Pricing Off Accounting Costs

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Abstract

When costs change, firms often report waiting to update prices until inventory acquired at old prices is exhausted. This behavior is at odds with standard models, which treat historical purchase costs as sunk and predict that desired prices should follow current replacement costs. We document similar patterns in other contexts: firms' prices incorporate hedging gains/losses, and firms report passing through changes in fixed costs at similar rates as variable costs. We rationalize these behaviors with a principal–agent model where replacement costs are unverifiable but accounting costs based on realized cash flows are observable and contractible. The model integrates several puzzles about pricing: prices incorporate historical input costs and fixed costs, but respond weakly to demand shocks, replacement costs, and anticipated future costs. Accounting cost pricing means that cost fluctuations take time to propagate along supply chains, as firms work through materials and inventories purchased at pre-shock prices. Price dynamics resemble canonical sticky-price models, but anticipation of cost increases can further delay—rather than accelerate—pass-through due to forward buying. In a quantitative input–output model, accounting cost pricing can generate substantial lags in the effect of shocks on consumer prices.

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1 Introduction

> *"A coffee roaster noted that while tariffs on coffee have largely been lifted, selling prices will only go down once the stock of inventory acquired at higher costs has been cleared."*
>
> — Federal Reserve Beige Book, January 2026

Standard economic theory suggests that a firm's marginal cost depends on the current replacement cost of its inputs. When a firm sells a good, the opportunity cost of the sale is the cost of replacing the unit it has just sold. Thus, the optimal price equates marginal revenue with the current replacement cost, regardless of the historical prices at which the firm acquired its inputs or inventory on hand. Differences between historical acquisition costs and current replacement costs should generally not affect prices.

In practice, however, firms frequently report that the costs of previously acquired inputs and inventory influence pricing decisions. Table 1 lists several examples from Federal Reserve interviews with business contacts about the price effects of tariffs, published in the Federal Reserve Beige Book over 2025–2026. Accounts that historical inventory costs affect prices are seen across Federal Reserve districts and industries, and the example of a New York coffee roaster waiting to pass along tariff exemptions suggests that this behavior applies to both cost increases and decreases.

Likewise, executives on earnings calls often describe historical purchase costs influencing either their own or competitors' prices. Appendix Table A1 catalogs examples from retailers like Wayfair, who cites a temporary price disadvantage relative to competitors carrying pre-tariff inventory, distributors like Global Industrial, who reports "implementing additional pricing actions as inventory affected by tariffs moves through [their] cost of sales," and manufacturers like Boeing, who expects to recoup duties paid on inputs when airplanes using those inputs are shipped. These examples collectively suggest that firms set prices based on average realized input costs, even when those costs diverge from the relevant replacement costs at the time of pricing.

Many of these examples come from the recent tariff episode, but we argue that the tendency to set prices using accounting measures of cost is more general. In Section 2, we draw on a survey of four hundred firm price-setters; a panel of firms asked about price and cost changes by the Federal Reserve Bank of Atlanta; and data on hedging gains/losses and ticket prices for airlines. Across these contexts, we find both survey and empirical evidence that prices respond to realized, average costs, and limited evidence that they respond to current or expected marginal costs.

In explaining why firms set prices this way, we emphasize the practical difficulties of setting prices according to replacement costs. John Cochrane's conversation about tariff pass-through with the CEO of a large retailer illustrates these challenges:[1]

> Retailer CEO: All tariff pauses just ended on August 8... we all brought in as much previously (lower) tariffed goods before that, and most fall merchandise was here in the spring and early summer... so we are still selling goods that didn't have the latest tariff burden. But we are all raising prices slowly and carefully as the tariffed inventory gets sold (remember, accounting wise, we have a cash hit paying tariffs upon receipt, but we have a P&L hit when we sell the tariffed goods). [....]
>
> Cochrane: It's interesting how the accounting treatment of bottom line matters. A pure economist would immediately mark up the current inventory to its opportunity cost[...], not its historical cost, book a windfall profit, and then mark any sales below that value as losses. Business[es] only raise prices when accounting losses force them to do so.

In effect, replacement cost pricing requires that firms value inputs and inventory on hand according to current cost conditions. The same concerns that prevent firms from marking-to-market inventories and most other assets in financial reporting apply to tying prices to mark-to-market values: quotes of replacement costs may be costly to obtain, easy to manipulate, and difficult to verify or audit. Even if firms only mark-to-market internally for pricing decisions and not externally in financial reporting, fluctuations in replacement costs relative to accounting costs of goods sold would result in volatile performance metrics that would be difficult to justify to external observers.

Section 3 presents a two-period model that captures this intuition and explains why a firm may engage in *accounting cost pricing*. A principal delegates the operations of a firm to a manager. The firm acquires inventory, and the manager observes the liquidation price for that inventory before choosing a price to set. Since the liquidation price determines the opportunity cost of a sale, the first-best price equates marginal revenue to this liquidation price.

However, we posit that the manager may have a private preference for setting a higher or lower price than is optimal. This preference could reflect empire-building motives, a bias toward immediate earnings over longer-term value, a reluctance to engage in competition, or simply inattention to the optimal price (e.g., Baumol 1959; Bertrand and Mullainathan 2003; Graham et al. 2005). The private preference implies that, when left to his own devices, the manager may choose a price other than the one that maximizes firm value. Moreover, the presence of this private preference means that the manager cannot

[1] `https://www.grumpy-economist.com/p/a-note-on-tariffs-from-the-real-world`

credibly communicate the liquidation price (which the manager can observe but the principal cannot independently verify) to the principal: regardless of the true liquidation price, the manager would always have an incentive to misreport it in order to justify his desired price.

The principal thus faces a trade-off when designing incentives. On one hand, stronger incentives restrict the manager's ability to set prices in line with personal preferences. On the other hand, they also discourage the manager from incorporating valuable private information—namely, the replacement cost of inventory—into the price. The optimal contract balances these forces and determines the extent to which the manager engages in *replacement cost pricing*, which indexes to the liquidation price of inventory, versus *accounting cost pricing*, which indexes to the book value of inventory on hand that can be observed by the principal.[2]

The model generates two key comparative statics for the extent of accounting cost pricing, both of which seem consistent with the evidence. First, accounting cost pricing should be more prevalent when firms sell differentiated goods and face shallower demand curves, and less prevalent when firms sell homogeneous, highly substitutable goods. Intuitively, a steep residual demand curve disciplines the extent to which the manager can use discretion in pricing, and the principal need not rely on high-powered incentives to achieve profits close to the first-best. In line with this prediction, we find in surveys that retail gas stations are the sole category of firms that report raising prices immediately when input costs go up, rather than waiting to raise prices until existing inventory is exhausted. Second, accounting cost pricing should diminish if there are external, accurate signals of current replacement costs. This explains why sellers of gold and silver jewelry often price to the current market price of precious metal inputs, rather than their historical purchase costs, even when they produce differentiated jewelry and face inelastic demand.

Accounting cost pricing offers an explanation for other pricing puzzles, such as why firms report passing through changes in fixed costs to prices and why prices exhibit a muted response to large demand shocks.[3] Both phenomena are forms of the main model result: principal–agent frictions can lead managers to set prices relative to accounting

[2]Okun (1981) (p. 156) discusses that firms appear to set prices using historical costs and arrives at an explanation remarkably close to ours: "The need for objective and systematic measurement forces the cost standard to be backward-looking—or at least sideward- rather than forward-looking. [...] Any attempt to forecast input costs or to put them on a current replacement basis, which necessarily entails a forecast, would add to expenses, introduce a subjective element into cost calculations, and complicate the task of managerial control. Bygones cannot be mere bygones if they are the sole sources of systematic information."

[3]See Section 2.1 for the pass-through of changes in fixed costs. For the asymmetric response of prices to demand and cost shocks, see e.g., Cagan (1979), Bils and Chang (2000), Fabiani et al. (2006), Gagnon and Lopez-Salido (2020), and Kohler et al. (2026). We discuss this evidence in more detail in Section 3.3.

costs, even when those accounting costs contain information irrelevant to the first-best price, and to ignore valuable information that is relevant to the first-best price but difficult for external observers to independently verify. Changes in overhead costs do not affect the first-best price, but since the reported split of fixed and marginal costs is easy to manipulate and hard to audit, accounting cost pricing takes changes in fixed costs into account. By contrast, demand conditions may be germane to the optimal price but especially difficult to verify for external shareholders.

We turn to the dynamics of prices implied by accounting cost pricing in Section 4. Compared to the two-period model, in which the book value of inventory is unambiguous, the accounting cost of goods sold in a dynamic setting depends on input prices that the firm faced in several prior periods and how the firm apportions costs across those prior purchases. We focus on the inventory valuation methods that firms use in practice when calculating cost of goods sold: most prominently average acquisition cost (AAC), first-in-first-out (FIFO), and last-in-first-out (LIFO). All three methods share the feature that accounting costs reflect realized historical costs rather than current replacement costs, but they differ in the weight they place on recent versus more distant purchases.

It turns out that there is a close connection between price dynamics under these inventory accounting methods and canonical sticky-price models. For example, price paths under average acquisition cost (AAC) pricing can be replicated by a model of Calvo (1983) rigidities, with an additional assumption that firms perceive future expected costs to equal current costs (a condition that Minton and Wheaton (2022) refer to as "myopic expectations"). Likewise, if firms make intermittent input purchases, price paths generated by LIFO pricing can coincide with a model of Taylor (1980) frictions in which firms are similarly myopic about future costs. Of course, the dependence on historical costs in the Calvo and Taylor models comes from the share of firms with stale prices, while in our model comes from the lag between when inputs or inventories are purchased and when final goods using those inputs are sold.

Despite the close connection, price dynamics under accounting cost pricing differ from the sticky-price models in some key ways. Under accounting cost pricing, desired prices depend on historical input costs, in contrast to the forward-looking reset prices in sticky-price models.[4] Accounting cost pricing therefore predicts slower adjustment to persistent shocks and more responsiveness to transitory shocks, and further amplifies delays in price adjustment in supply chains. Moreover, while anticipation of future cost changes

[4]The dependence on historical costs does not imply that prices are completely independent of expectations. Our model predicts that accounting cost pricing arises from managerial incentives to target a certain accounting profit level. But this target profit level may adjust endogenously to information the principal has about its optimum, such as information about the rate of inflation.

makes price adjustment more rapid in models with sticky prices, in our model, firms that anticipate future cost increases may stock up on inventories in advance, consequently delaying the pass-through of cost changes into prices. Thus, accounting cost pricing captures the role of forward buying in delaying the pass-through of tariffs in 2025–2026, as described in many of the quotes in Table 1.

The final two sections of the paper quantify the extent of accounting cost pricing and explore its macroeconomic implications. In Section 5, we exploit the fact that changes in a firm's input costs are first capitalized in inventory before affecting the accounting cost of goods sold. Changes in the book value of inventory, alongside sales and accounting costs of goods sold, can therefore be used to estimate the degree to which firms price off replacement costs vs. accounting costs. We estimate that the extent of accounting cost pricing for public firms in Compustat ranges from 60–80 percent. The weight on accounting costs is lower for firms in industries with reference prices, who sell on organized exchanges, or who have a large share of competitors using LIFO, as our theory predicts. In fact, once we zoom in on firms in industries with administered prices, the estimated extent of accounting cost pricing ranges from 85 percent to complete.

Accounting cost pricing can quantitatively generate substantial delays in aggregate price adjustment. Section 6 calibrates an input–output model of the U.S. economy with detailed data on industry inventories and simulates shocks to the prices of several commodities. The model with accounting cost pricing produces similar lags in aggregate price adjustment as a benchmark Calvo model, even with modest inventory stocks. These lags occur because commodity inputs take time to be used in production, and because we account for the time it takes for goods to move through the inventories of wholesale distributors and retailers. Our calibration suggests delays of five to twelve months in the effect of most commodity shocks on consumer prices.

