

Dynamics of Price Transmission and Market Power in the Turkish Beef Sector

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Overview

- Impact of low milk prices and liquidation of dairy herds
- Retailers' oligopolistic behavior
- Price transmission can be asymmetric when the speed or magnitude of price adjustment across vertically linked markets is different
- Market concentration and imperfect competition can be the cause of asymmetric price transmission
- What can we learn from this empirical study?
- Price transmission is asymmetric and price margins widen
- A differential impact on producers and retailers along the supply chain, consistent with imperfect competition
- Retail beef price behavior is consistent with the presence of oligopolistic market structure
- Consolidation and dominance of downstream industries has raised public concerns
- Results have policy implications



Background

- Beef prices increased significantly in Turkey
- Two strands of thought among the press and policy makers to explain the beef price spikes:
 - One references the low milk prices leading to liquidation of dairy cows back in 2007-2008
 - Excessive liquidation of more than 400,000 dairy animals (Akman, 2010)
 - Dairy animals were slaughtered by almost twice the annual average in 2007 (Turkish Statistical Institute)
 - The other, role of concentration and market power at the retail level. Big retailers increased their market shares:
 - The share of national chains increased from 31 percent to 51 percent between 2005 and 2011,
 - concentration ratio for the eight largest firms increased from 9 to 15 (Erdoğan *et al.*, 2012)



Literature

An extensive literature has addressed vertical price transmission and market power:

- ❏ Falkowski (2010), Lloyd, *et al.* (2009),
- ❏ Frey and Manera (2007), Saghaian, *et al.* (2007 a & b)
- ❏ Bakucs and Ferto (2005),
- ❏ Meyer and von Cramon-Taubadel (2004),
- ❏ Conforti (2004), Weldegebriel (2004), Jumah (2004),
- ❏ Luoma, *et al.* (2004), Lloyd, *et al.* (2003),
- ❏ Wohlgenant (2001), Goodwin and Harper (2000),
- ❏ Dawson and Tiffin (2000), Goodwin and Holt (1999),
- ❏ Kinnucan and Forker (1987)
- ❏ Ward (1982), Heien (1980), Gardner (1975)



Literature cont.

- Much of the literature has been directed toward *asymmetric*
- Adjustments
- Seems especially important in meat and livestock markets
- Why such concern? (What does *asymmetric adjustment* mean?)
 - Conventional wisdom: "big processors pass on price increases but not price decreases."
 - Pelzman (2000) \. . . consumers suspect prices they pay promptly reflect increases but tend to not reflect price decreases."
 - Ward (1982), Blinder (1994) and Blinder et al. (1998) argue the opposite, that competition may make sellers hesitant to raise prices, but not to lower them.
 - Bailey and Brorsen (1989) note may reflect asymmetries in underlying costs of adjustment
 - Kinnucan and Forker (1987) note government intervention effects



Asymmetric Price Transmission

- Price transmission can be asymmetric when the speed or magnitude of price adjustment across vertically linked markets is different
 - Price asymmetry can exist with respect to magnitude or speed, or a combination of the two
 - In the case of magnitude, long-run elasticities of price transmission differ depending on the direction of the initial price change
 - In the case of speed, short-term elasticities are different
- Market concentration and imperfect competition can be the cause of asymmetric price transmission
- APT affects price spreads between retail and producer levels and is an indication of inefficiency and imperfect competition along the supply chain
- Analysis of price transmission could explain why consumers paid significantly higher prices



Efficiency and Imperfect Competition

- The analysis of vertical price relationships is a useful tool in evaluating the degree of competition and the efficiency and equity of the marketing system in agricultural markets
- In an efficient market condition prices are transmitted fully and completely
- The fact that price dynamics may differ under competitive and noncompetitive market conditions can lead to market inefficiency
- Market power could cause the margin between retail and farm prices to widen



Econometric Methods

Time-Series Analyses

-  Co-integration

-  Multivariate Vector Error Correction (VEC) Model

-  A Test of Market Power and Imperfect Competition



Vector Error Correction Model

- The VEC model analysis of dynamic adjustments provides a precise measure of short-run speeds of adjustment for the price series
- They indicate how quickly the system returns to its long-run equilibrium after a temporary shock or depart from it
- The VEC model preserves the long-run relationships among the variables



Co-integration

- Co-integration is used as a tool to evaluate market efficiency
- Can analyze both perfect and imperfect market conditions
- Co-integration of prices in distinct markets is an indication of price transmission and market integration
- Its convergence property is consistent with the hypothesis that arbitrage binds prices into a long-run relationship
- It is now commonplace to test the extent of price transmission through the supply chain by co-integration techniques



