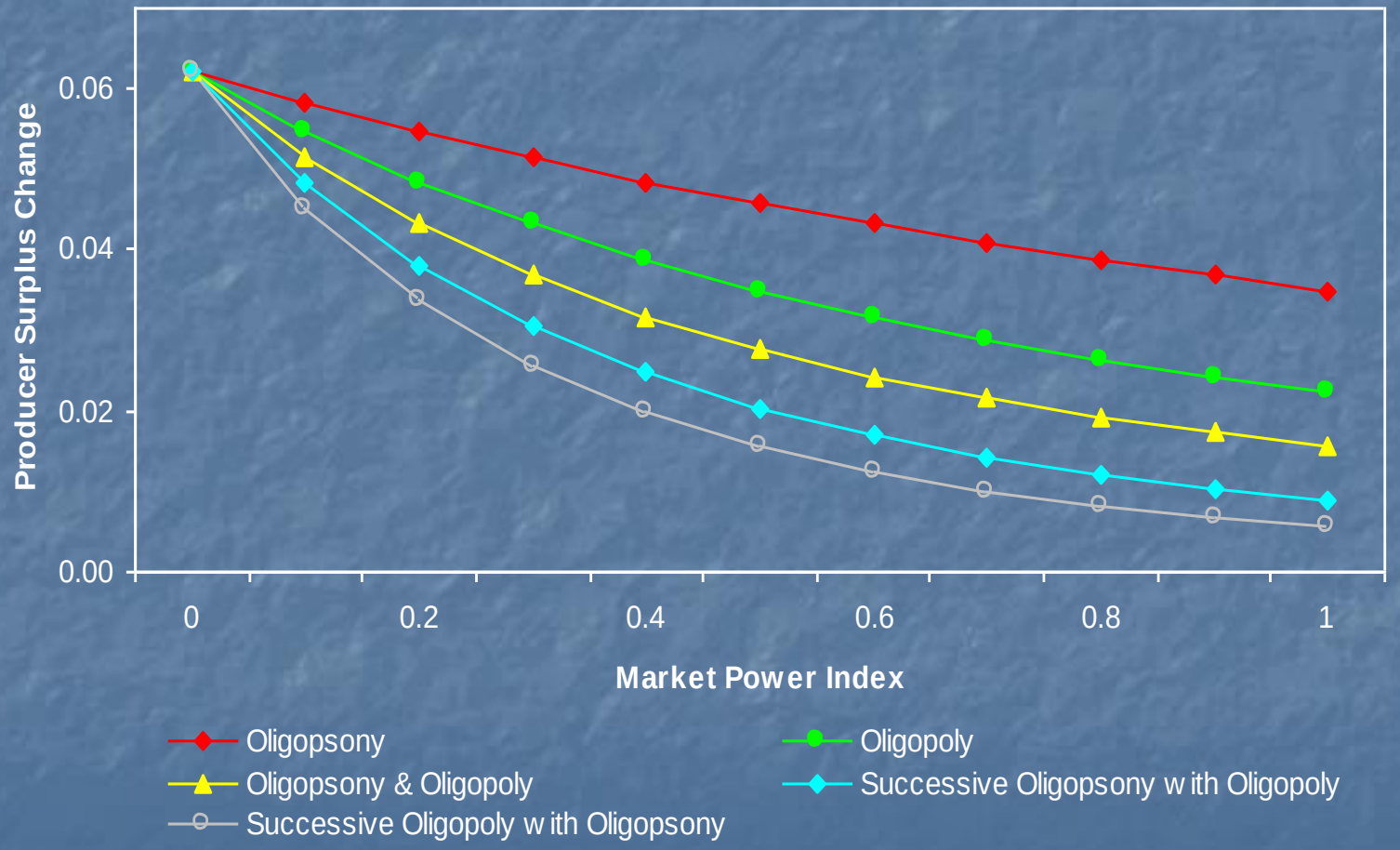


Figure 4: Change in Producer Surplus, Consumer Surplus and Marketers' Profits from Trade Liberalization for the Case of Processor Oligopsony and Retail Oligopoly