Related literature. The idea that firms set prices using realized costs, rather than current and anticipated replacement costs, dates back to Gordon (1981). Blinder et al. (1998) find that this theory of cost-based pricing resonates with firms. Most treatments of cost-based pricing refer to the role of a firm's most recent cost observations in shaping price—often because firms are inattentive to or imperfectly observe information that would predict future costs (e.g., Gordon 1990; Mankiw and Reis 2002; Woodford 2003; Minton and Wheaton 2022; Afrouzi et al. 2024)—rather than the idea that more distant historical costs, which affect accounting costs due to production and inventory lags, shape prices.[5] Two

[5]We do not address the question of how firms choose which accounting methods to use. Rogerson (2008, 2011) shows that if managers are incentivized using accounting measures of income, a measure based on

Table 1: Inventories and prices: Examples from the Federal Reserve Beige Book.

District	Date	Quote
Chicago	Apr 2025	Dealers expected strong demand to continue until existing inventories run down and tariffs start to affect pricing.
Boston	June 2025	Manufacturers' prices increased moderately on average, driven by a partial pass-through of tariff-related cost increases. However, some manufacturers held prices fixed, either because they were not exposed to tariffs or because they stockpiled inventories of foreign inputs in advance of tariffs.
Atlanta	June 2025	Some retailers noted they were still working through previously acquired inventories and thus had not raised prices.
Atlanta	July 2025	Several contacts noted they were still working through pre-tariff inventories, thus delaying price adjustments. [. . . .] Many merchants who were still selling off pre-tariff inventories expect demand to erode if, or when, tariff-related price increases are implemented.
Philadelphia	Sep 2025	One contact reported that pre-tariff inventory is almost sold out and that tariffs have begun to cause an increase in new car prices.
San Francisco	Sep 2025	Several contacts across different retail sectors phased in price increases as old inventories were sold and replaced with goods subject to tariffs. Retailers expect additional price increases as this phase-in continues.
Atlanta	Sep 2025	Some contacts reported recent price increases on final products as pre-tariff inventories were depleted. [....] Some retailers expressed concern over further declines in demand in the coming months, as prices may increase after pre-tariff inventories are depleted.
Richmond	Oct 2025	A couple of firms said they expected to raise prices once they worked through their pre-tariff inventory.
National summary	Jan 2026	Several contacts that initially absorbed tariff-related costs were beginning to pass them on to customers as pre-tariff inventories became depleted or as pressures to preserve margins grew more acute.
New York	Jan 2026	A coffee roaster noted that while tariffs on coffee have largely been lifted, selling prices will only go down once the stock of inventory acquired at higher costs has been cleared.

exceptions are Okun (1981) (see footnote 2) and Gordon (1981), who notes, "[while] we have assumed that firms compute marginal costs on a replacement-cost basis, [....m]any firms, however, appear to base prices on actual costs paid in the past, so-called 'FIFO' (first-in-first-out) pricing practices."

Our explanation of why firms pass through changes in fixed costs to prices relates to a literature on "full cost pricing," which posits that firms set prices to reflect both variable costs and allocated overhead costs. Surveys of firms report that such full cost pricing strategies are ubiquitous (see e.g., Hall and Hitch 1939; Kaplan et al. 1958; Lanzillotti 1958; Altomonte et al. 2015; Bewley 2025).[6] A distinctive feature of our evidence is that pricing also depends on other sunk costs beyond overhead, such as historical inventory purchase costs and hedging gains and losses. Several alternative models of full cost pricing—such as sales maximization subject to a profitability constraint (Baumol 1959), pricing with a "safety margin" to bound the risk of negative profits (Day et al. 1971; Altomonte et al. 2015), or limit pricing (Modigliani 1958; Bils and Chang 2000)—would not generally predict a dependence on such historical sunk costs.

Finally, an alternative explanation for the behaviors we observe is that firms set prices based on their realized costs out of fairness concerns (Okun 1981; Kahneman et al. 1986; Rotemberg 2005, 2011; Eyster et al. 2021).[7] Fairness and accounting cost pricing share many predictions because the underlying mechanisms are in fact quite similar: in both cases, stakeholders with incomplete information outside the firm aim to assess whether the price chosen by the firm is justified. Our model explains why these pricing behaviors arise even when consumers cannot realistically audit firms' choices—for example, by verifying the inventory a firm holds when costs change.

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replacement costs can restore the first best, and that this measure can be constructed from historical costs when the relationship between historical and future costs (for assets, the depreciation schedule) is known. Our model focuses on cases where replacement costs cannot be forecasted by the history of past costs.

[6]Nubbemeyer (2010) provides a catalog of the survey evidence for full-cost pricing and an excellent account of the debate between full-cost and marginalist theories of pricing. See also Lee (1999) for how full-cost pricing, target returns pricing, and related theories contribute to post-Keynesian economics, and Ellison (2006) for an account of early attempts to model full-cost pricing as a deviation from profit maximization.

[7]Kahneman et al. (1986) present participants with the following scenario, which bears a striking resemblance to our motivating evidence: "A grocery store has several months supply of peanut butter in stock which it has on the shelves and in the storeroom. The owner hears that the wholesale price of peanut butter has increased and immediately raises the price on the current stock of peanut butter." 79 percent of participants judged this behavior as unfair, compared to 21 percent who found it acceptable.

2 Empirical Evidence

This section documents that firms set prices using accounting costs across a range of contexts. We present evidence from (i) a survey of 400 firm managers about how inventories affect pass-through and how prices respond to changes in fixed costs; (ii) a survey by the Federal Reserve Bank of Atlanta on how expected future cost changes affect prices; and (iii) data on fuel hedging and fares in the airline industry. Across these settings, we find that pricing responds to realized costs (both variable and fixed) as they are recognized as part of the cost of goods sold, and not to current or future replacement costs.

2.1 Costs of Acquired Inventory and Pass-Through of Fixed Costs

Our first set of results comes from a survey of four hundred firms conducted by Raphael Schoenle, who graciously allowed us to add a few questions related to pass-through timing and overhead costs.[8] Survey respondents were contacted in February 2026 and screened on whether their role involved deciding prices or implementing prices decided by others. Appendix Table A2 shows descriptive statistics about the respondents and their firms. About half of the respondents are either business owners/co-owners or general managers, and half are store managers, supervisors, or specifically dedicated to pricing or revenue management. Many of the surveyed businesses are small—42 percent operate in one location and another 32 percent operate in 2–5 locations—but 10 percent of respondents work in businesses that operate in more than twenty locations. The surveyed firms also cover a wide swath of industries (elicited by asking respondents to categorize their business's main product or service), from professional services to grocery to construction.

Inventories and pass-through timing. We asked respondents about the following scenario: "Suppose your input cost rises today, but you still have inventory bought at lower cost. When do you raise your sales price?" Figure 1 shows that the most common answer among respondents is to wait to increase their price until after the inventory on hand is sold. This is consistent with the anecdotal evidence in Table 1 and Appendix Table A1. Only 22 percent of respondents report immediately increasing sales prices in line with replacement costs. A similar share of respondents also reports changing their sales price immediately, but adjusting incompletely to the cost increase.[9]

[8]The survey was conducted for Raphael's discussion at the NBER EFG 2026 Winter Meeting (Schoenle 2026). We are grateful to Raphael for conducting this survey and sharing the data with us.

[9]One possible reason for immediate but incomplete price adjustment is that, when firms use average acquisition cost accounting (the most common method alongside FIFO), changes in current purchase costs of inputs immediately affect the blended average cost of merchandise. Through the lens of our model in

The bottom panel of Figure 1 shows differences in responses by industry. Grocery stores and restaurants are slightly more likely to report waiting to increase prices when holding inventory than firms in personal services, professional services, or building materials and hardware. Across these five industries, however, 35 percent or more of respondents report increasing prices only after old inventory is sold, and fewer than 25 percent of respondents report increasing prices immediately in line with the change in the replacement cost.

The stark exception is retail gas stations. Fewer than 15 percent of respondents from retail gas stations report waiting to increase prices until existing inventory was sold, and more than 40 percent report increasing prices immediately on existing inventory, a mirror image of responses from other industries. Empirical studies of gasoline prices also suggest that the pass-through of upstream crude prices to downstream gasoline prices is not encumbered by distribution and inventory lags (see e.g., Borenstein et al. 1997; Bachmeier and Griffin 2003).[10] We return to the differences between retail gas stations and other types of firms when developing our model in Section 3. As we will see, the model predicts that industries with homogeneous goods and high visibility into cost fluctuations will tend to see more replacement cost pricing, in line with Figure 1.

Pass-through of changes in overhead costs. We also asked respondents about whether they pass through changes in overhead costs to prices. Figure 2 reports responses from firms asked to consider how an increase in overhead costs, such as rent, insurance, salaried employee costs, or equipment leases, would affect their prices. The most common response was that such overhead costs are passed through to prices at a similar rate as changes in variable costs. Fewer than 15 percent of participants said that they do not change prices in response to overhead cost changes.

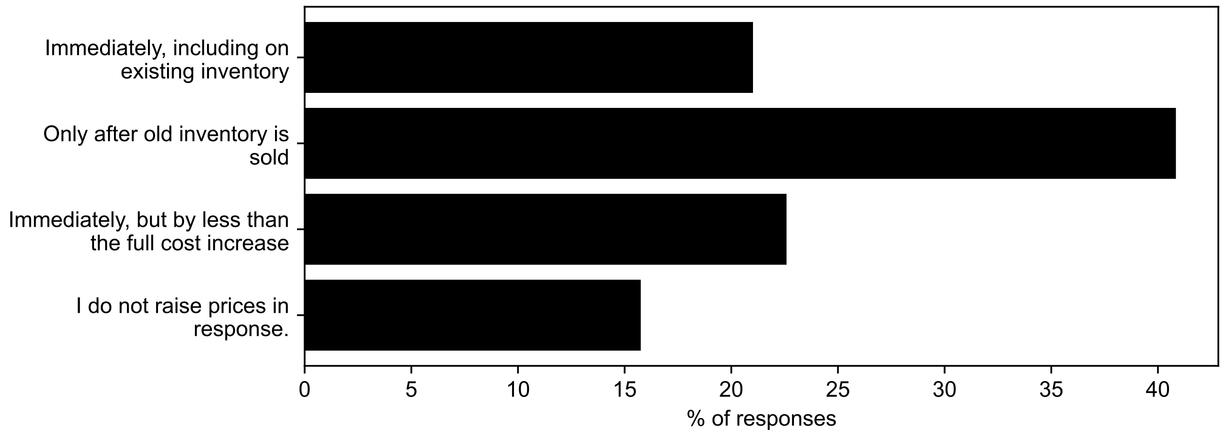
Although at odds with standard theory, the idea that firms report taking fixed costs like overhead—and not just marginal costs—into account when setting prices shows up ubiquitously in surveys and interviews of firm price-setters.[11] For example, Bewley (2025)

Sections 3–4, one could map the first three responses in Figure 1 to replacement cost or LIFO pricing, FIFO pricing, and average acquisition cost pricing. Of course, there could be alternative explanations for why firms adjust immediately but incompletely to a cost change—say due to strategic complementarities and respondents expecting that some competitors may not be exposed to the cost increase.

