Markups and Cost Pass-through Along the Supply Chain*

Santiago Alvarez-Blaser
Harvard University

Alberto Cavallo
Harvard University

Alexander MacKay
University of Virginia

Paolo Mengano
Esade Business School

July 2025

Abstract

We use a novel dataset of production costs, wholesale prices, and retail prices from a large global manufacturer to study markups and pricing behavior along the supply chain. We document several facts about markups covering the period July 2018 through June 2023, and we propose a model of supply chain pricing behavior that rationalizes key patterns in our data. We find substantial dispersion in markups across products at each supply chain level. Manufacturer and retail markups are negatively correlated in the cross section and over time. Despite time-series variation in firm-level markups, total markups—reflecting the relationship between retail prices and production costs—are stable over time, even when prices increased along with inflation in the United States in 2022. We apply our model to quantify factors that determine relative bargaining power between the manufacturer and retailers, leveraging variation across countries, products, and time. Finally, we consider the dynamics of cost pass-through and the mediating role of manufacturer-retailer bargaining in price dynamics, with implications for current policy debates, including trade policy and tariffs.

Keywords: Markups, Supply Chain, Vertical Relationships, Pass-through, Inflation
JEL Codes: D22, D40, E3, L11, L81

*This research project was conducted at the HBS Pricing Lab and funded by the Digital, Data, and Design Institute at Harvard. We thank Chris Conlon, Silke Forbes, Sharat Ganapati, Basile Grassi, Luigi Iovino, Sarah M. Lein, Igor Letina, Isabelle Mejean, Nate Miller, Ivan Werning, and Brian Wheaton for their valuable feedback, as well as the participants at MIT Economics, DC IO Day, Esade Macro Meetings, Salento Macro Meetings, SED 2024, CEBRA Annual Meeting, and ASSA Annual Meeting. We also acknowledge Tomas Pacheco for his excellent research assistance. We are grateful to the research team at the unnamed global manufacturing company for generously providing the manufacturing data used in this paper. Alberto Cavallo is a shareholder of PriceStats LLC, a private company that contributed proprietary price data without compensation and without imposing any conditions to review the findings. Contact Information: Alvarez-Blaser: s.alvarez.blaser@gmail.com; Cavallo: acavallo@hbs.edu; MacKay: mackay@virginia.edu; Mengano: paolo.mengano@esade.edu.

1 Introduction

Pricing decisions along the supply chain affect product markups and play a key role in the transmission of cost shocks to final consumer prices. When upstream and downstream firms have market power, firm-level markups can compound on one another, leading to higher prices and lower quantities for consumers (Spengler, 1950). Dynamically, the price-setting interactions between manufacturers and retailers can affect the rate at which shocks to production costs are transmitted to consumer prices. A large prior literature has focused on markups and cost pass-through for retailers and manufacturers separately. However, understanding these phenomena as a product moves along the supply chain can better inform economic questions related to equilibrium prices, firm profits, and inflation—issues that are particularly relevant amid renewed trade tensions and tariff uncertainty.

We use product-level data to provide direct evidence on markups and pricing behavior along the supply chain. Unlike most of the existing literature, we observe production costs and prices at the manufacturer level and directly link these to the final prices of the same products at the retail level. This allows us to measure markups at the manufacturer and retailer level and study the drivers of variation in wholesale and retail prices—in the cross section and over time. Motivated by our descriptive analysis, we propose a model of supply chain pricing behavior that rationalizes several of the patterns in our data, and we use the model to quantify factors that determine relative bargaining power between the manufacturer and retailers.

The dataset originates from a collaboration between a large global manufacturer of non-durable household products and the Pricing Lab at Harvard Business School. The manufacturer data contains product prices and costs, with a detailed breakdown into expected and unexpected costs, along with consumer survey-based quality indicators. Retail prices were sourced from PriceStats, a private company related to the Billion Prices Project (Cavallo and Rigobon, 2016). The dataset spans five years, from July 2018 through June 2023, and encompasses data from the United States, the United Kingdom, Canada, and Mexico. The combined dataset includes monthly production and retail information for approximately 2,000 products.

We document new facts about *total markups*, which we define as in terms of the relationship between retail prices and production costs, as well as the markups for each segment of the supply chain. We report markups in terms of the Lerner index.[1] Across countries, average total markups are similar: 0.67 in the US, 0.64 in the UK, 0.65 in Canada, and 0.60 in Mexico. In the US, the average manufacturer markup is 0.54 and the average retail markup is 0.28, implying an average firm-level markup of 0.41 for the products in our sample. In magnitudes, these markups are roughly in line with recent evidence using the demand approach (Döpper et al., 2025) and the production approach (De Loecker et al., 2020; De Loecker and Eeckhout, 2018)

[1] The Lerner index for price p and cost c is given by $\frac{p-c}{p}$, and typically ranges from 0 to 1. An alternative measure, p/c, has also been used in the literature. For a given value $L = \frac{p-c}{p}$, the price-over-cost markup p/c is equal to $\frac{1}{1-L}$.

to estimate markups.[2]

In the US, total markups were stable over time. Our sample period, July 2018 through June 2023, included the onset of the COVID-19 pandemic and aggregate inflation after 2021. In our data, retail prices increased in 2022, but total markups did not. For the products in our sample, the primary driver of increased consumer prices was an increase in production costs, rather than a net increase in markups. Thus, we do not find evidence for a discrete change in firm conduct during this period, despite the "greedflation" hypothesis that has been popular in the media.

However, for individual stages of the supply chain, we do find meaningful time-series variation in markups. In the second half of 2020, manufacturer markups increased while retail markups fell. In 2022, retail markups increased while manufacturer markups fell. In our data, markup changes in one stage of the supply chain are offset by adjustments in the other. As a result, total markups are remarkably stable, despite time-series variation in markups at the firm or sector level.

In the cross section, we document a large degree of within-country heterogeneity in total markups and markups at each stage of the supply chain. Markups are negatively correlated along the supply chain, such that a higher manufacturer markup corresponds to a lower retail markup. One channel that drives heterogeneity in markups is product quality. Manufacturer margins and markups are positively correlated with product quality, but there is a weak relationship between margins and quality for retailers. Because retailers pay more for higher-quality products, retail markups are negatively correlated with quality.

Overall, we observe similar patterns across countries. One notable exception is that, in contrast to the US, retailers in the United Kingdom, Canada, and Mexico capture a greater share of total margins, translating to higher retail markups and lower manufacturer markups. Over time, total markups are less volatile than manufacturer or retail markups for all four countries. Total markups are stable in the UK and Canada and show a slight increase in Mexico during our sample, coinciding with an increase in manufacturer markups. In contrast to the other countries, these changes in Mexico generate a positive correlation between manufacturer and retail markups in the time series.

We propose a model of supply chain pricing behavior based on our findings. Prices are determined in two stages. In the first stage, the manufacturer sets retail prices to maximize overall supply chain profits for the manufacturer's products. In the second stage, the supplier and the buyer negotiate the wholesale price, splitting the supply chain profits according to Nash bargaining. This model can be interpreted as one in which the retailer follows the manufacturer's suggested pricing policies, and the bargaining weight implicitly captures the (unmodeled) threat that the retailer deviates from these suggestions in the future. The model allows

[2] The demand and production approaches are empirical methods developed to recover markups either by estimating consumer demand on transaction data or firm production function on production data. See De Loecker and Scott (2022) for an overview and a comparison of the two methods.

us to rationalize several key facts in our data, including the negative correlation in markups along the supply chain, which is more challenging to rationalize with other models of vertical conduct. We use the model to estimate bargaining weights for each product-country-month combination.

As a first step to understanding the determinants of bargaining power between manufacturers and retailers, we present a descriptive analysis that relates bargaining weights to features of the product and market. Our analysis, which leverages variation across products, countries, and time, indicates that the manufacturer captures larger margin shares in markets characterized by greater market penetration and higher income levels. In contrast, retailers secure larger margin shares in response to higher production costs and to inflation, the latter of which may proxy for overall consumer demand.[3]

Finally, we consider the dynamic aspect of pricing behavior. We start by analyzing how production cost shocks propagate through the supply chain, highlighting the differential price adjustment dynamics between the manufacturer and retail sectors. Our findings reveal distinct price adjustment strategies in the US depending on the nature of the cost shock. For aggregate cost shocks, the manufacturer adjusts prices gradually, with full pass-through typically occurring within six months, while retailers respond more quickly and strongly. In contrast, idiosyncratic shocks are passed through to a much smaller extent along the supply chain: the manufacturer does not respond at all, and retailers adjust only partially, even after six or twelve months. These patterns suggest that the manufacturer absorbs more cost shocks—possibly due to its higher initial markup—while retailers pass through more of these shocks, relying on pricing strategies that reflect aggregate category-level conditions rather than product-specific cost variation (Nakamura, 2008).

We also find that cost pass-through of production costs to retail prices is greater for expected costs relative to unexpected costs. We see similar differences between the response to aggregate and idiosyncratic shocks by the manufacturer and retailers in other countries. These patterns underscore consistent differences in the degree of pass-through across stages of the supply chain, shaped by both the nature of the shock and the firm's position within the chain.

We return to our bargaining model to examine dynamics in bargaining power between the manufacturer and retailers. We introduce lagged costs into our regressions that predict bargaining weights, and we find that changes in production costs affect bargaining power gradually rather than immediately. Moreover, when distinguishing between expected and unexpected costs, we find that expected cost changes have persistent negative effects on manufacturer bargaining power, while unexpected cost changes show only temporary effects.

Taken together with the reduced-form findings, these results indicate a novel channel that can explain dynamics in cost pass-through. The translation of product costs to wholesale prices

[3] In Appendix A, we consider alternative assumptions with a fixed bargaining weight for each country and where variation in margin shares is attributed to variation in outside options.

and wholesale prices to retail prices may not be determined by independent steps at the firm level, but may instead reflect ongoing bargaining between the manufacturer and retailers. Thus, empirical findings of dynamics in pass-through may in part be driven by dynamics in bargaining power that determine wholesale prices—which is the dependent variable in a manufacturer pass-through regression and the key independent variable in the retail pass-through regression.

Our results speak directly to current policy discussions in the context of rising trade tensions and tariffs. In a trade war, our findings suggest that the impact on consumer prices depends on how broad and predictable the shock is. Tariffs that apply to entire product categories and are clearly anticipated should lead to faster price increases, as both the manufacturer and retailers adjust more quickly to aggregate and expected shocks. In contrast, more specific or more unexpected tariffs would result in slower pass-through along the supply chain. Furthermore, our results indicate that manufacturer bargaining power increases in response to unexpected costs in the short run and decreases in response to expected costs. These patterns highlight how supply chain relationships shape not only the level of prices, but also the timing and distribution of trade policy impacts between firms.

Our paper contributes to the empirical literature on markups and cost pass-through. In relation to the first, our total markup values are consistent in magnitude with structural estimates resulting from the demand approach in the United States (Döpper et al., 2025) and the production approach in the United States (De Loecker et al., 2020), as well as estimates using the production approach in Canada, Mexico, and the United Kingdom (De Loecker and Eeckhout, 2018; Díez et al., 2021). We complement this literature by presenting unique evidence of the breakdown of markups along the supply chain,[4], and of the relatively stable evolution in total markups over recent years, thereby showing a changing trend with respect to the previous decades. This provides further support in rejecting the hypothesis that the high level of inflation during the 2021–23 period was generated by firms increasing markups (Leduc et al., 2024; Bilyk et al., 2023).

In addition, our results may be relevant for methodological and empirical papers related to the estimation of markups. Existing structural approaches tend to rely on restrictive assumptions about pricing behaviors in either the upstream or downstream sectors (see, e.g., the discussion in De Loecker and Scott, 2022), which cannot rationalize our findings of frequent and active changes in markups in both sectors. We provide insights into pricing behaviors and statistics about markups along the supply chain that can help inform appropriate assumptions for future work.

Given the high-frequency nature of our data, we also relate to the literature focusing on short-run markup fluctuations that has produced contrasting results. Anderson et al. (2025)

[4]Villas-Boas (2007) recognizing the limited access to wholesale prices, indirectly infers vertical relations from movements in retail prices. In that setting, retailers exhibit higher bargaining power—the reverse pattern of what we find with richer micro data. Recent papers that focus on vertical relations are Alviarez et al. (2023), Demirer and Rubens (2025), and Toxvaerd (2024).

documents mildly procyclical markups in the retail sector, whereas Vaona (2016) finds countercyclical behavior in the manufacturing sector and Bils et al. (2018) finds countercyclical behavior in the entire economy.[5] We reconcile these seemingly conflicting findings by exploiting the vertical structure of the supply chain. Manufacturer and retailer markups move asymmetrically over the cycle—tending to offset one another—so that sector-level or economy-wide averages conceal important stage-specific dynamics.[6]

A large literature has analyzed the degree of cost pass-through, often finding incomplete transmission of costs to prices (recent examples include Amiti et al., 2019; Auer et al., 2018, 2021; Bonadio et al., 2020). While these studies typically focus on pass-through elasticities, we estimate pass-through in levels in order to be able to compare and compound the effect of a shock along the supply chain. Analyses along the supply chain are rare. Exceptions include Nakamura (2008), which finds a limited role of manufacturing shocks for retailers' observed behavior, and Nakamura and Zerom (2010), which shows that retailers completely pass on commodity shocks, thus playing a limited role in the incomplete transmission along the supply chain. Koujianou Goldberg and Hellerstein (2013) finds similar results in the beer market in the United States. Minton and Wheaton (2023) highlights the role of supply chain networks in delaying the transmission of shocks. Finally, our results complement recent studies that measure pass-through in levels, including Sangani (2023), and those that distinguish between price-setting responses to expected and unexpected cost shocks, including MacKay and Remer (2024) and Meyer and Sheng (2024).

The paper proceeds as follows: Section 2 presents the data and evidence on total markups. Section 3 focuses on time series and cross-sectional patterns of markups, documenting the negative correlation along the supply chain and investigating pricing behaviors along the quality distribution. Section 4 presents a supply chain pricing model to rationalize the findings. We use the model to recover bargaining weights and assess the factors that predict them. Section 5 examines dynamic pricing aspects, providing empirical evidence on cost pass-through at different stages of the supply chain and expanding the analysis in the theoretical framework. Finally, Section 6 concludes.

2 Data

2.1 Prices, Costs, and Quantities

Our analysis relies on two distinct data sources that together allow us to measure markups and examine pricing behavior along the value chain. The first source comprises detailed product-

[5]Other studies that focus on the cyclical behavior of markups are Stroebel and Vavra (2019), Kryvtsov and Midrigan (2013), Rotemberg and Woodford (1999), Bils (1987), Galeotti and Schiantarelli (1998), Bils and Kahn (2000), and Nekarda and Ramey (2020).

[6]Our evidence also complements the aggregation results in Burstein et al. (2020), which emphasize differences between firm- and sector-level markups.

level information from a global manufacturer. The second consists of a vast collection of retail prices provided by PriceStats, a private company related to the Billion Prices Project (Cavallo and Rigobon, 2016). Developed in the Pricing Lab at Harvard Business School, this combined dataset offers a unique opportunity to study price formation and pass-through mechanisms along the entire supply chain, from production to retail.

The first dataset, originating from a large global manufacturer active in the sector of non-durable household products, includes monthly SKU-level records of revenues, quantities, and costs from Canada, Mexico, the United Kingdom, and the United States. Our definition of a product is a combination of a brand, a product form and category, a package size, and a variant (for example, fragrance). Our raw data have multiple manufacturer SKUs that correspond to identical products according to our definition. To prepare the data for analysis, we aggregate across these SKUs, and we then link these products to the retail online prices in the second dataset. We calculate unit prices and unit costs by dividing revenues and costs by the quantity sold.[7] The measure of costs we obtained reflects variable costs, including raw materials, packaging, manufacturing operating expenses, transportation, and warehousing.

The manufacturer dataset features two additional features that are useful for our purposes: indicators of product quality and a breakdown of realized costs into expected and unexpected costs. Quality measures are derived from consumer surveys in which respondents rate perceived quality and rank the uniqueness of the product relative to competitors. The resulting indicators, *perceived quality* and *product differentiation*, are available only for products sold in the United States. We standardize these measures for our analysis and focus on perceived quality in the main text. As for the cost breakdown, the manufacturer relies on an in-house team of experts to forecast costs for each product, which are recorded as *expected* costs. Any discrepancies between these forecasts and the actual realized costs are recorded as *unexpected* costs. These features of the data allow us to examine how pricing behaviors vary with quality and in response to different types of cost shocks.

The second dataset includes retail prices and is provided by PriceStats, a private firm that collects prices from online retailers using web-scraping techniques and uses them to provide insights into daily price changes and product details, including category and sale status. Although the products in our data are also sold through brick-and-mortar channels, we view online prices as a reasonable measure for our purposes.[8] We aggregate daily observations to monthly average prices for each product-retailer. As we have a single wholesale price and multiple retail prices for each product, we construct an average retail price per product in two steps. Within

[7]Revenues are recorded net of all volume- or quantity-based rebates that the manufacturer grants to individual retailers. The resulting figure therefore reflects an average transaction price per product. We use this average price throughout, while noting that marginal prices could diverge if the manufacturer applies additional ad-hoc discounts.

[8]Cavallo (2017) shows that online prices are very similar to offline ones, even identical in 72% of the cases. Other papers using this data include Cavallo (2013), Cavallo et al. (2024); Cavallo and Kryvtsov (2023); Cavallo (2018), and Alvarez et al. (2022).

each country, we run the following specification:

$$\tilde{p}^R_{ijt} = b + \delta_i + \delta^{s(i)}_t + \delta_j + \varepsilon_{ijt}, \tag{1}$$

where δ_i, $\delta^{s(i)}_t$, and δ_j are product, time, and retailer fixed effects, respectively. Time fixed effects are calculated separately by product category, $s(i)$. In the second step, we subtract the retailer fixed effect (δ_j) from the raw retail price ($\tilde{p}^R_{ijst}$) and average within product and period to compute retail prices, $p^R_{it} = \frac{1}{|J_{it}|}\sum_{j\in J_{it}}(\tilde{p}^R_{ijt} - \delta_j)$. Once we have a single retail price per product, we manually match the prices to the manufacturer's production data. We drop outliers and then winsorize all variables at the 1% level.[9]

The resulting dataset, which we refer to as our main sample, includes more than 1,900 matched products, divided into 16 brands, over the period from July 2018 to June 2023. Appendix Table B.1 shows the number of observations, products, brands, and retailers available for each country. We were able to match more than 85% of the manufacturer's sales to the retail data in the United States, and around 70% considering all countries. Appendix Table B.3 reports summary statistics for the main sample.

In Section 5, where we study the dynamics of pricing and cost pass-through, we rely on an extended sample designed to maximize the time-series coverage of product-level observations. This dataset differs from the main sample in two key ways. First, we retain all observations for which we observe manufacturer prices and costs even when no corresponding retail prices are available. This substantially increases the number of observations available for estimation, particularly in specifications with multiple months of lags.[10] Second, for the United Kingdom, Canada, and Mexico, we address gaps in the manufacturer data by imputing missing observations using a forward-fill rule. Specifically, we carry forward wholesale prices and production costs for up to 90 days. Then, we match these imputed manufacturer observations with retail prices when available. While the share of imputed observations remains modest—around 10% on average—the process allows us to retain even more observations when incorporating lagged values in our dynamic regressions. Appendix Table B.1 shows the number of observations for the expanded sample, and Appendix Table B.2 provides a breakdown of the extent and impact of the imputation procedure by country.

2.2 Product Markups and Margin Shares

A key object of interest for our study is the supply chain *total markup*. For product i at time t, we compute this value as the Lerner index in terms of retail price (p^R_{it}) and production cost (c_{it}), $\mu^{TOT}_{it} = \frac{p^R_{it} - c_{it}}{p^R_{it}}$. This markup reflects the wedge between the price that consumers pay

[9]We classify observations as outliers if (a) products have negative revenues, costs, or volumes or (b) a product's log absolute change in volume from one month to the next is greater than 1 and the log absolute change in price or cost also exceeds 1.

[10]For the United States, for instance, this expands the sample from 24,238 to 40,603 product-period observations.

and the production costs, and it takes on values between 0 (price equals cost) and 1 (prices substantially greater than costs).

Our data also allow us to construct markups at the manufacturer and retailer level separately for individual products. We compute manufacturer markups as the Lerner index in terms of wholesale prices (p_{it}^M) and production costs, $\mu_{it}^M = \frac{p_{it}^M - c_{it}}{p_{it}^M}$. We note that our price and cost measures are constructed as within-month averages of revenues and variable costs, which may not always correspond to revenues and costs for the marginal unit. However, due to the nature of the products in our sample and the fact that these data are used by the manufacturer to assess margins, we believe they provide reasonable approximations.

We compute retail markups as the Lerner index with retail and wholesale prices, $\mu_{it}^R = \frac{p_{it}^R - p_{it}^M}{p_{it}^R}$, following other papers that study retail markups (e.g., Aguirregabiria, 1999; Eichenbaum et al., 2011; Anderson et al., 2025). The rationale for this approach is that the marginal cost of a product for a retailer is its replacement cost, with other retailing costs fixed over short horizons (Gopinath et al., 2011). To the extent that additional variable retailing costs (such as home delivery costs) exist, our measure of retail markups will be biased upward. In that case, our retail markups may be interpreted as upper bounds.[11] Similarly, our measure of total markups omits these additional retailer marginal costs and may also be biased upward. In our regressions, we employ fixed effects to control for certain types of unobserved costs that are common across products.