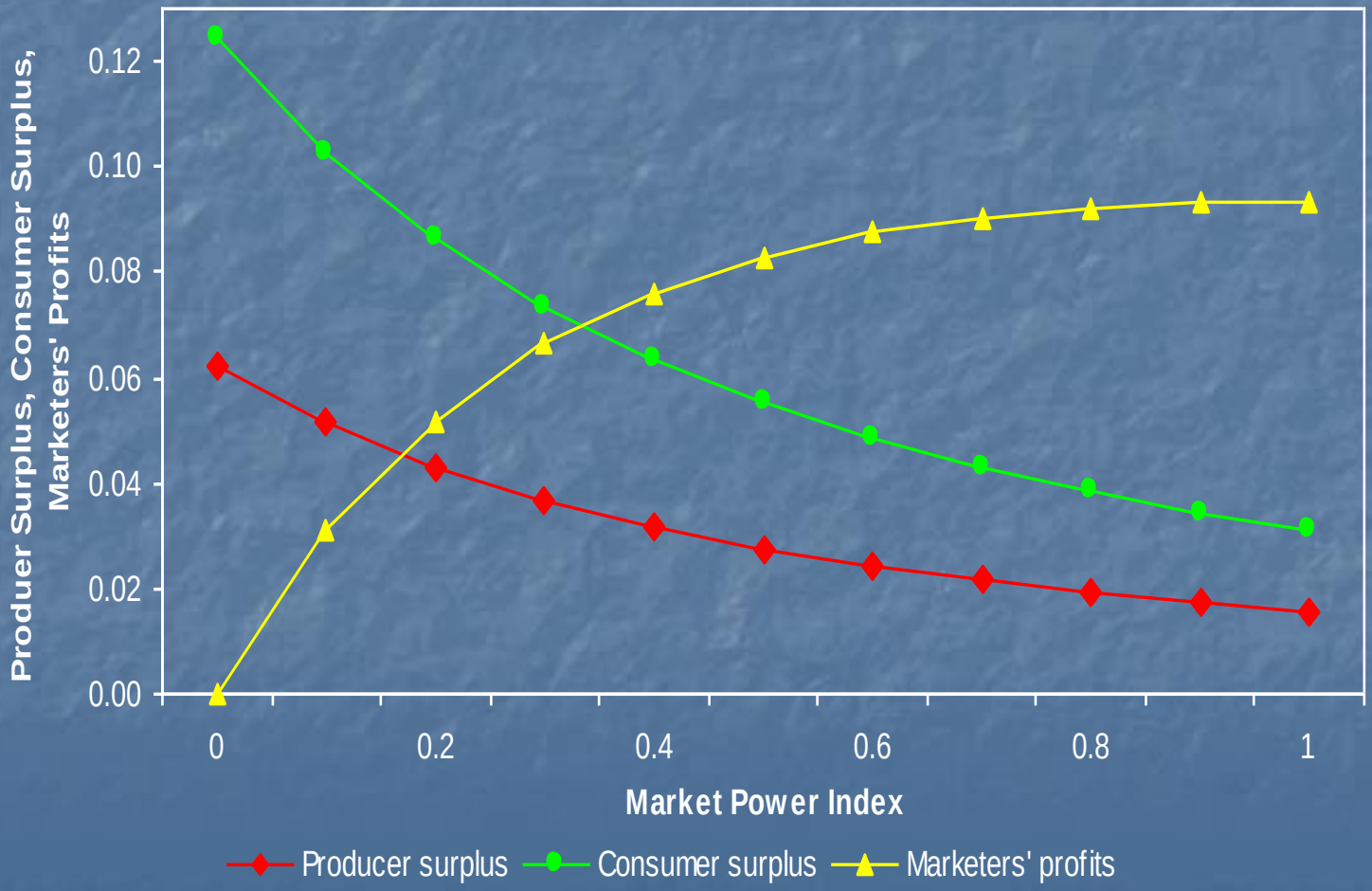
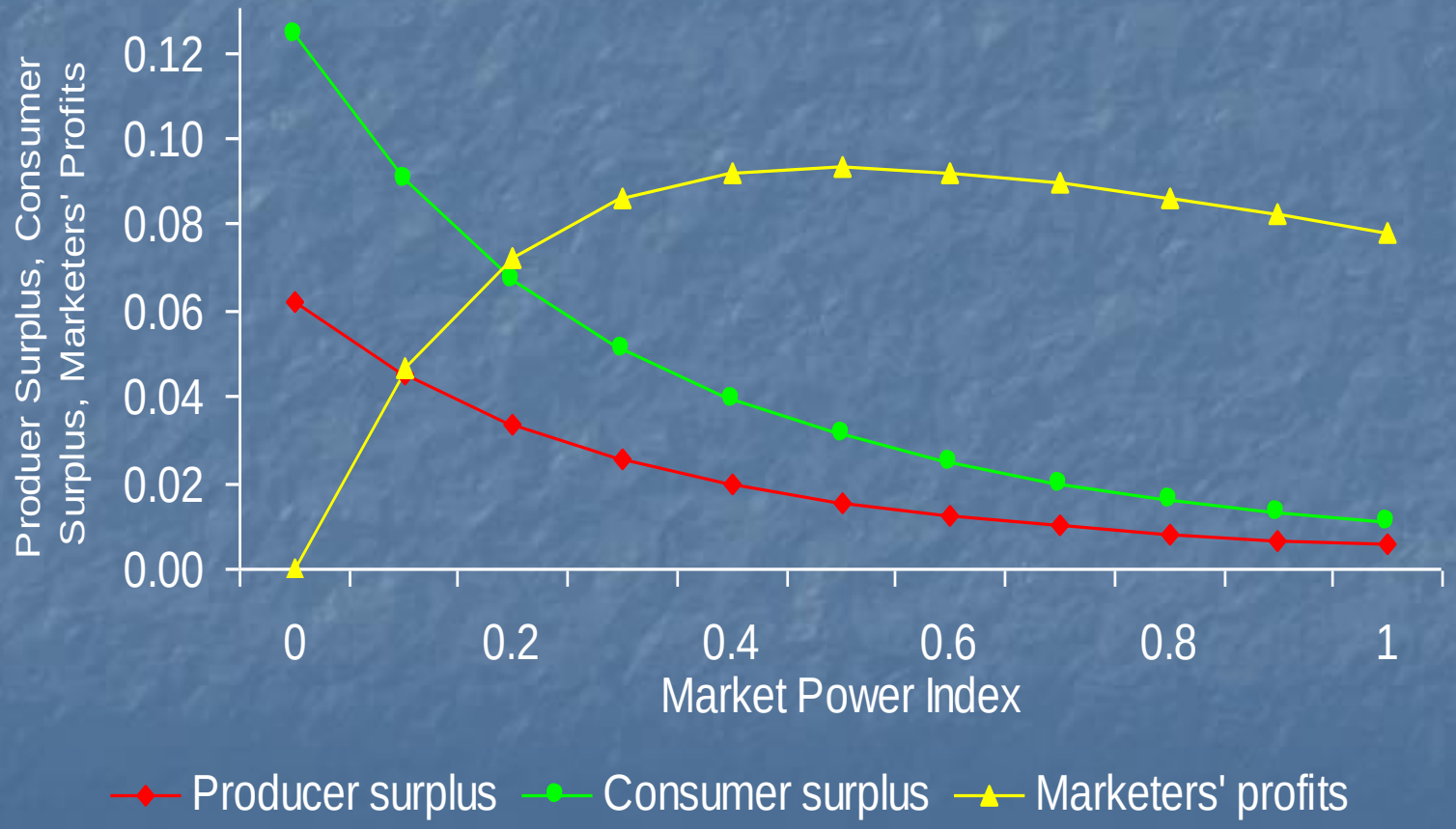


Figure 5: Change in Producer Surplus, Consumer Surplus and Marketers' Profits from Trade Liberalization for the Case of Successive Oligopoly with Processor Oligopsony



Summary and Conclusions

- Structure of food marketing system in DCs may matter for who gains from trade liberalization
- Results sensitive to assumptions about downstream technology and convexity of commodity supply function
- It is one thing to show imperfect competition can affect pass-through, another to infer imperfect competition from econometric analysis of price transmission