

Firm-to-firm Price Rigidity within a Network

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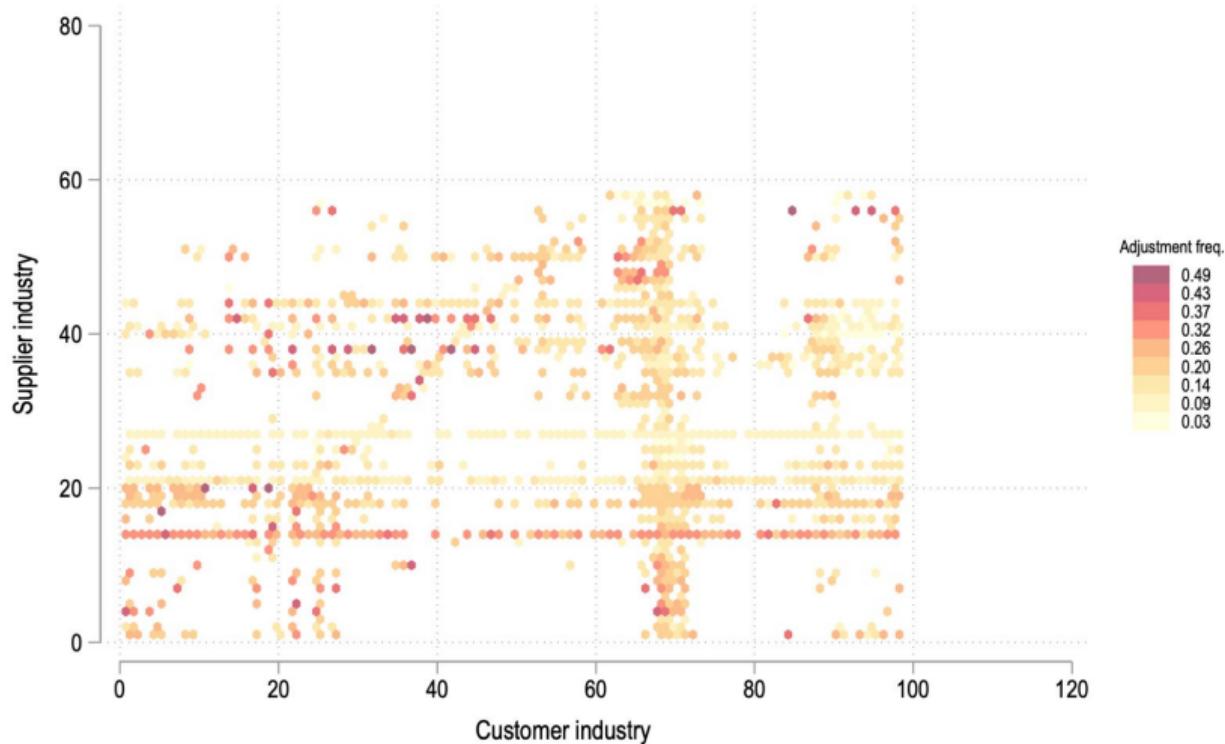
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Motivation

- Rigidity in firms' price adjustment decisions are a **crucial** element in macroeconomics
 - Key to assess the effectiveness of MP [Golosov and Lucas (2007), Alvarez et.al. (2011)]
 - At the heart of the transmission mechanisms of shocks: monetary policy, exchange rate, or commodity price. [Karadi (2023)]
- Large literature **embedding** granular data of firms' pricing decisions into macro models
 - Studying the role of strategic complementarities, menu cost, and rational inattention, [Mongey (2021), Bhattachari and Schoenle (2014), Afrouzi (2023)]
 - Sectoral heterogeneity in price stickiness → **amplify** monetary non-neutrality, [Nakamura and Steinsson (2010), Pasten et al (2020)]
- However, firms adjust prices heterogeneously to different customers (e.g., bargaining power/contracts) even **within** narrowly defined industries.
 - Market and network structure **are not orthogonal** to firm/sector level price stickiness

Sectoral frequency of price change f_{IJ} (2018.1-2023.6)



f_{IJ} : monthly frequency of price IJ changes ($> 0.5\%$) for all IJ transactions (average across goods)

This paper

- We study the **nature of price rigidity** through the lens of supplier-client relationships
 - Document firm-to-firms specific characteristics that affect the extensive and intensive margin of price adjustments while controlling for industry and product characteristics.
 - Rely on detailed and granular administrative data on the universe of firm-to-firm transactions in Chile
 - Through our findings, we can assess the importance of
 - # products, size of supplier, size of clients, # clients, age of the relationship, market structure, and network structure in **jointly determining** firm-to-firm stickiness
 - Relevant to understand the implications for the transmission of monetary policy shocks in economies with different market and network structures.

Takeaways

- Controlling for industry characteristics, larger firms are key to understand the potential propagation of shocks:
 - ① Bigger firms adjust prices more often and in smaller magnitude to their clients
 - ② Assortativeness: most firm-to-firm pairs involve a large supplier matched to a large client
 - ③ Network position: Large firms are key suppliers to all parts of the size distribution
- Firms with higher product-level market share adjust more frequently and in higher magnitude. This is more prevalent during high-inflation episodes
- Bigger customers experience more frequent price adjustments from sellers, but of a lower magnitude. More prevalent during high-inflation episodes
- Non-pricing factors, such as the length of the relationship between the two parties, reduce the probability of price revisions.
 - Possible presence of contracts which stipulates prices.

Related literature

① Micro origins of price stickiness

- Bils and Klenow (2004), Nakamura and Steinsson (2008), Goldberg and Hellerstein (2011), Bhattara and Schoenle (2014), Midrigan, (2011); Eichenbaum, Jaimovich, and Rebelo, (2011); Alvarez and Lippi (2014), Turen (2023), Afrouzi (2023)

Contribution: using new data, we confirm previous results but document the relevance of market structure and network structure

② Monetary non-neutrality in multisector models with sticky prices

- Nakamura and Steinsson (2010), Pasten et al. (2020), Rubbo (2023), Alvarez and Lippi (2014), Blanco et al. (2022), Mongey (2022), Minton and Wheaton (2023)

Contribution: our results point to jointly consider market-network structure and price stickiness in assessing MP transmission or inflationary consequences of shocks

The data

The data

- Universe of **firm-to-firm** transactions (daily frequency) in Chile, 2018-2023.
- Cleaned using machine learning techniques to identify prices at the **variety** level,
[Acevedo et.al. (2022)]
- The triplet ijv , i :seller, j : buyer and v : variety
 - Varieties are restricted to be associated with products in the official CPI and PPI baskets.
 - Each variety must appear at least 24 times (for any supplier)
 - Drop change in prices ($d/\ln(p)$) for percentiles 1 and 99
- Balance Sheet information about **both** seller and client
 - Total Sales, employment, industries, input purchases

Example: Products and subclasses (INE-PPI)

Estructura	Código Estructura	Glosa IPPMan 2014=100	Pond.
SUBCLASE	21494	Mermeladas de frutas, cítricos o frutos secos; dulces de frutas de consistencia gelatinosa; purés y pastas de frutas o frutos secos	0.00784
PRODUCTO	2149401	Puré, pastas y pulpas de frutas o frutos secos	0.00613
PRODUCTO	2149402	Compotas y mermeladas de frutas o frutos secos	0.00171
SUBCLASE	22110	Leche líquida procesada	0.00956
PRODUCTO	2211000	Leche líquida procesada, sin adición de azúcar ni otro edulcorante	0.00956
SUBCLASE	24131	Destilados, licores, y otras bebidas destiladas con un grado alcohólico volumétrico de alrededor de un 40%	0.00252
PRODUCTO	2413101	Pisco y productos a base de pisco	0.00188
PRODUCTO	2413199	Aguardientes, licores y otras bebidas espirituosas	0.00064
SUBCLASE	35260	Medicamentos para usos terapéuticos o profilácticos	0.02572
PRODUCTO	3526001	Medicamentos para el sistema digestivo	0.00401
PRODUCTO	3526003	Medicamentos para el sistema cardiovascular y síndrome metabólico	0.00264
PRODUCTO	3526004	Medicamentos dermatológicos (uso tópico)	0.00158
PRODUCTO	3526005	Medicamentos para el aparato genitourinario y hormonas	0.00288
PRODUCTO	3526008	Medicamentos para el sistema musculoesquelético	0.00357
PRODUCTO	3526009	Medicamentos para el sistema nervioso	0.00615
PRODUCTO	3526010	Medicamentos para el sistema respiratorio	0.00489