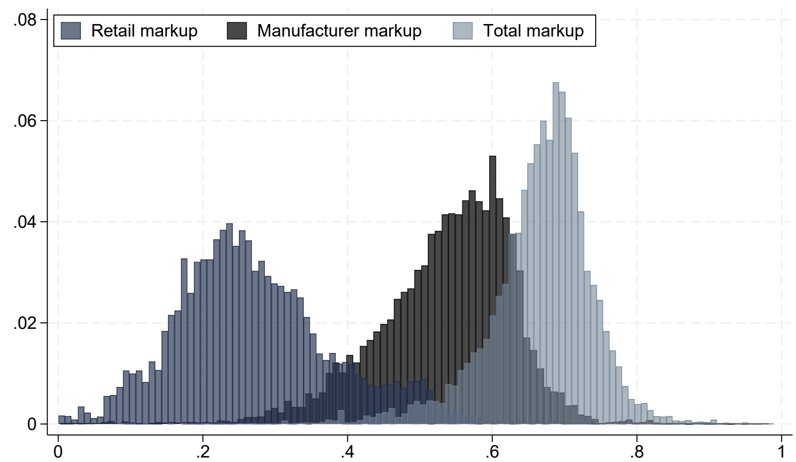
Finally, we construct the manufacturer and retailer *margin share*—the share of total markups (or dollar margins) obtained by each stage of the supply chain. Margin shares are calculated as $\frac{p_{it}^M - c_{it}}{p_{it}^R - c_{it}}$ and $\frac{p_{it}^R - p_{it}^M}{p_{it}^R - c_{it}}$. To illustrate the difference between markups and margin shares, note that an increase in cost while holding fixed wholesale and retail prices will increase the retail margin share but leave retail markups unchanged. Also, because the wholesale price enters the denominator of the retail markup, a retailer may have a lower markup than the manufacturer but a higher margin share. Our measures of margin shares have a direct connection to the model we present in Section 4.

3 Supply Chain Markups

In this section, we analyze markups and pricing behavior in four countries: the United States, the United Kingdom, Canada, and Mexico. We begin by discussing the distribution of markups and time-series variation for the largest market in our sample, the US market. Subsequently, we expand the analysis by comparing it with the UK, Canadian, and Mexican markets.

[11] Sangani (2022) compares retail markups measured using replacement costs with estimates resulting from structural methods based on demand and production models, thereby incorporating a richer notion of marginal costs, and finds similar markup levels.

Figure 1: Markups Along the Supply Chain



Notes: This figure shows the sales-weighted frequency distribution of markups along the supply chain in the United States. Retail markups ($\frac{p^R - p^M}{p^R}$) are shown in dark blue, manufacturer markups ($\frac{p^M - c}{p^M}$) in dark grey, and total markups ($\frac{p^R - c}{p^R}$) in light blue.

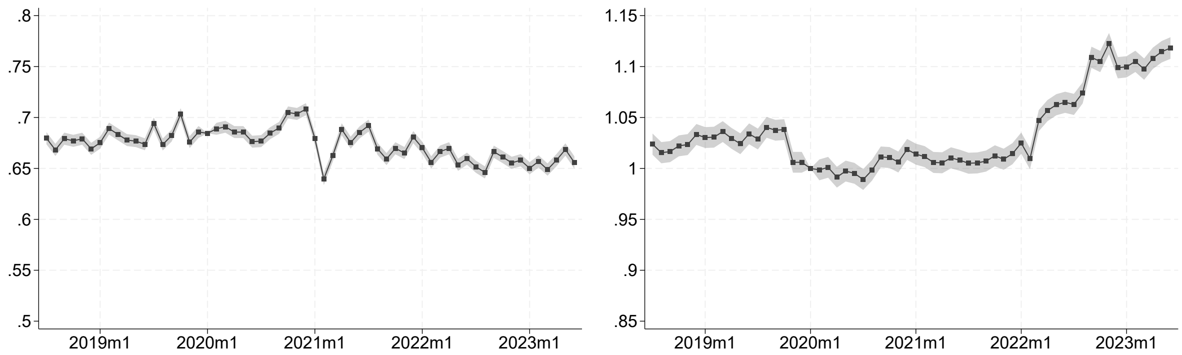
3.1 Markup Levels and Heterogeneity

In Figure 1, we plot the distribution of markups for each stage of the supply chain, along with total markups, in the US. Manufacturer markups are substantially larger than retailer markups. The mean manufacturer markup is 0.54, nearly twice the mean retailer markup of 0.28. This indicates a mean firm-level markup of 0.41, while the mean total markup, reflecting the entire supply chain, is 0.67.

Retail markups, manufacturer markups, and total markups exhibit substantial heterogeneity. The 10th and 90th percentiles for retail markups and manufacturer markups are (0.15, 0.43) and (0.42, 0.63), respectively. The 10th and 90th percentiles for total markups are (0.58, 0.74). Though Figure 1 displays markups for all years in our data, we observe similar levels of dispersion in the cross section (see Appendix Figure B.1 for separate plots by year). This degree of heterogeneity is particularly striking because the products in our study come from a single manufacturer in a limited set of product categories. Summary statistics for the distribution of markups and margin shares are presented in Appendix Table B.4.

These findings have important implications for firm behavior and consumer demand. First, to accurately capture product-level cost and price variation, models of supply and demand should allow markups for a single firm to vary meaningfully across products. Second, the differences in markups at each segment of the supply chain suggest that manufacturers and retailers are not symmetric in terms of, e.g., competitive pressures, bargaining positions, or conduct. The differences in markups between the two segments are not simply due to the fact that retailer markup is calculated with a larger denominator. Appendix Figure B.7 shows that the margin share—i.e., the share of the variable profits in dollar terms—is much higher for

Figure 2: Time Series of Prices and Total Markups



(a) Total Markups

(b) Retail Prices

Notes: This figure shows the time series trends in (a) total markups and (b) retail prices in the United States. Total markups are defined as the Lerner index using retail prices and manufacturing costs. We report time period coefficients from regressions on period and product fixed effects using sales weights, with 2020m1 as the base period. In panel (a), the base period is indexed to its (sales-weighted) mean value. In panel (b), the dependent variable is log price and the base period is indexed to a value of 1. 95 percent confidence intervals are displayed in gray.

manufacturers.

Our direct measurements are consistent with estimates from the literature that use indirect (econometric) approaches to recover markups. Using the production approach, De Loecker et al. (2020) estimate an average firm-level markup (across manufacturers, retailers, and other sectors) of 0.38 in 2016, which is close to our value of 0.41. Papers that use the demand approach to estimate markups for non-durable household products have employed assumptions about vertical conduct between manufacturers and retailers that implicitly recover the total markup. With this approach, Döpper et al. (2025) estimates a median markup of 0.63 in 2019, comparing favorably to our estimate of 0.67. Brand (2021) and Atalay et al. (2025) report slightly lower median markups and 75th percentile markups of 0.69 and 0.64. Using direct measures of prices and wholesale costs, Sangani (2022) finds a retail markup of 0.24 in 2007, close to our estimate of 0.28, albeit from a period over 10 years prior.[12]

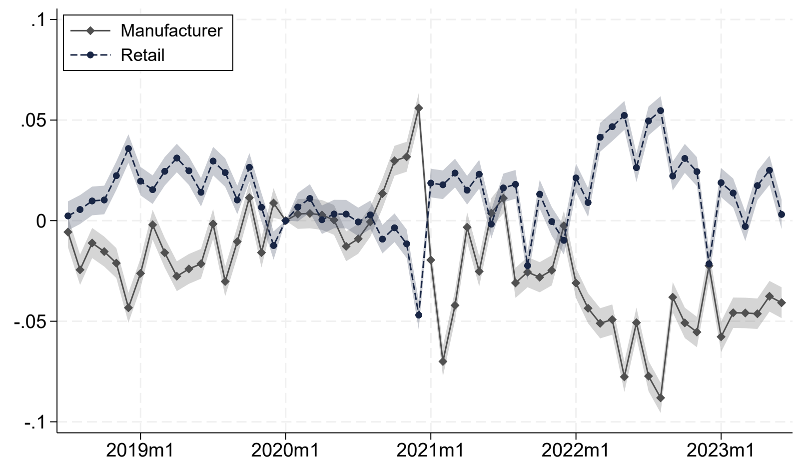
3.2 Markups Over Time

We now consider time-series variation in markups. We first examine the pattern in total markups from July 2018 through June 2023. We estimate time series trends by regressing our outcomes of interest on product and period (month-year) fixed effects, and then reporting the coefficients from the period fixed effects.[13]

[12]De Loecker et al. (2020) and Sangani (2022) report price-over-cost markups of 1.6 and 1.32, respectively, which we translate to the Lerner index values.

[13]We weight observations by sales. The inclusion of product fixed effects controls for changes in the composition of products over time.

Figure 3: Markup Dynamics



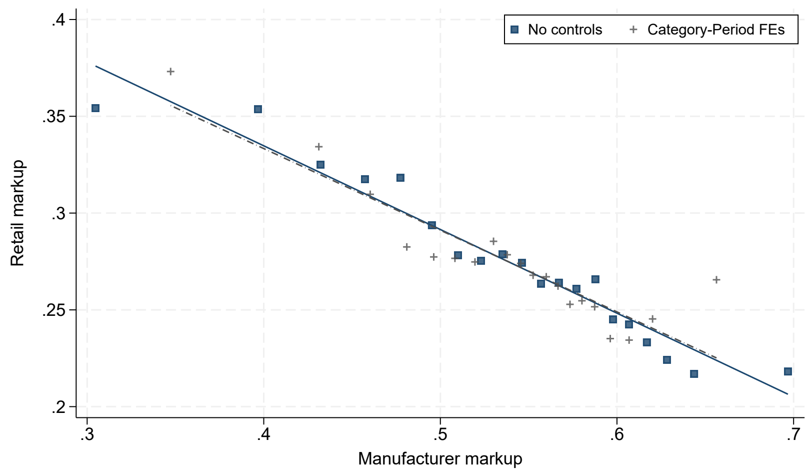
Notes: This figure shows the negative dynamic correlation of markups along the supply chain in the United States. Changes in average markups and 95% (robust) confidence intervals resulting from a regression on period and product fixed effects using sales weights.

Figure 2 displays the results for total markups and retail prices. Panel (a) shows that the average total markup in the US was fairly stable over time. Monthly values hewed close to the average value of 0.67, with slightly higher values in 2020 and a slight decline starting in 2021. The degree of stability is striking, especially with the inflationary period occurring in the US toward the end of our sample. Panel (b) shows the time series for retail prices, which increased approximately 10 percent in 2022. Despite the sharp rise in retail prices, we see no corresponding change in total markups. Thus, for the products in our sample, retail price changes coincided with increases in production costs. This finding indicates that, during this period, there was no discrete change in pricing practices across the supply chain, as would be implied by narratives for which inflation was driven primarily by higher markups, such as the "greedflation" hypothesis.

In contrast to total markups, there are meaningful fluctuations in markups at individual stages in the supply chain. In Figure 3, we plot the time series of manufacturer and retailer markups separately, normalizing January 2020 to 0. Manufacturer markups increased sharply at the end of 2020, returned to previous levels in 2021, then declined in 2022. Retailer markups followed an inverse pattern, declining at the end of 2020 and increasing in 2022. Even at a monthly frequency, we observe that changes in one sector's markups are often offset by inverse changes in the other, contributing to stable total markups.

These time series patterns yield two main implications for supply chain behavior. First, vertical conduct along the supply chain may stabilize total markups, even in the face of significant shocks to production costs or wholesale prices that generate variation in manufacturer or retailer markups. Second, the empirical relationship between firm profitability and consumer

Figure 4: Markup Correlation Along the Supply Chain



Notes: This figure shows the negative correlation of markups along the supply chain in the United States. Bins include sales-weighted values and values residualized on category-period fixed effects.

prices can depend on where the firm is in the supply chain. During the period of increased consumer prices starting in 2022, variable profits, as captured by the markup, were relatively higher for retailers and relatively lower for the manufacturer. Thus, attempts to connect inflation to firm profitability are complicated by supply chain conduct.

3.3 Exploring Cross-Sectional Markup Variation

The distributions displayed in Figure 1 show that the variance in total markups is smaller than the variation in manufacturer and retail markups. This is due in part to the fact that manufacturer and retail markups are negatively correlated in the cross section. To demonstrate this more formally, we plot a binscatter of manufacturer versus retailer markups in Figure 4. The plot displays two sets of values: the raw data and the residual markups after controlling for category-period fixed effects. In both specifications, we find statistically significant negative slope coefficients.

We further investigate these correlations by decomposing markups into time, product, and residual components using the regression:

$$\mu_{it}^d = \delta_t^d + \delta_i^d + \varepsilon_{it}^d \tag{2}$$

where $d \in \{\text{Manufacturer, Retail}\}$, δ_t^d denotes time fixed effects, δ_i^d product fixed effects, and ε_{it}^d the residual component. The correlation coefficients are then computed for the aggregate markup series and for each of these components in the two stages of the supply chain. Results are shown in Appendix Table B.5.[14] The aggregate correlation between manufacturer and retail

[14]We use per-period sales weights in both the regression and the correlations.

Table 1: Margins and Quality

	Margins			Markup		
	Total	Manufacturer	Retail	Total	Manufacturer	Retail
Perceived Quality	0.015***	0.014***	0.001***	0.008***	0.030***	-0.026***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.79	0.81	0.56	0.38	0.35	0.30
N	16,476	16,476	16,476	16,476	16,476	16,476

Notes: This table reports the linear relation between margins or markups and (standardized) product quality estimated from the following linear model: $y_{it} = a + \alpha q_i + \beta X_{it} + \phi_{it} + \varepsilon_{it}$, with y_{it} being the variable of interest, margins or markups, for product i at time t, q_i (standardized) product quality, X_{it} controls including linear and quadratic package size to account for quantity discounts, ϕ_{it} fixed effects including product category interacted with time, and ε_{it} a mean zero error. Robust standard errors are reported in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

markups is -0.34. For the US, the correlation is negative for all components. There is a strong negative correlation over time (-0.70; Figure 3), along with a cross-sectional correlation across products of -0.42 and a residual correlation of -0.12. Our proposed model in Section 4, which invokes bargaining between the manufacturer and retailers, provides a way to rationalize the negative correlation in markups across products.

Finally, to explore one potential determinant of these patterns, we document the correlation between product quality and margins and markups in Table 1. We find that higher product quality is associated with higher total margins and markups, consistent with consumers having a less elastic demand for high-quality products. However, examining the patterns separately for the manufacturer and the retailer reveals stark differences in pricing behavior. The manufacturer achieves higher margins and markups with higher quality products.[15] In contrast, retail margins exhibit a much weaker relationship with quality, which leads to a negative correlation between retail markups and product quality. Interestingly, product quality explains a larger share of the variance in margins than in markups for all stages of the supply chain. We find similar patterns with our alternative measure of quality (product differentiation), which we report in Appendix Table B.6.[16]

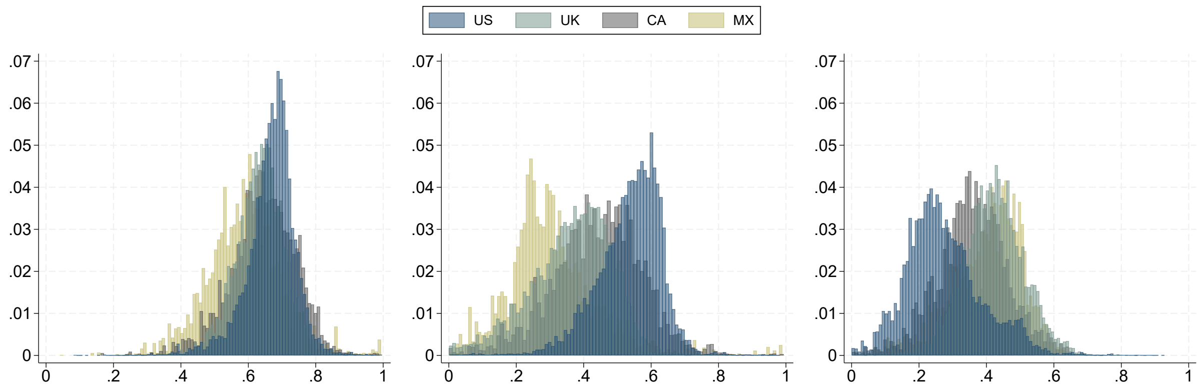
These results highlight the importance of considering separate stages of the supply chain for questions related to profitability, markups, and price levels. Our results indicate that product quality matters more to the manufacturer than it does to the retailer (in equilibrium). We proposed a two-stage pricing-bargaining framework in Section 4 to rationalize these patterns.[17]

[15] Since we observe only variable costs, this could reflect higher fixed costs for installing production factors and quality improvements.

[16] Appendix Figure B.2 and B.3 show binscatter plots along the entire distribution of the two quality indicators.

[17] Uniform margins within a category can be rationalized by a multi-product firm facing a logit demand (de Roos, 2011).

Figure 5: Markups Distributions



(a) Total (b) Manufacturer (c) Retail

Notes: This figure shows the sales-weighted frequency distribution of markups along the supply chain. The total markup is defined as the Lerner index of retail prices and production costs, $(p^R - c)/p^R$, the manufacturer markup as the Lerner index of wholesale prices and production costs, $(p^M - c)/p^M$, while the retail markup as the Lerner index of retail prices and wholesale costs, $(p^R - p^M)/p^R$.

3.4 The UK, Canada, and Mexico

We now examine markup patterns across the four countries in our data. Figure 5a shows total markups in Canada, Mexico, the United Kingdom, and the United States.[18] The distribution of total markups is remarkably similar across countries, with average values of 0.64 in the UK, 0.65 in Canada, and 0.60 in Mexico, compared to 0.67 in the US. All four countries exhibit meaningful dispersion in total markups (see Appendix Table B.4 for summary statistics).

Despite comparable total markup levels, we find substantial heterogeneity in the distribution of markups along the supply chain between the US and other countries (Figure 5b and Figure 5c). In Canada, manufacturer and retailer markups are more evenly distributed, with the manufacturer having slightly higher markups on average. In the UK, retail markups are systematically higher than manufacturer markups. Finally, Mexico has the highest retailer markups and the lowest manufacturer markups in the sample. These findings stand in stark contrast to the US market structure, as retailers in these three countries capture a substantially larger proportion of total markups (see Appendix Figure B.7). Our markup estimates at the firm level (averaging across the manufacturer and retail markup) are consistent with estimates reported in the literature.[19]

Total markups remain relatively stable over time in all countries. This stability reflects the negative correlation between manufacturing and retail markups over time, confirming

[18] Appendix Figure B.4 shows total markup distributions using raw retail prices instead of average per-product retail prices.

[19] In the UK, De Loecker and Eeckhout (2018) and Díez et al. (2021) obtain values of 0.40 and 0.23, close to our estimate of 0.39. In Mexico, De Loecker and Eeckhout (2018) obtain an estimate of 0.35, compared to 0.37 in our data. In Canada, De Loecker and Eeckhout (2018) obtain an estimate of 0.35, which is slightly lower than our estimate of 0.40.

Table 2: International Comparison

	Countries			
	US	UK	Canada	Mexico
Average Total Markup	0.67	0.64	0.65	0.60
Average Manufacturer Markup	0.54	0.36	0.46	0.32
Average Retail Markup	0.28	0.42	0.35	0.42
Average Product Markup	0.41	0.39	0.40	0.37
Average Manufacturer Margin Share	0.59	0.33	0.46	0.31
Average Retail Margin Share	0.41	0.67	0.54	0.69
Negative Time Series Corr.	Yes	Yes	Yes	No
Negative Product Corr.	Yes	Yes	No	Yes

Notes: This table summarizes the main results across the countries included in our sample. Margin shares are computed as manufacturer or retail margin over total margins, i.e., $\tilde{M}_t^M = M_t^M/(M_t^M + M_t^R)$ and $\tilde{M}_t^R = M_t^R/(M_t^M + M_t^R)$.

the pattern documented for the US. Appendix Figure B.6 displays this dynamic relationship, where increases in manufacturer markups correspond to decreases in retailer markups, and vice versa. This compensatory mechanism helps maintain overall markup stability by balancing fluctuations between different stages of the supply chain. Appendix Table B.5 reports the corresponding correlation coefficients based on the decomposition in Equation (2), highlighting cross-country heterogeneity. The UK exhibits a negative correlation in both aggregate markups and all underlying components. By contrast, Canada and Mexico have a negative correlation in two of the components and positive correlation in the third. Canada does not show a negative correlation across product fixed effects. Mexico stands out as the main exception, with weak negative correlations in the cross section, a positive correlation in the time series, and a positive overall correlation in manufacturer and retail markups.

Table 2 summarizes our findings across countries. We report means of our measures of markups, as well as the manufacturer and retailer margin shares. The margin share patterns are similar to the markup patterns, with the exception of Canada: retailers have a lower markup than manufacturers but a higher margin share.[20]

4 Model

We propose a model of supply chain pricing behavior that rationalizes several of our key findings. The framework considers a manufacturer that supplies a set of products, $\mathcal{I}$, to multiple retailers. The supplier-buyer network is fixed, and pricing occurs in two stages. First, the manufacturer determines the optimal retail prices (p_i^R) that maximize joint manufacturer-retailer profits for the set of products $\mathcal{I}$. Second, the manufacturer and the retailer negotiate wholesale prices (p_i^M) through a bargaining process for each product separately. The model is consistent

[20] As an example, consider $P^R = \$2.75$, $P^M = \$1.75$, and $c = \$1.00$. The retailer has a higher margin share ($1.00 out of the $1.75 total margin) but a lower markup.

with conversations with the manufacturer and captures features of our data that standard models do not readily account for, including the negative correlation between manufacturer and retailer markups described in Section 3.