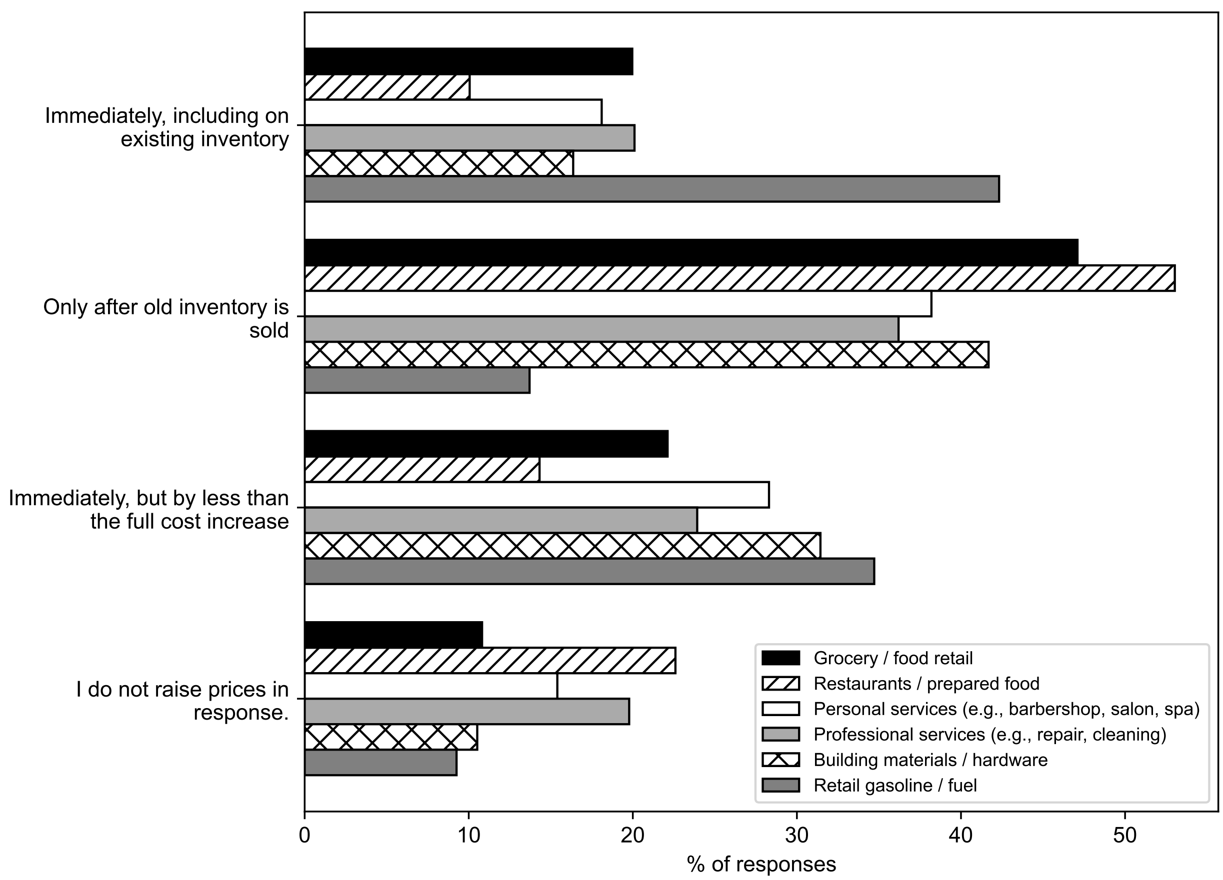
[10]Though, even in retail gasoline, some industry experts suggest that gas stations price to the cost of their last shipment. Jeff Lenard from the National Association of Convenience Stores says, "Two stores [stations] that are virtually next to each other could have entirely different prices because one called in for their next shipment an hour or two before the other one and that absolutely changed their wholesale price." https://www.wfdd.org/economy/2026-03-10/consumers-concerned-after-iran-war-drives-gas-prices-higher.

[11]Standard theory says that firms price using marginal cost, and entry and exit bring prices in line with average cost. Hall and Hitch (1939) (pp. 13–14) summarize, "The equation of average cost and average revenue, if it occurs at all, is assumed to take place as the result of the entry of new firms where average

Figure 1: Responses to "Suppose your input cost rises today, but you still have inventory bought at lower cost. When do you raise your sales price?"



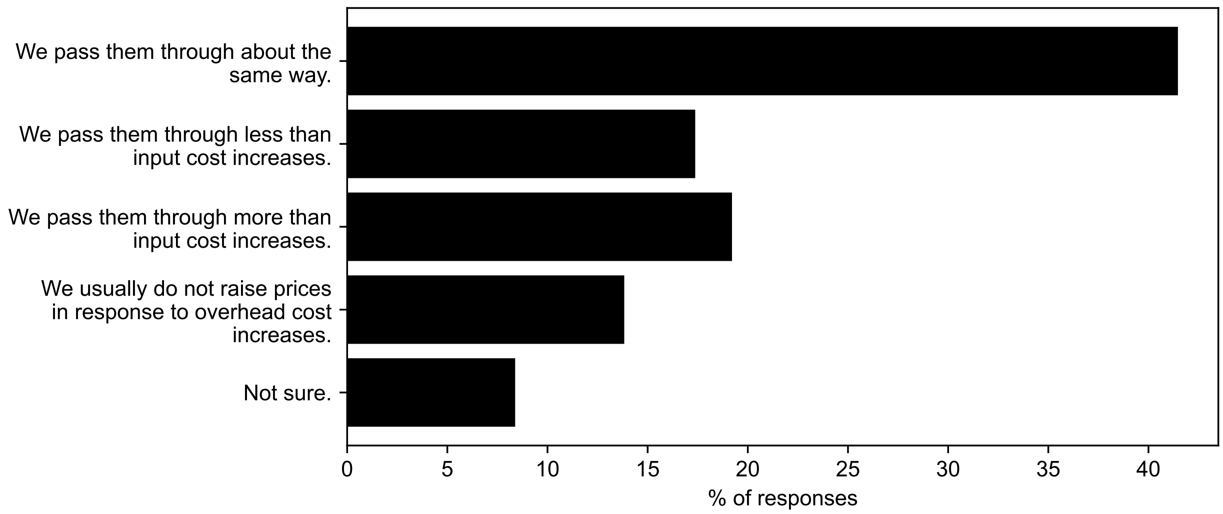
(a) All respondents.



(b) Respondents, split by industry of main product or service.

Note: Responses from survey of 400 firm price-setters conducted by Schoenle (2026).

Figure 2: Responses to "Suppose your overhead costs go up, for example on rent, insurance, salaried staff or equipment leases. How do increases in such overhead costs affect your pricing—compared to increases in per-unit input costs on materials, wholesale goods, shipping per item, or hourly labor per job?"



Note: Responses from survey of 400 firm price-setters conducted by Schoenle (2026).

recently documents widespread use of "fully absorbing cost systems" to set prices by manufacturers of products with differentiated (non-commodity) products. Beyond surveys, empirical studies document an effect of minimum wage changes on retail prices (see e.g., Ashenfelter and Jurajda 2022, Renkin et al. 2022, Pérez 2026), which may constitute pass-through of overhead costs if labor is largely a fixed rather than variable cost.[12]

2.2 Limited Response to Anticipated Future Costs

We next consider whether firms' prices incorporate anticipated future costs. We turn to the Federal Reserve Bank of Atlanta's Business Inflation Expectations (BIE) survey (Meyer and Sheng, 2025). The survey asks 640 executives at firms in the Sixth Federal Reserve District about past, current, and expected business conditions. Of particular interest to us are firms' realized year-over-year cost and price changes and their expectations of future cost

revenue exceeds average cost, and by the dropping out of old ones where the reverse is the case[...] It is not an equation which any particular entrepreneur attempts to bring about, or indeed one which he desires."

[12]Compared to survey evidence, empirical evidence that firms pass through changes in overhead costs to prices is scant, perhaps because it is difficult to identify shocks to overhead costs that do not affect marginal costs or because overhead costs may be correlated with local conditions that also affect consumer demand. For example, Stroebel and Vavra (2019) document an effect of local land prices to retail prices, but attribute it to changes in consumer price sensitivity rather than rent pass-through.

changes. In models with sticky prices, firms' optimal prices depend on their expectations about the path of future replacement costs. Thus, firms' price changes should reflect their expected future cost changes, and particularly so if expectations are informative of future cost realizations.

We estimate the specifications,

$$\text{Price Change}_{it} = \beta_1 \left(\text{Cost Change}_{it}\right) + \beta_2 \mathbb{E}_t[\text{Cost Change}_{it+12}] + \alpha_i + \delta_t + \varepsilon_{it}, \quad (1)$$

$$\text{Cost Change}_{it+12} = \gamma_1 \left(\text{Cost Change}_{it}\right) + \gamma_2 \mathbb{E}_t[\text{Cost Change}_{it+12}] + \alpha_i + \delta_t + \omega_{it}. \quad (2)$$

Here, Price Change_{it} and Cost Change_{it} are firm i's reported, realized percentage change in output price and unit cost over the year from $t-12$ to t, reported in month t. The variable $\mathbb{E}_t[\text{Cost Change}_{it+12}]$ is firm i's expected change in unit costs over the next year (i.e., from t to $t+12$). We include firm and time fixed effects to absorb firm- and time-specific factors that may be spuriously correlated with cost and price changes.

The coefficient of interest in specification (1) is β_2, which captures the degree to which firms' realized price changes incorporate anticipated future cost changes. Of course, it may not be optimal to incorporate expectations if these expectations are very noisy predictors of future costs; the coefficient γ_2 in specification (2) captures whether firms' expectations at t indeed predict realized cost changes over the following year.

The survey differs in how realized and anticipated costs and prices are collected. Past year-over-year unit cost changes are collected via a categorical question, with five options ranging from costs falling by 1 percent or more to costs rising by 5 percent or more. The survey elicits expectations of future cost changes by asking for a probability distribution over the same bins. We take the probability-weighted mean across bins as our measure of cost expectations. Finally, realized price changes are collected using a fill-in field. The fill-in responses have a number of outliers, and so we winsorize the bottom and top 5 percent of responses. Note that price changes were recently added to the survey; price changes were elicited in special survey modules in 2020–2022, before being incorporated into the survey on a regular, quarterly basis starting in 2024. We use a consistent sample that includes price responses for all results.

Table 2 presents the results from estimating specifications (1)–(2). Column 1 shows that, while current price changes react strongly to realized cost changes, there is no appreciable effect of anticipated future cost changes on realized prices. The same conclusion obtains if we separate out responses on realized cost changes using bins (column 3) or if we additionally include date–sector fixed effects to control for time-varying sectoral factors (columns 2 and 4). In columns 5–6, we find that this is despite the fact that expected

Table 2: Price changes do not incorporate firms' expectations of future cost changes.

	Realized Price Change$_t$				*Realized Cost Change$_{t+12}$*	
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{E}_t$[Cost Change$_{t+12}$]	−0.082	−0.169	−0.082	−0.171	0.359**	0.298**
	(0.204)	(0.182)	(0.197)	(0.176)	(0.090)	(0.082)
Realized Cost Change$_t$	1.272**	0.979**				
	(0.305)	(0.233)				
Realized Cost Change$_t$ = 0%			4.458**	3.661**	0.131	0.058
			(1.833)	(1.490)	(0.286)	(0.334)
Realized Cost Change$_t$ = 2%			6.622**	5.439**	0.145	0.178
			(2.350)	(1.832)	(0.360)	(0.340)
Realized Cost Change$_t$ = 4%			8.280**	6.627**	−0.103	−0.064
			(2.622)	(2.066)	(0.424)	(0.392)
Realized Cost Change$_t$ = 6%			11.717**	9.184**	−0.254	−0.208
			(3.032)	(2.300)	(0.467)	(0.456)
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes
Date FEs	Yes		Yes		Yes	
Date-Sector FEs		Yes		Yes		Yes
N	3493	3480	3493	3480	1415	1410
R^2	0.48	0.56	0.49	0.56	0.65	0.73

Note: This table reports results from estimating specifications (1) (columns 1–4) and (2) (columns 5–6). The variable $\mathbb{E}_t$[Cost Change$_{t+12}$] is a weighted mean using respondents' reported probabilities of each bin of cost changes. In columns 1–2, Realized Cost Change$_t$ is the value for the midpoint of the bin. We winsorize fill-in responses for Realized Price Change$_t$ at the five percent level. Standard errors two-way clustered by firm and quarter. * indicates significance at the 10% level, ** at 5%.

cost changes are indeed highly predictive of future realized cost changes. In other words, firms appear to have information about future cost changes, but do not meaningfully incorporate these expectations into current prices, as most sticky-price models would predict.