Descriptive statistics: size and downstream customers

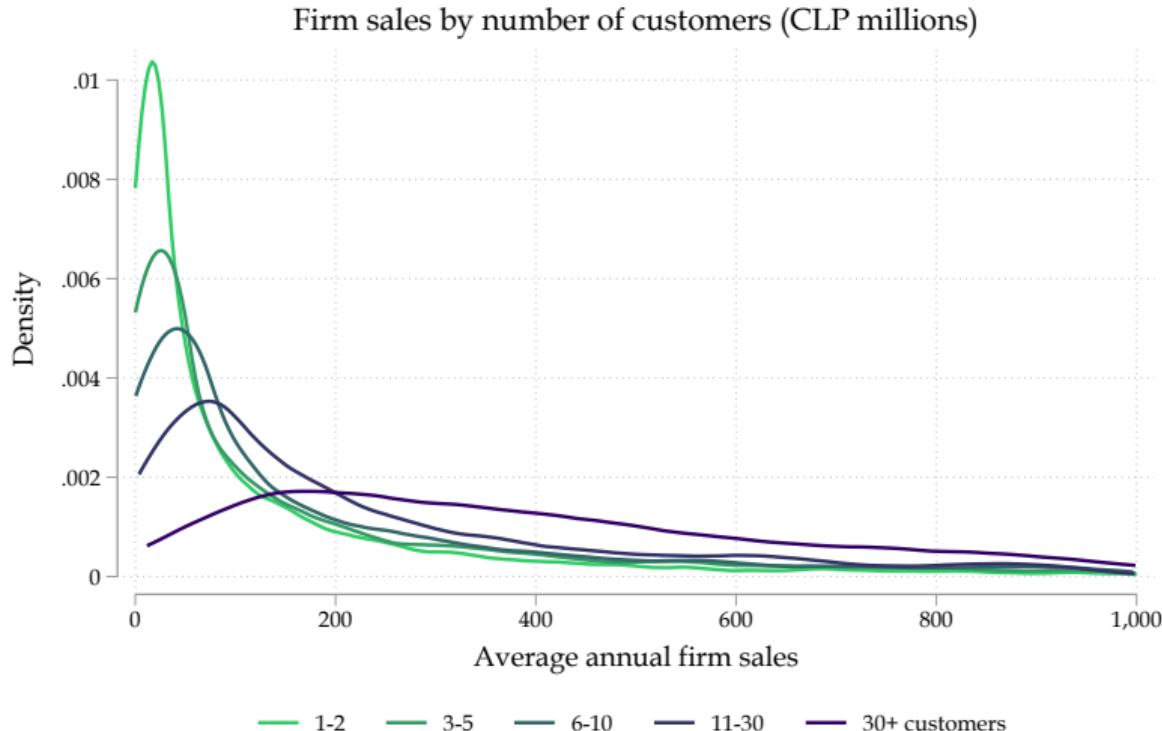
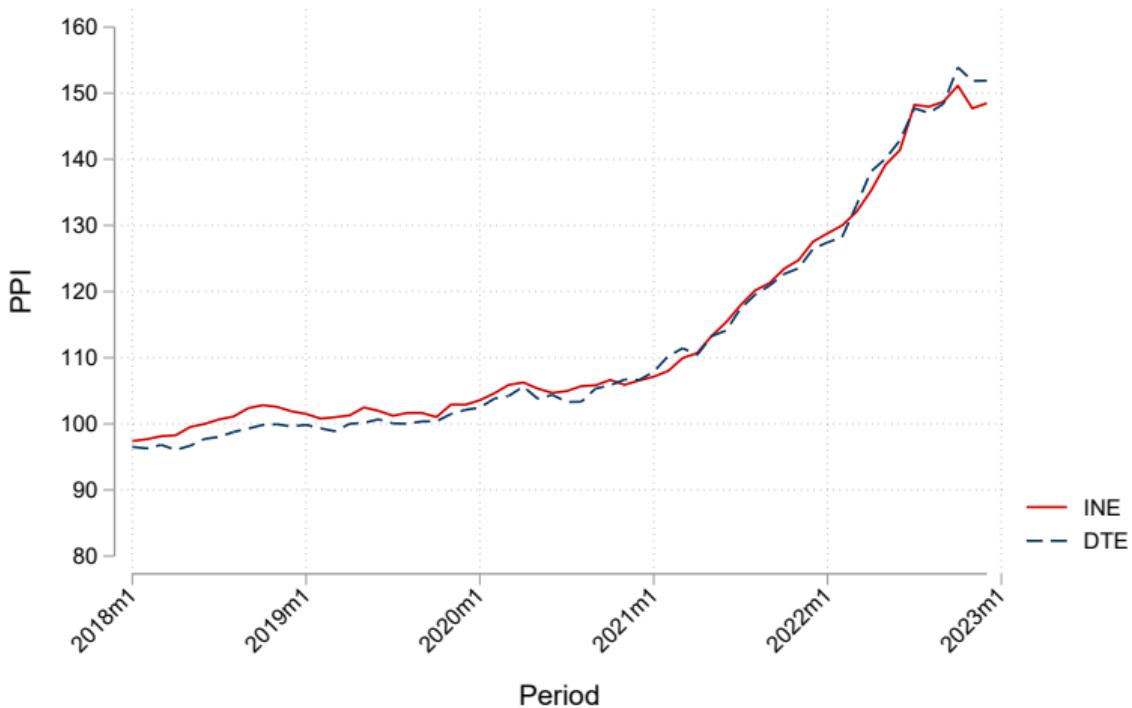


Figure: Firm sales by number of customers group (truncated at 1,000 CLP millions)

Representativeness of the data (PPI)



Note: The sum of weights is 0.97 of 100, and there are 165 of 173 products

Consistent with Acevedo et al. (2022)

[Additional validation](#)

Frequency price change

Aggregate and sectoral desc. stats.

Frequency of price adjustment at supplier-client-variety level f_{ijv}

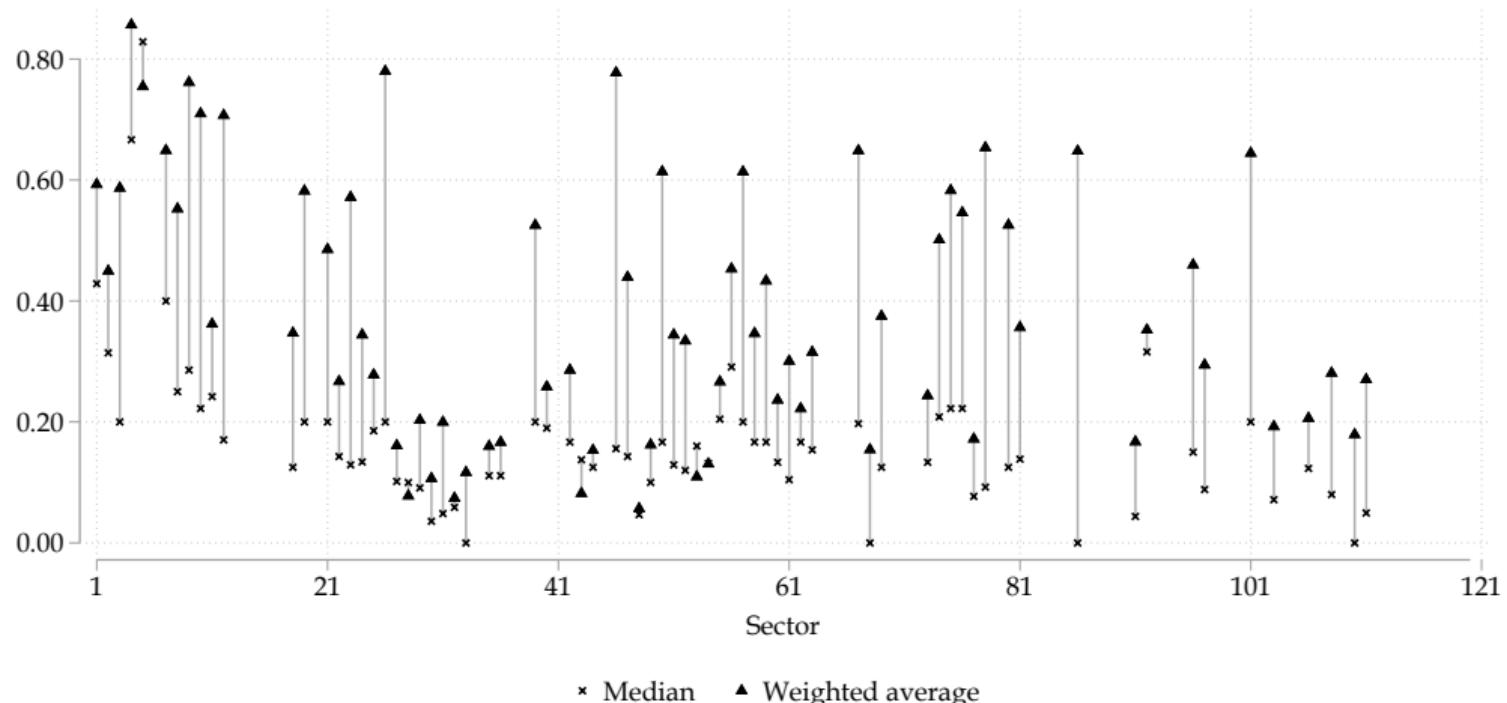
Table: Frequency price change at supplier-client-variety level f_{ijv}

	Mean	SD	P10	P25	P50	P75	P90	N
CPI product	0.35	0.30	0.00	0.11	0.27	0.57	0.83	12,947,624
PPI product	0.22	0.24	0.00	0.00	0.15	0.33	0.60	10,007,004
Total	0.29	0.29	0.00	0.06	0.20	0.45	0.78	22,954,628

Note: We obtain f_{ijv} as follows $f_{ijv} = \frac{\sum_{t=1}^{T_{ijv}} \mathbf{1}(\Delta \log P_{ijvt} > 0.005)}{T_{ijv}}$

- Average PPI price duration is 4 months, while CPI prices last on average 2.3 months.
- Note the skewed distribution. The median durations are 6.15 months and 3.17 months for PPI and CPI prices, respectively.