A feature of our model is that the second-stage bargaining process does not influence retail prices, quantities, or joint profits. Thus, our model allows us to assess the determinants of manufacturer and retailer bargaining power without imposing additional structure on demand, supply, or competition. We quantify the Nash bargaining weights that determine equilibrium wholesale prices while taking retail prices and quantities as given. We then exploit variation across products, countries, and time to examine the different factors that predict relative bargaining power in our model.

4.1 Supply Chain Pricing

In the first stage, the manufacturer determines the retail prices that maximize supply-chain profits for its own products:

$$\max_{\{p_i^R\}} \sum_{i \in \mathcal{I}} \left(p_i^R - c_i\right) q_i \ , \tag{3}$$

where p_i^R is the retail price, c_i is the production cost, and q_i is the total retail quantity for product i. Without loss of generality, we write the model as if there is a single downstream retailer.

In practice, manufacturers often avoid directly setting retail prices through contracts. Instead, they incentivize retailers to adhere to preferred prices using a combination of "list prices" at the retail level (MSRP) and "promotional" rebates to the retailer. Moreover, manufacturers tend to focus on the behavior of the end consumer and spend extensive resources analyzing them.[21] Our specification is consistent with these dynamics and captures them in a reduced form.

At this stage, the manufacturer internalizes downstream consumer substitution patterns across products in $\mathcal{I}$, products of other manufacturers sold by the retailer, and the outside option. In general, one could put additional structure on demand to estimate substitution patterns and conduct counterfactuals. For our current purposes, no additional structure is necessary.

In the second stage, the manufacturer and the retailer bargain over the wholesale price for each product. Total supply-chain profits are fixed in stage 1, so only the split of those profits—implemented through the wholesale price—remains to be determined.[22] Let $\pi_i^M(p_i^M, q_i)$ and

[21]As one typical example, in a March 2023 earnings call, the executives of General Mills discuss pricing and elasticities several times, referring to retail consumer behavior. `https://seekingalpha.com/article/4589620-general-mills-inc-gis-q3-2023-earnings-call-transcript`

[22]The split can be represented as a wholesale price or a lump sum transfer; either will yield equivalent results. Consistent with our assumptions, the data used by the manufacturer does not distinguish between the two.

$\pi_i^R(p_i^M, q_i)$ denote manufacturer and retailer profits on product i at quantity q_i, and let $\bar{\pi}_i^M$ and $\bar{\pi}_i^R$ be their outside options. The Nash problem is:

$$\max_{p_i^M} \left[\pi_i^M(p_i^M, q_i) - \bar{\pi}_i^M\right]^{\tau_i}, \left[\pi_i^R(p_i^M, q_i) - \bar{\pi}_i^R\right]^{1-\tau_i}, \qquad \forall i \in \mathcal{I}. \tag{4}$$

We make the following assumptions regarding the disagreement payoffs. First, we abstract from strategic considerations across products or spillover from individual negotiations to other products. Bargaining is conducted product-by-product: the manufacturer and the retailer negotiate over thousands of products, and the median item accounts for less than one percent of volumes and sales within its product category, so any single product does not affect the others. Second, if negotiations break down, the retailer can immediately replace the product with a close substitute supplied by a competitive fringe making zero profits. Finally, negotiations occur at high frequency. Therefore, this implies that the production process of the manufacturer is already set, and the marginal cost of producing an additional unit of product is only the additional material to purchase. If the negotiation breaks down, the manufacturer incurs no costs. Under these assumptions, the disagreement payoffs satisfy $\bar{\pi}_i^M = \bar{\pi}_i^R = 0$, i.e., the outside options are effectively zero for both sides.

Under these conditions, Equation (4) simplifies to:

$$\max_{p_i^M} \left[\left(p_i^M - c_i\right) q_i\right]^{\tau_i} \left[\left(p_i^R - p_i^M\right) q_i\right]^{1-\tau_i}, \qquad \forall i \in \mathcal{I}. \tag{5}$$

The first component represents the profits of the manufacturer, expressed as manufacturer margin ($p_i^M - c_i$) times quantity. The second component is retailer profits, expressed as retail margins ($p_i^R - p_i^M$) times quantity. Here, τ_i and $(1 - \tau_i)$ represent the bargaining weights of the manufacturer and retailer, respectively, reflecting their relative bargaining power.

Because q_i is fixed from stage 1, the problem reduces to:

$$\max_{p_i^M} \left(p_i^M - c_i\right)^{\tau_i} \left(p_i^R - p_i^M\right)^{1-\tau_i}, \qquad \forall i \in \mathcal{I}. \tag{6}$$

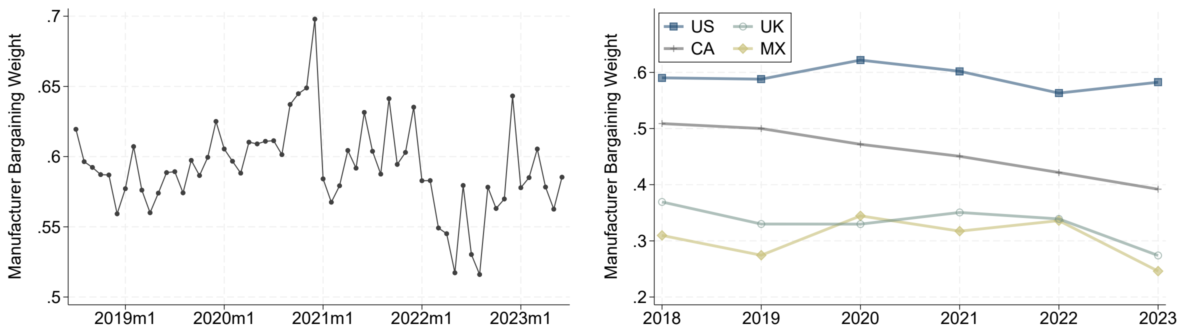
In equilibrium, the solution to the bargaining problem yields a share of margins for the manufacturer that is equal to the bargaining weight, τ_i. This can be expressed as

$$\frac{p_i^M - c_i}{p_i^R - c_i} = \tau_i. \tag{7}$$

Using our data on retail prices, wholesale prices, and production costs, we can recover the manufacturer's bargaining weights directly from the data.

With this approach, we interpret variation in profit split as arising from time-series and cross-sectional variation in bargaining power. In Appendix A, we present two alternative ap-

Figure 6: Manufacturer Bargaining Power



(a) The United States

(b) All countries

Notes: This figure shows the time series of the manufacturer's bargaining weights in the US (a) and across all countries (b). Bargaining weights are calculated using (7) and aggregated at the country-month level, weighted by sales.

proaches that interpret this variation as arising from time-series and cross-sectional variation in disagreement payoffs, while bargaining weights are fixed at the country level. Both approaches indicate that the manufacturer has more bargaining power in the US than other countries, and, despite the differences in interpretation, they feature similar time-series variation as our baseline approach.

4.2 Quantifying Manufacturer-Retailer Bargaining Power

Using the expression derived from our model, we can examine the relative shifts in markups between manufacturers and retailers and changes in bargaining power. We construct the sales-weighted average bargaining weights for the manufacturer at the monthly level for the US and at the annual level for cross-country comparisons.

Figure 6 plots the time series of manufacturer bargaining weights. In the US (Figure 6a), the manufacturer consistently held higher bargaining power than retailers, averaging 0.62 over the observed period. Moreover, the bargaining weight remained relatively stable until late 2020, when it experienced a sharp increase and subsequent decline due to changes in production costs. By 2022, bargaining power decreased significantly, coinciding with rising production costs.

The manufacturer exhibits lower bargaining power outside of the US (Figure 6b) when negotiating wholesale prices. The average bargaining weight is 0.47 in Canada, 0.33 in Mexico, and 0.36 in the United Kingdom. The evolution over time also varies across countries: in Canada, bargaining power has steadily declined since late 2019; in the United Kingdom, it remained unchanged over the period until a significant drop in 2023; while in Mexico, the manufacturer's bargaining power increased substantially in 2020 but fell again in 2023.

We examine the correlation between bargaining weights and economic factors to identify

Table 3: Bargaining Weight Predictors

	(1)	(2)	(3)	(4)	(5)
Production Cost	-0.496***	-0.496***	-0.481***	-0.471***	-0.480***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.005)
Total Margin	0.571***	0.559***	0.611***	0.486***	0.476***
	(0.002)	(0.002)	(0.003)	(0.004)	(0.005)
Sales per Capita	0.049***	0.051***	0.064***	0.048***	0.047***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
GDP per Capita	0.412***	-0.101**	0.556***	0.351***	0.419***
	(0.007)	(0.041)	(0.014)	(0.086)	(0.105)
CPI	-0.168***	0.028	-0.233***	-0.134**	-0.086
	(0.024)	(0.028)	(0.038)	(0.053)	(0.064)
Quality					0.027***
					(0.003)
Country FEs		X			
Non US			X		
US Only				X	X
Observations	42,458	42,458	18,220	24,238	16,476
R^2	0.672	0.675	0.688	0.477	0.477

Notes: This table reports the outcome of regressing the (log) manufacturer bargaining weights on (log) production costs, (log) total margins, (log) product sales, (log) GDP per capita, (log) CPI, and (standardized) quality. Standard errors in parentheses. $^{*}\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$.

potential determinants of the manufacturer's bargaining power. Factors considered include production costs (which reflect supply shocks), total margins (which reflect market structure and competition), product-level sales per capita (market penetration), GDP per capita (income levels)[23], and the Consumer Price Index (CPI) as a proxy for overall demand (once production costs and margins are controlled for). Using variation across products, time, and countries, this analysis aims to provide qualitative insights into the predictors of bargaining power.

The results in Table 3 shed light on the economic factors that influence the manufacturer's bargaining power and their relative importance in different contexts. All variables except quality (which is standardized) are in logs, allowing for the interpretation of coefficients as elasticities. The first column shows that production costs are negatively correlated with bargaining weights. This suggests that higher production costs, such as those observed during the post-pandemic surge in input costs, are linked to lower manufacturer bargaining power. A 10 percent increase in production costs is associated with a 4.96 percent decline in margin share. Conversely, total margins show a positive relationship with bargaining weights. Because higher margins persist for products with fewer close substitutes, this suggests that lower competition in the downstream sector strengthens the manufacturer's position.

The coefficients of product-level sales per capita and GDP per capita show that higher mar-

[23] We adjust GDP per capita for PPP to compare across countries.

ket penetration and higher income are also associated with higher manufacturer bargaining power. This suggests that products with a larger presence in the market and wealthier consumer bases provide greater leverage in negotiations for this manufacturer. Finally, the coefficient of CPI shows that higher demand, as captured by aggregate price levels after accounting for costs and product-specific margins, is associated with lower manufacturer bargaining power. This suggests that positive aggregate demand shocks may lead to disproportionate gains for retailers. Together, these factors explain more than 67 percent of the variation in bargaining weights.

In columns (2) through (4), we examine alternative specifications by introducing country fixed effects, restricting the sample to non-US countries, and focusing solely on the US. Across all specifications, the estimated coefficients are remarkably stable. In column (2), the inclusion of country fixed effects emphasizes within-country variation. Relative to our baseline specification, the coefficient on GDP per capita becomes negative and there is a decrease in the magnitude of the coefficient on CPI, with almost no change in R^2.[24] The stability in the other coefficients and R^2 suggests that our chosen variables effectively capture persistent cross-country differences in bargaining power. In column (3), we limit the analysis to Canada, Mexico, and the UK, while column (4) narrows the focus to the US. The coefficients are very similar across these specifications, underscoring the robustness of our results and suggesting the existence of a stable framework to explain bargaining weights across countries.

Finally, in column (5) we introduce our measure of product quality, which we have only for the US. Our earlier evidence indicated that higher product quality is associated with higher manufacturer markups but lower retailer markups (Section 3). Our analysis here provides corroborating evidence in terms of bargaining power: higher quality is associated with higher manufacturer bargaining power. Specifically, the estimated coefficient implies that a one standard deviation increase in product quality is associated with a 2.7 percent increase in the manufacturer's bargaining power.

5 Price Dynamics Along the Supply Chain

Thus far, we have treated pricing behavior as static. However, it is well known that prices may take time to reflect upstream cost shocks. Here, we consider the dynamics of cost pass-through. We provide reduced-form estimates of how cost shocks propagate along each part of the supply chain, and we document dynamic patterns that differ between the manufacturer and retailers. As in Section 3, we start with evidence from the United States before extending our analysis to the United Kingdom, Canada, and Mexico. We close this section by adding dynamic adjustments to bargaining weights in our model of supply chain pricing. Our estimates illustrate how dynamics in bargaining power can generate dynamics in cost pass-through.

[24] The sign flip of the coefficient on GDP is mostly driven by the negative correlation in Mexico, and to a lesser extent in Canada.

5.1 Cost Pass-Through Along the Supply Chain

We begin by examining how costs are transmitted to prices in the United States. First, we look at how costs are transmitted down each stage of the supply chain. Second, we consider the differential impact of expected and unexpected cost shocks. Third, we examine whether cost transmission differs for products of higher versus lower quality.

We measure the pass-through mechanisms at both the manufacturer and the retail levels to unravel the complementary dynamics between manufacturing costs and retail pricing strategies. Specifically, we compute the pass-through of costs at the manufacturer level using the following specification:

$$p_{ist}^{M} = a + \sum_{z=0}^{T} \alpha_z^M \hat{c}_{ist-z}^{M} + \sum_{z=0}^{T} \beta_z^M C_{st-z}^{M} + \phi_i + \varepsilon_{ist} \tag{8}$$

where p_{ist}^{M} represents the manufacturer prices for product i in category s at time t, and c_{ist}^{M} represents its production cost. We divide the latter into its product-specific component, $\hat{c}_{ist}^{M}$, by demeaning it, and the category common component, C_{st}^{M}, representing the product category average cost. ϕ_i are product fixed effects and ε_{ist} is a mean-zero error term. This specification, where the identification of pass-through coefficients $\{\alpha_z^M\}_{z=0}^{T}$ and $\{\beta_z^M\}_{z=0}^{T}$ is based on within-product variation over time, allows us to disentangle the effects on prices of product-idiosyncratic costs and changes in aggregate common components.

Similarly, the pass-through at the retailer level is estimated using the following specification:

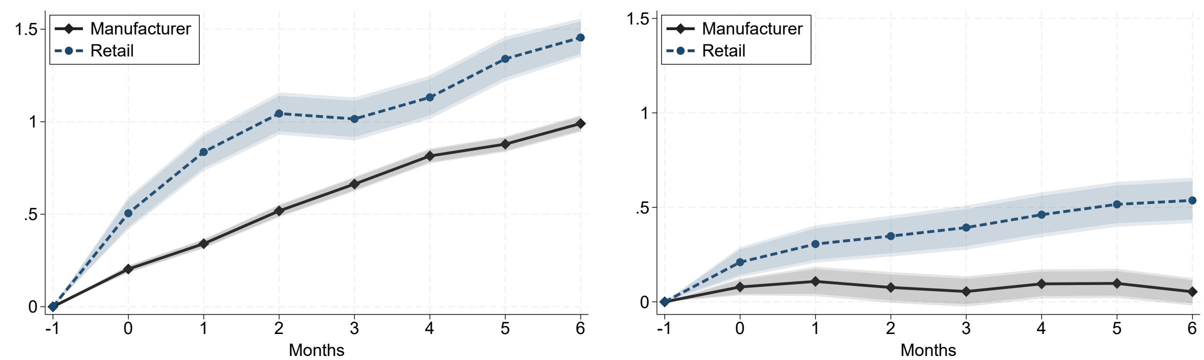
$$p_{ist}^{R} = b + \sum_{z=0}^{T} \alpha_z^R \hat{p}_{ist-z}^{M} + \sum_{z=0}^{T} \beta_z^R P_{st-z}^{M} + \gamma_i + \nu_{ist} \tag{9}$$

where p_{ist}^{R} represents the retail price for product i in category s at time t, and p_{ist}^{M} represents the manufacturer's price, which is the cost incurred by the retailers to purchase the product. As in the wholesale analysis, we divide the latter into a product-specific component, $\hat{p}_{ist}^{M}$, and a common component, P_{st}^{M}, representing the average cost of the product category. γ_i are product fixed effects. Although we study a single manufacturing firm that produces multiple products for the wholesale cost pass-through, we have information on several retailers selling the same product which we average as described in Section 2. Therefore, the pass-through coefficients at the retail level, $\{\alpha_z^R\}_{z=0}^{T}$ and $\{\beta_z^R\}_{z=0}^{T}$, reflect the average impact across retailers for the same product.

To address product attrition, we use the expanded sample in this section and restrict our baseline specification to analyze price responses within the first six months.[25] Figure 7a shows

[25] We report our baseline coefficients in Appendix Table B.7 and B.9, along with coefficients for different lags, showing cumulative price responses over extended periods. Appendix Table B.8 and B.10 reports the resulting coefficients including period fixed effects to control for aggregate conditions.

Figure 7: Cost Pass-through Along the Supply Chain



(a) Aggregate

(b) Idiosyncratic

Notes: This figure shows the cumulative pass-through of costs to wholesale prices and of wholesale prices to retail prices, estimated using Equation (8) and Equation (9). Panel (a) includes responses to aggregate shocks, and panel (b) to idiosyncratic ones. Solid lines are the point estimates, and shaded areas are the 95 and 90 percent confidence bands computed using the Delta method.

the cumulative price adjustments following an aggregate increase in costs, while Figure 7b examines the cumulative price responses to idiosyncratic cost changes. The figures reveal different pricing strategies, both with respect to idiosyncratic and aggregate components, and with respect to the manufacturer and retailers.

For both the manufacturer and retailers, price adjustments to aggregate cost shocks are substantial but unfold at different speeds. Following a $1 increase in aggregate costs, the manufacturer passes through $0.2 on impact, gradually increasing to full pass-through in levels within six months. In contrast, retailers exhibit a faster initial response, passing through $0.50 immediately, reaching full pass-through in levels within two months, and continuing to increase prices thereafter, with a cumulative adjustment of $1.45 after six months.

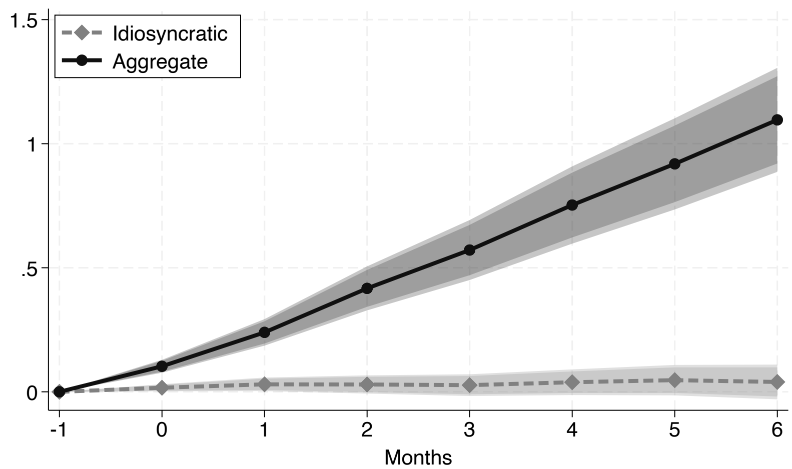
The manufacturer and retailers respond quite differently to idiosyncratic cost shocks. As shown in Figure 7b, the manufacturer's price response is muted and not statistically distinguishable from zero at any horizon within the first six months.[26] In contrast, retailers react more visibly, with an immediate pass-through of $0.21 following a $1 increase in wholesale costs. This is followed by small, gradual adjustments over time, reaching a cumulative response of $0.55 after six months.[27] This pattern is consistent with the disconnect between retail margins and quality we observed within a category, suggesting that retailers adjust partially and slowly to product-specific cost changes, potentially reflecting pricing strategies based on broader category-level dynamics rather than individual product conditions.

To further contextualize these dynamics, we use pass-through estimates to calculate the change in retail prices due to a $1 increase in production cost, incorporating adjustments at

[26] Appendix Table B.7 shows that the manufacturer's price adjustments to idiosyncratic cost components remain statistically insignificant even after one year.

[27] Appendix Table B.9 shows that retailer pass-through of idiosyncratic cost components remains incomplete even after one year.

Figure 8: Pass-through from Production Cost to Retail Price



Notes: This figure shows the cumulative pass-through of production costs to retail prices. The cumulative responses are calculated as $\theta_t^{\text{AGG}} = \sum_{i=0}^{t} \beta_i^R (\sum_{j=0}^{t-i} \beta_j^M)$, and as $\theta_t^{\text{IDIO}} = \sum_{i=0}^{t} \alpha_i^R (\sum_{j=0}^{t-i} \alpha_j^M)$, with θ_t^{AGG} and θ_t^{IDIO} being the cumulative retail price adjustment at time t to aggregate or idiosyncratic costs, and α^X and β^X with $X = \{M, R\}$ recovered from Equation (8) and (9). Standard errors are constructed by bootstrapping 500 times with replacement.