2.3 Pass-Through of Hedging Gains and Losses

As an alternative to stockpiling inventory, firms often make forward purchase agreements or use financial instruments to manage the cost of future inputs. Like inventory in the stockroom, inputs locked in at a higher or lower historical price affect the average cost that a firm incurs for its purchases, but, as long as the firm buys at the spot price on the margin, do not affect marginal costs. According to standard theory, resulting effects on average costs should be treated as windfall gains and losses and should not affect pricing decisions.

We use the airline industry as a laboratory to study the effects of realized hedging gains and losses on prices. Jet fuel typically accounts for 20–30 percent of airlines' operating expenses, and jet fuel prices are highly volatile. Airlines therefore use hedging to smooth cost fluctuations, though the extent of hedging varies substantially over time and across airlines.[13] In their financial statements, airlines report fuel expenses inclusive of realized gains and losses from these hedges.[14]

The correct notion of marginal cost in this industry is difficult to assess. Once a flight is scheduled, filling one more seat has a negligible effect on fuel consumption. Since fares adjust frequently up to departure, the marginal cost of filling a seat relevant over most price spells is largely independent of fuel prices. The fact that airline pricing departments incorporate fuel surcharges into prices (Hortaçsu et al. 2024) already suggests a departure from this marginal cost pricing benchmark. Even if the relevant notion of marginal costs includes fuel costs (for example, if pricing is set when capacity decisions are made), fares should depend on the price of fuel on the margin, not the airline's average cost of fuel. We test whether this is the case.

Our analysis builds on Shi et al. (2024), who show that deviations in airlines' average fuel costs affect prices. We further show that the gap between an airline's average realized fuel cost and the jet fuel spot price passes through to ticket prices at a similar rate as the spot price itself. This is consistent with airlines pricing off average realized cost of fuel rather than marginal fuel costs.

Data on airline ticket prices and fuel costs. We use fare data from the Airline Origin and Destination Survey (DB1B), a 10 percent sample of airline tickets collected by the Bureau of Transportation Statistics (BTS). We restrict the sample to nonstop itineraries to maximize comparability across carriers, and keep only tickets for which the operating carrier and ticketing carrier are the same to ensure that fares can be matched to a single carrier's costs. For all analysis that follows, we define a route r as an origin–destination airport pair interacted with an indicator for whether the itinerary is roundtrip. (We find similar results if we instead define a route as an origin–destination pair and control for roundtrip itineraries, or if we drop roundtrip tickets altogether.) We compute fare per mile using the reported fare and route distance and winsorize the top and bottom 2 percent of observations within each route-year.

[13] Airlines primarily use financial derivatives on crude oil and refined products (the latter limit exposure to fluctuations in the crack spread between crude oil and jet fuel). Some airlines have also pursued non-financial hedges, e.g., Delta's acquisition of the Philadelphia-based Trainer Refinery in 2012.

[14] The same goes for fuel costs reported to the Bureau of Transportation Statistics, which we use below. The instructions for F41 reporting (14 CFR 2012 Part 241) direct airlines to report fuel cost using a period average acquisition cost method.

Data on spot fuel prices and airlines' realized fuel costs come from the Energy Information Administration (EIA) and the BTS, respectively. We use the spot price of kerosene-type jet fuel from the EIA. Airlines' realized fuel costs come from the BTS Air Carrier Financial Reports (Form 41), Schedule P-12(a). We focus on fuel costs for scheduled domestic operations, since these operations correspond most closely to the tickets in the DB1B sample; nonscheduled operations refer to cargo charters and other irregular services. For each carrier i in quarter t, we compute the average fuel cost per gallon as

$$\text{Fuel Cost}_{it} = \frac{\text{Total Scheduled Domestic Fuel Cost}_{it}}{\text{Total Scheduled Domestic Fuel Consumption}_{it}}.$$

Effects of hedging gains/losses on prices. To estimate the effect of airlines' realized fuel costs on fares, we estimate the specification,

$$\begin{aligned}\log(\text{Fare Per Mile}_{sirt}) &= \beta \log(\text{Spot Fuel Price}_t) \\ &\quad + \gamma \left[\log(\text{Fuel Cost}_{it}) - \log(\text{Spot Fuel Price}_t)\right] + \alpha_{ir} + \varepsilon_{sirt}. \quad (3)\end{aligned}$$

where Fare Per Mile$_{sirt}$ is the fare per mile for ticket s operated by carrier i on route r in quarter t, Spot Fuel Price$_t$ is the spot price of jet fuel per gallon in quarter t, and Fuel Cost$_{it}$ is the average cost of jet fuel per gallon for carrier i in quarter t. The coefficient β estimates the pass-through of spot jet fuel prices to fares, and the coefficient γ estimates the pass-through of the difference between airlines' realized fuel costs and the spot price to fares. We include carrier–route fixed effects α_{ir} to control for systematic differences in costs and fares across airlines and their routes, so that identification comes from within-carrier variation in fuel costs and within-carrier-route variation in fares over time.

Column 1 of Table 3 finds that the pass-through of both spot fuel prices and the differential between airlines' realized fuel costs and the spot price are both significantly different from zero. Moreover, the estimated elasticities are roughly equal in magnitude, indicating that fares respond just as much to the difference between airlines' realized costs and the spot price as to the jet fuel spot price. We find an elasticity of fares to fuel costs close to the average share of total fare revenues spent on fuel, consistent with complete pass-through in levels of fuel costs (Sangani 2025).

Column 2 allows for asymmetric responses to positive and negative differences between airlines' realized fuel costs and the spot price. We find that the response to positive and negative differences are similar in magnitude. Shi et al. (2024) provide corroborating evidence of the idea that fuel costs both higher and lower than the average matter for fares, using Southwest's lower-than-spot fuel prices prior to 2007 and Delta's higher-than-spot

Table 3: Effect of airlines' realized fuel costs on prices.

	Log Fare Per Mile$_{sirt}$					
	OLS (1)	OLS (2)	OLS (3)	IV (4)	IV (5)	IV (6)
Log Spot Fuel Price$_t$	0.133**	0.132**		0.143**	0.132**	
	(0.026)	(0.023)		(0.027)	(0.027)	
Log Fuel Cost$_{it}$ − Log Spot Fuel Price$_t$	0.253**		0.110**	0.440**		0.111**
	(0.105)		(0.041)	(0.069)		(0.052)
×1{Positive}		0.235**			0.212**	
		(0.062)			(0.097)	
×1{Negative}		0.281			0.783**	
		(0.210)			(0.092)	
Route × Carrier (*ir*) FEs	Yes	Yes	Yes	Yes	Yes	Yes
Route × Quarter (*rt*) FEs			Yes			Yes
N (millions)	219.8	219.8	219.8	219.8	219.8	219.8
R^2	0.33	0.33	0.37	0.33	0.33	0.37

Note: In columns 4–6, carrier fixed effects interacted with the log change in the spot fuel price over the past year is used as an instrument for Log Fuel Cost$_{it}$ − Log Spot Fuel Price$_t$. Standard errors two-way clustered by carrier and route. * indicates significance at the 10% level, ** at 5%.

fuel prices in 2009 as case studies. Thus, like firms' reports for how historical costs of acquired inventory affect prices, prices appear to respond to realized costs whether or not those costs are higher or lower than marginal costs.

In column 3, we add route–quarter fixed effects, so that identification comes from differences in fares across carriers operating on the same route at the same time. The disadvantage of this specification is that the jet fuel spot prices is collinear with quarter fixed effects, and so we can no longer compare the pass-through of the differential between realized fuel costs and the spot price to the pass-through of the spot price itself. Nevertheless, adding route-quarter fixed effects removes the bias that could arise from time series factors correlated with both fares and the gap between realized costs and spot prices. We continue to find significant effects of airlines' realized fuel costs on fares, with an elasticity of 0.11.

One concern is that changes in airlines' realized fuel costs may be the result of strategic decisions, such as changes in hedging strategy or fuel sourcing, that correlate with fare changes. To address this concern, we exploit the fact that jet fuel spot prices are approximately a random walk. While the extent to which an airline hedges can be determined by endogenous factors, the evolution of the jet fuel price—which determines the ultimate effect of hedges on realized fuel costs—is plausibly exogenous. In columns 4–6, we use carrier fixed effects, which proxy for different tendencies to hedge across airlines, interacted with the change in the jet fuel spot price over the past year as an instrument for the differential between carriers' realized fuel costs and the spot price. Columns 4–6 find similar or moderately stronger effects of airlines' realized fuel costs with this approach.

A second concern is that, rather than prices responding to realized costs, changes in realized costs or cash-on-hand may lead airlines to change their capacity decisions. We explore this possibility by estimating the effect of realized fuel costs on planned and realized quantities. For our measure of planned capacity, we use the total number of seats offered by airline i on route r in month t; for realized quantities, we use the percentage of offered seats ultimately filled, called the "load factor." We take both measures from the BTS T-100 domestic segment data. Appendix Table A3 shows that total seat capacity for the average route indeed falls when an airline's fuel costs rise, though surprisingly the effect reverses sign when we instrument for airlines' realized fuel costs. However, even conditional on changes in the number of seats offered, we find that airlines' load factors fall when their realized fuel costs rise relative to other airlines. In other words, prices do not appear to be a consequence of capacity decisions alone, but instead affect realized quantities even after controlling for planned capacity.

3 A Two-Period Model of Accounting Cost Pricing

This section develops a two-period model of accounting cost pricing. In the model, a principal delegates the operation of a firm to a manager. The principal observes accounting profits and can use a transfer contingent on observed profits to discipline the manager's behavior. In choosing the transfer, the principal balances the benefits of discouraging the manager from taking his own idiosyncratic preferences into account and the costs of ignoring valuable information that the manager (but not the principal) can observe about the business. As the risk of managerial discretion grows large, the principal increasingly penalizes the manager from deviating too sharply from expected profits. This leads the manager to ignore private information about replacement costs and price off accounting costs visible to the principal.

We start with a stripped-down model to build intuition. After deriving the main results, we show that extensions of the model can also rationalize why firms pass through changes in overhead costs to prices and exhibit limited responsiveness to demand shocks.

3.1 Baseline Model

Figure 3 shows the timing of the two-period model. At time $t = 0$, the firm manager purchases I units of inventory at price h. At time $t = 1$, the manager observes the price c at which he can liquidate inventory in the future ($t = 2$). After observing c, the manager chooses a price p and sells $D(p)$ units of the inventory. The principal can observe the firm's sales, $pD(p)$, and the book value of the goods sold, $hD(p)$, but cannot observe the liquidation price c. She can use sales and costs of goods sold to determine the amount she pays the manager, K. Finally, at time $t = 2$, the manager sells the leftover inventory at the price c.

Figure 3: Two-period model timing.

$t = 0$	$t = 1$	$t = 2$
Manager purchases I units of inventory at price h.	Manager observes c and sets p, leading to sales $pD(p)$. Principal chooses payment K.	Manager liquidates leftover inventory at price c.

