
Markups and export pricing

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Background and motivation

- Recent empirical research has recognized large variations in firms' export prices (f.o.b.) even in very narrowly defined product categories.
- Variations not only observed across firms but also within a single firm exporting to different destinations.
 - E.g., Görg, Halpern and Muraközy, 2010, show that Hungarian exporters charge 25-30 percent more for the same product in the U.S than in Germany.
- Why should a single firm charge different price for the same product on different markets?



Background and motivation (cont.)

- Research in international trade tends to emphasize quality differences as an explanation to export-price variations.
 - Empirical research identified quality differences by variations in price (e.g., to distinguish between vertical and horizontal intra-industry trade).
- Explanations in heterogeneous-firm setting:
 - More productive firms produce higher-quality goods and can, consequently, charge higher prices (Kugler and Verhoogen, 2008, Hallak and Sidavasan, 2009).
- Relevance of quality differences for variations in export prices *within* the firm appears uncertain.
 - Scale economies
 - Reputation / Trade marks literature (Economides, 1988)



Background and motivation (cont.)

- In the IO literature price variation within single-product lines primarily explained by price discrimination across segmented markets.
- Empirical evidence of the importance of price discriminating behavior.
 - E.g., Fabiani et al (2005) suggests that more than 80 percent of firms in the Euro area apply price-discriminating strategies.
 - The law of one price rejected in a large number of studies, suggesting arbitrage cost and segmented markets



Price discrimination in international trade

- Spatial price discrimination and segmented markets following Hoover (1937).
 - Reciprocal dumping models (Brander, 1981, Brander and Krugman, 1983).
 - Studies of “pricing-to-market”
- Variations in markups in heterogeneous firm models:
 - Melitz and Ottaviano (2008).
 - Model where markups vary across firms and export destinations.
 - Firms with lower cost levels charge lower prices and have higher markups.
 - Bernard, Eaton, Jensen and Kortum (2003)
 - Firm’s markup and price will be higher on markets where it can exert more market power.



Price discrimination in international trade (cont.)

- De Loecker and Warzynski (forthcoming) provides an empirical study of the relationship between markups and firms' export status.
 - find that exporters have higher markups, consistent with a productivity premium for exporters but higher markups not always due to costs or productivity (e.g., De Loecker, 2007)
- We focus on the heterogeneity among exporters' price-setting behavior and how the exporting pricing strategy relates to the markup.



This paper

- In particular:
 - Argue that variation in a firm's export prices reflect price-discriminating behavior across export destinations.
 - Examine how the export-price strategy is correlated with firm markups across sectors with different distribution networks.
 - Method: perform a markup-estimation and investigate how the ability to set local prices relates to firms' markups across sectors.



Related studies of within-firm export-price variations

- Focus on spatial pattern of export prices
 - Exporting firms set higher prices at more distant markets (due to higher markups and/or upgraded quality).

E.g.:

- Manova and Zhang (2009)
 - Firms that export more and to more markets have higher export prices and display larger price variations. Interpret this as quality-to-market.
- Görg, Halpern and Muraközy (2010)
 - Argue that export price variation could be explained by exporting firms adding transport costs to f.o.b. prices



Markup and the empirical model

- Can estimate markups from production data.
- We calculate markups using firm-level data by considering a general model consistent with an imperfectly competitive market structure (Hall, 1988, Levinsohn, 1993, and Harrison, 1994).
- Method based on the insight that cost shares of factors of production are equal to their revenue share only if markets are perfectly competitive. If imperfect competition, markup drives a wedge between revenue and cost shares.
- We use an extension of the work of Hall developed by Roeger (1995).
 - Need only data on nominal sales and values of input.