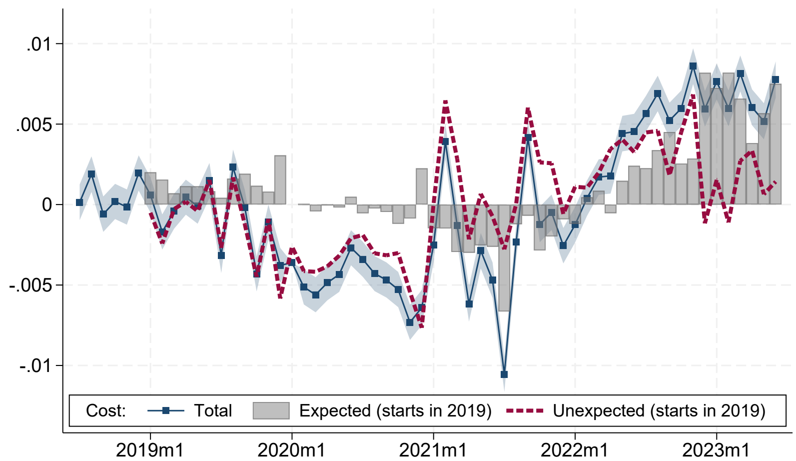
both the manufacturing and retail levels, as shown in Figure 8. The cumulative response at time t, following a shock at time $t = 0$, is calculated as $\theta_t^{\text{AGG}} = \sum_{z=0}^{t} \beta_z^R (\sum_{w=0}^{t-z} \beta_w^M)$, and as $\theta_t^{\text{IDIO}} = \sum_{z=0}^{t} \alpha_z^R (\sum_{w=0}^{t-z} \alpha_w^M)$, with θ_t^{AGG} and θ_t^{IDIO} being the cumulative retail price adjustment at time t to aggregate or idiosyncratic costs, and α^X and β^X with $X = \{M, R\}$ recovered from Equation (8) and (9).[28] Adding up coefficients from different regressions allows us to use more data than estimating pass-through from production costs to retail prices by addressing product attrition. To validate our results, we also estimate these pass-through coefficients directly, finding very similar results.[29]

The figure indicates that an aggregate shock to manufacturing costs, affecting the entire product category, is passed on to the final consumer within five months, with delays due to temporary cost absorption attributable primarily to the manufacturer, and, to a lesser extent, to the retailers. Importantly, two months after the shock, by which time retailers would have already passed through the cost change completely, retail prices have increased only by \$0.50, underscoring the role played by the manufacturer and the supply chain in general in delaying cost transmission (Minton and Wheaton, 2023). Furthermore, idiosyncratic shocks generate no meaningful price response along the supply chain. As shown in Figure 8, the cumulative

[28]This method of calculating the cumulative response accounts for delayed adjustments in both the manufacturing and retail sectors. For instance, a \$1 increase in aggregate production cost results in an immediate pass-through at period 0, which will be $\theta_0^{\text{AGG}} = \beta_0^R \beta_0^M$; after one month, $\theta_1^{\text{AGG}} = \theta_0^{\text{AGG}} + \beta_0^R \beta_1^M + \beta_1^R \beta_0^M = \beta_0^R(\beta_0^M + \beta_1^M) + \beta_1^R \beta_0^M$, and so on.

[29]Appendix Figure B.8 presents the cumulative response estimated by regressing retail prices directly on production costs using the following specification: $p_{ist}^R = b + \sum_{z=0}^{T} \alpha_z^R \hat{c}_{ist-z}^M + \sum_{z=0}^{T} \beta_z^C C_{st-z}^M + \gamma_i + \nu_{ist}$, where product-specific production costs are decomposed into idiosyncratic and aggregate components, as in Equation (9). Table B.11 shows the estimated coefficients.

Figure 9: Expected and Unexpected Costs Over Time



Notes: The figure displays total, expected, and unexpected production costs over time. The y-axis reports deviations from mean values over the sample period in US dollars per unit. Each point reflects monthly averages from a regression of costs on date and product fixed effects, weighted by per-period sales. 95% (robust) confidence intervals are displayed for total costs.

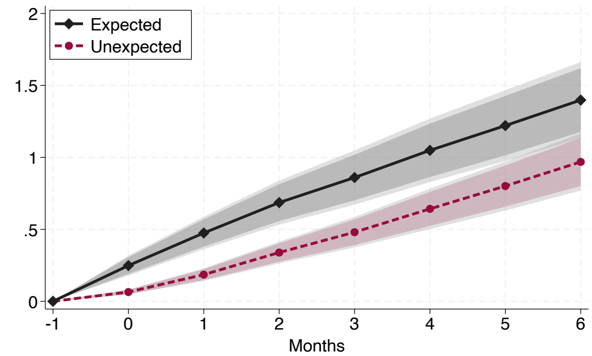
pass-through from production costs to retail prices remains statistically indistinguishable from zero throughout the first six months. This reflects the fact that the manufacturer do not adjust wholesale prices in response to product-specific cost changes, leaving retailers with no upstream cost pressure to justify retail price adjustments. As a result, there is no transmission of idiosyncratic shocks to consumers. Note that the retailer may respond to non-cost idiosyncratic factors that change wholesale prices, which explains why we might find a non-zero retail pass-through in Figure 7b.

Expected and Unexpected Costs The period under examination was characterized by significant global shocks that were largely unforeseen. In Figure 9, we leverage the detailed cost breakdown from the dataset to illustrate the changes in overall, expected, and unexpected costs. As highlighted by the coefficient of variation in Appendix Table B.3, unexpected costs, despite having an average close to zero, significantly contributed to the overall cost variation, similar to expected costs. Given the significant impact of unexpected shocks during this period, we investigate whether the manufacturer reacts differently to expected and unexpected shocks, potentially influencing the observed dynamics of cost pass-through.

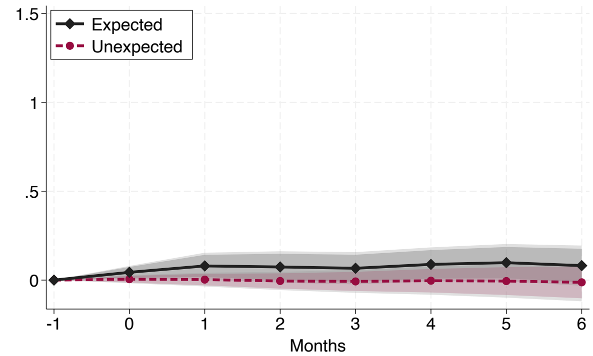
To explore potential deviations in pass-through from normal conditions, we use information on expected and unexpected cost shocks to estimate the differential price responses with the following specification:

$$p_{ist}^{M} = a + \sum_{z=0}^{T} \left\{ \alpha_{e,z}^{M} \hat{c}_{ist-z}^{e,M} + \beta_{e,z}^{M} C_{st-z}^{e,M} + \alpha_{u,z}^{M} \hat{c}_{ist-z}^{u,M} + \beta_{u,z}^{M} C_{st-z}^{u,M} \right\} + \phi_i + \varepsilon_{ist} \tag{10}$$

Figure 10: Pass-through from Production Cost to Retail Price by Cost Type



(a) Aggregate Cost



(b) Idiosyncratic Cost

Notes: This figure shows the cumulative pass-through of production costs to retail prices for expected and unexpected costs. The cumulative responses are calculated separately for expected and unexpected costs as $\theta^{\text{AGG}}_{y,t} = \sum_{i=0}^{t} \beta^{R}_{i}(\sum_{j=0}^{t-i} \beta^{M}_{y,j})$, and $\theta^{\text{IDIO}}_{y,t} = \sum_{i=0}^{t} \alpha^{R}_{i}(\sum_{j=0}^{t-i} \alpha^{M}_{y,j})$, with $\theta^{\text{AGG}}_{y,t}$ and $\theta^{\text{IDIO}}_{y,t}$ being the cumulative adjustment of the retail price at time t to aggregate or idiosyncratic costs with $y = \{e, u\}$ for expected and unexpected changes. α^{X}_{e} and α^{X}_{u} are recovered from Equation (10), and β^{X} from Equation (9) with $X = \{M, R\}$. Standard errors are constructed by bootstrapping 500 times with replacement.

where $c^{e,M}_{ist}$ represents the expected cost change at time t and $c^{u,M}_{ist}$ the unexpected one, which we split into a demeaned component and the product category average. Given that we do not have the cost breakdown for retailers, we limit our focus to the manufacturer and assume retailers cannot distinguish between expected and unexpected cost changes.

Figure 10 shows the cumulative pass-through from production costs to retail prices, combining the responses at both the manufacturing and retail stages, following the approach used in Figure 8.[30] The results indicate that for aggregate cost shocks, expected changes are passed through to retail prices more rapidly and to a greater extent than unexpected changes. The cumulative response to expected aggregate costs reaches \$1.50 after six months, while the response to unexpected aggregate costs lags behind but follows a similar patter. For idiosyncratic costs, the cumulative pass-through is indistinguishable from zero regardless of whether the shock is expected or unexpected.

The manufacturer's response, documented in Appendix Figure B.9, shows that expected aggregate shocks trigger a strong and immediate price reaction, with pass-through reaching \$0.50 on impact and climbing to \$1.10 after six months. In contrast, the response to unexpected aggregate shocks starts much smaller—at \$0.20—and only gradually reaches \$0.90 over the same horizon. For idiosyncratic costs, the manufacturer exhibits small changes in prices after expected shocks, but these decline one month later, suggesting the effect is transitory and not economically meaningful.

These findings highlight the differential behaviors throughout the supply chain in response to both the type of shock (aggregate or idiosyncratic) and its nature (expected or unexpected).

[30]While the manufacturer exhibits heterogeneous responses depending on the nature of the shock recovered from Equation (10), we apply the coefficients for retailers estimated from Equation (9).

The manufacturer responds more strongly and faster to expected aggregate cost changes, possibly indicating prudence or delays caused by nominal rigidities, while reacting more slowly to unexpected aggregate cost changes. As a result, the slower pass-through at the manufacturing level for unexpected shocks leads to delayed transmission to final prices, amplifying price stickiness of unanticipated cost volatility.

Product Quality Finally, we investigate the role of quality differentiation in the transmission of cost shocks to prices. For that, we use the following specification for the manufacturer:

$$p^M_{ist} = a + \sum_{z=0}^{T} \left\{ \alpha^M_z \hat{c}^M_{ist-z} + \beta^M_z C^M_{st-z} + \mathrm{I}_{q,i} \times \left(\alpha^M_{q,z} \hat{c}^M_{ist-z} + \beta^M_{q,z} C^M_{st-z} \right) \right\} + \phi_i + \varepsilon_{ist} \tag{11}$$

and for retailers:

$$p^R_{ist} = b + \sum_{z=0}^{T} \left\{ \alpha^R_z \hat{p}^M_{ist-z} + \beta^R_z P^M_{st-z} + \mathrm{I}_{q,i} \times \left(\alpha^R_{q,z} \hat{p}^M_{ist-z} + \beta^R_{q,z} P^M_{st-z} \right) \right\} + \gamma_i + \nu_{ist} \tag{12}$$

with $\mathrm{I}_{q,i}$ being a dummy variable taking value 1 for products with quality above the average within a category, else 0.

We find no significant differences between pass-through estimates for high- and low-quality products in response to aggregate and idiosyncratic cost shocks, as shown in Figure B.12. Thus, the evidence suggests that quality does not significantly influence the degree of pass-through for the products in our sample.[31]

5.2 Pass-through in the UK, Canada, and Mexico

Finally, we study cost transmission in the United Kingdom, Canada, and Mexico. To analyze price dynamics, we use the same specifications as in the US: Equation (8) for the manufacturer and Equation (9) for the retailers, using the expanded sample of observations. This ensures consistency and comparability across countries. We estimate pass-through jointly by interacting coefficients and fixed effects with country dummies to capture country-specific dynamics. Appendix Figure B.13 shows the cumulative pass-through of production costs to wholesale prices, of wholesale prices to retail prices, and of production costs to retail prices for the United Kingdom, Canada, and Mexico, respectively.[32]

The manufacturer's response to cost shocks is remarkably consistent across countries. In the United Kingdom, Canada, and Mexico—as in the United States—aggregate cost shocks are gradually passed through to wholesale prices, though the cumulative six-month pass-through is

[31]The manufacturer's and retailers' individual responses are provided in Appendix Figure B.11.
[32]The cumulative response of retail prices to production cost changes is constructed using the same calculation as for Figure 8.

a bit less than one outside of the US. The response to idiosyncratic shocks is limited but varies across countries: wholesale prices remain unchanged in Canada, rise modestly to around $0.20 in Mexico, and reach $0.50 in the United Kingdom. This pattern reflects the little weight that the manufacturer has in its pricing behavior with respect to product-specific cost changes.

Greater heterogeneity arises on the retailer side. In response to aggregate shocks, retail price adjustments are large and relatively fast in the United Kingdom, with cumulative pass-through reaching $1.50 within six months. In Canada, the retail response is more gradual—muted in the first three months and eventually approaching one. In Mexico, the retailer response is substantially more limited, with pass-through peaking at roughly $0.50. For idiosyncratic shocks, Canadian retailers remain entirely unresponsive, while those in the United Kingdom and Mexico gradually adjust prices, reaching about $0.50 over the six-month horizon, as in the United States.

These individual responses generate some similar patterns in the combined pass-through from production costs to retail prices across countries. Aggregate shocks are fully transmitted to consumers within six months in both the United Kingdom and Canada, although the timing and composition of the adjustment differ. In contrast, idiosyncratic shocks fail to reach final prices in either country, as inaction by either the manufacturer or the retailers prevents upstream cost changes from propagating downstream. Mexico stands out as the only country where both aggregate and idiosyncratic shocks result in negligible combined pass-through, highlighting more limited transmission along the supply chain.

5.3 Dynamic Evolution of Bargaining Power

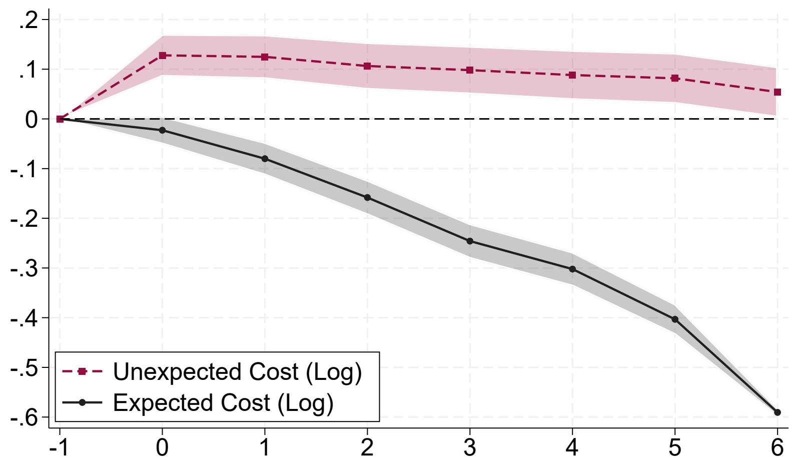
The results in this section indicate that wholesale and retail prices adjust dynamically to cost shocks, while our earlier results showed a negative correlation in markups between the manufacturer and the retailer. Taken together, this suggests that dynamic adjustments in bargaining power may explain the divergence between manufacturer and retailer cost pass-through.

We start by linking the results to the cost-pass through rates estimated in the previous section to better understand the determinants of bargaining power. Following a positive cost shock, the manufacturer would capture a larger margin share—that is, enhance its bargaining power—if the percentage change in its margin (i.e., $\Delta M^M/M^M$) exceeds the percentage change in the total margin ($\Delta M^T/M^T$). This condition can be written as:

$$\rho^M - 1 > (\rho^T - 1)m_0,$$

where ρ^M is the manufacturer's pass-through, ρ^T is the total pass-through from production cost to retail price (equal to the product $\rho^R\rho^M$), and m_0 is the initial manufacturer's margin share. Using the pass-through estimates from Appendix Table B.7 and B.9, along with the margin share from Table 2, we confirm that this condition is not satisfied on impact, thus

Figure 11: Cumulative Responses of Manufacturer Bargaining Weight



Notes: This figure shows the cumulative pass-through of production costs to manufacturer bargaining weight. The cumulative responses are calculated summing the coefficients from Table B.12, while standard errors are constructed using the Delta method.

rationalizing the negative relationship between production costs and bargaining weights shown in Table 3. Intuitively, the manufacturer is not able to pass through the cost shock quickly enough to enhance its bargaining power, especially given its initial large margin share.

To explore these dynamics more directly, we use our estimates of bargaining weights from the model of Section 4 to examine how these weights evolve over time in response to cost changes. Given the differences in estimated pass-through in response to expected and unexpected costs, we include these costs separately when examining dynamics. We follow closely the descriptive regressions from Section 4 while adding lags to the measures of cost shocks to account for dynamics in pricing behavior.

Figure 11 reports the cumulative response of manufacturer bargaining weight to expected and unexpected costs up to six months after the shock. The introduction of lagged cost shocks reduces the contemporaneous response to expected costs. With six-month lags, this coefficient is nearly zero. The lagged coefficients are negative, statistically significant, and economically meaningful.[33] These coefficients suggest that changes in production costs affect bargaining power gradually rather than immediately.

When incorporating lagged shocks, contemporaneous unexpected cost changes show a positive effect on manufacturer bargaining power. However, this dissipates over the following months and the longer-run effect of a permanent unexpected cost shock is negative, as indicated by the sum of the current and lagged unexpected cost coefficients.[34]

[33]The sum of the expected cost coefficients is -0.572 in the specification with two-month lags and -0.593 with six-month lags, which are similar to the estimated contemporaneous effect. This indicates that the immediate effect captured in our baseline specification reflects the combined impact of current and past cost changes.

[34]Regression coefficients are reported in Appendix Table B.12. In magnitudes, we find a slightly larger response to expected costs (-0.539) and a much smaller response to unexpected costs (-0.118), compared to the coefficient of

One possible explanation for this pattern is the following: at the arrival of an unexpected cost shock, the manufacturer can immediately push for higher wholesale prices that the retailer does not immediately pass on. Given some time to respond, the retailer adjusts retail prices or pushes back against these cost increases. These dynamic patterns may help explain the observed stability in total markups despite significant cost fluctuations. When costs increase, the manufacturer's bargaining power decreases gradually, leading to a smoother adjustment of margins between supply chain participants.

These results suggest a different interpretation to empirical findings of differential speeds of price adjustment between stages of the supply chain. When wholesale prices are determined by dynamic bargaining, then the dependent variable in a manufacturer pass-through regression and the key independent variable in the retail pass-through regression reflect this bargaining game. Thus, considering estimated pass-through relationships for a single stage of the supply chain requires some care.

6 Conclusion

This study analyzes markups and pricing strategies along the supply chain in the United States, the United Kingdom, Canada, and Mexico. We created a unique dataset combining detailed product price and cost information from a major global manufacturer with corresponding retail prices collected online. With data from around 2,000 products, we measure markups for both the manufacturer and retailers without relying on strong assumptions.

Our findings reveal that total markups are similar in magnitude across countries, averaging around 0.65, but there is significant heterogeneity along the supply chain. This indicates substantial market power at both the manufacturer and the retailer levels and suggests that economic models that assume a single sector or perfect competition in upstream or downstream sectors may not be well-suited to capture the richness of markup patterns in the real world.

Total markups are stable and shared between the manufacturer and retailers. We do not find evidence that inflation is driven by higher markups; in the time series, higher prices are driven by higher costs and total markups are fairly stable. These findings are not consistent with the "greedflation" hypothesis, which suggests that in recent years inflation was driven by firms increasing their markups. Total markup stability over time is due to the negative correlation along the supply chain, where adjustments in the manufacturing and retail sectors are asymmetric and partially offset each other.

We develop a two-stage supply chain pricing model to rationalize these findings. Our model fits key facts in our data that are not readily explained by standard models in the industrial

-0.488 on production costs. This asymmetry parallels our previous finding that expected costs are transmitted more rapidly through the supply chain, and may be driven, for example, if retailers raise prices by more when wholesale price increases are expected.

organization and macroeconomic literature. This model can be adapted for future research on how supply chain relationships influence various economic phenomena.

Our model allows us to quantify the relative bargaining power between the manufacturer and retailers. The analysis reveals that the manufacturer holds greater bargaining power than retailers in the US, while retailers have greater bargaining power than the manufacturer in other countries. Over time, the manufacturer's bargaining power has declined in the United States and Canada, remained stable in the United Kingdom, and increased significantly in Mexico in 2020.

Using variation across products, countries, and time, we analyze different predictors of bargaining power. We find that the manufacturer bargaining weights increase with income and market penetration and decrease with production costs and inflation. Manufacturer bargaining weights also increase with the total margin of a product, indicating the manufacturer captures a greater share when fewer close substitutes are available.

Finally, we show that the manufacturer and the retailers adjust their prices at different rates and magnitudes. Differences in the pass-through along the supply chain have significant implications for the transmission of various shocks. Idiosyncratic shocks generate little price adjustment: the manufacturer does not respond, and retailers adjust only partially and slowly. As a result, product-specific cost changes are transmitted only partially to final prices. In contrast, aggregate shocks are passed gradually, but long-run pass-through is larger as both the manufacturer and retailers eventually fully pass on these costs. Additionally, the more unexpected the shock, the slower the pass-through. Our model of supply chain pricing can rationalize these patterns as dynamic changes in bargaining power in response to cost shocks.

From a policy perspective, these findings underscore the importance of considering supply chain dynamics when addressing inflation and market power. The differing speeds at which cost changes propagate through the supply chain can delay consumer price responses to supply-side shocks. Furthermore, shifts in economic conditions can reshape the bargaining positions of suppliers and buyers, affecting price setting and market outcomes. Accounting for these factors is crucial to developing effective strategies that promote price stability and competitive markets.

One clear topical application of our findings is trade policy, especially in light of ongoing US trade tensions and proposed tariffs on a range of imports. Our results suggest that the impact of tariffs on consumer prices may depend on how predictably and broadly they are applied. When the tariffs affect entire product categories and are more expected, the manufacturer and retailers tend to adjust prices more quickly, leading to faster—and complete—pass-through. In contrast, if tariffs are product-specific or more uncertain, price adjustments may tend to be slower. Markups may shift across stages of the supply chain over time: initially falling for manufacturers as import costs rise, and later for retailers as wholesale and retail prices gradually adjust.

References

Aguirregabiria, V. (1999). The dynamics of markups and inventories in retailing firms. *The Review of Economic Studies*, 66(2):275–308.