For simplicity, we assume that the units of inventory I purchased in the first period are sufficiently high that $D(p) < I$ for all values of p, so that the optimal price is not affected by the risk of stockouts. We further assume no discounting. So, the first-best value of the firm is

$$V^{\text{FB}} = \max_{p} \left\{ -hI + pD\left(p\right) + c\left(I - D\left(p\right)\right) \right\}. \tag{4}$$

Notice that the optimal price does not depend on the initial price of inventory h. Instead, the value of the firm is maximized by choosing $p^* = \arg\max_p (p - c)D(p)$, i.e., the price that maximizes profits using the liquidation price c as the measure of the marginal cost. Intuitively, the liquidation price c reflects the opportunity cost of selling one more unit of inventory, analogous to the replacement cost in a dynamic model.

Delegating the pricing decision to the manager can be costly because the manager's goals may not be aligned with the principal. We assume the following manager value function,

$$V^{\text{manager}} = \max_{p} \Big\{ \underbrace{-hI + pD\left(p\right) + c\left(I - D\left(p\right)\right)}_{\text{True value}} + \underbrace{\left(\alpha - 1\right)p}_{\text{Pricing wedge}} + \underbrace{K\left(pD(p), hD(p)\right)}_{\text{Incentive payment}} \Big\}. \tag{5}$$

The manager's value function includes the true value of the firm, which is the first bracketed term. But it also includes a private benefit that the manager enjoys from setting the price above or below the optimum, which is the second term. This private benefit could reflect a manager's preference for prices that are lower than the value-maximizing level ($\alpha < 1$), for example due to empire-building motives (Baumol 1959), or a preference for higher-than-optimal prices ($\alpha > 1$), for example to avoid intense competition with rivals (Bertrand and Mullainathan 2003). More broadly, the wedge introduced by $\alpha \neq 1$ stands in for any way in which the managerial discretion, inattention, or slack may distort pricing at the expense of the firm's value. We assume that α is the private information of the manager and cannot be observed by the principal.

The third term is a payment K that the principal can make to the manager. Crucially, the principal is limited in what information she can use to determine the payment. She observes accounting quantities, but cannot observe the true opportunity cost of a sale, c. Moreover, since the manager's pricing wedge α is private information, the manager also cannot credibly communicate the liquidation price c to the principal: regardless of the true value of c, the manager would always have an incentive to misreport it in order to justify his desired price. The principal must therefore condition the payment solely on observable accounting quantities—sales $pD(p)$ and the book value of goods sold $hD(p)$.

A natural question is why the principal cannot wait until $t = 2$ and condition the payment on the liquidation proceeds, which reveal c to both parties. Our assumption that the contract is tied to short-term accounting performance, rather than the long-run value of decisions, reflects the need to monitor and incentivize managers in a timely manner. Conditioning on $t = 2$ liquidation proceeds requires the manager to commit to a longer-term contract and attribute distant outcomes to current decisions, both of which are likely difficult in practice.

Given the manager's pricing choice, the principal's problem is to design the payment terms, $K(\cdot)$, to maximize expected firm value:

$$V^{\text{principal}} = \max_{K(\cdot)} \mathbb{E}\left[-hI + pD(p) + c\left(I - D(p)\right)\right]. \tag{6}$$

The principal faces a trade-off when choosing $K(\cdot)$: higher-powered incentives limit the extent to which the manager will allow their idiosyncratic preferences, captured by α, to erode firm value, but they also lead the manager to disregard their valuable private information about liquidation price c.

To derive closed-form results, we make several parametric assumptions. We assume demand is isoelastic with an elasticity η, i.e., $D(p) = p^{-\eta}$. For the payment function, we assume the principal penalizes the manager for deviating from a target accounting markup μ, with κ governing the strength of incentives,

$$K\left(pD(p), hD(p)\right) = -\frac{\kappa}{2}\left(\frac{pD(p)}{hD(p)} - \mu\right)^2, \tag{7}$$

We define the replacement cost shock $\varepsilon = c/h$ and log-linearize the model around the point where $h = 1$, $\alpha = 1$, and $\varepsilon = 1$. For any variable x, let $\hat{x}$ denote the log deviation of x from its equilibrium value. We assume that the variances of $\hat{h}$, $\hat{\alpha}$, and $\hat{\varepsilon}$ are proportional to a parameter z and take a first-order approximation around $z = 0$.

Proposition 1 characterizes the price that the manager would set in the absence of incentives from the principal.

Proposition 1 (Pricing without incentives)**.** *If $\kappa = 0$, then the price set by the manager is*

$$\hat{p} = \hat{c} + \frac{1}{\eta - 1}\left(\frac{\eta}{\eta - 1}\right)^{\eta}\hat{\alpha}.$$

The elasticity of the price to manager preferences $\hat{\alpha}$ is decreasing in the firm's demand elasticity η.

In the absence of incentives, the price set by the manager fully incorporates information about the opportunity cost of selling inventory: changes in the liquidation value c pass through one-for-one to prices.[15] However, the manager's idiosyncratic preferences α also distort prices. The degree of distortion falls as the elasticity of demand η increases. Intuitively, when the elasticity of substitution is high, deviating from the optimal price leads to a more rapid fall-off in firm value. Thus, market forces penalize the manager from diverging too far from the optimum. This mechanism captures the idea that managerial slack is more difficult to sustain in competitive industries (Hart 1983; Giroud and Mueller 2010, 2011).

We now turn to the optimal contract parameters chosen by the principal. To limit the influence of the manager's idiosyncratic preferences on prices, the principal offers a payment that penalizes deviations from a target accounting markup. Proposition 2 characterizes the parameters of this contract.

Proposition 2 (Optimal contract parameters)**.** *Given a payment of the form* (7)*, the contract*

[15] In our analytic results, we use pass-through to refer to the elasticity of prices to costs. Sangani (2025) shows that pass-through tends to be complete in *levels* rather than in logs and characterizes demand curves that predict pass-through in levels, unlike the isoelastic demand curve we posit above. One could assume a semi-log demand curve and derive similar conclusions about the pass-through in levels of accounting versus true marginal costs.

parameters that maximize expected firm value are $\mu^* = \eta/(\eta - 1)$ *and*

$$\kappa^* = \frac{1}{\eta}\left(\frac{\eta}{\eta-1}\right)^{\eta}\frac{\sigma_\alpha^2}{\sigma_\varepsilon^2},$$

where $\sigma_\alpha^2 = \mathbb{E}[\hat{\alpha}^2]$ *and* $\sigma_\varepsilon^2 = \mathbb{E}[\hat{\varepsilon}^2]$. *The strength of incentives* κ^* *is decreasing in the firm's demand elasticity* η, *increasing in the variance of manager preferences* σ_α^2, *and decreasing in the variance of the cost shock* σ_ε^2.

The optimal accounting markup target $\mu^* = \eta/(\eta-1)$ is the standard monopoly markup that would obtain in the first-best if the liquidation price c coincided with the accounting price h. The optimal strength of the incentive, captured by κ^*, is increasing in the ratio of the variance of the manager's pricing wedge to the variance of cost shocks, $\sigma_\alpha^2/\sigma_\varepsilon^2$. Intuitively, a greater risk of managerial discretion warrants stronger incentives, but incentives should be tempered when costs are volatile and the manager's private information about c is especially valuable. A more competitive market (i.e., a higher elasticity of substitution η) leads to lower-powered incentives, because market forces limit the degree to which the manager prices according to his own idiosyncratic preferences.

Proposition 3 shows how the optimal contract shapes the manager's pricing decision.

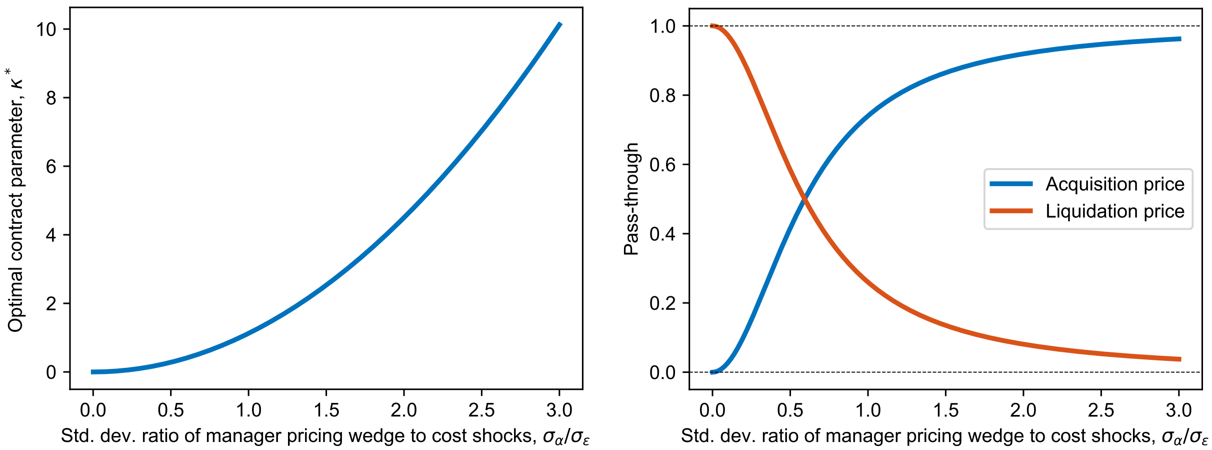
Proposition 3 (Pricing with optimal contract)**.** *If* $\mu = \mu^*$ *and* $\kappa = \kappa^*$, *then the manager sets*

$$\hat{p} = \frac{\omega(\eta)}{\omega(\eta) + \sigma_\alpha^2/\sigma_\varepsilon^2}\left[\hat{c} + \frac{1}{\eta-1}\left(\frac{\eta}{\eta-1}\right)^{\eta}\hat{\alpha}\right] + \frac{\sigma_\alpha^2/\sigma_\varepsilon^2}{\omega(\eta) + \sigma_\alpha^2/\sigma_\varepsilon^2}\hat{h},$$

where $\omega(\eta) = (\eta-1)^2\left(\frac{\eta}{\eta-1}\right)^{-2\eta}$ *is strictly increasing in the demand elasticity* η. *The degree of accounting cost pricing is increasing in the variance of manager preferences* σ_α^2, *decreasing in the variance of the cost shock* σ_ε^2, *and decreasing in* η.

Under the optimal contract, the manager's price is a weighted average of two components: the price that the manager would set in the absence of incentives, and the accounting cost at which inventory was acquired. We refer to the former as *replacement cost pricing* and to the latter as *accounting cost pricing*. The weight on accounting costs is increasing in the relative importance of the agency problem, which is captured by the ratio of variances $\sigma_\alpha^2/\sigma_\varepsilon^2$. When managerial discretion is the dominant concern ($\sigma_\alpha^2/\sigma_\varepsilon^2 \to \infty$), the principal forces the manager to price entirely off the historical acquisition cost h. Conversely, when the manager's private information about replacement costs is especially valuable relative to agency concerns ($\sigma_\alpha^2/\sigma_\varepsilon^2 \to 0$), incentives are weak and the manager prices off the true marginal cost as in Proposition 1.

Figure 4: Accounting cost pricing as variance of manager pricing wedge grows.



(a) Optimal contract parameter κ^*.

(b) Replacement vs. accounting cost pricing.