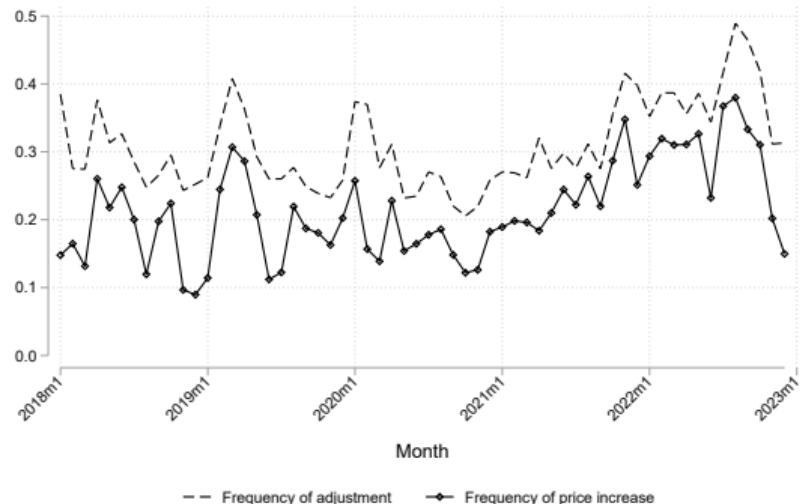
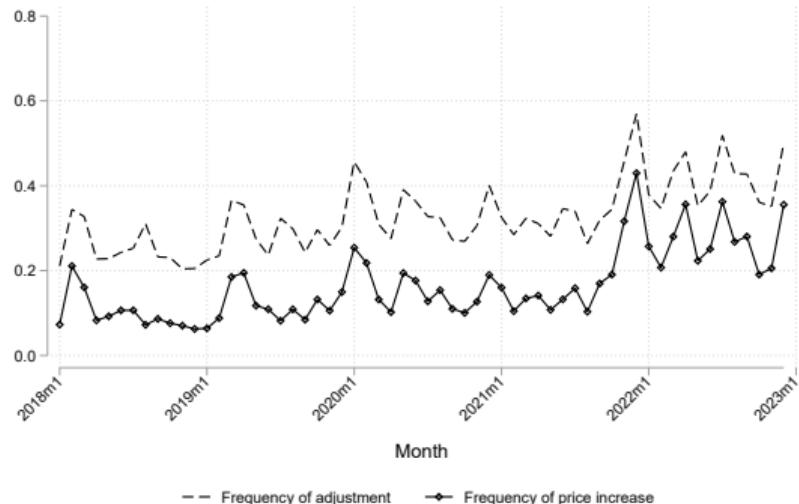
Sectoral stickiness: median vs mean



- Significant price stickiness heterogeneity across sectors
- Consistent with evidence from the US, [Nakamura and Steinsson (2010)]

Evolution frequency price change: PPI and CPI

Figure: Frequency of price change PPI (left) and CPI (right)

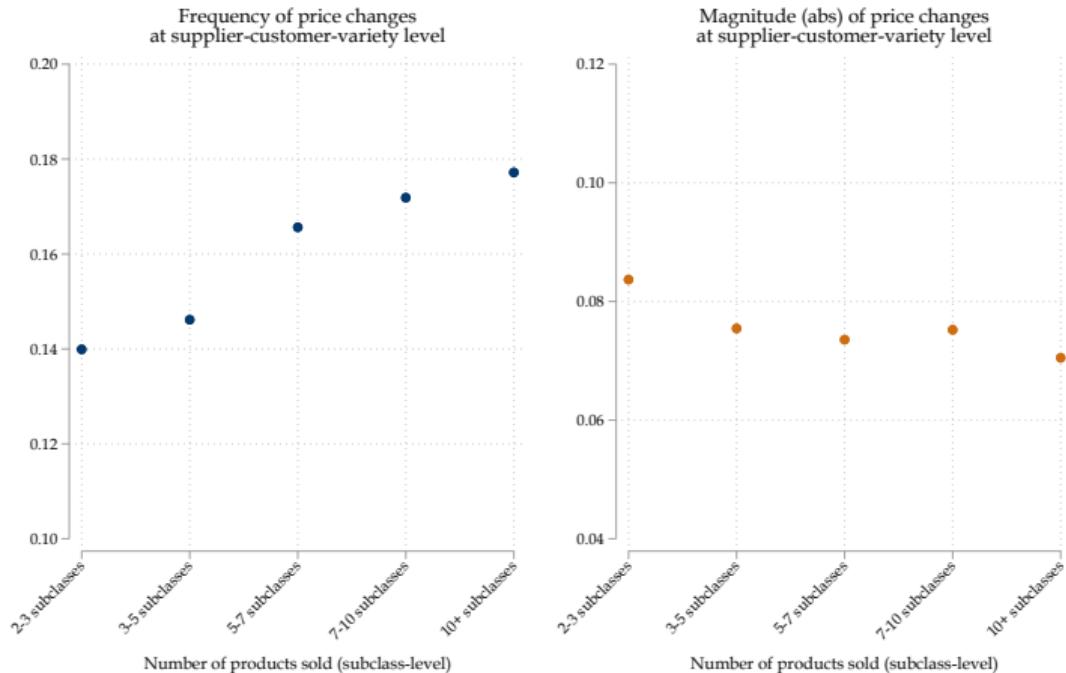


Price duration significantly declined during COVID-19 reaching an age of 1.2-1.5 months. Driven by a rise in the frequency of price increases (Blanco et al., 2022)

Frequency/magnitude price change

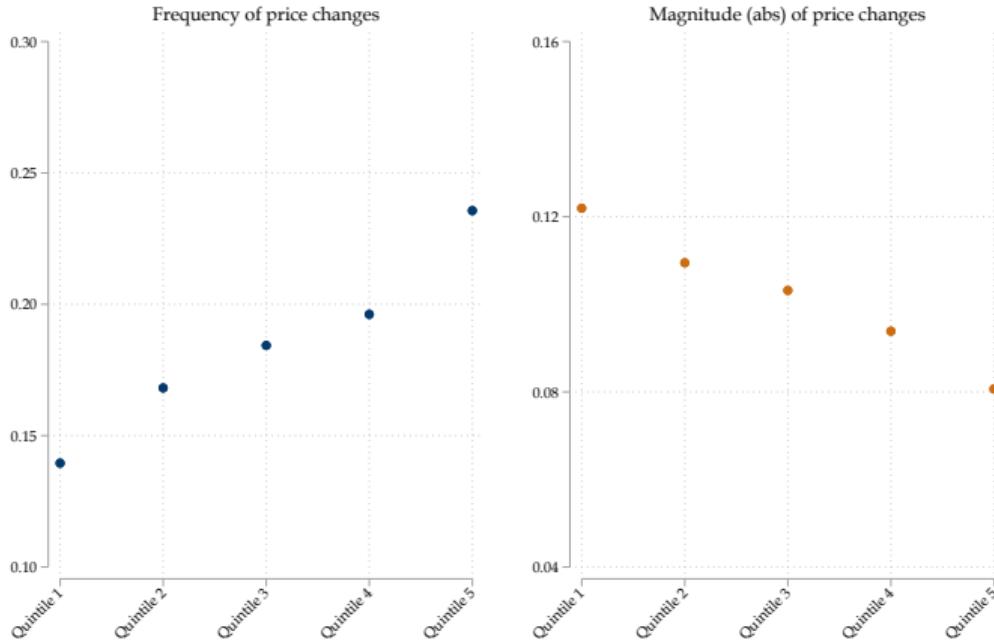
supplier-client-product(s) characteristics

Frequency/magnitude price adj. and # of products sold



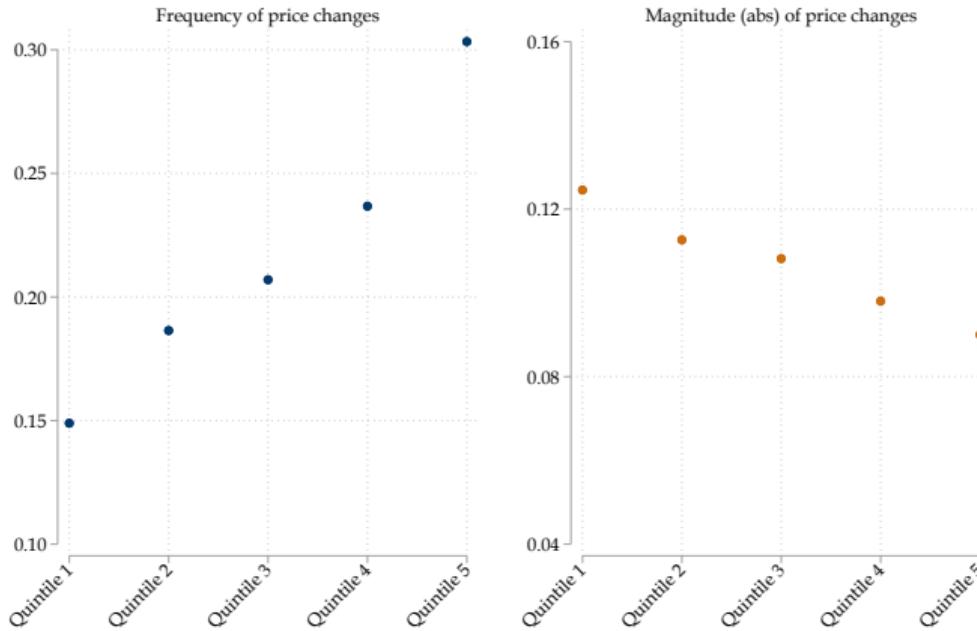
As in Bhattacharjee and Schoenle (2014): multiproduct firms adjust more frequently and in less magnitude (economies of scope in menu costs)

Frequency/magnitude price adj. and total sales



- As in Goldberg and Hellerstein (2011) large firms adjust more frequently and in smaller magnitude (e.g., returns to scale in price setting or better information; Zbaracki et al., 2004)
- Similar when considering industry/product market share

Frequency/magnitude price adj. and sales (one-product firms)



Size matters beyond its association to multiproduct firms

Multivariate regression analysis

cross-sectional

Cross-sectional regression

We assess the empirical relationship between firm-to-firm frequency/magnitude of price adjustment

$$y_{ijs} = \alpha \cdot \mathbf{X}_i + \beta \cdot \mathbf{Y}_j + \gamma \cdot \mathbf{Z}_{ij} + \epsilon_{ijs}$$

where y_{ijs} is *i*) the average frequency of price change of supplier i to client j in the subclass s , or *ii*) the average log change in the price of supplier i to client j in the subclass s

the vectors $\mathbf{X}, \mathbf{Y}, \mathbf{Z}$ contain supplier, client, and supplier-client characteristics, respectively.