Alvarez, F., Lippi, F., and Oskolkov, A. (2022). The macroeconomics of sticky prices with generalized hazard functions. *The Quarterly Journal of Economics*, 137(2):989–1038.

Alviarez, V. I., Fioretti, M., Kikkawa, K., and Morlacco, M. (2023). Two-sided market power in firm-to-firm trade. Technical report, National Bureau of Economic Research.

Amiti, M., Itskhoki, O., and Konings, J. (2019). International shocks, variable markups, and domestic prices. *The Review of Economic Studies*, 86(6):2356–2402.

Anderson, E., Rebelo, S., and Wong, A. (2025). Markups across space and time. *Review of Economic Studies*.

Atalay, E., Frost, E., Sorensen, A. T., Sullivan, C. J., and Zhu, W. (2025). Scalable demand and markups. *Journal of Political Economy*.

Auer, R., Burstein, A., and Lein, S. M. (2021). Exchange rates and prices: evidence from the 2015 swiss franc appreciation. *American Economic Review*, 111(2):652–686.

Auer, R. A., Chaney, T., and Sauré, P. (2018). Quality pricing-to-market. *Journal of International Economics*, 110:87–102.

Bils, M. (1987). The cyclical behavior of marginal cost and price. *The American Economic Review*, pages 838–855.

Bils, M. and Kahn, J. A. (2000). What inventory behavior tells us about business cycles. *American Economic Review*, 90(3):458–481.

Bils, M., Klenow, P. J., and Malin, B. A. (2018). Resurrecting the role of the product market wedge in recessions. *American Economic Review*, 108(4-5):1118–1146.

Bilyk, O., Grieder, T., and Khan, M. (2023). Markups and inflation during the covid-19 pandemic. Technical report, Bank of Canada.

Bonadio, B., Fischer, A. M., and Sauré, P. (2020). The speed of exchange rate pass-through. *Journal of the European Economic Association*, 18(1):506–538.

Brand, J. (2021). Differences in differentiation: Rising variety and markups in retail food stores. *Available at SSRN 3712513*.

Burstein, A., Carvalho, V. M., and Grassi, B. (2020). Bottom-up markup fluctuations. Technical report, National Bureau of Economic Research.

Cavallo, A. (2013). Online and official price indexes: Measuring argentina's inflation. *Journal of Monetary Economics*, 60(2):152–165.

Cavallo, A. (2017). Are online and offline prices similar? evidence from large multi-channel retailers. *American Economic Review*, 107(1):283–303.

Cavallo, A. (2018). Scraped data and sticky prices. *Review of Economics and Statistics*, 100(1):105–119.

Cavallo, A. and Kryvtsov, O. (2023). What can stockouts tell us about inflation? evidence from online micro data. *Journal of International Economics*, page 103769.

Cavallo, A., Lippi, F., and Miyahara, K. (2024). Large shocks travel fast. *American Economic Review: Insights*.

Cavallo, A. and Rigobon, R. (2016). The billion prices project: Using online prices for measurement and research. *Journal of Economic Perspectives*, 30(2):151–178.

De Loecker, J. and Eeckhout, J. (2018). Global market power. Technical report, National Bureau of Economic Research.

De Loecker, J., Eeckhout, J., and Unger, G. (2020). The rise of market power and the macroeconomic implications. *The Quarterly Journal of Economics*, 135(2):561–644.

De Loecker, J. and Scott, P. (2022). Markup estimation using production and demand data. an application to the us brewing industry. Technical report, Working paper.

de Roos, N. (2011). Markup uniformity under the multi-nomial logit. *Available at SSRN 1804735*.

Demirer, M. and Rubens, M. (2025). Welfare effects of buyer and seller power. Technical report, National Bureau of Economic Research.

Díez, F. J., Fan, J., and Villegas-Sánchez, C. (2021). Global declining competition? *Journal of International Economics*, 132:103492.

Döpper, H., MacKay, A., Miller, N., and Stiebale, J. (2025). Rising markups and the role of consumer preferences. *Journal of Political Economy*.

Eichenbaum, M., Jaimovich, N., and Rebelo, S. (2011). Reference prices, costs, and nominal rigidities. *American Economic Review*, 101(1):234–262.

Galeotti, M. and Schiantarelli, F. (1998). The cyclicality of markups in a model with adjustment costs: econometric evidence for us industry. *Oxford Bulletin of Economics and Statistics*, 60(2):121–142.

Gopinath, G., Gourinchas, P.-O., Hsieh, C.-T., and Li, N. (2011). International prices, costs, and markup differences. *American Economic Review*, 101(6):2450–2486.

Koujianou Goldberg, P. and Hellerstein, R. (2013). A structural approach to identifying the sources of local currency price stability. *Review of Economic Studies*, 80(1):175–210.

Kryvtsov, O. and Midrigan, V. (2013). Inventories, markups, and real rigidities in menu cost models. *Review of Economic Studies*, 80(1):249–276.

Leduc, S., Li, H., and Liu, Z. (2024). Are markups driving the ups and downs of inflation? *FRBSF Economic Letter*, 2024(12):1–5.

MacKay, A. and Remer, M. (2024). Consumer inertia and market power. *Available at SSRN 3380390*.

Meyer, B. and Sheng, X. S. (2024). Unit cost expectations and uncertainty: Firms' perspectives on inflation. *FRB Atlanta Working Paper*.

Minton, R. and Wheaton, B. (2023). Delayed inflation in supply chains: Theory and evidence. *Available at SSRN 4470302*.

Nakamura, E. (2008). Pass-through in retail and wholesale. *American Economic Review*, 98(2):430–437.

Nakamura, E. and Zerom, D. (2010). Accounting for incomplete pass-through. *The Review of Economic Studies*, 77(3):1192–1230.

Nekarda, C. J. and Ramey, V. A. (2020). The cyclical behavior of the price-cost markup. *Journal of Money, Credit and Banking*, 52(S2):319–353.

Rotemberg, J. J. and Woodford, M. (1999). The cyclical behavior of prices and costs. *Handbook of macroeconomics*, 1:1051–1135.

Sangani, K. (2022). Markups across the income distribution: Measurement and implications. *Available at SSRN 4092068*.

Sangani, K. (2023). Pass-through in levels and the incidence of commodity shocks. Available at SSRN: `https://ssrn.com/abstract=4574233` or `http://dx.doi.org/10.2139/ssrn.4574233`.

Spengler, J. J. (1950). Vertical integration and antitrust policy. *Journal of Political Economy*, 58(4):347–352.

Stroebel, J. and Vavra, J. (2019). House prices, local demand, and retail prices. *Journal of Political Economy*, 127(3):1391–1436.

Toxvaerd, F. (2024). Bilateral monopoly revisited: Price formation, efficiency and countervailing powers. Technical report, CEPR Discussion Papers.

Vaona, A. (2016). A nonparametric panel data approach to the cyclical dynamics of price-cost margins in the fourth kondratieff wave. *Eurasian Business Review*, 6:155–170.

Villas-Boas, S. B. (2007). Vertical relationships between manufacturers and retailers: Inference with limited data. *The Review of Economic Studies*, 74(2):625–652.

Appendix

A Alternative Bargaining Assumptions

We propose an alternative version of the theoretical framework introduced in Section 4, which differs from the baseline in one key respect: it assumes fixed bargaining weights for both parties and introduces a time-varying outside option $\bar{\pi}_i^M \geq 0$ for the manufacturer and $\bar{\pi}_i^R \geq 0$ for the retailer. Product pricing remains unchanged: it follows a two-stage process in which the manufacturer first sets retail prices to maximize joint supply chain profits, and then the manufacturer and retailer negotiate the division of product-level margins.

Product margins are split via a Nash bargaining protocol with fixed weights $\tau_i \in [0, 1]$ for the manufacturer:

$$\max_{p_i^M} \left(p_i^M - c_i - \bar{\pi}_i^M\right)^{\tau_i} \left(p_i^R - p_i^M - \bar{\pi}_i^R\right)^{1-\tau_i}, \ \forall i \in \mathcal{I}. \tag{A.1}$$

Taking the first-order condition yields:

$$\tau_i = \frac{p_i^M - c_i - \bar{\pi}_i^M}{p_i^R - c_i - \bar{\pi}_i^R - \bar{\pi}_i^M}, \tag{A.2}$$

where the bargaining weight corresponds to the share of surplus the manufacturer captures in the negotiation. Unlike Equation (7) in the baseline model, this expression cannot be directly mapped to the data, as it depends on two unobserved outside options.

We proceed in two complementary ways to bring Equation (A.2) to the data. First, we impose a parametric restriction by assuming that the expected value of each party's outside option is a constant fraction $A \in [0, 1)$ of their *average* margin:

$$\mathbb{E}[\bar{\pi}_i^M] = A\ \mathbb{E}[p_i^M - c_i], \qquad \mathbb{E}[\bar{\pi}_i^R] = A\,\mathbb{E}[p_i^R - p_i^M].$$

Taking expectations of Equation (A.2) and substituting these moment conditions yields:

$$\tau = \frac{\mathbb{E}[p_i^M - c_i]}{\mathbb{E}[p_i^R - c_i]}. \tag{A.3}$$

Since A cancels out, the ratio of sample means identifies τ for any assumed value of A.

Second, we provide a more flexible alternative by estimating the manufacturer's bargaining

Table A.1: Bargaining Weight with Time-Varying Outside Options

(a) Calibration Exercise

	(1) US	(2) UK	(3) CA	(4) MX
Bargaining Weight	0.59	0.33	0.42	0.31

(b) Estimation Exercise

	(1) US	(2) UK	(3) CA	(4) MX
Bargaining Weight	0.399***	0.281***	0.383***	0.282***
	(0.007)	(0.004)	(0.008)	(0.023)
Constant	0.023***	0.007***	0.008***	0.002
	(0.001)	(0.000)	(0.001)	(0.002)
R^2	0.61	0.52	0.67	0.43
N	24,238	7,713	6,618	3,889

Notes: This table reports estimates for bargaining weights with time-varying outside option. Panel a) shows weighted averages from Equation (A.3), and Panel b) shows OLS coefficients and (robust) standard errors of Equation (A.4) using per period sales as weights.

weight directly. Rearranging Equation (A.2) yields the following linear regression specification:

$$p_i^M - c_i = \tau_i(p_i^R - c_i) + (1-\tau_i)\bar{\pi}_i^M - \tau_i\bar{\pi}_i^R\ , \tag{A.4}$$

which we estimate via OLS using period sales weights. The estimate of τ_i is unbiased under the assumption that outside options are mean-independent of the total margin.

Table A.1 reports the results. Table A.1a shows bargaining weights derived from the calibration exercise with parametric restrictions, while Table A.1b reports country-level OLS estimates.[35] Both approaches yield the same picture: the manufacturer has the strongest bargaining power, meaning it retains the largest share of surplus, in the United States, while its bargaining power is weaker in the UK, Canada, and Mexico. The calibrated weights (Table A.1a) closely match the average of the time-varying bargaining weights recovered in Section 4. In contrast, the OLS estimates (Table A.1b) are lower. One reason for this is that our OLS estimates attribute more of the manufacturer's bargaining power to greater relative outside options, as we now discuss.

While we cannot separately identify $\bar{\pi}^M$ and $\bar{\pi}^R$ for each product without further assumptions, we can recover the combined term $\left[(1-\tau_i)\bar{\pi}_i^M - \tau_i\bar{\pi}_i^R\right]$, which reflects a weighted difference between the manufacturer's and retailer's outside options. Using the estimated bargaining weights, we can recover the combined outside option term from equation (A.4) for both specifications. For the OLS specification, the regression constant identifies the (sales-weighted) average of this combined term, and the product-specific value is recovered by adding the re-

[35] All moments are computed using period sales weights, consistent with Section 4.

gression residuals to the constant.[36] Estimated constants are reported in Table A.1b, and are positive and significant in the US, UK, and Canada, but not significantly different from zero in Mexico.[37] In the US, we estimate a greater relative outside option, which explains the greater decline in the bargaining weight (compared to other countries) from the calibration exercise.

We explore the time-series dynamics of the combined outside option term in Figure A.1. The top panels show results from the calibration exercise, and the bottom panels from the estimation exercise. Figure A.1a displays monthly variation in the US under the calibration approach. The combined term fluctuates around zero by construction, with notable volatility: it spikes at the end of 2020 and falls sharply in early 2022, before returning to trend. Figure A.1c shows similar high-frequency variation under the estimation approach, though the series now centers around a positive mean of approximately 0.02.

Figure A.1b plots annual averages across countries from the calibration exercise. The series remains relatively stable for the US and Canada, while Mexico and the UK exhibit a pronounced decline in 2023. A comparable pattern emerges from the estimation-based series in Figure A.1d, with the US, UK, and Canada consistently showing positive averages.

Finally, we examine the correlation between estimated combined term and a set of economic variables to shed light on the potential determinants of outside options in favor of one or the other party involved in the negotiation. This exercise mirrors the analysis presented in the main text, where we explored how bargaining power covaries with market structure and supply chain characteristics.

Since a non-negligible share of the combined outside option terms are negative, we cannot apply a log transformation. Instead, we standardize it and regress it on the same set of predictors. For completeness, we also replicate Table 3 using the standardized level of bargaining power (recovered from Equation (7)) as the dependent variable. The results, presented in Table A.2, remain consistent with the baseline specification: all coefficients preserve their sign and statistical significance, though the R^2 values are lower than in our baseline specification.[38]

We now examine how the combined outside option term correlates with product and market characteristics, noting that an increase in the combined term $\left[(1-\tau_i)\bar{\pi}_i^M - \tau_i\bar{\pi}_i^R\right]$ implies an increase in the manufacturer's outside option relative to retailer's. Table A.3 reports the estimated coefficients for the calibration exercise, and Table A.4 reports the same analysis using the combined outside option terms resulting from the estimation exercise.

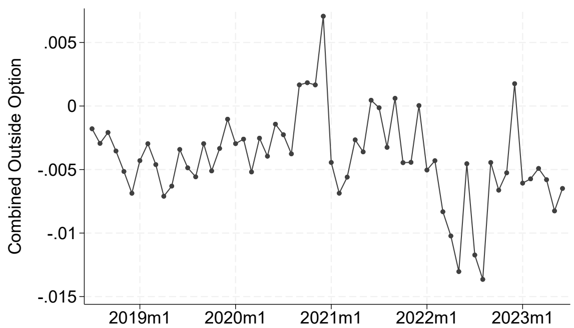
Some patterns are consistent across all three tables. Product sales per capita remain a strong and stable predictor, with large positive coefficients throughout. This suggests that products with broader market penetration are associated with stronger fallback positions for the man-

[36]We trim the resulting estimates of the combined outside option term at the 1% level.

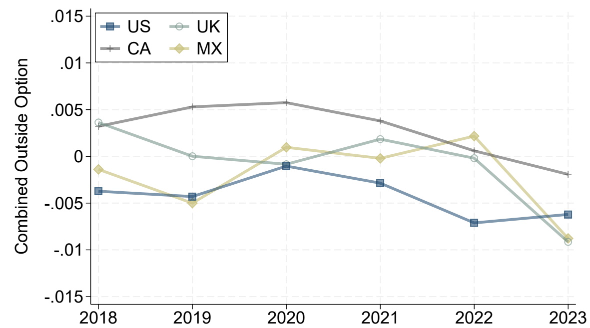
[37]A regression without a constant—effectively assuming this term equals zero on average—yields higher τ estimates in all countries: 0.53 in the US, 0.33 in the UK, 0.43 in Canada, and 0.31 in Mexico. Median coefficients from quantile regressions with a constant are also close to those from the OLS without constant.

[38]The coefficient on quality appears larger than in the baseline because the dependent variable is standardized, while quality is still in logs and fixed over time, thus presenting very little variation.

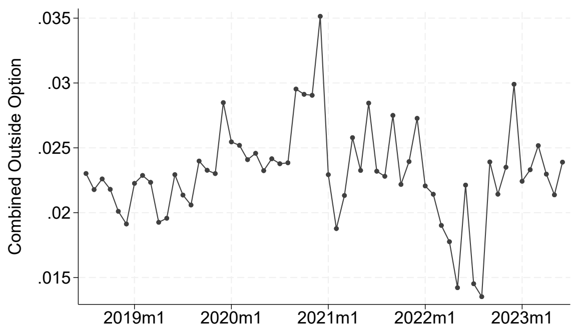
Figure A.1: Combined Outside Option Over Time



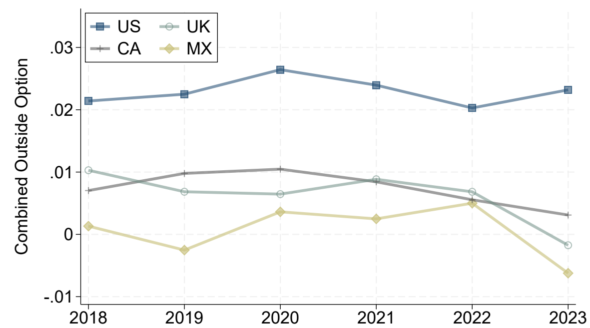
(a) The United States



(b) All countries



(c) The United States



(d) All countries

Notes: This figure shows the time series of the estimates of the combined outside options term $\left[(1-\tau_i)\bar{\pi}_i^M - \tau_i\bar{\pi}_i^R\right]$. Panel (a) and (b) show estimates from the calibration exercise, while Panel (c) and (d) estimates from the estimation exercise.

ufacturer, possibly due to demand scale or distribution leverage. Inflation, measured as the consumer price index (CPI) is negatively and significantly associated with the combined term across all specifications.

However, we do see changes in sign for some key variables across specifications and within specifications across countries. Overall, the predictive power of these regressions is substantially lower than our baseline specification. R^2 values for column (1) are 0.20 and 0.17 for the combined outside options specifications, compared to 0.56 for the bargaining weight predictions. Our preferred specification is the one used in the main text.

Table A.2: Bargaining Weight Predictors

	(1)	(2)	(3)	(4)	(5)
Production Cost	-0.742***	-0.759***	-0.607***	-0.921***	-0.964***
	(0.006)	(0.006)	(0.008)	(0.010)	(0.012)
Total Margin	0.883***	0.806***	0.783***	0.910***	0.811***
	(0.005)	(0.005)	(0.006)	(0.009)	(0.012)
Sales per Capita	0.127***	0.133***	0.098***	0.146***	0.132***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
GDP per Capita	1.179***	-0.260***	0.909***	0.919***	1.111***
	(0.015)	(0.089)	(0.027)	(0.209)	(0.251)
CPI	-0.820***	-0.242***	-0.553***	-0.758***	-0.628***
	(0.053)	(0.061)	(0.073)	(0.128)	(0.152)
Quality					0.200***
					(0.006)
Country FEs		X			
Non US			X		
US Only				X	X
Observations	42,458	42,458	18,220	24,238	16,476
R^2	0.563	0.582	0.507	0.396	0.432

Notes: This table reports the outcome of regressing standardized manufacturer bargaining weights on (log) production costs, (log) total margins, (log) product sales, (log) GDP per capita, (log) CPI, and (standardized) quality. Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.3: Combined Outside Option Predictors

	(1)	(2)	(3)	(4)	(5)
Production Cost	-0.228***	-0.029**	-0.106***	0.209***	0.112***
	(0.008)	(0.013)	(0.012)	(0.021)	(0.027)
Total Margin	-0.306***	-0.479***	-0.126***	-0.834***	-0.969***
	(0.009)	(0.013)	(0.014)	(0.022)	(0.028)
Sales per Capita	0.166***	0.159***	0.093***	0.202***	0.159***
	(0.003)	(0.003)	(0.005)	(0.004)	(0.005)
GDP per Capita	-0.572***	-0.306***	-0.067	0.872***	1.137***
	(0.023)	(0.111)	(0.044)	(0.286)	(0.344)
CPI	-0.217***	-0.497***	-0.618***	-1.257***	-1.264***
	(0.072)	(0.080)	(0.095)	(0.177)	(0.210)
Quality					0.362***
					(0.009)
Country FEs		X			
Non US			X		
US Only				X	X
Observations	41,612	41,612	17,858	23,754	16,094
R^2	0.202	0.224	0.055	0.280	0.367

Notes: This table reports the outcome of regressing the combined outside options term $\left[(1-\tau_i)\bar{\pi}_i^M - \tau_i\bar{\pi}_i^R\right]$ on (log) production costs, (log) total margins, (log) product sales, (log) GDP per capita, (log) CPI, and (standardized) quality. Standard errors in parentheses. Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.4: Combined Outside Option Predictors

	(1)	(2)	(3)	(4)	(5)
Production Cost	0.206***	0.005	-0.148***	0.151***	0.116***
	(0.008)	(0.013)	(0.013)	(0.020)	(0.025)
Total Margin	0.082***	0.257***	0.110***	0.240***	0.050*
	(0.009)	(0.013)	(0.015)	(0.020)	(0.026)
Sales per Capita	0.160***	0.170***	0.100***	0.192***	0.146***
	(0.003)	(0.003)	(0.005)	(0.004)	(0.005)
GDP per Capita	1.625***	-0.241**	-0.054	0.613**	0.760**
	(0.025)	(0.116)	(0.047)	(0.283)	(0.333)
CPI	-1.344***	-0.485***	-0.700***	-0.741***	-0.832***
	(0.075)	(0.083)	(0.101)	(0.177)	(0.206)
Quality					0.382***
					(0.008)
Country FEs		X			
Non US			X		
US Only				X	X
Observations	41,610	41,610	17,857	23,753	16,145
R^2	0.165	0.188	0.036	0.169	0.281