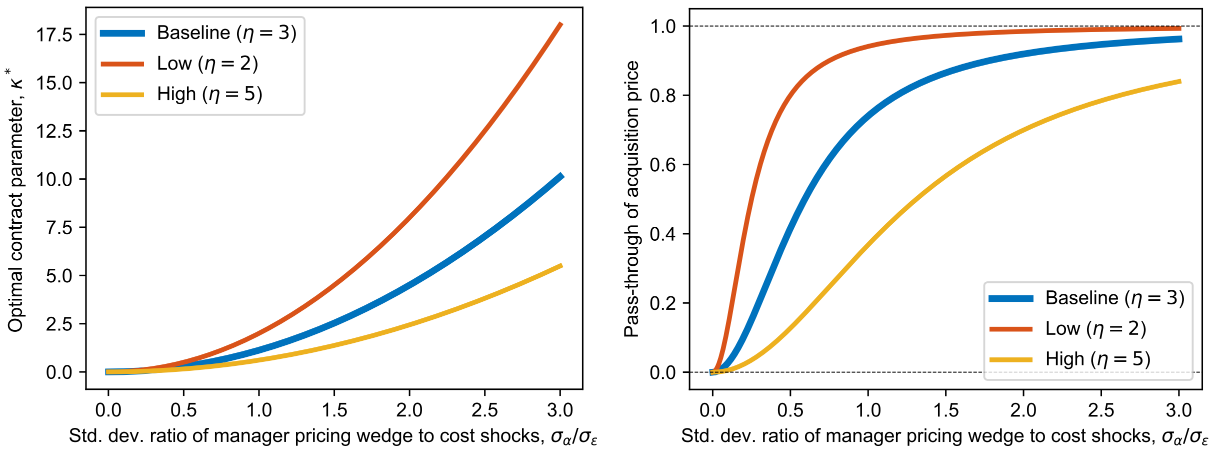
Note: The plots show analytical solutions from a log-linearization around $h = 1$, $\alpha = 1$, and $\varepsilon = 1$, assuming a demand elasticity $\eta = 3$. The left panel shows the contract parameter κ^* that maximizes expected firm value, and the right panel shows the elasticity of prices with respect to the inventory acquisition price and inventory liquidation price.

Figure 4 shows these results under illustrative parameter values. The left panel shows how the optimal contract parameter κ^* changes as the variance of the manager's pricing wedge relative to replacement cost shocks grows larger. The principal chooses higher-powered incentives as the risk of managerial discretion rises. This means that the price set by the manager becomes more responsive to accounting costs and less responsive to the true marginal cost of a sale, shown in the right panel of Figure 4. For the parameters we choose, even a relatively small amount of manager discretion results in a substantial movement toward accounting cost pricing rather than pricing off the true marginal cost.

Proposition 3 shows that the weights put on accounting costs versus true marginal costs are also governed by the demand elasticity η through $\omega(\eta)$. Firms facing more competitive conditions place less weight on accounting costs and more weight on current replacement costs. Market competition already disciplines the manager's choice of price, and does so without introducing the accounting cost distortion embedded in the principal's contract.

We illustrate how the degree of accounting cost pricing depends on the elasticity of demand in Figure 5. Compared to our baseline case where the elasticity of demand $\eta = 3$, lowering the elasticity of demand to $\eta = 2$ leads the principal to make incentives higher-powered and thus leads to more accounting cost pricing. Conversely, when $\eta = 5$, incentives are less strong, and the manager's price is more responsive to true marginal costs.

Figure 5: Accounting cost pricing strengthens when elasticity of demand is low.



(a) Optimal contract parameter κ.

(b) Replacement vs. accounting cost pricing.

Note: The plots show analytical solutions from a log-linearization around $h = 1$, $\alpha = 1$, and $\varepsilon = 1$, under different values for the demand elasticity. The left panel shows the contract parameter κ^* that maximizes expected firm value, and the right panel shows the elasticity of prices with respect to the inventory acquisition price.

While both our parameterization of the model and the specific parameters we choose for the simulation are illustrative, the model provides a useful prediction that accounting cost pricing should be less prevalent in markets where firms sell undifferentiated, highly substitutable goods. In fact, Okun (1981) comes to a similar conclusion to us about the cases where accounting cost pricing are less likely to prevail:

> The reliance of firms on historical costs is evident in many empirical studies of price-cost relations. [....] The exceptions that occur to me arise when processed raw materials are sold on auction markets, as in the case of flour or soybean meal. In those cases, the processed products promptly reflect changes in the (auction-market) prices of the primary products (Okun 1981, pp. 156–157).

Processed goods that are sold on auction markets are relatively homogeneous, making firms' residual demand curves elastic. With little room for discretionary pricing, the need to monitor managers through accounting-based contracts diminishes, and prices naturally track current replacement costs.

3.2 Partial Cost Observability

The central friction in the model is that the agent cannot credibly communicate the cost shock ε to the principal. What if the principal can use external sources, such as the behavior of competitors or market signals, to obtain an independent estimate of current costs? To consider this possibility, suppose that at $t = 1$ there is a public signal of the replacement cost shock, $s \sim \mathcal{N}(\hat{\varepsilon}, 1/\tau)$. The principal can now condition the payment contract on s in addition to the accounting sales and costs from before. We assume the same quadratic penalty form but allow the target accounting markup to depend on s,

$$K = -\frac{\kappa}{2}\left(\frac{pD(p)}{hD(p)} - \mu(s)\right)^2.$$

Proposition 4 characterizes the optimal contract parameters and the price set by the manager given the public signal s with precision τ.

Proposition 4 (Partial cost observability)**.** *The optimal contract uses*

$$\mu^*(s) = \frac{\eta}{\eta - 1}\exp\left(\frac{\tau\sigma_\varepsilon^2}{1 + \tau\sigma_\varepsilon^2}s\right), \qquad \textit{and} \qquad \kappa^* = \frac{1}{\eta}\left(\frac{\eta}{\eta - 1}\right)^\eta \frac{\sigma_\alpha^2}{\sigma_\varepsilon^2}\left(1 + \tau\sigma_\varepsilon^2\right).$$

Given the inventory acquisition price h, liquidation price c, and manager preference α, the expected price set by the manager is

$$\hat{p} = \frac{\omega(\eta) + \tau\sigma_\alpha^2}{\omega(\eta) + \sigma_\alpha^2/\sigma_\varepsilon^2 + \tau\sigma_\alpha^2}\left[\hat{c} + \frac{\omega(\eta)}{\omega(\eta) + \tau\sigma_\alpha^2}\frac{1}{\eta - 1}\left(\frac{\eta}{\eta - 1}\right)^\eta \hat{\alpha}\right] + \frac{\sigma_\alpha^2/\sigma_\varepsilon^2}{\omega(\eta) + \sigma_\alpha^2/\sigma_\varepsilon^2 + \tau\sigma_\alpha^2}\hat{h},$$

where $\omega(\eta)$ is as defined in Proposition 3.

The public signal effectively allows the principal to "mark-to-market" the firm's inventory. The principal's target accounting markup $\mu^*(s)$ reflects the principal's updated estimate of the value of the firm's inventory stock. The greater visibility into the real-time value of inventory also allows the principal to set higher-powered incentives: the optimal choice of κ^* increases with the signal precision τ.

The effect on pricing is twofold. First, the signal-adjusted target $\mu^*(s)$ means that even with high-powered incentives, the manager's price more closely tracks the true replacement cost in expectation. Thus, holding other parameters equal, increasing precision τ increases the weight on the liquidation price and lowers the weight on historical inventory acquisition cost. Second, relative to Proposition 3, we see that the public signal reduces the pass-through of the manager's idiosyncratic preference into prices by a factor of $\omega(\eta)/(\omega(\eta)+\tau\sigma_\alpha^2)$. In words, increasing the signal precision crowds out idiosyncratic managerial discretion.

The effect of cost observability on pricing contrasts with the role of product market competition analyzed above. In that case, a more elastic firm demand curve leads to more replacement cost pricing because market forces already discipline the manager, reducing the need for accounting-based incentives. Here, greater cost observability leads to more pricing off replacement costs *because* incentives can be made stronger. Thus, these two mechanisms both lead to greater replacement cost pricing, but with opposite effects on the power of the optimal contract.

Proposition 4 suggests another set of markets where we should tend to find a low degree of accounting cost pricing: markets where the real-time liquidation value of firms' input costs can be readily observed. Retail gasoline stations—which, as we documented in Section 2, are less likely to price off historical inventory acquisition costs than other firms—fall into this category. Sellers of gold and silver jewelry are another example. Our model explains their tendency to set prices using current gold and silver market prices as coming not from steep demand curves—indeed, jewelry can be quite differentiated, and customers may be quite price-insensitive—but rather from the fact that their inventories can be readily marked-to-market.[16]

3.3 Extensions: Average Cost Pricing and Demand Shocks

The baseline model shows that principal–agent frictions can lead managers to price off accounting costs—even when those accounting costs reflect information that is irrelevant to the first-best price—and to ignore valuable information that is relevant to the first-best price. It is not hard to see how the same forces can lead firms to pass through changes in average cost that do not affect marginal costs (e.g., changes in overhead costs) and to neglect changing market conditions, such as demand shocks, that affect the optimal price but cannot be externally verified. We briefly sketch these extensions.

Average cost pricing. Suppose that selling units of the good at $t = 1$ requires paying a stochastic overhead cost $F = \bar{F} + \nu$ and stochastic variable cost per unit sold w. The realizations of the overhead cost F and variable cost w can be observed by the firm

[16]In fact, from an accounting rule perspective, firms are typically not allowed to mark inventories to a market value above acquisition cost except for goods whose replacement value is directly observable. FASB ARB 43 states, "Only in exceptional cases may inventories properly be stated above cost. For example, precious metals having a fixed monetary value with no substantial cost of marketing may be stated at such monetary value; any other exceptions must be justifiable by inability to determine appropriate approximate costs, immediate marketability at quoted market price, and the characteristic of unit interchangeability."

manager at $t = 1$ but not by the principal. Thus, the principal observes total accounting costs at $t = 1$, which are equal to $(h + w)\,D(p) + F$, but cannot disentangle the portion of costs that is due to variable costs from the portion due to fixed costs. (The presence of the stochastic variable cost w also prevents the principal from using other information, such as the change in the book value of inventory, to back out the realization of the fixed cost.)

Notice that the manager cannot credibly communicate the realization of F to the principal, just as the replacement cost shock ε could not be credibly communicated. From the principal's perspective, a higher realization of F and thus a lower ratio of sales to accounting costs could just as well be due to the manager preferring a lower-than-optimal markup ($\alpha < 1$). In order to disincentivize discretion, the principal may use the accounting markup net of fixed costs, $\mu = pD(p)/\left[(h + w)D(p) + F - \bar{F}\right]$ to monitor the manager, which should equal $\eta/(\eta - 1)$ in the absence of shocks. In doing so, however, the principal makes the transfer payment depend on the realization of overhead costs $\nu = F - \bar{F}$. One can show that the manager consequently passes through innovations in overhead costs to prices at the same rate as he passes through changes in accounting costs. This is despite the fact that, if left alone, the manager's chosen price would ignore the fixed cost altogether.

In standard models, the coincidence of prices and average costs occurs because free entry brings prices and volumes down to the level where expected profits net of fixed costs are zero, not because firms deliberately pass through fixed costs to prices. Yet, as we saw in Figure 2, the vast majority of firms report passing through changes in fixed costs to prices. Our model rationalizes the pass-through of fixed costs as managers responding optimally to target accounting markups.[17]

Pass-through of demand *vs.* cost shocks. In the same way that incentives from the principal can cause the manager to neglect valuable information about replacement costs, so too can these incentives lead the manager to ignore other valuable information, such as demand shocks. Suppose for example that the elasticity of demand η is stochastic. Low realizations of η mean that consumer demand is unusually inelastic, leading to a higher first-best price, while high realizations of η lower the first-best price.