Regression results: frequency price adjustment

	(1)	(2)	(3)	(4)
Supplier size: quintile 2	0.001 (0.002)	0.003* (0.002)	-0.000 (0.001)	0.002 (0.001)
Supplier size: quintile 3	0.007*** (0.001)	0.014*** (0.001)	0.013*** (0.001)	0.021*** (0.001)
Supplier size: quintile 4	0.023*** (0.001)	0.034*** (0.001)	0.022*** (0.001)	0.035*** (0.001)
Supplier size: quintile 5	0.015*** (0.001)	0.034*** (0.001)	0.020*** (0.001)	0.041*** (0.001)
Supplier size: top 5%	0.033*** (0.000)	0.036*** (0.000)	0.033*** (0.000)	0.039*** (0.000)
Ln relationship duration	-0.013*** (0.000)	-0.015*** (0.000)	-0.014*** (0.000)	-0.015*** (0.000)
Ln of # customers js of i		-0.007*** (0.000)		-0.008*** (0.000)
Ln of # suppliers is of j		0.002*** (0.000)		0.006*** (0.000)
Supplier subclass share		0.157*** (0.001)		0.163*** (0.001)
Constant	0.143*** (0.002)	0.171*** (0.002)	0.136*** (0.002)	0.162*** (0.002)
N	2,386,022	2,386,022	2,386,018	2,386,018
Adjusted R2	0.301	0.312	0.368	0.376
Supplier Industry FE	✓	✓	✓	✓
Customer Industry FE	✓	✓	✓	✓
Subclass FE			✓	✓

Regression results: magnitude price adjustment

	(1)	(2)	(3)	(4)
Supplier size: quintile 2	0.001* (0.001)	0.002*** (0.001)	0.000 (0.001)	0.001** (0.001)
Supplier size: quintile 3	0.001 (0.001)	0.003*** (0.001)	-0.001** (0.001)	0.002*** (0.001)
Supplier size: quintile 4	-0.006*** (0.001)	-0.002*** (0.001)	-0.005*** (0.001)	-0.001* (0.001)
Supplier size: quintile 5	-0.015*** (0.000)	-0.008*** (0.000)	-0.013*** (0.000)	-0.006*** (0.000)
Supplier size: top 5%	-0.000*** (0.000)	0.005*** (0.000)	-0.000*** (0.000)	0.005*** (0.000)
Ln relationship duration	-0.004*** (0.000)	-0.004*** (0.000)	-0.004*** (0.000)	-0.004*** (0.000)
Ln of # customers js of i		-0.003*** (0.000)		-0.002*** (0.000)
Ln of # suppliers is of j		-0.001*** (0.000)		-0.000*** (0.000)
Supplier subclass share		0.029*** (0.000)		0.023*** (0.000)
Constant	0.101*** (0.001)	0.110*** (0.001)	0.099*** (0.001)	0.106*** (0.001)
N	1,817,505	1,817,505	1,817,498	1,817,498
Adjusted R2	0.101	0.110	0.135	0.139
Supplier Industry FE	✓	✓	✓	✓
Customer Industry FE	✓	✓	✓	✓
Subclass FE			✓	✓

Multivariate regression analysis

low-high inflation

Frequency price adj. low-high inflation (supplier)

	(1) All period	(2) Low inflation	(3) High inflation	(4) All period	(5) Low inflation	(6) High inflation
Supplier size: quintile 2	0.003* (0.002)	0.021*** (0.003)	0.030*** (0.003)	0.002 (0.001)	0.028*** (0.003)	0.036*** (0.003)
Supplier size: quintile 3	0.016*** (0.001)	0.028*** (0.003)	0.045*** (0.003)	0.023*** (0.001)	0.043*** (0.002)	0.053*** (0.003)
Supplier size: quintile 4	0.037*** (0.001)	0.044*** (0.002)	0.062*** (0.002)	0.038*** (0.001)	0.053*** (0.002)	0.066*** (0.002)
Supplier size: quintile 5	0.039*** (0.001)	0.047*** (0.002)	0.069*** (0.002)	0.046*** (0.001)	0.059*** (0.002)	0.078*** (0.002)
Supplier size: top 5%	0.045*** (0.000)	0.040*** (0.001)	0.036*** (0.001)	0.047*** (0.000)	0.039*** (0.001)	0.036*** (0.001)
Ln of Supplier n. of customers in subclass s	-0.011*** (0.000)	-0.009*** (0.000)	-0.014*** (0.000)	-0.011*** (0.000)	-0.008*** (0.000)	-0.013*** (0.000)
Supplier subclass share	0.158*** (0.001)	0.120*** (0.001)	0.202*** (0.001)	0.163*** (0.001)	0.117*** (0.001)	0.187*** (0.001)
Constant	0.169*** (0.001)	0.114*** (0.002)	0.145*** (0.002)	0.163*** (0.001)	0.099*** (0.002)	0.135*** (0.002)
N	2,386,029	1,162,556	1,162,556	2,386,025	1,162,550	1,162,550
Adjusted R2	0.299	0.284	0.268	0.365	0.351	0.342
Supplier Industry FE	✓	✓	✓	✓	✓	✓
Subclass FE				✓	✓	✓

Frequency price adj. low-high inflation (client)

	(1) All period	(2) Low inflation	(3) High inflation	(4) All period	(5) Low inflation	(6) High inflation
Customer size: quintile 2	0.010*** (0.001)	0.006*** (0.001)	0.008*** (0.001)	0.005*** (0.000)	0.001 (0.001)	0.005*** (0.001)
Customer size: quintile 3	0.018*** (0.001)	0.014*** (0.001)	0.021*** (0.001)	0.012*** (0.000)	0.005*** (0.001)	0.015*** (0.001)
Customer size: quintile 4	0.024*** (0.001)	0.021*** (0.001)	0.034*** (0.001)	0.018*** (0.000)	0.010*** (0.001)	0.028*** (0.001)
Customer size: quintile 5	0.026*** (0.001)	0.027*** (0.001)	0.044*** (0.001)	0.023*** (0.000)	0.016*** (0.001)	0.040*** (0.001)
Customer size: top 5%	-0.007*** (0.000)	-0.001** (0.001)	-0.001** (0.001)	-0.002*** (0.000)	0.003*** (0.000)	0.007*** (0.000)
Ln of Customer n. of suppliers in subclass s	0.021*** (0.000)	0.012*** (0.000)	0.019*** (0.000)	0.009*** (0.000)	0.007*** (0.000)	0.009*** (0.000)
Customer subclass share	0.493*** (0.015)	0.546*** (0.018)	0.521*** (0.018)	0.514*** (0.014)	0.501*** (0.016)	0.589*** (0.017)
Constant	0.142*** (0.000)	0.109*** (0.001)	0.113*** (0.001)	0.151*** (0.000)	0.120*** (0.001)	0.122*** (0.001)
N	2,386,030	1,162,556	1,162,556	2,386,026	1,162,549	1,162,549
Adjusted R2	0.026	0.023	0.034	0.301	0.314	0.317
Customer Industry FE	✓	✓	✓	✓	✓	✓
Subclass FE				✓	✓	✓

Magnitude price adj. low-high inflation (supplier)

	(1) All period	(2) Low inflation	(3) High inflation	(4) All period	(5) Low inflation	(6) High inflation
Supplier size: quintile 2	0.002*** (0.001)	-0.006*** (0.001)	-0.005*** (0.001)	0.001 (0.001)	-0.007*** (0.001)	-0.006*** (0.001)
Supplier size: quintile 3	0.003*** (0.001)	-0.012*** (0.001)	-0.005*** (0.001)	0.001** (0.001)	-0.014*** (0.001)	-0.009*** (0.001)
Supplier size: quintile 4	-0.001*** (0.001)	-0.013*** (0.001)	-0.011*** (0.001)	-0.001*** (0.001)	-0.015*** (0.001)	-0.013*** (0.001)
Supplier size: quintile 5	-0.008*** (0.000)	-0.022*** (0.001)	-0.018*** (0.001)	-0.007*** (0.000)	-0.022*** (0.001)	-0.018*** (0.001)
Supplier size: top 5%	0.005*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.005*** (0.000)	0.009*** (0.000)	0.007*** (0.000)
Ln of Supplier n. of customers in subclass s	-0.003*** (0.000)	-0.003*** (0.000)	-0.004*** (0.000)	-0.003*** (0.000)	-0.002*** (0.000)	-0.003*** (0.000)
Supplier subclass share	0.028*** (0.000)	0.023*** (0.000)	0.042*** (0.000)	0.021*** (0.000)	0.017*** (0.001)	0.029*** (0.000)
Constant	0.094*** (0.000)	0.097*** (0.001)	0.109*** (0.001)	0.091*** (0.000)	0.094*** (0.001)	0.108*** (0.001)
N	1,817,506	787,233	829,097	1,817,499	787,222	829,090
Adjusted R2	0.103	0.099	0.126	0.133	0.127	0.162
Supplier Industry FE	✓	✓	✓	✓	✓	✓
Subclass FE				✓	✓	✓

Magnitude price adj. low-high inflation (customer)