Notes: This table reports the outcome of regressing the combined outside options term $\left[(1-\tau_i)\bar{\pi}_i^M - \tau_i\bar{\pi}_i^R\right]$ on (log) production costs, (log) total margins, (log) product sales, (log) GDP per capita, (log) CPI, and (standardized) quality. Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

B Additional Tables and Figures

Table B.1: The Matched Manufacturer-Retailer Dataset

	Main Sample						Expanded Sample	
	Observations	% Sales	% Products	Products	Brands	Retailers	Manufacturer	Retail
US	24,238	0.85	0.64	971	8	16	40,603	24,238
UK	7,713	0.84	0.59	406	5	7	12,275	7,997
CA	6,618	0.55	0.34	309	6	12	21,987	6,943
MX	3,889	0.60	0.47	232	9	5	9,122	4,273
All	42,458	0.70	0.53	1,918	16	40	83,987	43,451

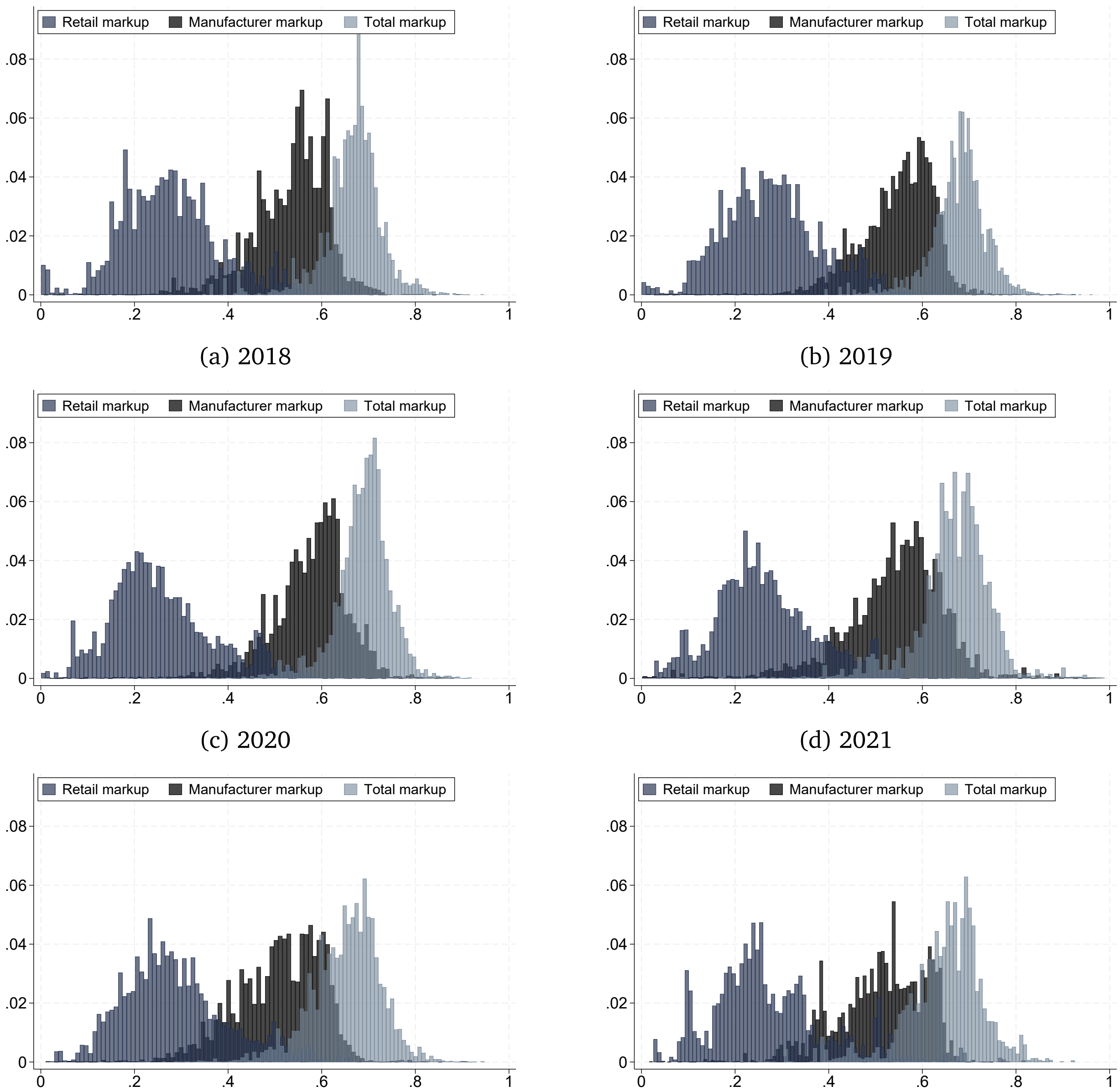
Notes: This table reports summary statistics for the main sample used throughout the paper and for the expanded sample used in Section 5. For each country and for the pooled sample, we report the number of matched product-period observations, the share of the manufacturer's sales covered by matched products, the share of products with a retail match, and the number of unique products, brands, and retailers. The final columns refer to the expanded sample and report the number of product-periods with available manufacturer data and the corresponding number with available retail prices.

Table B.2: Imputed Data

	Manufacturer Data				Retail Data			
	Observations		Regression Obs. (6M)		Observations		Regression Obs. (6M)	
	No Fill	Fill	No Fill	Fill	No Fill	Fill	No Fill	Fill
UK	11,549	12,275	6,712	8,352	7,713	7,997	4,868	5,522
CA	19,817	21,987	9,693	15,586	6,618	6,943	3,581	4,607
MX	7,788	9,122	3,102	5,563	3,889	4,273	1,752	2,537
All	79,757	83,987	46,831	56,825	42,458	43,451	26,541	29,006

Notes: This table reports the number of product-period observations for all products ("Observations") and for those continuously observed over a six-month period ("Regression Obs. (6M)"). For each group, we show the raw number of observations and the total after imputing missing values by carrying forward production costs and wholesale prices to fill gaps of up to 90 days in a product's time series. Row "All" includes also the observations from the US, where no observations were filled in the manufacturer dataset.

Figure B.1: Markups Along the Supply Chain by Year (United States)



(a) 2018

(b) 2019

(c) 2020

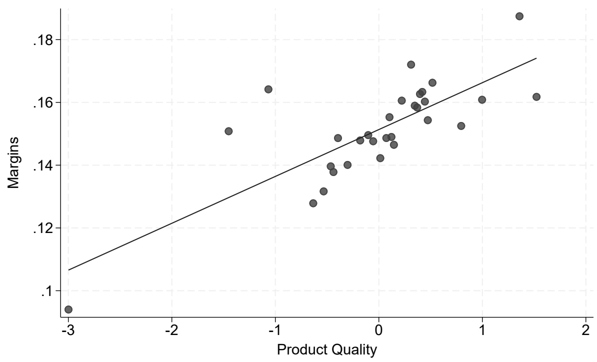
(d) 2021

(e) 2022

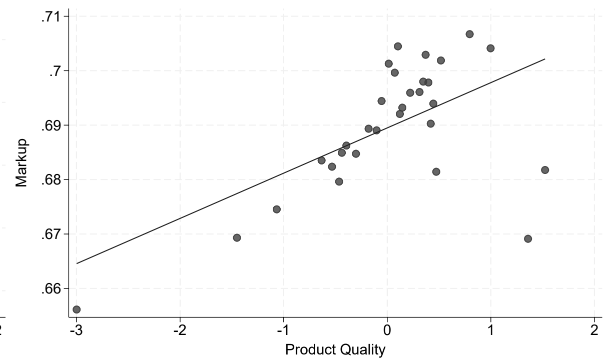
(f) 2023

Notes: This figure shows the sales-weighted frequency distribution of markups along the supply chain in the United States by year. Retail markups ($\frac{p^R-p^M}{p^R}$) are shown in dark blue, manufacturer markups ($\frac{p^M-c}{p^M}$) in dark grey, and total markups ($\frac{p^R-c}{p^R}$) in light blue.

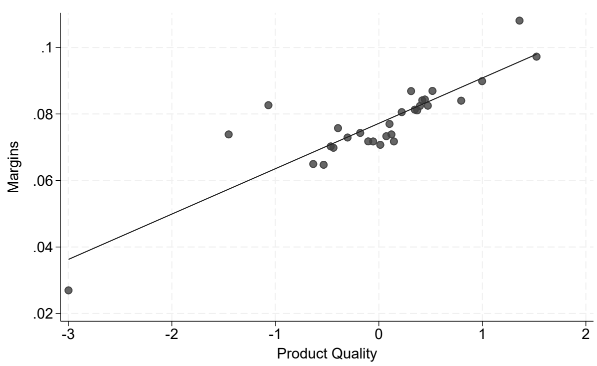
Figure B.2: Quality Differentiation Along the Supply Chain (Perceived Quality)



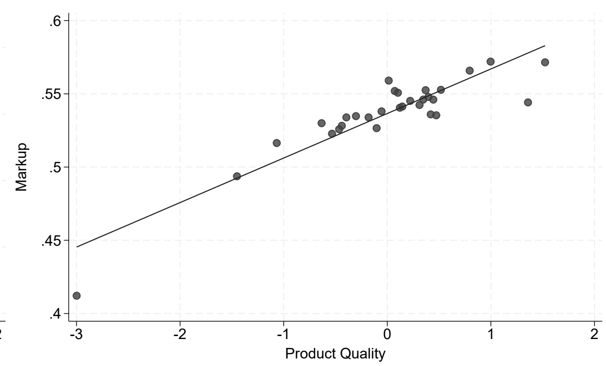
(a) Total Margins



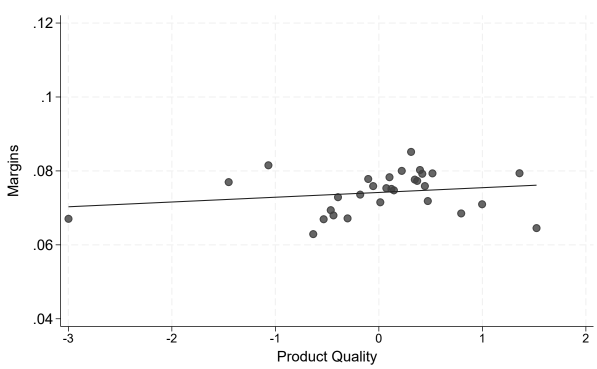
(b) Total Markups



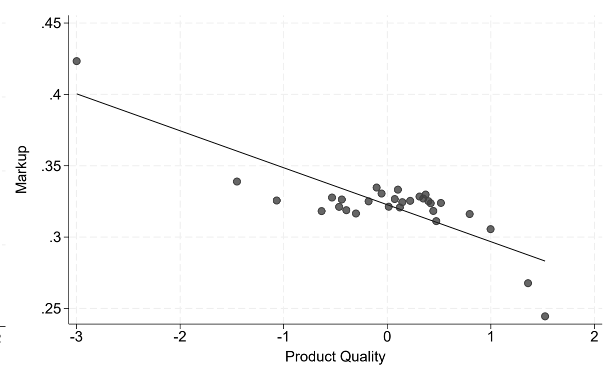
(c) Manufacturer Margins



(d) Manufacturer Markups



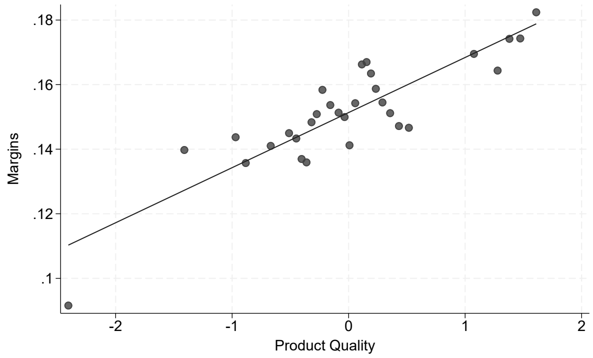
(e) Retail Margins



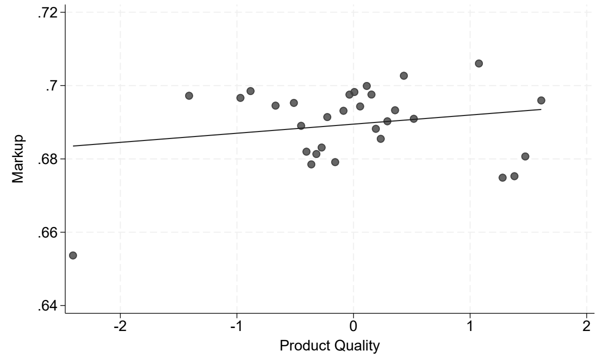
(f) Retail Markups

Notes: This figure shows the relation of product (a) total margins, (b) total markups, (c) manufacturer margins, (d) manufacturer markups, (e) retail margins, and (f) retail markups to a (standardized) measure of perceived quality. Values are residualized on linear and quadratic package size, to account for quantity discounts, and on a set of fixed effects including product category interacted with periods.

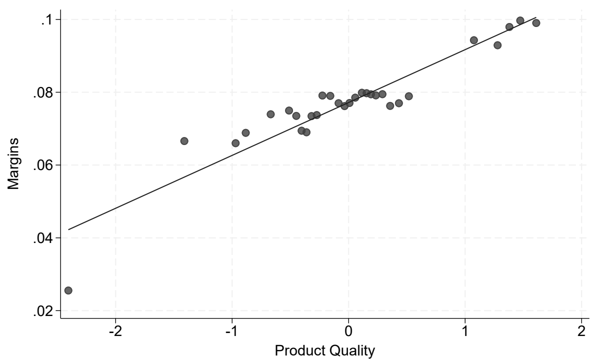
Figure B.3: Quality Differentiation Along the Supply Chain (Product Differentiation)



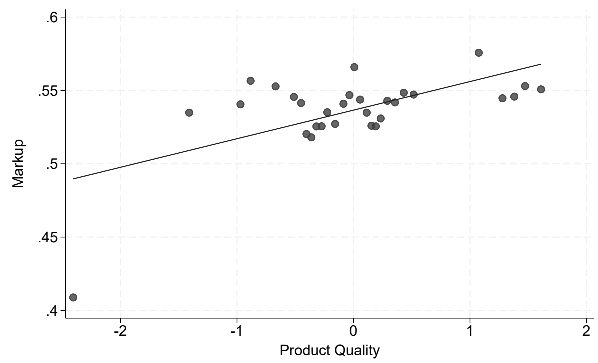
(a) Total Margins



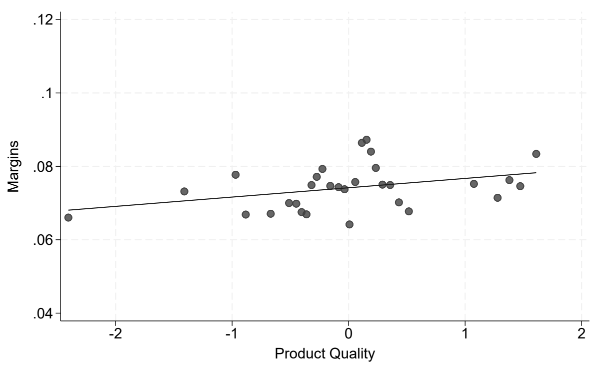
(b) Total Markups



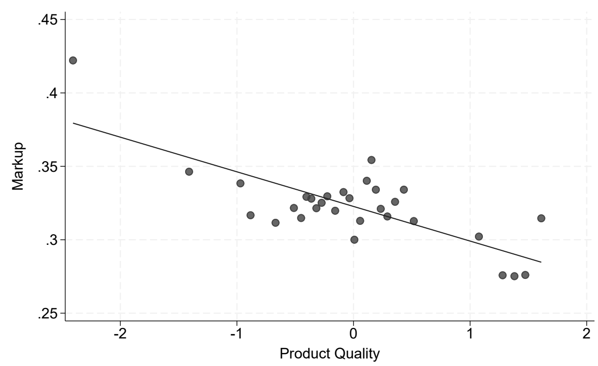
(c) Manufacturer Margins



(d) Manufacturer Markups



(e) Retail Margins



(f) Retail Markups

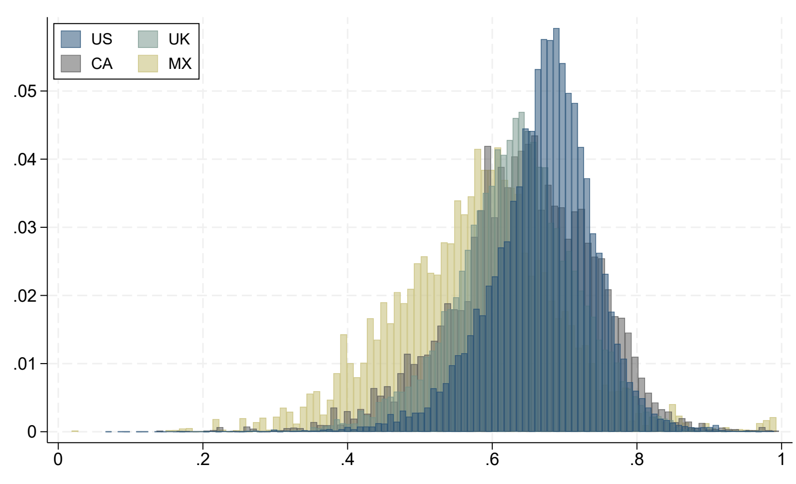
Notes: This figure shows the relation of product (a) total margins, (b) total markups, (c) manufacturer margins, (d) manufacturer markups, (e) retail margins, and (f) retail markups to a (standardized) measure of product differentiation. Values are residualized on linear and quadratic product size, to account for quantity discounts, and product category interacted with periods.

Table B.3: Summary Statistics of Costs, Prices and Quality

	Mean	p25	p75	SD	CV_i	N
Retail Price	0.214	0.116	0.295	0.11	0.08	42,458
Manufacturer Price	0.133	0.068	0.183	0.07	0.08	42,458
Cost	0.068	0.039	0.093	0.04	0.13	42,458
Cost Breakdown						
Expected	0.066	0.037	0.090	0.03	0.09	39,123
Unexpected	0.002	-0.001	0.006	0.01	0.10	39,123
Quality Indicators						
Differentiation	68.23	65.84	71.23	3.13	-	668
Perceived Quality	86.14	85.20	87.44	1.92	-	668

Notes: This table reports summary statistics for costs, prices, and quality in the matched sample from July 2018 to June 2023 (with cost breakdown data available starting in January 2019). N denotes the number of product-month observations for prices and costs, or the number of products with available quality information. All prices and costs are converted to January 2019 US dollars. "SD" reports the standard deviation across all observations. As a measure of time-series variation, we compute the coefficient of variation for each product across time and report the average across products as CV_i. Since unexpected costs have a mean close to zero, we report coefficients of variation for both expected and unexpected costs relative to total costs to aid interpretation. Summary statistics for expected and unexpected costs are based on fewer observations due to their later start date. All variables are winsorized at the 1% level. Quality information is available only for a subset of products sold in the US

Figure B.4: Total Markups Without Retail Price Adjustment



Notes: This figure shows the sales-weighted frequency distribution of total markups ($\frac{p^R - c}{p^R}$) along the supply chain for each country.

Table B.4: Summary Statistics For Markups and Margin Shares

Variable	Mean	SD	p10	p25	p50	p75	p90
Country: United States							
Total Markup	0.67	0.07	0.58	0.64	0.68	0.71	0.74
Manufacturer Markup	0.54	0.09	0.42	0.49	0.55	0.60	0.63
Retail Markup	0.28	0.11	0.15	0.20	0.26	0.34	0.43
Product Markup	0.41	0.06	0.34	0.37	0.41	0.44	0.48
Manufacturer Margin Share	0.59	0.15	0.37	0.51	0.60	0.69	0.77
Retail Margin Share	0.41	0.15	0.23	0.31	0.40	0.49	0.63
Country: Canada							
Total Markup	0.65	0.11	0.51	0.59	0.65	0.72	0.77
Manufacturer Markup	0.46	0.14	0.28	0.37	0.46	0.54	0.62
Retail Markup	0.35	0.11	0.21	0.29	0.35	0.42	0.49
Product Markup	0.40	0.09	0.29	0.35	0.40	0.46	0.51
Manufacturer Margin Share	0.46	0.16	0.25	0.36	0.46	0.56	0.65
Retail Margin Share	0.54	0.16	0.35	0.44	0.54	0.64	0.75
Country: Mexico							
Total Markup	0.60	0.12	0.46	0.53	0.60	0.67	0.75
Manufacturer Markup	0.32	0.16	0.15	0.23	0.30	0.40	0.52
Retail Markup	0.42	0.10	0.27	0.36	0.43	0.49	0.53
Product Markup	0.37	0.10	0.26	0.30	0.36	0.42	0.49
Manufacturer Margin Share	0.31	0.14	0.14	0.22	0.30	0.39	0.49
Retail Margin Share	0.69	0.14	0.51	0.61	0.70	0.78	0.86
Country: United Kingdom							
Total Markup	0.64	0.07	0.54	0.59	0.64	0.68	0.72
Manufacturer Markup	0.36	0.12	0.20	0.29	0.38	0.45	0.50
Retail Markup	0.42	0.09	0.31	0.37	0.42	0.48	0.54
Product Markup	0.39	0.06	0.31	0.35	0.39	0.43	0.47
Manufacturer Margin Share	0.33	0.13	0.17	0.25	0.34	0.42	0.49
Retail Margin Share	0.67	0.13	0.51	0.58	0.66	0.75	0.83

Notes: This table reports summary statistics of the sales-weighted markup and margin share distributions in each country. Markups are computed as the Lerner index using retail prices and production costs for the total indicator ($\frac{p^R-c}{p^R}$), wholesale prices and production costs for the manufacturer indicator ($\frac{p^M-c}{p^M}$), and retail prices and wholesale prices for the retail indicators ($\frac{p^R-p^M}{p^R}$). Product markup is computed as the average between the manufacturer markup and the retail markup. Margin shares indicate the percentage of the total $ margin available per product that the manufacturer ($\frac{p^M-c}{p^R-c}$) and the retailer ($\frac{p^R-p^M}{p^R-c}$) retain.