The principal's inability to verify the state of demand frustrates the manager's ability to incorporate this information into prices. Just like fluctuations in the replacement cost, the manager cannot credibly report the realization of the demand elasticity to the principal,

[17] This explanation is also consistent with how managers justify average cost pricing: "An overwhelming majority of the entrepreneurs thought that a price based on full average cost (including a conventional allowance for profit) was the 'right' price, the one which 'ought' to be charged." (Hall and Hitch, 1939, p. 19). In our model, this is indeed the price that external owners of the firm expect the manager to charge.

and thus he under-responds to this information relative to the first-best.[18]

The idea that firms underreact to demand shocks relative to cost shocks has a long history of empirical support. Cagan (1979) reports that, "Empirical studies have long found that short-run shifts in demand have small and often insignificant effects [on prices]." More recently, the asymmetric response of prices to costs relative to demand is documented both in surveys (e.g., Fabiani et al. 2006; Kohler et al. 2026) and empirically (e.g., Bils and Chang 2000). Studies exploiting local demand and cost shocks likewise find small responses of prices to large local demand shocks (e.g., Arcidiacono et al. 2020; Gagnon and Lopez-Salido 2020) but large responses to local cost shocks (Butters et al. 2022).

4 Price Dynamics

This section explores how accounting cost pricing affects price dynamics. We focus on the limit case where firms price solely off accounting costs (i.e., $\kappa \to \infty$). Since the prior section shows that managers choose a weighted average of accounting cost- and replacement cost-based prices, price dynamics for intermediate values of κ would (to a first-order approximation) follow a weighted average of the price dynamics we derive here and the current replacement cost.

We first discuss how we model the evolution of accounting costs and inventory stocks. Then, we characterize the dynamics of prices based on accounting costs and compare the results to canonical sticky-price models.

4.1 Inventory Valuation and Dynamics of Accounting Costs

To characterize price dynamics, we need to take a stance on how firms calculate the accounting cost of goods sold. In the two-period model, the firm purchases inventory once at price h, so the accounting cost per unit is h regardless of whether the firm uses first-in-first-out (FIFO), average acquisition cost (AAC), or last-in-first-out (LIFO) accounting.[19] In a dynamic setting, however, the firm purchases inputs repeatedly, and the valuation method determines how it apportions costs for units that are sold. Under FIFO, the cost of goods sold reflects the price of the oldest inventory in stock; under LIFO, the cost of goods sold reflects the most recent purchase price; and under AAC, the cost of

[18] This result requires that we specify the model so that the principal cannot back the demand elasticity out by observing both the price level p and sales $pD(p)$.

[19] The average acquisition cost method is often referred to as "average cost." We use "average acquisition cost" throughout to distinguish between this inventory valuation method and the full cost pricing theory that firms set prices according to average costs (inclusive of fixed costs) rather than marginal costs.

goods sold depends on a blended average of prior acquisition prices. All three methods share the feature that accounting costs reflect realized historical costs rather than current replacement costs, but they differ in the weight they place on recent versus prior purchases.

We focus largely on AAC and FIFO accounting, because these are the predominant methods used by firms that are likely to price off accounting costs. Figure 6a shows that AAC and FIFO are unconditionally the most common inventory valuation methods used by public firms, together accounting for over 80 percent of inventory-carrying firms in Compustat from 2010–2025. Both methods put more weight on older acquisition costs than LIFO, which instead computes costs using the price of the most recently acquired inventory and thus more closely tracks current replacement costs.[20]

More importantly, AAC and FIFO are especially prevalent in the industries where our model suggests accounting cost pricing is likely to matter. Figure 6b shows the fraction of inventories in the 2017 Economic Census valued using LIFO across NAICS-6 industries whose products are primarily traded on organized exchanges, whose products are priced relative to reference prices quoted in trade publications, and whose products have administered prices (Rauch 1999). Industries with organized exchanges and reference prices have homogeneous outputs and public signals of cost fluctuations, while industries with administered prices are more likely to have differentiated inputs and outputs. Industries with administered prices—where accounting cost pricing is most likely to matter—tend to use AAC and FIFO more, and LIFO less, than industries with organized exchanges or reference prices.

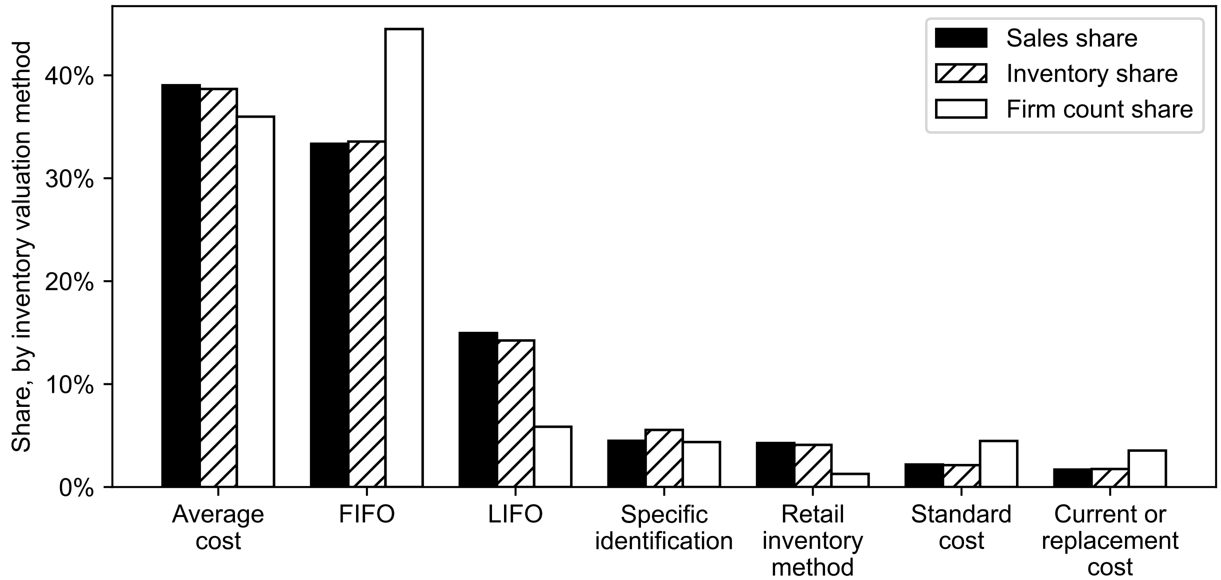
4.2 Price Dynamics Under Average Acquisition Cost Accounting

It turns out the average acquisition cost accounting yields especially tractable price dynamics because, unlike FIFO or LIFO, it does not require keeping track of inventory vintages. The law of motion for inventories is

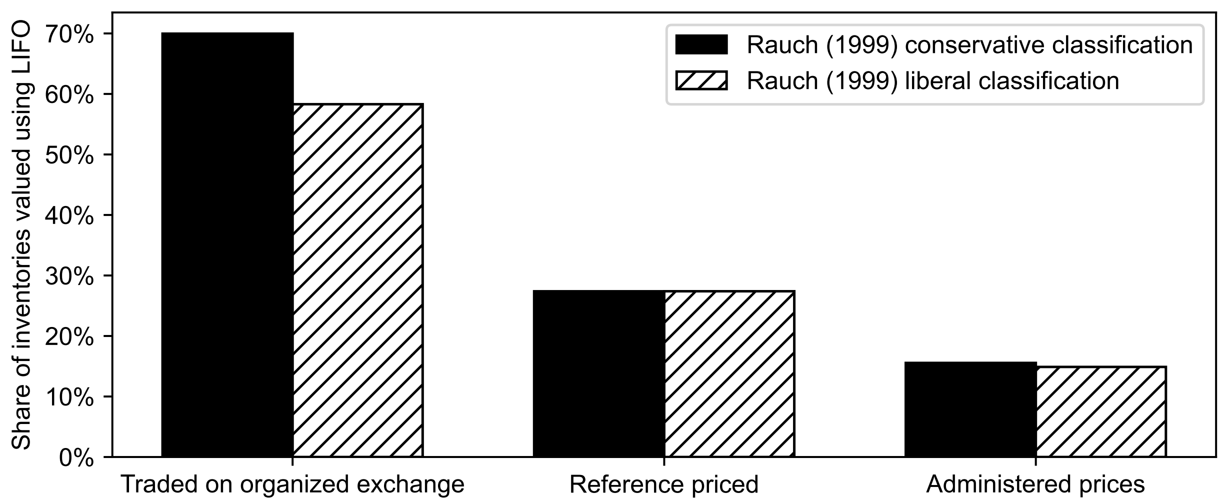
$$I_t = I_{t-1} - D_t + Y_t,$$

[20]The fact that LIFO pricing more closely approximates replacement cost pricing might make it puzzling why so few firms use LIFO, especially given that LIFO also confers a tax advantage when input costs trend upward. Part of the reason is institutional: LIFO is prohibited under International Financial Reporting Standards (see IAS 2 paragraph 25). A further reason is that LIFO can be administratively costly, requiring firms to classify inputs and determine when newly received shipments are sufficiently similar to existing inventory. Using variation in tax benefits from LIFO over time, Ling and Tinkelman (2024) estimate that the administrative and compliance costs of LIFO accounting average more than 0.35% of costs of goods sold for public firms.

Figure 6: Prevalence of inventory valuation methods.



(a) Inventory valuation methods for public firms, 2010–2025.



(b) Share of inventories in 2017 Economic Census valued using LIFO, by Rauch (1999) classification.

Note: The top panel shows the share of Compustat firms with each inventory valuation method (`INVVAL`) over the period 2010–2025. We exclude firms whose inventory valuation methods are recorded as "No inventory" (44.1% of observations), as "Not reported" (5.5% of observations), or are missing (<0.1% of observations). The bottom panel shows the fraction of inventories in the 2017 Economic Census priced using LIFO accounting, split by the most common Rauch (1999) categorization of products within the NAICS-6 industry code. The 2017 Economic Census covers inventory valuation methods for the mining (NAICS 21), manufacturing (NAICS 31–33), and wholesale trade (NAICS 42) sectors. We match Rauch (1999) categorizations to 258 NAICS-6 industries covering 41.6% percent of inventories in these sectors.

where I_t is the inventory stock at the end of period t, D_t is the number of units sold at t, and Y_t are purchases of new units of inventory at t.

Under AAC accounting, the accounting value of inventories at the end of period t is calculated as

$$h_t I_t = (I_{t-1} - D_t)\, h_{t-1} + Y_t c_t. \tag{8}$$

That is, the accounting cost per unit of inventory h_t is a weighted average of the prior period accounting cost h_{t-1} and the current replacement cost c_t. The weights are the shares of leftover inventory from the prior period and new purchases in the final inventory stock, respectively. We maintain the assumption of isoelastic demand from Section 3, so that under AAC pricing, the output price is $p_t = (\eta/(\eta-1))\, h_t$.

We log-linearize around a steady state where the cost of inventory is fixed at c^{ss}. We denote the steady-state ratio of per-period demand to inventories by $\delta = D^{ss}/I^{ss}$. We refer to δ as the *shipment-inventory ratio* to differentiate it from sales-inventory ratios reported by statistical agencies; the sales-inventory ratio measures the ratio of sales to the book value of inventory, so in steady state is instead $\delta\eta/(\eta-1)$. As in Section 3, we use $\hat{x}_t$ to denote the log-deviation of any variable x_t from its steady state value, $\log x_t - \log x^{ss}$.

Log-linearizing (8) and using $\hat{p}_t = \hat{h}_t$ yields the recursive equation,

$$\hat{p}_t = (1-\delta)\hat{p}_{t-1} + \delta \hat{c}_t. \tag{9}$$

The weights on the current replacement cost $\hat{c}_t$ and the last-period price $\hat{p}_{t-1}$ depend on the rate at which inventory is depleted. When turnover is high, the selling price largely reflects the current replacement cost. When turnover is low, the average unit acquired spends a long time in inventory before being sold, and prices are more reflective of historical costs.

The recursive formulation in (9) is reminiscent of the law of motion for prices under the Calvo (1983) model of sticky prices. We formalize the relationship between the price dynamics under AAC pricing and Calvo in Proposition 5.