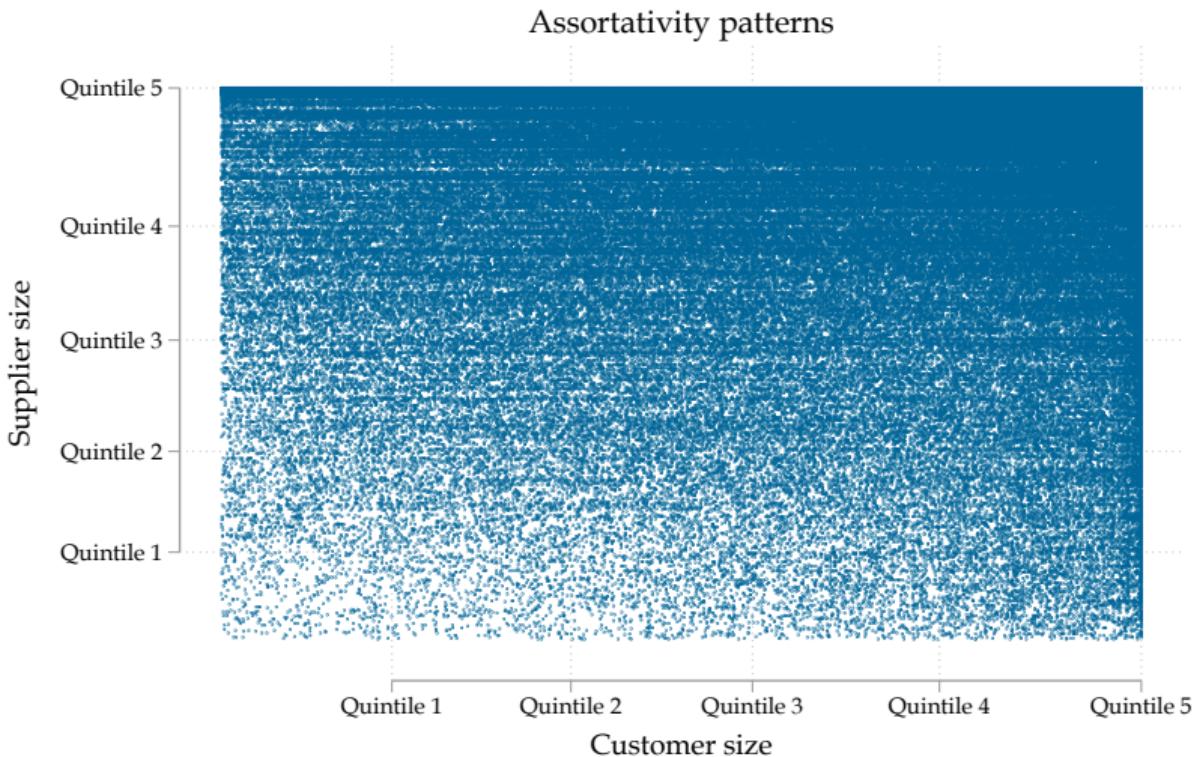
	(1) All period	(2) Low inflation	(3) High inflation	(4) All period	(5) Low inflation	(6) High inflation
Customer size: quintile 2	-0.001*** (0.000)	-0.001** (0.000)	-0.001** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.002*** (0.000)
Customer size: quintile 3	-0.000** (0.000)	-0.001*** (0.000)	-0.001* (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.003*** (0.000)
Customer size: quintile 4	-0.001*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)	-0.003*** (0.000)	-0.004*** (0.000)	-0.004*** (0.000)
Customer size: quintile 5	-0.001*** (0.000)	-0.004*** (0.000)	-0.001*** (0.000)	-0.004*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)
Customer size: top 5%	0.002*** (0.000)	0.000* (0.000)	0.003*** (0.000)	-0.000 (0.000)	-0.000** (0.000)	0.000 (0.000)
Ln of Customer n. of suppliers in subclass s	-0.002*** (0.000)	0.003*** (0.000)	-0.004*** (0.000)	0.000*** (0.000)	0.001*** (0.000)	0.000 (0.000)
Customer subclass share	-0.012*** (0.004)	-0.039*** (0.005)	-0.007 (0.005)	-0.116*** (0.004)	-0.112*** (0.006)	-0.129*** (0.005)
Constant	0.071*** (0.000)	0.062*** (0.000)	0.073*** (0.000)	0.072*** (0.000)	0.064*** (0.000)	0.074*** (0.000)
N	1,817,506	787,234	829,098	1,817,500	787,222	829,090
Adjusted R2	0.015	0.019	0.020	0.106	0.114	0.134
Customer Industry FE	✓	✓	✓	✓	✓	✓
Subclass FE				✓	✓	✓

Economic relevance of coefficients

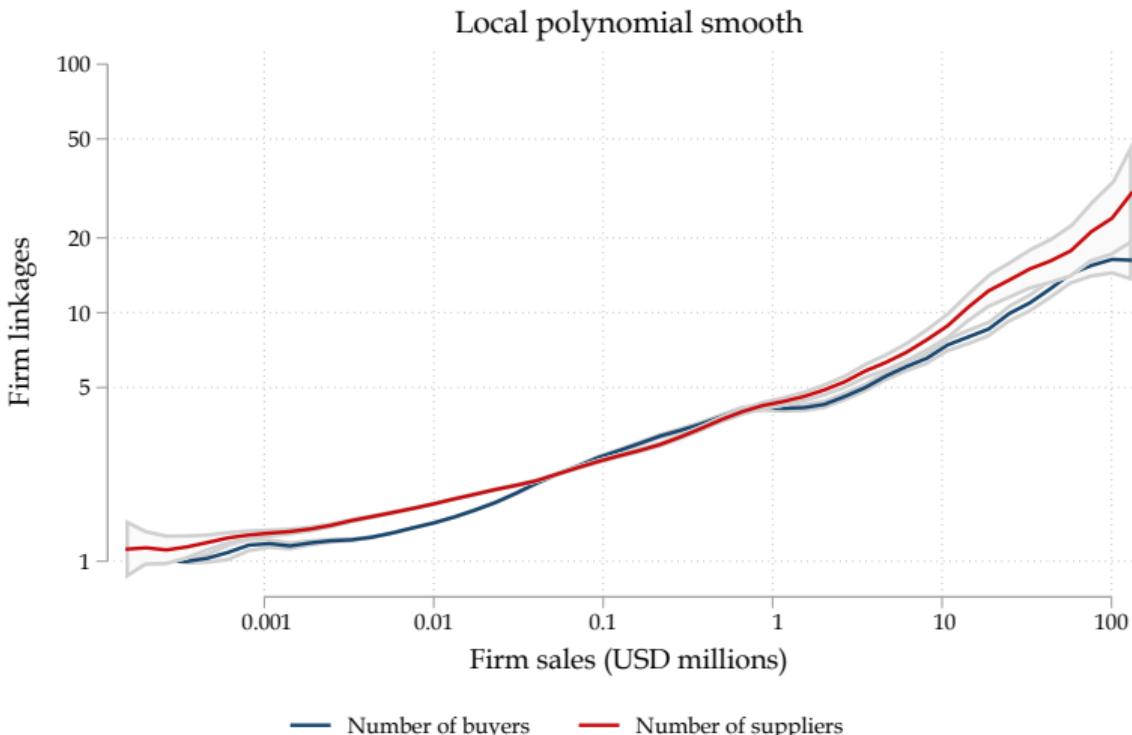
- Prices of firms in the 5th quantile of sales last 1.3 months less than that of firms in the first quantile
- Firms with a median supplier-product market share have a duration of 5.7 months and firms in the 99th of supplier-product market share have a price duration of 5.2 months
- A 10% increase in relationship duration (30 to 33 months) is associated with an increase in price duration from 5.6 to 5.7 months
- A 10% increase in the number of customers (24 to 26.4 clients) is associated with an increase in price duration from 5.66 to 5.63 months

Implications within the network

Big connect to big, and big and star suppliers



Large firms are more connected: up and downstream



Taking stock

- Large firms change their prices more often than do small firms.
 - Price adjustment across large firms is also smaller in magnitude.
 - Consistent with PPI evidence from the US, [Goldberg and Hellerstein (2011)]
- Finding suggests the presence of returns to scale in the technology of price setting:
 - High correlation between size and multi-products, [Midrigan (2011), Bhattacharai and Schoenle (2014)]
 - Tight link between size and productivity that could lead to lower adjustment costs or more information.
 - Connection btwn size and network position
- # customers mattering speaks of menu cost that are supplier-client not just supplier based

Implications for theory

- Importance of multiproduct firms (e.g., Midrigan, 2011; Alvarez and Lippi, 2014; Bhattara and Schoenle, 2014; Blanco et al., 2022)
- Importance of large firms' price setting technology as in Goldberg and Hellerstein (2011)
- Results also emphasize the importance of market concentration in shaping frequency and magnitude of price changes, as in Mongey (2022).
 - We emphasize that is relevant to move towards a two-sided market power framework within network
 - Relevance of the network:# clients and supplier and location of large firms in the network

Time series regression (next step)

Here, we define y_{ijst} as either *i*) a price adjustment dummy or *ii*) the log change in prices in every month t

$$y_{ijst} = \alpha + \beta \cdot \mathbf{X}_{it-1} + \gamma \cdot \mathbf{Y}_{jt-1} + \phi \cdot \mathbf{Z}_{ijt-1} + \delta \cdot \mathbf{push}_{it} + \psi \cdot \mathbf{push}_{it} \cdot \mathbf{X}_{it-1} \\ + \rho \cdot \mathbf{push}_{it} \cdot \mathbf{Y}_{jt-1} + \varrho \cdot \mathbf{push}_{it} \cdot \mathbf{Z}_{ijt-1} + \epsilon_{ijst}$$

where \mathbf{push}_{it} is a measure of cost shock affecting supplier i (or client j eventually). E.g., exchange rate shock or oil price shock.