Table B.5: Markup Correlation Along the Supply Chain

	Aggregate	Time FEs	Product FEs	Residuals
US	-0.34	-0.70	-0.41	-0.12
CA	-0.09	-0.29	0.02	-0.13
MX	0.05	0.33	-0.01	-0.07
UK	-0.30	-0.24	-0.27	-0.35

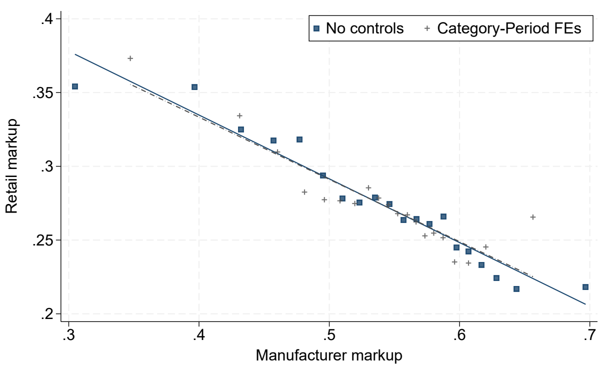
Notes: This table reports correlation coefficients between manufacturer and retail markups. Column (1) presents the aggregate (raw) correlation, while Columns (2)-(4) reports the correlation between the different markup components resulting from equation (2) across the two stages of the supply chain. Regressions and correlations are weighted by per-period sales.

Table B.6: Margins and Alternative Quality Measure (Product Differentiation)

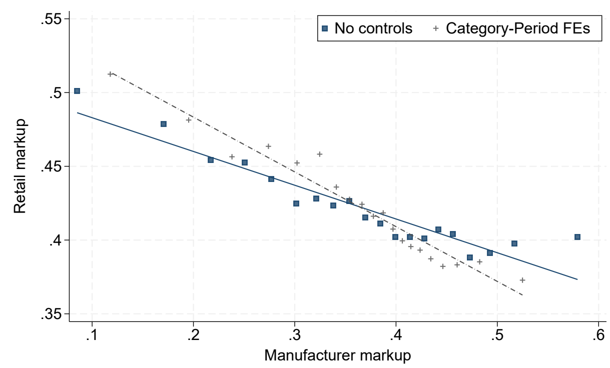
	Margins			Markup		
	Total	Manu.	Retail	Total	Manuf.	Retail
Differentiation	0.017***	0.014***	0.003***	0.002***	0.019***	-0.023***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.79	0.81	0.56	0.37	0.31	0.29
N	16,476	16,476	16,476	16,476	16,476	16,476

Notes: This table reports the linear relation between margins or markups and (standardized) product quality estimated from the following linear model: $y_{it} = a + \alpha q_i + \beta X_{it} + \phi_{it} + \varepsilon_{it}$, with y_{it} being the variable of interest, margins or markups, for product i at time t, q_i (standardized) product quality, X_{it} controls including linear and quadratic package size to account for quantity discounts, ϕ_{it} fixed effects including product category interacted with time, and ε_{it} a mean zero error. Robust standard errors are reported in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

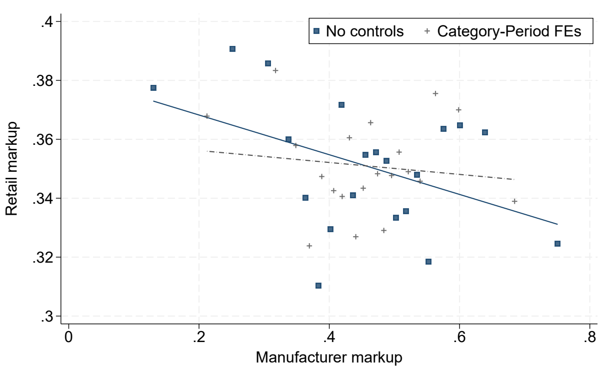
Figure B.5: Manufacturer and Retailer Markup Relation



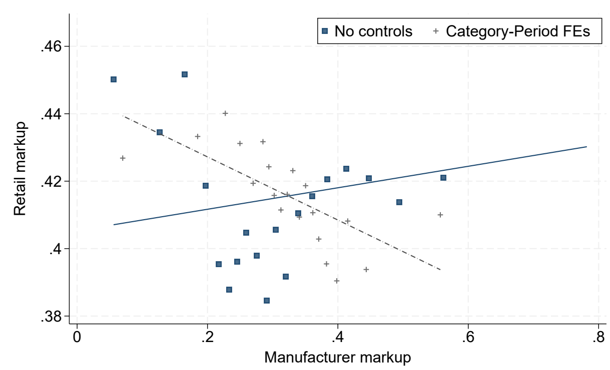
(a) United States



(b) United Kingdom



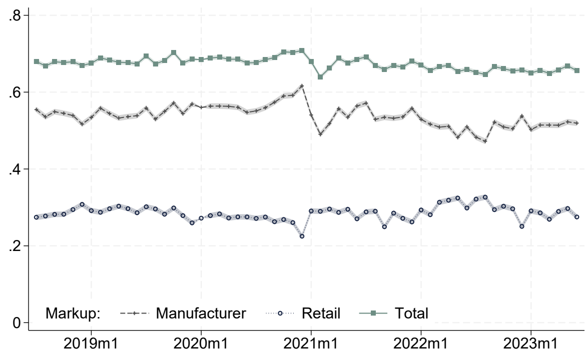
(c) Canada



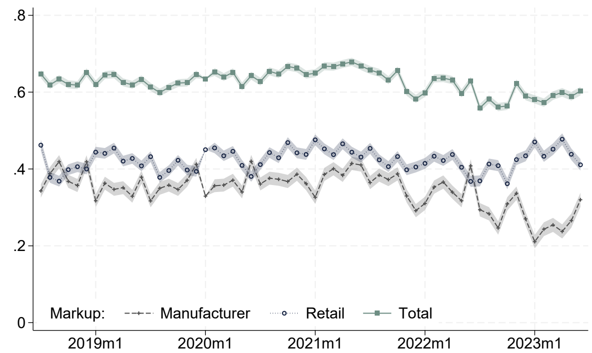
(d) Mexico

Notes: This figure shows the correlation of markups along the supply chain in every country. Bins include sales-weighted values and values residualized on category-period fixed effects.

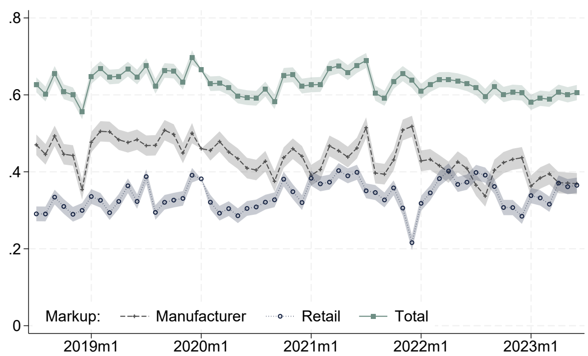
Figure B.6: Markup Dynamics



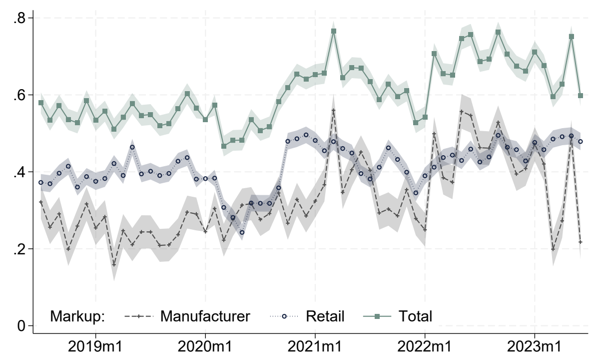
(a) United States



(b) United Kingdom



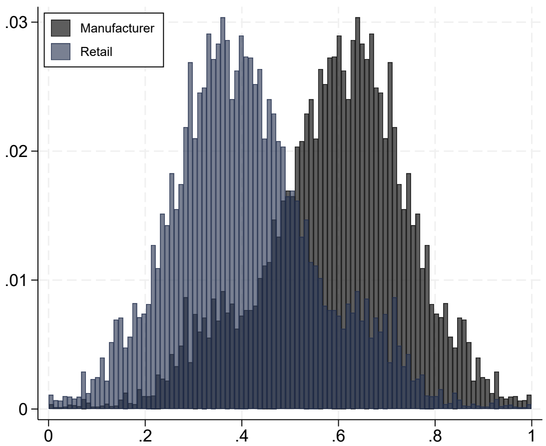
(c) Canada



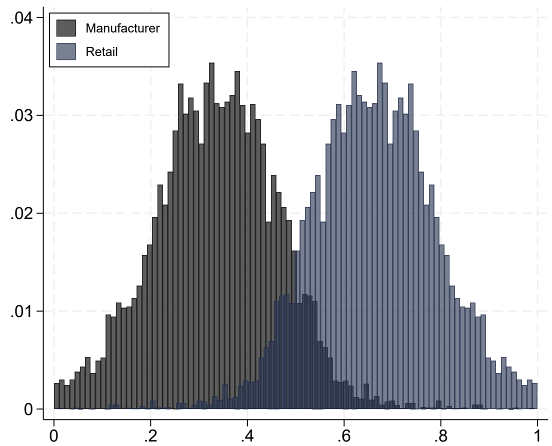
(d) Mexico

Notes: This figure shows markup averages and 95% (robust) confidence intervals in the United States, United Kingdom, Canada, and Mexico, resulting from a regression on period and product fixed effects using sales weights. The total markup is defined as the Lerner index of retail prices and production costs, $\frac{p^R - c}{p^R}$, the manufacturer markup as the Lerner index of wholesale prices and production costs, $\frac{p^M - c}{p^M}$, while the retail markup as the Lerner index of retail prices and wholesale costs, $\frac{p^R - p^M}{p^R}$.

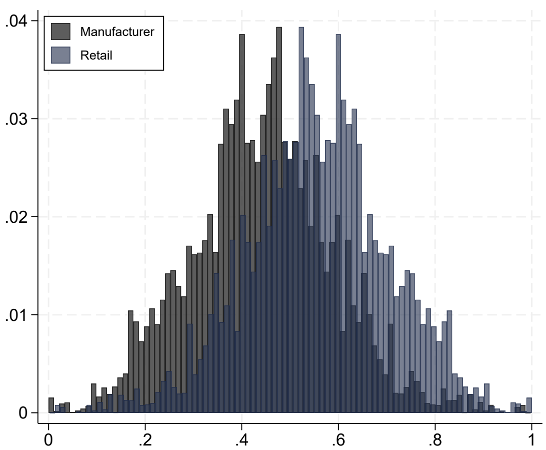
Figure B.7: Manufacturer and Retailer Margin Share



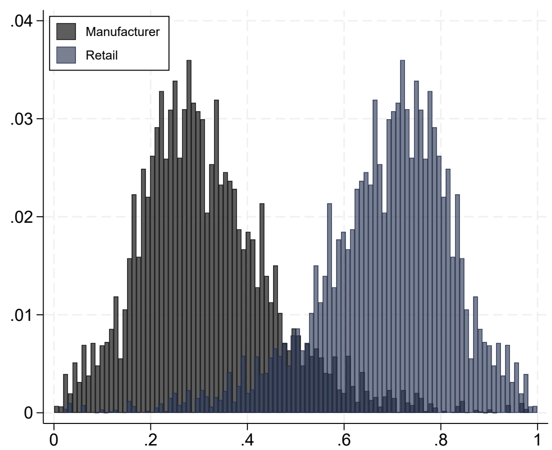
(a) United States



(b) United Kingdom



(c) Canada



(d) Mexico

Notes: This figure shows the sales-weighted frequency distribution of margin shares along the supply chain for all years separately by country. Manufacturer margin share is defined as the ratio of the manufacturer margin to the total margin $\frac{p^M-c}{p^R-c}$. Retailer margin is share defined as the ratio of the retail margin to the total margin $\frac{p^R-p^M}{p^R-c}$.

Table B.7: Manufacturer Pass-through

	Idiosyncratic					Aggregate			
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)
$\hat{c}$	0.538***	0.089***	0.079***	0.048***	C_t	0.283***	0.208***	0.204***	0.178***
	(0.063)	(0.022)	(0.023)	(0.026)		(0.015)	(0.010)	(0.010)	(0.011)
$\hat{c}_{t-1}$		0.044***	0.029**	0.048**	C_{t-1}		0.176***	0.137***	0.118***
		(0.033)	(0.040)	(0.055)			(0.010)	(0.009)	(0.011)
$\hat{c}_{t-2}$		-0.005*	-0.032	-0.003	C_{t-2}		0.152***	0.177***	0.171***
		(0.022)	(0.024)	(0.032)			(0.012)	(0.012)	(0.013)
$\hat{c}_{t-3}$		0.029**	-0.021	-0.032	C_{t-3}		0.190***	0.145***	0.134***
		(0.020)	(0.020)	(0.023)			(0.011)	(0.011)	(0.012)
$\hat{c}_{t-4}$			0.041*	0.035	C_{t-4}			0.152***	0.131***
			(0.018)	(0.020)				(0.011)	(0.010)
$\hat{c}_{t-5}$			0.002	-0.011	C_{t-5}			0.064***	0.079***
			(0.018)	(0.021)				(0.010)	(0.012)
$\hat{c}_{t-6}$			-0.044**	-0.070**	C_{t-6}			0.111***	0.124***
			(0.017)	(0.022)				(0.009)	(0.009)
$\hat{c}_{t-7}$				0.038	C_{t-7}				0.072***
				(0.021)					(0.010)
$\hat{c}_{t-8}$				0.009	C_{t-8}				0.107***
				(0.021)					(0.010)
$\hat{c}_{t-9}$				-0.003	C_{t-9}				0.013
				(0.020)					(0.010)
$\hat{c}_{t-10}$				-0.007*	C_{t-10}				0.069***
				(0.023)					(0.011)
$\hat{c}_{t-11}$				0.040	C_{t-11}				-0.069***
				(0.025)					(0.012)
$\hat{c}_{t-12}$				-0.008	C_{t-12}				0.087***
				(0.025)					(0.013)
Long-term PT	0.538	0.157	0.053	0.084		0.283	0.726	0.990	1.214
s.e.	0.063	0.043	0.037	0.051		0.015	0.020	0.023	0.029
Product FE	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Date FE	No	No	No	No		No	No	No	No
N	40,566	32,592	27,324	19,214		40,566	32,592	27,324	19,214

Notes: This table reports pass-through of costs to wholesale prices estimated using Equation (8). Coefficients for idiosyncratic and aggregate shocks are estimated jointly. Robust standard errors are shown in parentheses. Long-term pass-through estimates are constructed using the Delta method.

Table B.8: Manufacturer Pass-through with Fixed Effects

	Idiosyncratic					Aggregate			
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)
$\hat{c}$	0.541***	0.113***	0.108***	0.083***	C_t	0.131***	0.075***	0.085***	0.087***
	(0.060)	(0.021)	(0.022)	(0.025)		(0.014)	(0.009)	(0.009)	(0.010)
$\hat{c}_{t-1}$		0.041**	0.025	0.053*	C_{t-1}		0.062***	0.053***	0.051***
		(0.032)	(0.038)	(0.053)			(0.009)	(0.009)	(0.010)
$\hat{c}_{t-2}$		0.004*	-0.021	-0.008	C_{t-2}		0.057***	0.077***	0.103***
		(0.021)	(0.024)	(0.030)			(0.011)	(0.011)	(0.011)
$\hat{c}_{t-3}$		0.045*	0.016	0.008	C_{t-3}		0.046***	0.036***	0.045***
		(0.019)	(0.019)	(0.023)			(0.011)	(0.010)	(0.011)
$\hat{c}_{t-4}$			0.025	0.025	C_{t-4}			0.040***	0.049***
			(0.017)	(0.019)				(0.010)	(0.009)
$\hat{c}_{t-5}$			0.000	-0.003	C_{t-5}			-0.004*	0.008
			(0.017)	(0.020)				(0.010)	(0.011)
$\hat{c}_{t-6}$			-0.039*	-0.055*	C_{t-6}			0.021*	0.046***
			(0.016)	(0.022)				(0.009)	(0.009)
$\hat{c}_{t-7}$				0.014	C_{t-7}				-0.000
				(0.019)					(0.010)
$\hat{c}_{t-8}$				0.012	C_{t-8}				0.046***
				(0.019)					(0.009)
$\hat{c}_{t-9}$				0.001	C_{t-9}				-0.007
				(0.019)					(0.009)
$\hat{c}_{t-10}$				-0.015*	C_{t-10}				0.023*
				(0.021)					(0.009)
$\hat{c}_{t-11}$				0.034	C_{t-11}				-0.054***
				(0.023)					(0.010)
$\hat{c}_{t-12}$				-0.005	C_{t-12}				0.007
				(0.023)					(0.012)
Long-term PT	0.541	0.202	0.114	0.143		0.131	0.240	0.308	0.403
s.e.	0.060	0.043	0.035	0.046		0.014	0.022	0.029	0.040
Product FE	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Date FE	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
N	40,566	32,592	27,324	19,214		40,566	32,592	27,324	19,214

Notes: This table reports pass-through of costs to wholesale prices estimated using Equation (8). Coefficients for idiosyncratic and aggregate shocks are estimated jointly. The specification includes date fixed effects and robust standard errors are shown in parentheses. Long-term pass-through estimates are constructed using the Delta method.

Table B.9: Retailer Pass-through

	Idiosyncratic					Aggregate			
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)
$\hat{c}$	0.316***	0.210***	0.210***	0.229***	C_t	0.896***	0.489***	0.505***	0.607***
	(0.039)	(0.043)	(0.040)	(0.046)		(0.041)	(0.041)	(0.045)	(0.058)
$\hat{c}_{t-1}$		0.139***	0.096**	0.129**	C_{t-1}		0.342***	0.331***	0.400***
		(0.040)	(0.037)	(0.046)			(0.038)	(0.042)	(0.053)
$\hat{c}_{t-2}$		0.095*	0.042	0.069	C_{t-2}		0.301***	0.208***	0.218***
		(0.039)	(0.037)	(0.047)			(0.039)	(0.043)	(0.052)
$\hat{c}_{t-3}$		0.122***	0.045	0.046	C_{t-3}		0.111**	-0.029***	-0.019***
		(0.033)	(0.035)	(0.042)			(0.039)	(0.044)	(0.054)
$\hat{c}_{t-4}$			0.068*	0.037	C_{t-4}			0.117*	0.089***
			(0.039)	(0.048)				(0.046)	(0.055)
$\hat{c}_{t-5}$			0.055	0.033	C_{t-5}			0.208***	0.149**
			(0.032)	(0.038)				(0.043)	(0.055)
$\hat{c}_{t-6}$			0.021**	0.002**	C_{t-6}			0.115**	0.068***
			(0.030)	(0.044)				(0.041)	(0.055)
$\hat{c}_{t-7}$				0.048	C_{t-7}				0.094***
				(0.037)					(0.055)
$\hat{c}_{t-8}$				0.053	C_{t-8}				0.178**
				(0.038)					(0.059)
$\hat{c}_{t-9}$				0.030	C_{t-9}				0.045
				(0.038)					(0.055)
$\hat{c}_{t-10}$				0.081*	C_{t-10}				0.152**
				(0.035)					(0.056)
$\hat{c}_{t-11}$				0.059	C_{t-11}				0.099***
				(0.034)					(0.054)
$\hat{c}_{t-12}$				-0.040	C_{t-12}				-0.047***
				(0.034)					(0.055)
Long-term PT	0.316	0.565	0.537	0.775		0.896	1.244	1.455	2.034
s.e.	0.039	0.061	0.061	0.109		0.041	0.048	0.053	0.101
Product FE	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Date FE	No	No	No	No		No	No	No	No
N	24,233	19,677	16,340	11,346		24,233	19,677	16,340	11,346

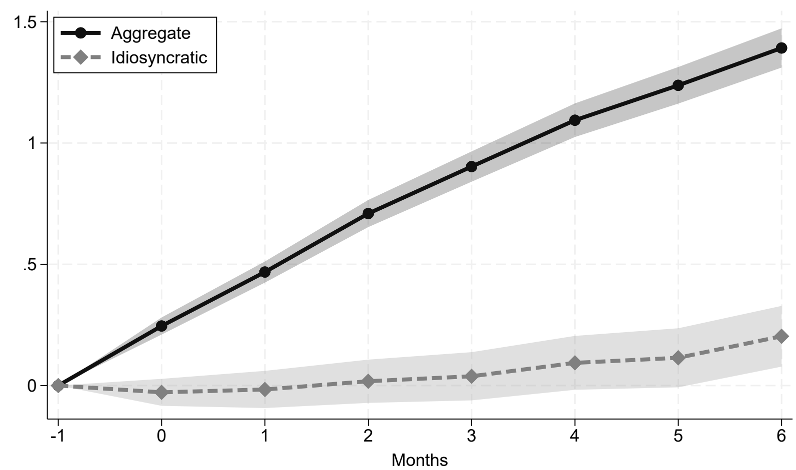
Notes: This table reports pass-through of wholesale prices to retail prices estimated using Equation (9). Coefficients for idiosyncratic and aggregate shocks are estimated jointly. Robust standard errors are shown in parentheses. Long-term pass-through estimates are constructed using the Delta method.