Markup and the empirical model (cont.)

$$\Delta Y_{it} = \mu \Delta X_{it}$$

where

$$\Delta Y_{it} = \Delta \ln(\text{sales}) - \Delta \ln(\text{value of capital})$$

$$\Delta X_{it} = \alpha_{Lit} L_{it} [\Delta \ln(\text{wage cost}) - \Delta \ln(\text{value of capital})] + \alpha_{Mit} M_{it} [\Delta \ln(\text{cost of raw materials}) - \Delta \ln(\text{value of capital})]$$

$$\alpha_{Lit} L_{it} = (\text{wage cost}) / \text{sales}$$

$$\alpha_{Mit} M_{it} = (\text{cost of raw materials}) / \text{sales}$$

and μ is the markup to be estimated



Data

- Data on firms in the Swedish food supply chain.
- Study a whole supply chain to investigate how market power and the ability to price discriminate varies across sectors and with different distribution networks.
- The food supply chain is one of the largest supply chains and is vertically integrated, making it possible to compare price setting behavior of exporters when we follow products down-stream.
 - Food and beverage accounts for about 15 percent of total expenditures (2009).
 - Swedish food chain employs 6 percent of all employees in Sweden.
 - Studies of the food supply chain emphasize the differences in market structures and firm market power across sectors and countries (McCorriston, 2002).



Data (cont.)

- Firm-level data for exporting firms in the Swedish food supply chain for the period 1997-2006 (food processing) and 2003-2006 (agriculture, wholesale and retail) provided by Statistics Sweden.
- Data set provides information on export values by product (CN8) and trading partners and the quantity traded, making it possible to calculate export unit prices (free-on-board).
 - very detailed products classification.
 - minimize the problem of comparing prices of products with different quality.