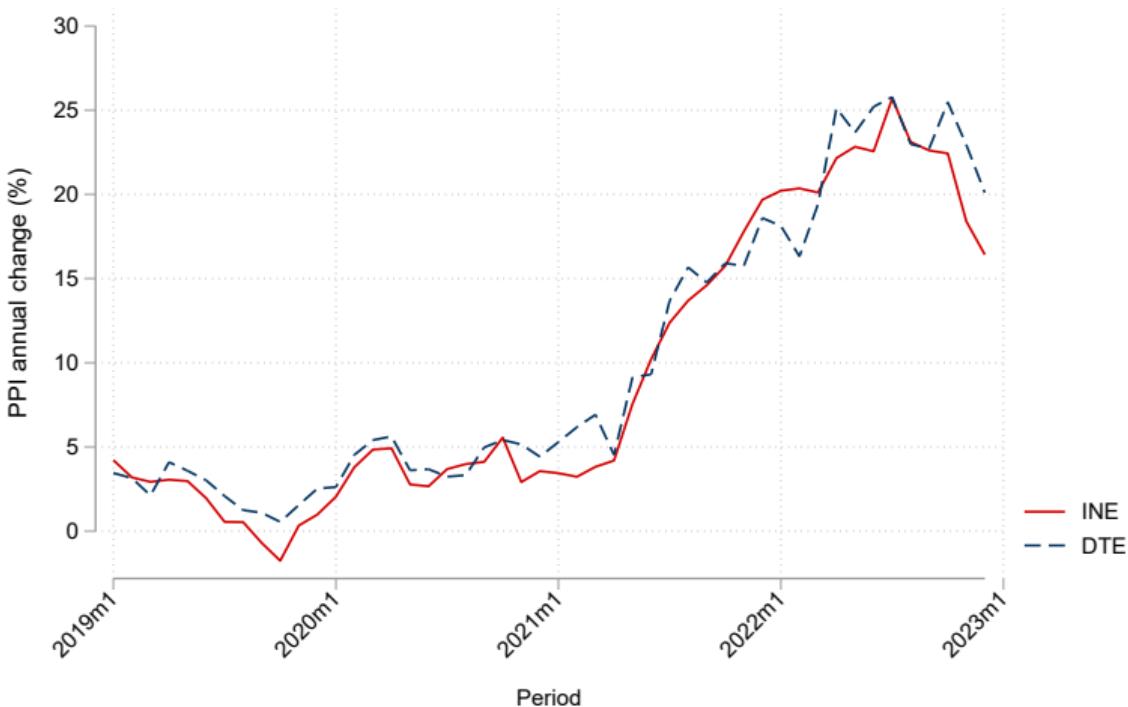
The vectors \mathbf{X} , \mathbf{Y} , \mathbf{Z} contain supplier, client, and supplier-client characteristics, respectively.

Conclusion

- Market structure and network structure are relevant when thinking about price stickiness and monetary non-neutrality
- We have showed that price stickiness varies considerably within firms in an industry
- Size of the suppliers (or customers), market share, the number of products sold and supplier-client relationship features are key determinants
- Evidence of state dependency amplifying the aforementioned relationships

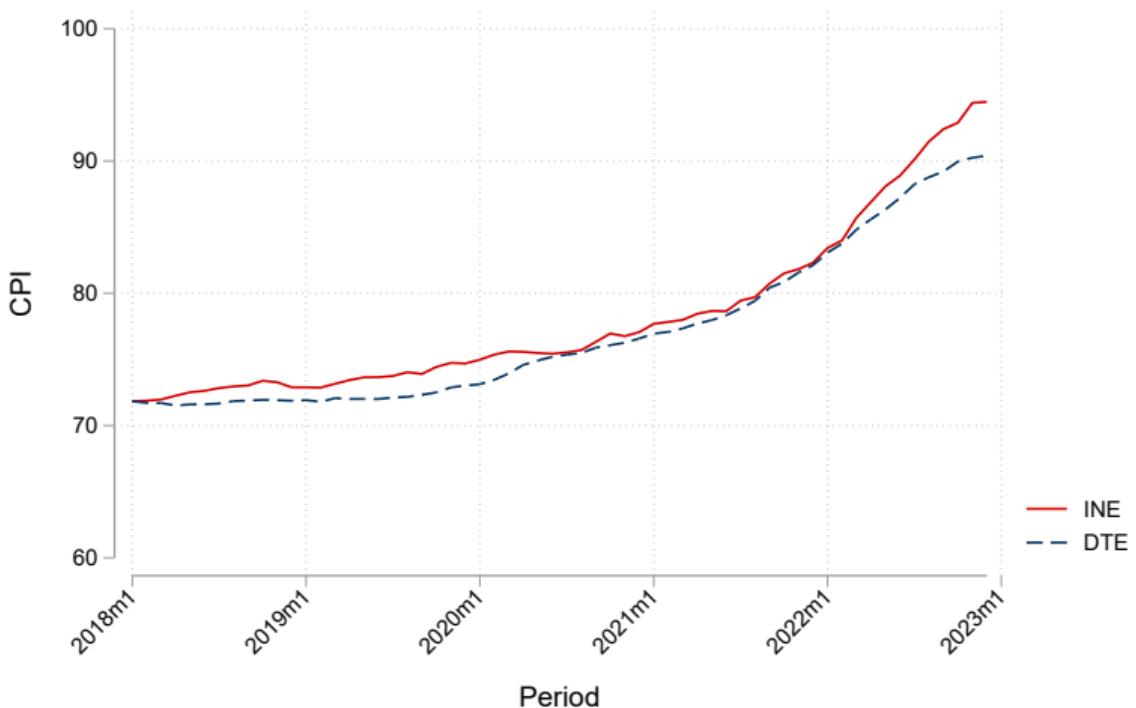
Appendix

Representativeness of the data (PPI annual change)



Note: The sum of weights is 0.97 of 100, and there are 165 of 173 products

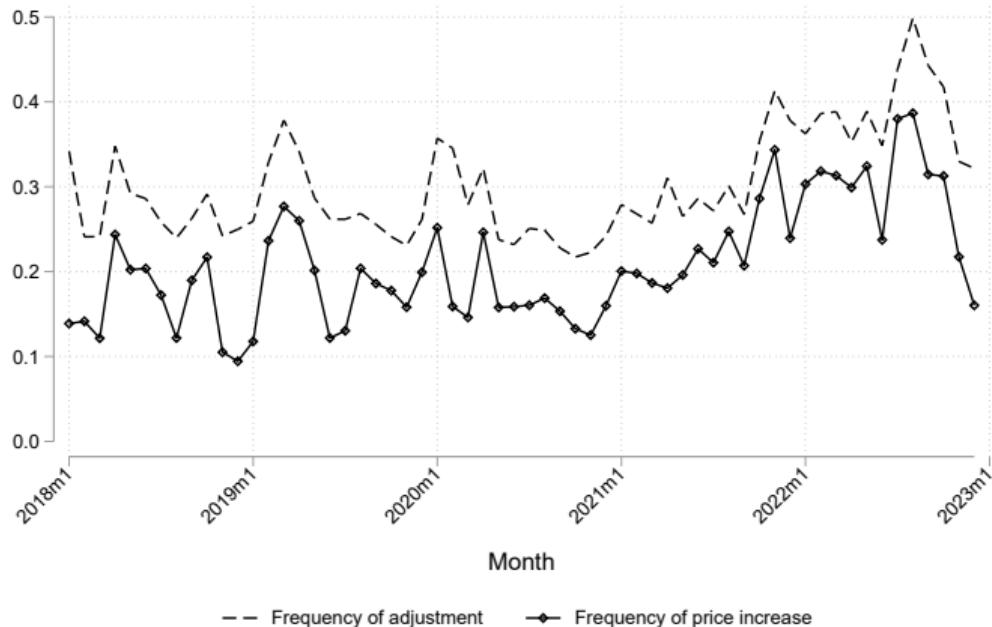
Representativeness of the data (CPI)



Note: The sum of weights is 71.83 of 100, and there are 254 of 303 products

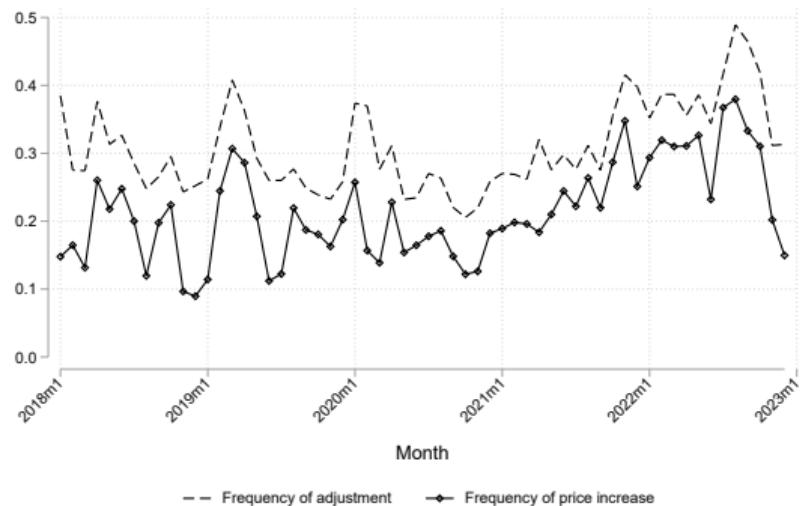
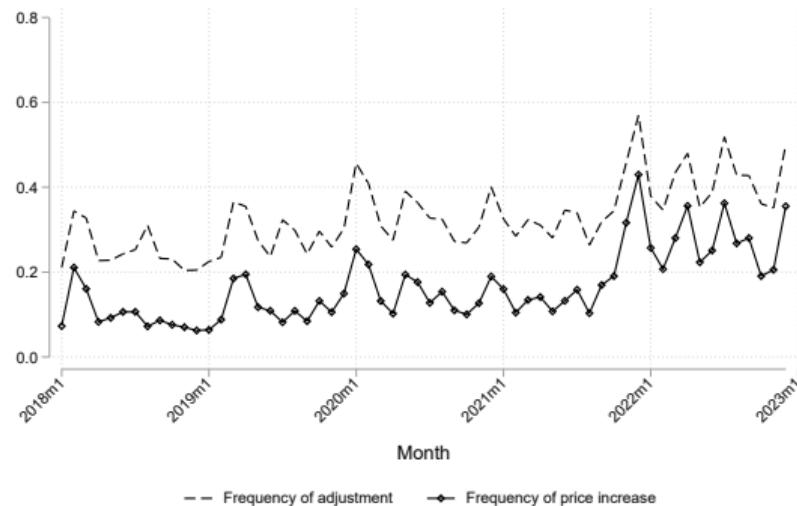
Evolution frequency price change: CPI