Table B.10: Retailer Pass-through with Fixed Effects

	Idiosyncratic					Aggregate			
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)
$\hat{c}$	0.289***	0.165***	0.148***	0.183***	C_t	0.647***	0.361***	0.335***	0.477***
	(0.041)	(0.044)	(0.039)	(0.041)		(0.058)	(0.054)	(0.058)	(0.071)
$\hat{c}_{t-1}$		0.126**	0.061	0.096*	C_{t-1}		0.281***	0.206***	0.317***
		(0.040)	(0.036)	(0.044)			(0.054)	(0.056)	(0.067)
$\hat{c}_{t-2}$		0.083*	0.008	0.025	C_{t-2}		0.230***	0.160**	0.172*
		(0.039)	(0.036)	(0.046)			(0.055)	(0.058)	(0.068)
$\hat{c}_{t-3}$		0.118***	0.035	0.020	C_{t-3}		0.105***	0.037***	-0.037***
		(0.033)	(0.035)	(0.040)			(0.056)	(0.062)	(0.075)
$\hat{c}_{t-4}$			0.066	0.013	C_{t-4}			0.092***	-0.015***
			(0.038)	(0.045)				(0.061)	(0.075)
$\hat{c}_{t-5}$			0.054	0.004	C_{t-5}			0.125*	0.009
			(0.031)	(0.035)				(0.057)	(0.074)
$\hat{c}_{t-6}$			0.024*	-0.025*	C_{t-6}			0.025*	0.029***
			(0.029)	(0.041)				(0.054)	(0.074)
$\hat{c}_{t-7}$				0.029	C_{t-7}				-0.002
				(0.035)					(0.074)
$\hat{c}_{t-8}$				0.045	C_{t-8}				0.157*
				(0.037)					(0.077)
$\hat{c}_{t-9}$				0.030	C_{t-9}				-0.011
				(0.036)					(0.072)
$\hat{c}_{t-10}$				0.076*	C_{t-10}				0.102*
				(0.033)					(0.070)
$\hat{c}_{t-11}$				0.069*	C_{t-11}				0.004***
				(0.032)					(0.068)
$\hat{c}_{t-12}$				-0.021	C_{t-12}				-0.093
				(0.033)					(0.065)
Long-term PT	0.289	0.492	0.395	0.544		0.647	0.977	0.978	1.108
s.e.	0.041	0.067	0.064	0.110		0.058	0.074	0.074	0.126
Product FE	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Date FE	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
N	24,233	19,677	16,340	11,346		24,233	19,677	16,340	11,346

Notes: This table reports pass-through of wholesale prices to retail prices estimated using Equation (9). Coefficients for idiosyncratic and aggregate shocks are estimated jointly. The specification includes date fixed effects and robust standard errors are shown in parentheses. Long-term pass-through estimates are constructed using the Delta method.

Figure B.8: Pass-through from Production Cost to Retail Price Using Direct Estimation



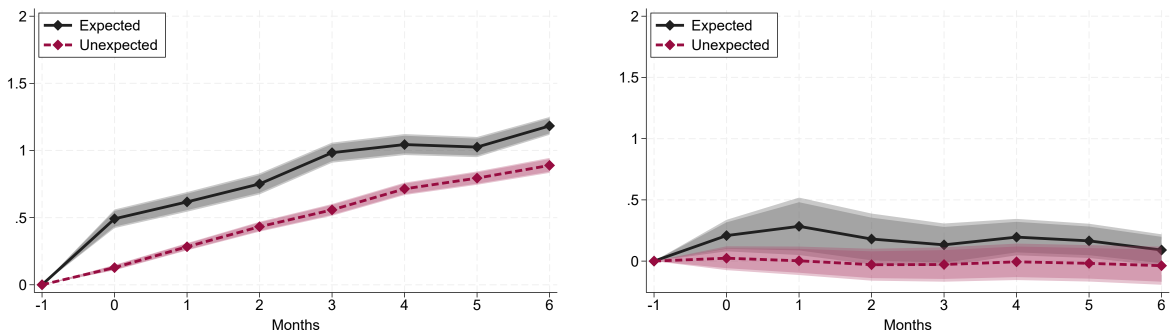
Notes: This figure reports the cumulative response estimated by regressing retail prices directly on production costs using the following specification: $p^R_{ist} = b + \sum_{z=0}^{T} \alpha^R_z \hat{c}^M_{ist-z} + \sum_{z=0}^{T} \beta^C_z C^M_{st-z} + \gamma_i + \nu_{ist}$. Lines are the point estimates, and shaded areas are the 95 and 90 percent confidence bands computed using the Delta method.

Table B.11: Cost Pass-through to Retail Price Using Direct Estimation

	Idiosyncratic					Aggregate			
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)
$\hat{c}$	0.163***	0.003***	-0.028***	-0.036***	C_t	0.340***	0.262***	0.246***	0.244***
	(0.049)	(0.042)	(0.034)	(0.043)		(0.022)	(0.021)	(0.021)	(0.026)
$\hat{c}_{t-1}$		0.075***	0.012**	0.047**	C_{t-1}		0.262***	0.223***	0.240***
		(0.042)	(0.037)	(0.049)			(0.020)	(0.020)	(0.023)
$\hat{c}_{t-2}$		0.084*	0.034	0.048	C_{t-2}		0.223***	0.241***	0.247***
		(0.044)	(0.039)	(0.052)			(0.020)	(0.020)	(0.025)
$\hat{c}_{t-3}$		0.108**	0.021	0.001	C_{t-3}		0.216***	0.194***	0.218***
		(0.040)	(0.041)	(0.049)			(0.021)	(0.021)	(0.025)
$\hat{c}_{t-4}$			0.055*	-0.008	C_{t-4}			0.191***	0.178***
			(0.043)	(0.051)				(0.020)	(0.024)
$\hat{c}_{t-5}$			0.021	-0.007	C_{t-5}			0.144***	0.177***
			(0.042)	(0.051)				(0.021)	(0.024)
$\hat{c}_{t-6}$			0.089*	0.011**	C_{t-6}			0.154***	0.158***
			(0.040)	(0.054)				(0.021)	(0.025)
$\hat{c}_{t-7}$				0.055	C_{t-7}				0.166***
				(0.063)					(0.026)
$\hat{c}_{t-8}$				0.042	C_{t-8}				0.107***
				(0.063)					(0.031)
$\hat{c}_{t-9}$				0.066	C_{t-9}				-0.020
				(0.071)					(0.032)
$\hat{c}_{t-10}$				0.170*	C_{t-10}				-0.025**
				(0.073)					(0.036)
$\hat{c}_{t-11}$				-0.024	C_{t-11}				-0.013***
				(0.065)					(0.031)
$\hat{c}_{t-12}$				0.005	C_{t-12}				0.002***
				(0.054)					(0.030)
Long-term PT	0.163	0.270	0.203	0.369		0.340	0.964	1.392	1.681
s.e.	0.049	0.088	0.076	0.124		0.022	0.038	0.049	0.075
Product FE	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Date FE	No	No	No	No		No	No	No	No
N	24,233	19,677	16,340	11,346		24,233	19,677	16,340	11,346

Notes: This table reports pass-through of costs to retail prices estimated using Equation (9) on the retail dataset—only observations with matched retail data kept. Coefficients for idiosyncratic and aggregate shocks are estimated jointly. Robust standard errors are shown in parentheses. Long-term pass-through estimates are constructed using the Delta method.

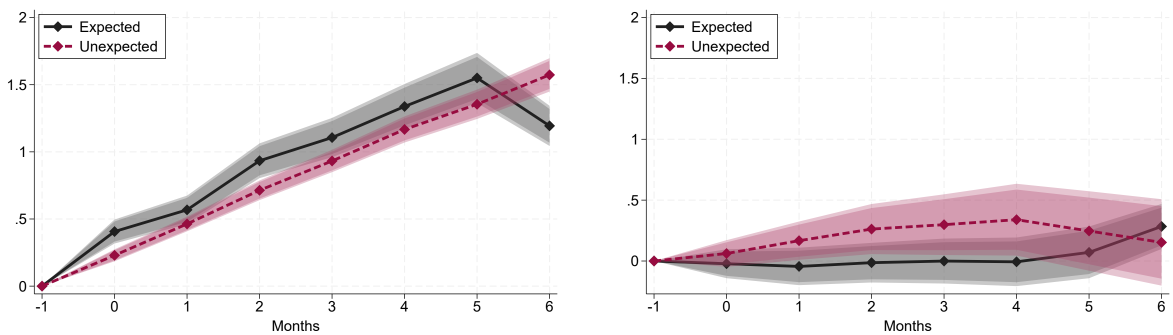
Figure B.9: Manufacturer’s Cost Transmission by Cost Type



(a) Aggregate Cost (b) Idiosyncratic Cost

Notes: This figure shows the cumulative pass-through of aggregate costs (panel a) and of idiosyncratic costs (panel b) to wholesale prices, differentiating by expected and unexpected costs, and estimated using Equation (10). Solid lines are the point estimates, and shaded areas are the 95 and 90 percent confidence bands computed using the Delta method.

Figure B.10: Pass-through from Production Cost to Retail Price by Cost Type Using Direct Estimation



(a) Aggregate Cost (b) Idiosyncratic Cost

Notes: This figure shows the cumulative pass-through of aggregate costs (panel a) and of idiosyncratic costs (panel b) to retail prices, differentiating by expected and unexpected costs, and estimated using a direct estimation of costs to retail prices. Solid lines are the point estimates, and shaded areas are the 95 and 90 percent confidence bands computed using the Delta method.

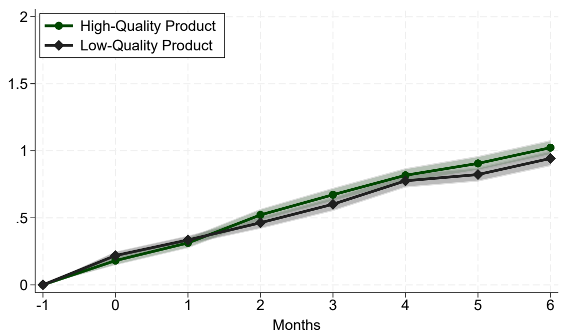
Table B.12: Bargaining Weight Predictors with Dynamics

	(1)	(2)	(3)	(4)
Production Cost	-0.496***			
	(0.003)			
Total Margin	0.571***	0.611***	0.622***	0.629***
	(0.002)	(0.002)	(0.003)	(0.003)
Sales per Capita	0.049***	0.048***	0.047***	0.051***
	(0.001)	(0.001)	(0.001)	(0.001)
GDP per Capita	0.412***	0.339***	0.282***	0.235***
	(0.007)	(0.007)	(0.007)	(0.008)
CPI	-0.168***	-0.388***	-0.402***	-0.547***
	(0.024)	(0.025)	(0.027)	(0.032)
Expected Cost$_t$		-0.554***	-0.157***	-0.023
		(0.003)	(0.011)	(0.014)
Expected Cost$_{t-1}$			-0.168***	-0.057***
			(0.013)	(0.015)
Expected Cost$_{t-2}$			-0.252***	-0.078***
			(0.012)	(0.016)
Expected Cost$_{t-3}$				-0.088***
				(0.016)
Expected Cost$_{t-4}$				-0.056***
				(0.016)
Expected Cost$_{t-5}$				-0.101***
				(0.016)
Expected Cost$_{t-6}$				-0.187***
				(0.015)
Unexpected Cost$_t$		-0.088***	0.018*	0.064***
		(0.009)	(0.010)	(0.011)
Unexpected Cost$_{t-1}$			-0.024**	-0.003
			(0.011)	(0.011)
Unexpected Cost$_{t-2}$			-0.053***	-0.018
			(0.010)	(0.011)
Unexpected Cost$_{t-3}$				-0.008
				(0.011)
Unexpected Cost$_{t-4}$				-0.010
				(0.011)
Unexpected Cost$_{t-5}$				-0.007
				(0.011)
Unexpected Cost$_{t-6}$				-0.028**
				(0.011)
Observations	42458	39072	32678	23941
R^2	0.672	0.689	0.691	0.689

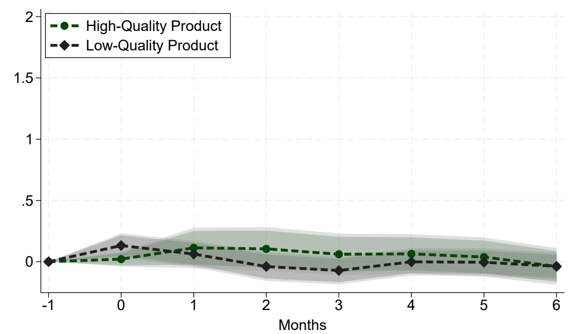
Notes: This table reports the outcome of regressing the (log) manufacturer bargaining weight on (log) total margins, (log) product sales, (log) GDP per capita, (log) CPI, present and lagged (log) production costs. Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure B.11: Cost Transmission Along the Supply Chain by Product Quality

Manufacturer

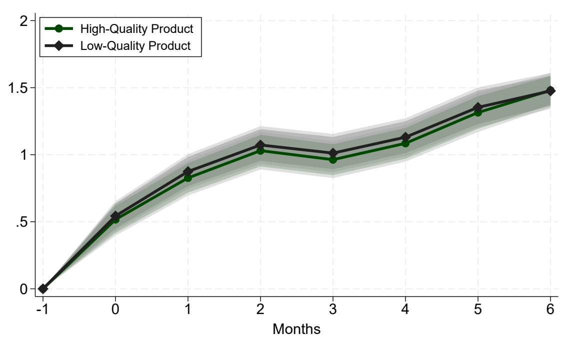


(a) Aggregate Cost

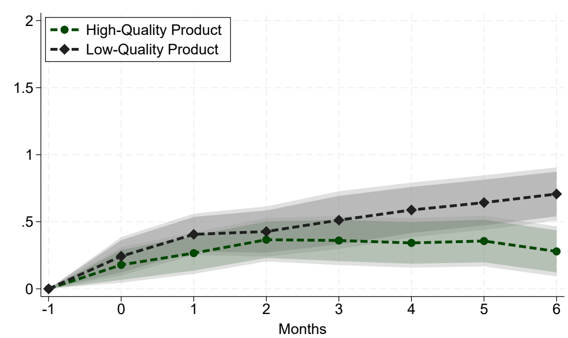


(b) Idiosyncratic Cost

Retailers



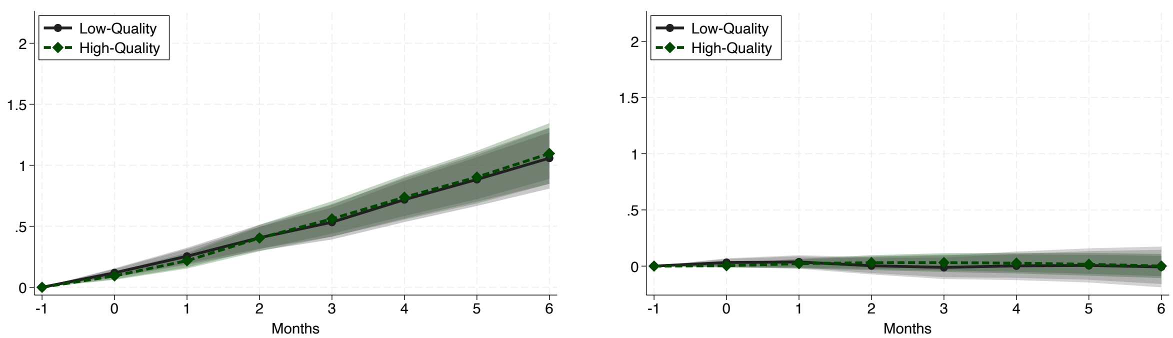
(c) Aggregate Cost



(d) Idiosyncratic Cost

Notes: This figure shows the cumulative pass-through of costs to wholesale prices (panels a and b) and of wholesale prices to retail prices (panels c and d), estimated using Equation (11) and Equation (12). Blue represents high-quality products, and orange represents low-quality products. Solid lines are the point estimates, and shaded areas are the 95 and 90 percent confidence bands computed using the Delta method.

Figure B.12: Pass-through from Production Cost to Retail Price by Product Quality

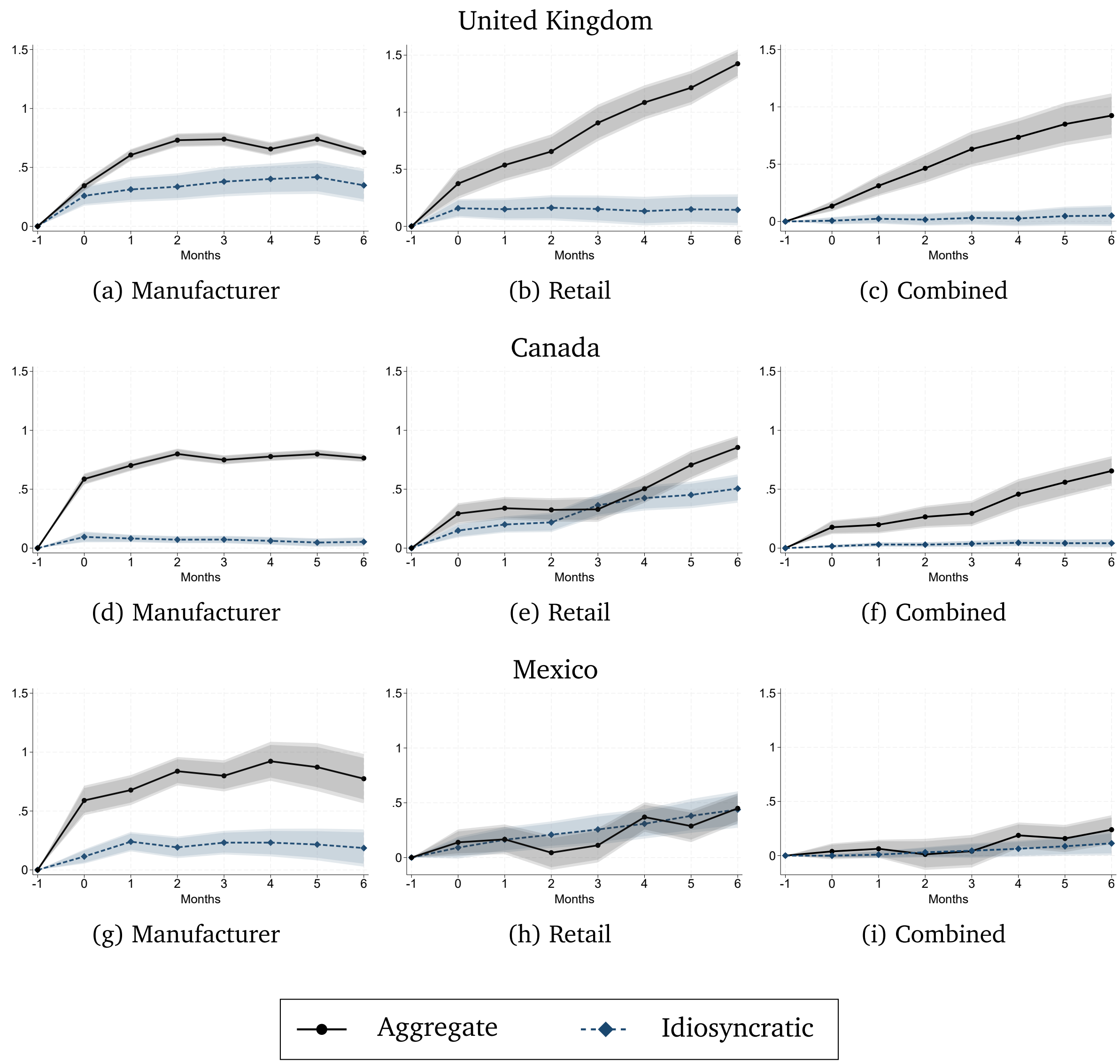


(a) Aggregate Cost

(b) Idiosyncratic Cost

Notes: This figure shows the cumulative pass-through of production costs to retail prices by product quality. The cumulative responses are calculated as $\theta^{\text{AGG}}_{q,t} = \sum_{i=0}^{t} \tilde{\beta}^{R}_{q,i}(\sum_{j=0}^{t-i} \tilde{\beta}^{M}_{q,j})$ and $\theta^{\text{IDIO}}_{q,t} = \sum_{i=0}^{t} \tilde{\alpha}^{R}_{q,i}(\sum_{j=0}^{t-i} \tilde{\alpha}^{M}_{q,j})$ with $\theta^{\text{AGG}}_{q,t}$ and $\theta^{\text{IDIO}}_{q,t}$ being the cumulative adjustment of the retail price at time t to aggregate or idiosyncratic costs and q = 1 for high-quality products and 0 otherwise. The coefficients are recovered from Equation (11) and Equation (12) with $\tilde{\alpha}^{X}_{q,t} = \alpha^{X}_{t} + \text{I}_{q,t} \times \left(\alpha^{X}_{q,t}\right)$ and $\tilde{\beta}^{X}_{q,t} = \beta^{X}_{t} + \text{I}_{q,i} \times \left(\beta^{X}_{q,t}\right)$ with $\text{I}_{q,i} = 1$ if product i has above average quality and 0 otherwise, and $X = \{M, R\}$. Standard errors are constructed by bootstrapping 500 times with replacement.

Figure B.13: Cost Pass-through Along the Supply Chain



(a) Manufacturer (b) Retail (c) Combined

(d) Manufacturer (e) Retail (f) Combined

(g) Manufacturer (h) Retail (i) Combined

Notes: This figure shows the cumulative pass-through of costs to wholesale prices on the left, of wholesale prices to retail prices in the center, and of production costs to retail prices on the right. Coefficients are estimated using Equation (8) and Equation (9), jointly for all countries, using country dummies. The top panel includes results for the United Kingdom, the second for Canada, and the third for Mexico. Solid lines are the point estimates, and shaded areas are the 95 and 90 percent confidence bands computed using the Delta method.