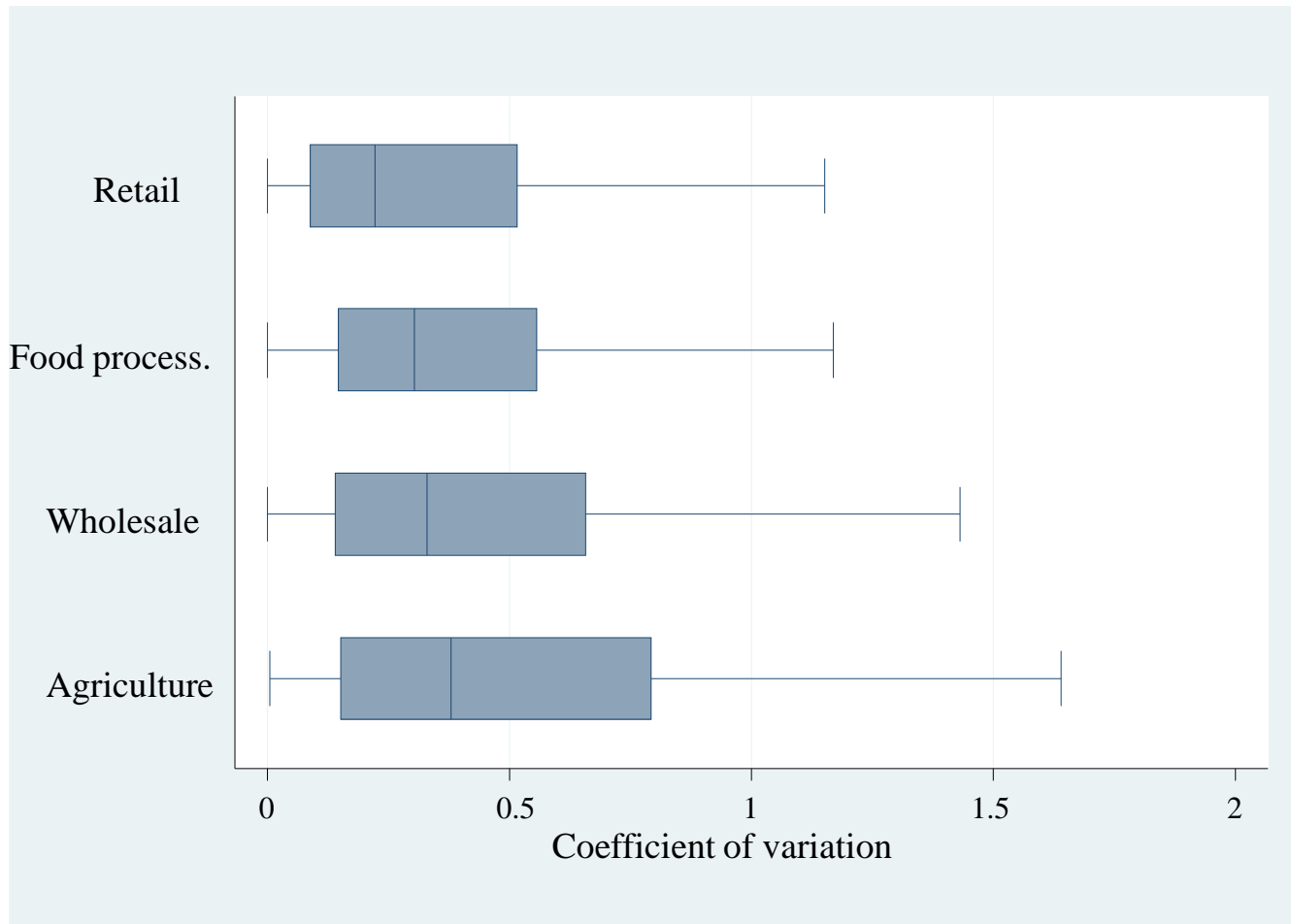


Table 1. Descriptive figures

	Agriculture		Food processing		Wholesale		Retail	
	Multi-destination	Single destination	Multi-destination	Single destination	Multi-destination	Single destination	Multi-destination	Single destination
Average number of employees	22	2.4	230	49	39.6	10	167	17
Average sales (1 000 SEK)	53 000	3 800	562 000	116 000	288 000	70 000	1 910 000	259 000
Average export value (1 000 SEK)	15 100	130	75 000	1 200	15 000	840	9 100	590
Average number of destinations	5.4	1	10	1.3	6.0	1.2	4.9	1.2
Average number of exported products	6.4	1.3	16	2.5	19	3.4	48.7	3.1
Average total factor productivity	2.4	1.9	3.2	1.3	2.0	1.8	1.0	3.6
Number of firm-product-destination observations	856	2 314	75 247	3 667	48 618	9 952	4 740	1 217
Number of firms	43	1 287	337	568	612	1 604	46	256



Figure 1. Firm-product price dispersion for multi-destination exports (2003-2006)