back



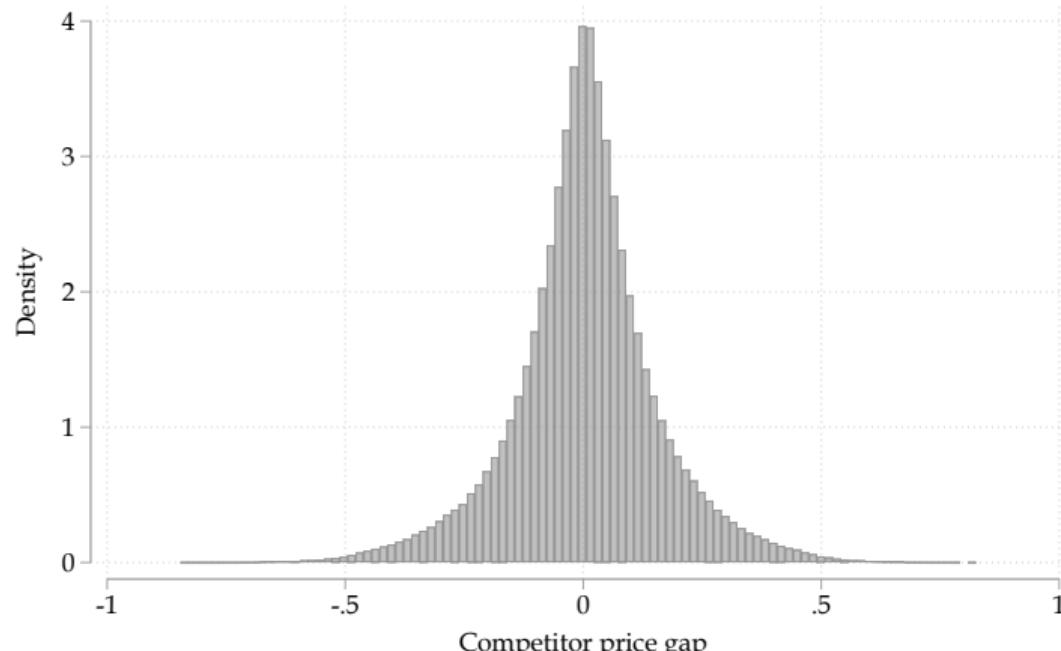
Evolution frequency price change: PPI and CPI frequent transactions

Figure: Frequency of price change (left) and CPI (right) frequent transactions



Competitor-price gap (strategic complementarities)

Back

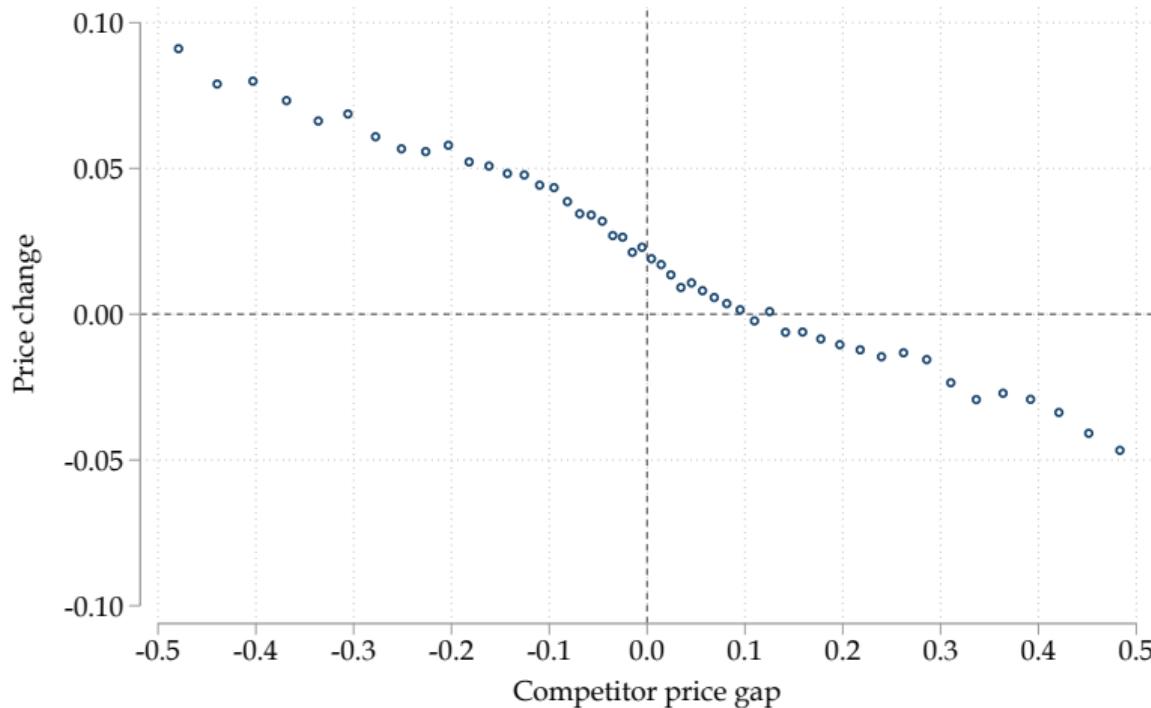


Note: competitor gap truncated at 50 percent

Filtered of supplier-product and month FE, using OLS (Karadi, Schoenle and Wursten (2022)). Using subclasses (bundling varieties, keeping constant number of varieties)

Magnitude of adjustment as function of competitor price gap

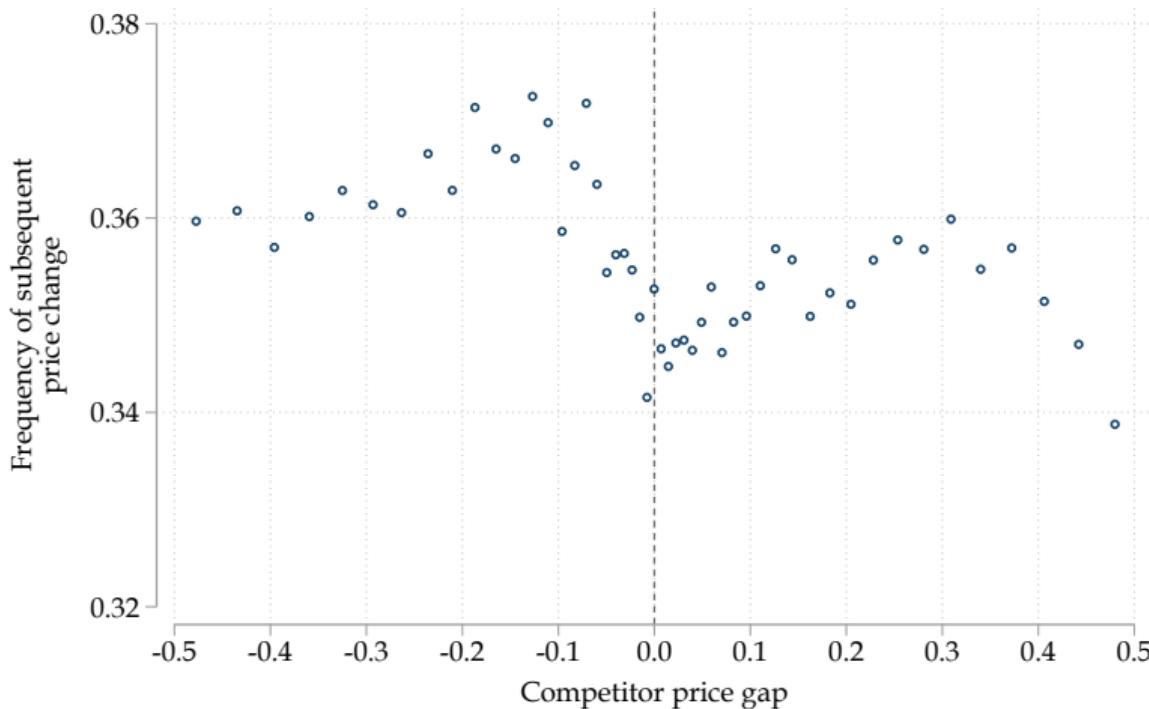
Figure: Magnitude of adjustment ($t+1$) as function of the gap



Note: competitor gap truncated at 50 percent

Frequency of adjustment ($t+1$) as function of competitor price gap

Figure: Magnitude of adjustment as function of the gap



Note: competitor gap truncated at 50 percent

Descriptive statistics (freq. price increases)

Table: Frequency of price increases

	Mean	SD	P10	P25	P50	P75	P90	N
CPI product	0.24	0.21	0.00	0.06	0.20	0.38	0.56	12,947,624
PPI product	0.17	0.17	0.00	0.00	0.13	0.27	0.42	10,007,004
Total	0.21	0.20	0.00	0.00	0.17	0.33	0.50	22,954,628

Descriptive statistics (share of price increases)

Table: Share of price increases

	Mean	SD	P10	P25	P50	P75	P90	N
CPI product	0.72	0.29	0.33	0.50	0.75	1.00	1.00	10,486,557
PPI product	0.83	0.26	0.50	0.67	1.00	1.00	1.00	7,121,443
Total	0.77	0.28	0.40	0.57	0.86	1.00	1.00	17,608,000

Descriptive statistics (supplier characteristics)

	Mean	Std. Dev.	p10	p25	p50	p75	p90	Obs.
Average sales (CLP millions)	3,903	92,937	8	23	92	381	1,714	25,078
Number of customers	24.6	699.6	1.0	1.1	1.8	5.2	17.2	25,078
Number of subclasses sold	1.6	1.9	1.0	1.0	1.0	1.5	2.7	25,078

By sector

We have 25,078 firms and a total of 22,954,628 supplier-client-variety triplets

Descriptive statistics (supplier characteristics by sector)