Theoretical Market Power Test :

$$P_R = P_F + M \text{ or } M = P_R - P_F$$

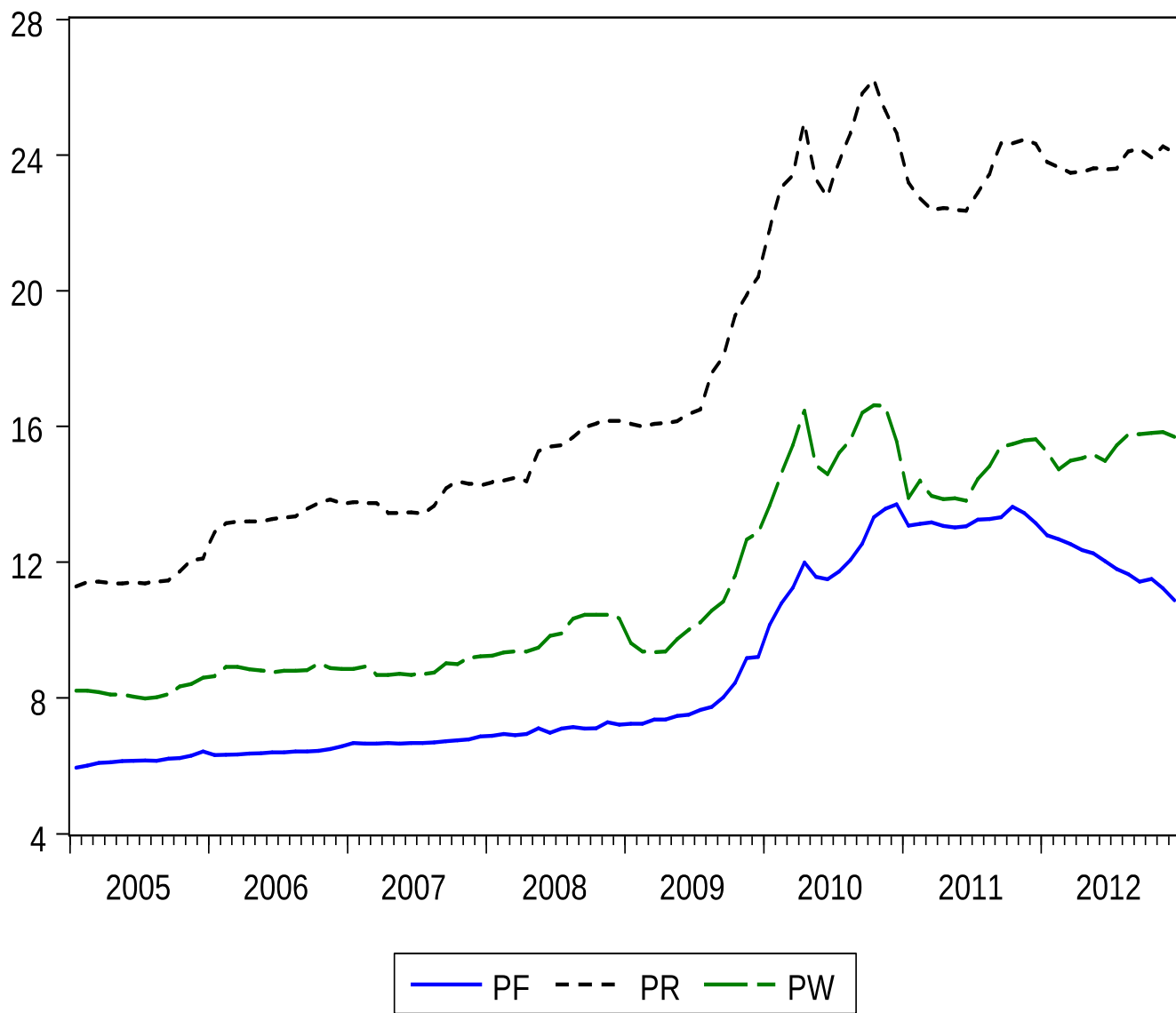
$$P_R = g_0 + g_1 P_F + g_2 M + g_3 D + g_4 S,$$



Data

- Monthly time series farm, wholesale, and retail beef prices from Turkish Statistical Institute for the 2005:01-2012:12 time-period
- All prices in Turkish Lira per kilogram
- Consumer food price index proxy for demand shifter
- Index of gross wages in meat-processing sector proxy for MC
- Feed costs proxy for supply shifter





Results

- Three co-integrated vectors
- The speed of adjustment of wholesale prices is higher than retail
- Wholesale prices more flexible than retail prices
- An indication of APT
- Price margins widen
- Distorts distribution of income
- Marketing system inefficient



Results, cont.

- All coefficients statistically significant
- All have correct signs, consistent with theoretical predictions
- Coefficients of demand and supply shifters both statistically significant
- Null hypothesis of perfect competition is rejected
- Demand shifter shifts the demand curve to the right
- Supply shifter shifts the supply curve to the left
- Consequently the margins widen
- Consistent with the price transmission results



Conclusions

- Differential speeds of adjustment
- Imperfect price transmission at the retail level
- Imperfect competition: Concentration and market power
- Policy goals: Support producers
- Provide a sustainable supply of red meats in the country
- Important to consumers
- Affordable dairy and beef products that take a sizable share of their consumption budget
- Strategic policy actions to better manage beef and milk operations
- Construct appropriate oversight institutions
- Increase the efficiency of operations
- Provide assurances to consumers of a sustainable stream of beef supply