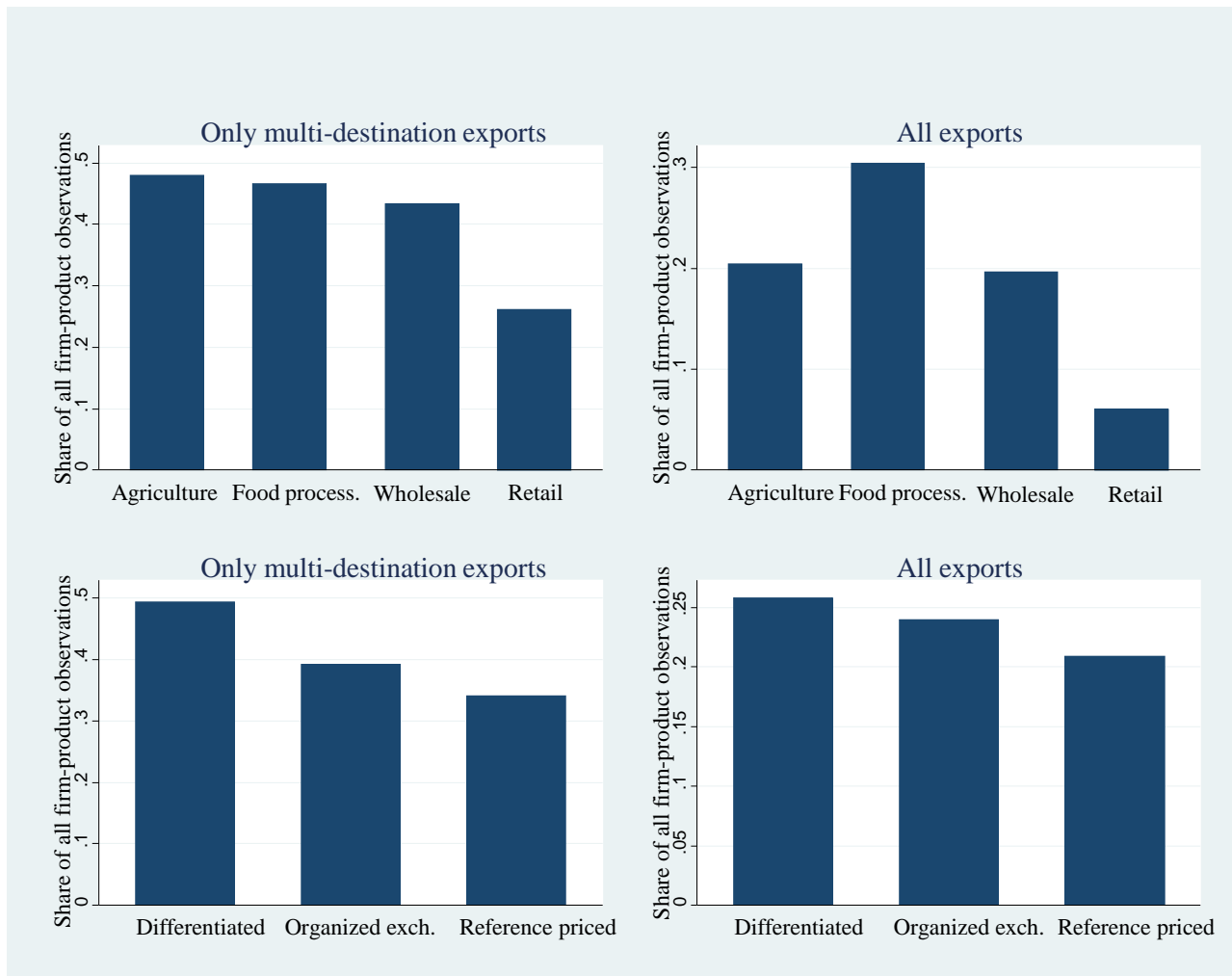


Measure of firm export-price strategy

- Local market indicator: if any firm-product-market price differs with more than 40 percent from the average firm-product price, the firm is assumed to be able to segment local markets for that particular product (use 30 and 50 as alternative thresholds).



Figure 2. Price discrimination: Share of local price setting (2003-2006)



Empirical specification

$$\Delta Y_{it} = \mu_1 \Delta X_{it} + \mu_2 [\Delta X_{it} \times PriceStrat_{ijt}] + \mu [\Delta X_{it} \times \mathbf{Z}_{i,k,t}] + \beta PriceStrat_{ijt} + \gamma \mathbf{Z}_{i,k,t} + \alpha_{ij} + \tau_t + \varepsilon_{it}$$

μ_2 = marginal change in markup from firm's product-export-price variations

μ = additional changes in markup from various control variables



Table 3. Price strategies and markup

	Agriculture		Food processing		Wholesale		Retail	
	Local market (0.50)	Local market (0.40)	Local market (0.50)	Local market (0.40)	Local market (0.50)	Local market (0.40)	Local market (0.50)	Local market (0.40)
ΔX	-0.251 (0.60)	-0.146 (0.78)	1.255 (0.00)	1.250 (0.00)	1.153 (0.00)	1.154 (0.00)	0.871 (0.00)	0.872 (0.00)
PriceStrat	0.124 (0.37)	0.087 (0.53)	-0.002 (0.00)	-0.0014 (0.00)	0.004 (0.39)	0.003 (0.51)	0.014 (0.00)	0.016 (0.00)
ΔX PriceStrat	1.708 (0.00)	1.491 (0.01)	0.074 (0.07)	0.077 (0.03)	-0.043 (0.03)	-0.038 (0.04)	0.209 (0.14)	-0.009 (0.47)
<i>Marginal effect w.r.t. ΔX</i>	<i>0.080</i>	<i>0.221</i>	<i>1.276*</i>	<i>1.275*</i>	<i>1.146*</i>	<i>1.146*</i>	<i>0.879*</i>	<i>0.871*</i>
N	97	97	8 046	8 046	6 643	6 643	963	963
R ²	0.65	0.61	0.86	0.86	0.86	0.86	0.99	0.99

Note: The regressions include firm-product fixed effects and time dummies (not shown here). P-values within brackets are based on robust standard errors.

* indicates a markup significantly different from 1.