Table 2: Supplier characteristics by economic sector

	Mean	Std. Dev.	p10	p25	p50	p75	p90	Obs.
1								
Average sales (CLP millions)	951	14,948	7	20	85	335	1,247	7,454
Number of customers	3.1	11.5	1.0	1.0	1.1	2.1	5.1	7,454
Number of subclasses sold	1.3	1.3	1.0	1.0	1.0	1.0	1.8	7,454
2								
Average sales (CLP millions)	95,645	805,937	43	125	372	1,329	5,040	234
Number of customers	5.6	26.5	1.0	1.0	1.4	2.6	6.8	234
Number of subclasses sold	1.2	0.6	1.0	1.0	1.0	1.0	1.6	234
3								
Average sales (CLP millions)	3,926	60,147	8	25	96	402	2,013	16,864
Number of customers	34.9	852.9	1.0	1.3	2.5	7.5	23.9	16,864
Number of subclasses sold	1.8	2.1	1.0	1.0	1.0	1.7	3.1	16,864
4								
Average sales (CLP millions)	4,157	32,407	3	7	25	120	1,164	526
Number of customers	8.7	42.1	1.0	1.2	2.1	5.2	12.9	526
Number of subclasses sold	1.2	0.8	1.0	1.0	1.0	1.0	1.4	526
Total								
Average sales (CLP millions)	3902.6	92937.2	7.6	22.8	92.0	381.4	1714.4	25,078
Number of customers	24.6	699.6	1.0	1.1	1.8	5.2	17.2	25,078
Number of subclasses sold	1.6	1.9	1.0	1.0	1.0	1.5	2.7	25,078

Note: 1 “Agriculture” 2 “Minning” 3 “Manufacture” 4 “Utilities”

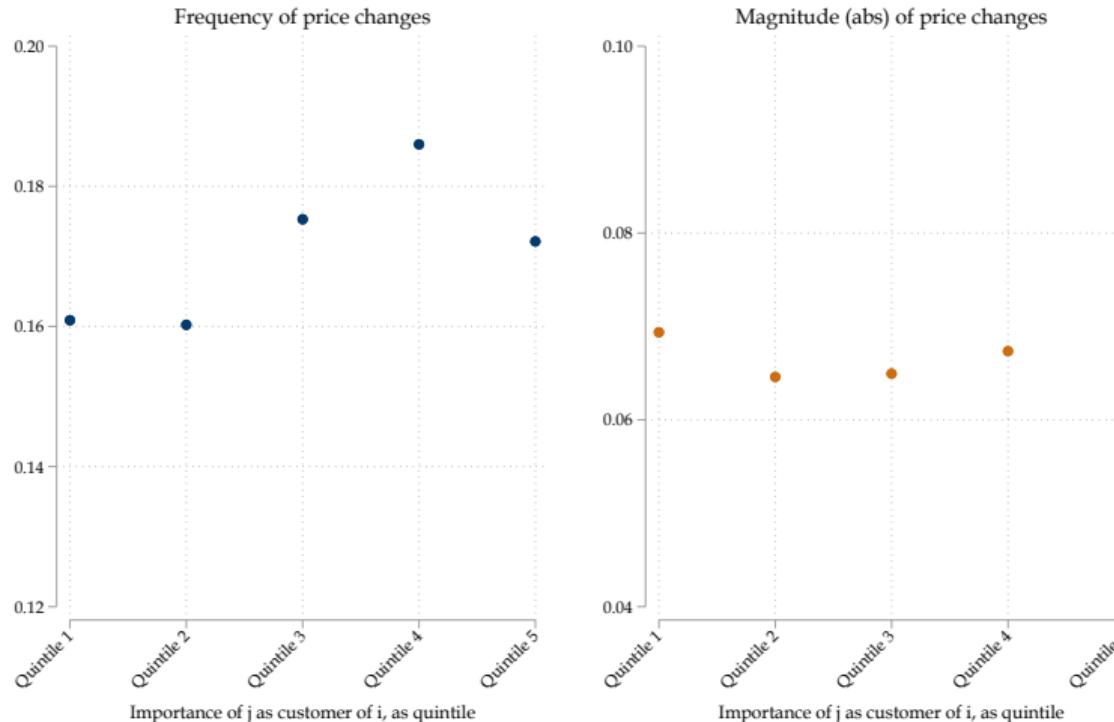
Descriptive statistics (supplier characteristics, subsample)

Table: Supplier characteristics - Subsample

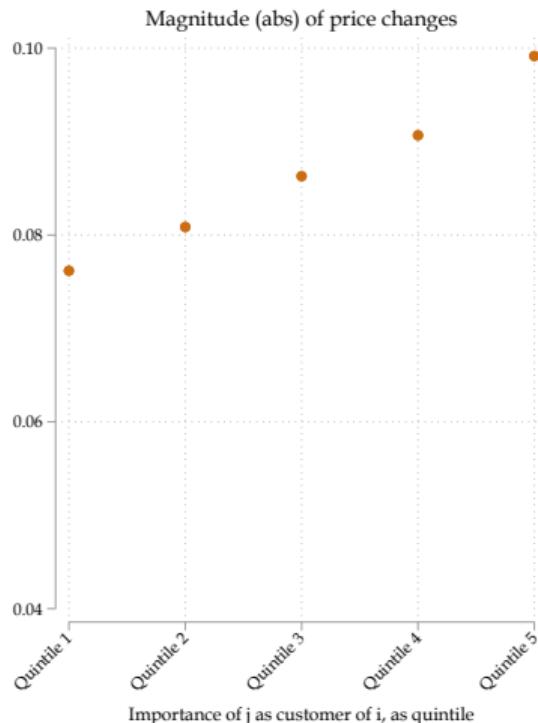
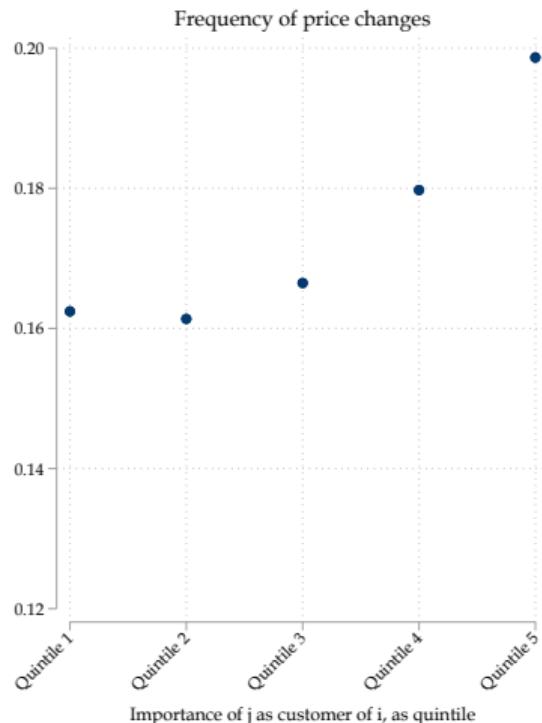
	Mean	Std. Dev.	p10	p25	p50	p75	p90	Obs.
Average sales (CLP millions)	13,134	118,547	24	90	404	2,088	12,585	4,109
Number of customers	123.9	1724.5	1.5	3.1	8.4	25.0	75.1	4,109
Number of subclasses sold	4.3	3.6	2.1	2.4	3.1	4.7	7.7	4,109

Firms selling more than one subclass

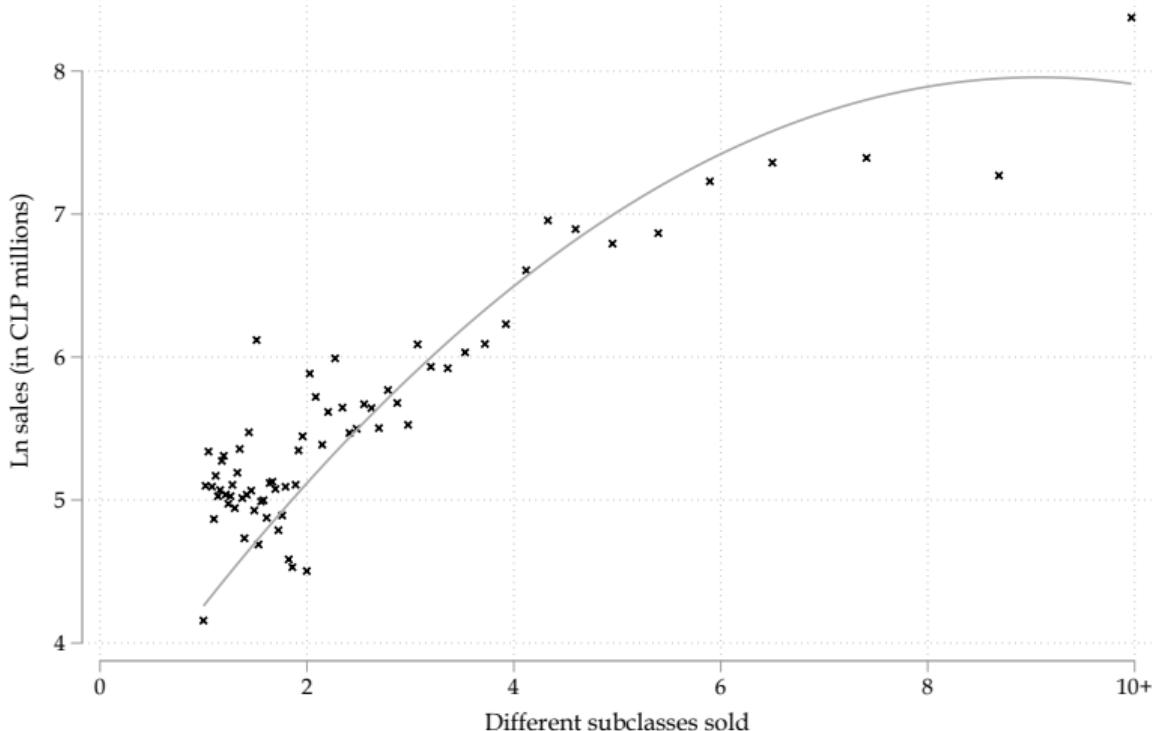
Frequency/magnitude price adj. and customer market share product level



Frequency/magnitude price adj. and customer market share (product truncated)



Size and subclasses



Variety and subclasses