Table 4. Price strategies and markup, extended

	Food processing		Wholesale		Retail	
	Local market (0.40)	Local market (0.40) multidest.	Local market (0.40)	Local market (0.40) multidest.	Local market (0.40)	Local market (0.40) multidest.
ΔX	1.533	1.695	1.049	1.441	-0.061	4.122
	(0.00)	(0.00)	(0.00)	(0.00)	(0.80)	(0.00)
PriceStrat	-0.002	-0.002	0.005	0.006	0.005	-0.001
	(0.37)	(0.58)	(0.28)	(0.38)	(0.01)	(0.06)
$\Delta X \times \text{PriceStrat}$	0.080	0.068	-0.005	0.005	-0.002	-0.001
	(0.04)	(0.08)	(0.78)	(0.83)	(0.42)	(0.79)
$\Delta X \times \ln(\text{export intensity})$	0.037	0.029	0.017	0.005	-0.032	1.090
	(0.00)	(0.04)	(0.00)	(0.58)	(0.48)	(0.00)
$\Delta X \times \text{number of destinations}$	-0.037	-0.055	-0.044	-0.000	-0.287	-0.000
	(0.17)	(0.11)	(0.00)	(0.99)	(0.01)	(0.99)
$\Delta X \times \ln(\text{dist})$	0.004	-0.005	-0.065	-0.084	-0.058	-0.000
	(0.82)	(0.81)	(0.00)	(0.00)	(0.36)	(0.46)
$\Delta X \times \ln \text{GDP}$	-0.014	-0.018	0.051	0.045	0.120	0.030
	(0.24)	(0.24)	(0.00)	(0.00)	(0.00)	(0.00)
<i>Marginal effect w.r.t. ΔX</i>	<i>1.276*</i>	<i>1.276*</i>	<i>1.146*</i>	<i>1.146*</i>	<i>0.871*</i>	<i>0.871*</i>
N	8 046	6 385	6 643	6 643	963	129
R ²	0.86	0.84	0.87	0.91	0.99	0.99

Note: The regressions include firm-product fixed effects and time dummies as well as direct effects of all the interacted variables (not shown here). P-values within brackets are based on robust standard errors.

* indicates a markup significantly different from 1.



Table 5. Determining export prices

	Agriculture	Food processing	Wholesale	Retail
ln(tfp)	-0.008 (0.90)	-0.009 (0.68)	-0.016 (0.58)	-0.132 (0.28)
ln (skill intensity)	-0.106 (0.34)	-0.009 (0.42)	0.062 (0.02)	0.322 (0.00)
ln(export intensity)	0.186 (0.00)	0.023 (0.01)	0.035 (0.00)	0.066 (0.17)
ln(gdp)	0.029 (0.68)	-0.006 (0.14)	-0.009 (0.06)	0.017 (0.44)
ln(gdp per capita)	0.064 (0.49)	0.062 (0.00)	0.025 (0.00)	0.144 (0.01)
ln(distance)	-0.037 (0.76)	0.066 (0.00)	-0.002 (0.89)	0.201 (0.00)
N	3161	77750	57852	5920
R ² (within)	0.030	0.008	0.002	0.047
Rho	0.881	0.821	0.878	0.838

Note: The regressions include firm-product fixed effects and time dummies (not showed). P-values within brackets are based on robust standard errors.



Conclusions

- This study starts from the observation that firms charge different prices on different markets.
- We argue that this may be price-discriminating behavior of exporting firms (instead of quality differences).
- Investigate if export-price variation within the firm is correlated with firm markups.
- May explain heterogeneity among exporting firms when it comes to export performance such as productivity.
- Contributes to the existing literature by offering additional information about the price-setting policy of exporting firms.



Conclusions (cont.)

- Only in the food processing industry where firms that are able to set local prices on export markets that have higher markups.
- Results consistent with findings that price discrimination more prevalent in the manufacturing sector whereas firms in the trade sectors more often choose uniform pricing strategies.
- As we study a whole supply chain, the paper also relates to the growing literature on the role of intermediaries in international trade.
- Suggests that price-setting behavior of firms in the manufacturing sector not necessarily observed in other sectors of the economy.