Proposition 5 (AAC pricing *vs.* Calvo)**.** *Given a path of costs $\{\hat{c}_t\}_{t=-\infty}^{\infty}$, the path of prices under AAC pricing and replacement cost pricing with Calvo frictions are*

$$\hat{p}_t^{AAC} = \delta \sum_{k=0}^{\infty} (1-\delta)^k \, \hat{c}_{t-k},$$

$$\hat{p}_t^{Calvo} = \theta \sum_{k=0}^{\infty} (1-\theta)^k \, \hat{c}_{t-k} + \underbrace{\theta \left[1 - \beta\,(1-\theta)\right] \sum_{k=0}^{\infty} \sum_{s=0}^{\infty} \beta^s \,(1-\theta)^{k+s}\, \mathbb{E}_{t-k}\left[\hat{c}_{t+s-k} - \hat{c}_{t-k}\right]}_{\text{Due to forward-looking reset prices}},$$

where δ is the steady-state shipment-inventory ratio, θ is the fraction of firms able to reset their prices each period under Calvo, and β is the discount factor. The paths of prices under both models coincide if $\delta = \theta$ and either $\beta = 0$ or $\mathbb{E}_t[\hat{c}_{t+s}] = \hat{c}_t$ for all periods t and forecast horizons s.

Both AAC pricing and Calvo frictions predict prices with geometrically decaying weights on historical costs, but the forces determining the speed of decay are different. Under Calvo frictions, the decay rate is determined by the share of firms θ that are unable to change their prices each period and are left with stale prices reflecting historical costs. Under AAC pricing, prices are flexible but depend on historical costs because the average unit spends $1/\delta$ periods in inventory before being sold.

Compared to AAC pricing, prices under Calvo frictions have an extra term that reflects how firms expect future replacement costs to differ from current costs. This forward-looking term drives a wedge between the Calvo and AAC price paths unless firms do not care about the future (i.e., $\beta = 0$) or firms' expectations of future costs are equal to current costs. The latter condition is satisfied if costs follow a martingale or if firms have what Minton and Wheaton (2022) term myopic expectations. Minton and Wheaton (2022) estimate that "complete myopia" is necessary to match the dynamics of pass-through for most commodities through the input-output network.

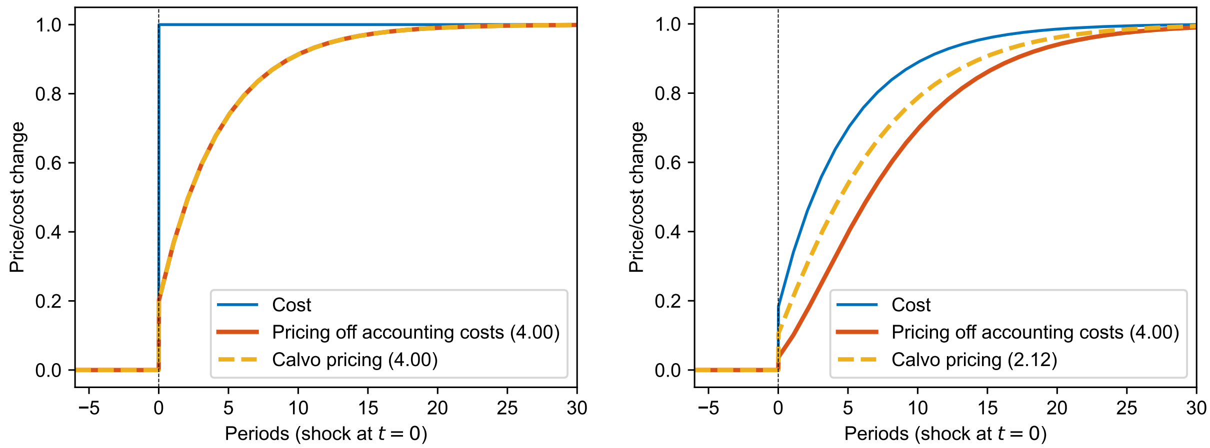
We use a few illustrative examples to highlight three ways in which AAC pricing leads to different predictions than Calvo frictions: (i) accounting cost pricing generates more sluggish pass-through of slow-moving shocks, (ii) it amplifies the degree to which supply chains slow down price responses, and (iii) compared to Calvo, accounting cost pricing generates greater responsiveness to transitory shocks.

Example 1 (Sluggish response to slow-moving shocks)**.** Calvo prices respond more quickly to a cost shock that unfolds over time, because firms increase their prices in anticipation of future cost changes, unlike firms with AAC pricing. To illustrate this, suppose there is an unanticipated shock to costs at time $t = 0$, with $\hat{c}_t = 1 - \rho^{t+1}$ for $t \geq 0$. The parameter ρ describes how slow-moving the shock is: when $\rho = 0$, costs jump to $\hat{c}_0 = 1$ immediately, while when $\rho > 0$ the cost shock gradually increases to one over time. Applying Proposition 5 yields the following price paths for $t \geq 0$,

$$\hat{p}_t^{\text{AAC}} = 1 - (1-\delta)^{t+1} - \delta\rho\left[\frac{(1-\delta)^{t+1} - \rho^{t+1}}{(1-\delta) - \rho}\right],$$
$$\hat{p}_t^{\text{Calvo}} = 1 - (1-\theta)^{t+1} - \theta\rho\left[\frac{(1-\theta)^{t+1} - \rho^{t+1}}{(1-\theta) - \rho}\right]\left[1 - \frac{(1-\rho)\beta(1-\theta)}{1-\rho\beta(1-\theta)}\right],$$

When $\delta = \theta$, $\hat{p}_t^{\text{Calvo}} \geq \hat{p}_t^{\text{AAC}}$ for all $t \geq 0$, with the inequality holding strictly when $\rho > 0$

Figure 7: Price response to immediate *vs.* slow-moving cost shocks.



(a) Immediate shock. **(b)** Slow-moving shock.

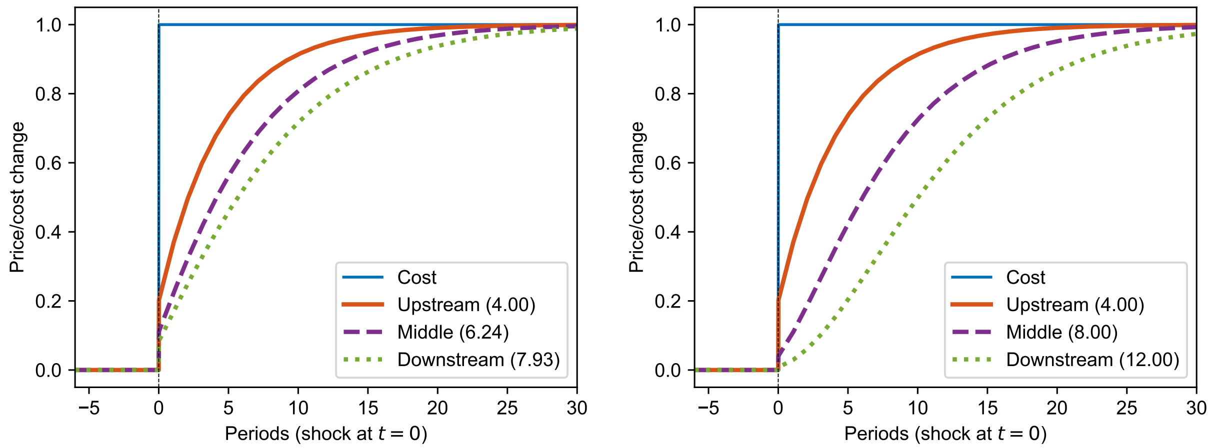
Note: The Calvo model uses $\beta = (0.96)^{1/12}$ and $\theta = 0.2$, and the pricing off accounting costs model uses weighted average acquisition costs with $\delta = 0.2$ (i.e., an inventory-shipments ratio of five). The left panel shows the response to an unanticipated, permanent cost shock ($\rho = 0$) while the right panel shows the response to a unanticipated, slow-moving shock ($\rho = e^{-0.2}$). The numbers in parentheses reflect the sluggish response of prices to costs, $\sum_{t=0}^{\infty}(c_t - p_t)$.

and $\beta > 0$. In words, firms raise their prices more quickly under Calvo frictions, because firms anticipate that future costs are higher than present costs.

Figure 7 plots these price responses. The left panel shows that the responses of prices under Calvo frictions and pricing off accounting costs coincide for an immediate, permanent shock. However, the coincidence fails when anticipated future costs differ from current costs, as in the case of the slow-moving shock shown in the right panel. In that case, prices respond more sluggishly when firms price off accounting costs as higher-priced inventory slowly makes its way through firms' inventory stocks. We calculate the cumulative gap between costs and prices over the path of the shock (embedded in a simple general equilibrium model, this gap would be proportional to the cumulative impulse response of the cost shock on output). In the right panel of Figure 7, AAC pricing increases this statistic by over 80 percent relative to Calvo pricing.

Example 2 (Amplified delays in supply chains)**.** Both sticky prices and pricing off accounting costs translate immediate cost shocks into gradual price changes. In supply chains, this means that immediate cost shocks facing an upstream producer can turn into slow-moving cost shocks for their customers, and even slower-moving cost shocks for producers further downstream. Thus, supply chains can further amplify the differences between AAC and Calvo pricing.

Figure 8: Amplification of sluggish price response in supply chains.



(a) Calvo.

(b) Pricing off accounting costs (AAC).

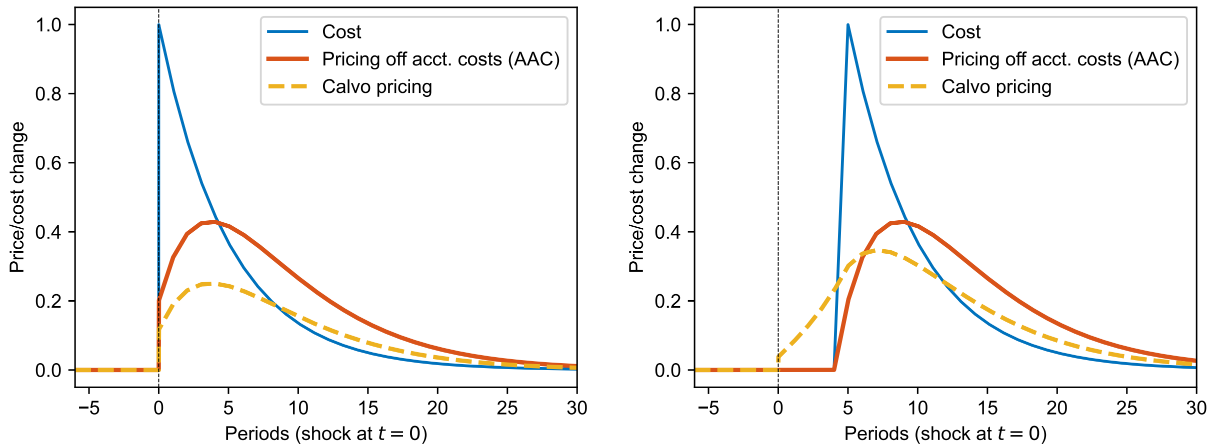
Note: The Calvo model uses $\beta = (0.96)^{1/12}$ and $\theta = 0.2$, and the pricing off accounting costs model uses weighted average acquisition costs with $\delta = 0.2$ (i.e., an inventory-shipments ratio of five). In both panels, the shock to upstream costs in unanticipated before $t = 0$. The numbers in parentheses reflect the sluggish response of prices to costs, $\sum_{t=0}^{\infty}(c_t - p_t)$.

Figure 8 shows the response of prices in a three-firm vertical supply chain to an immediate, permanent cost increase in the most upstream firm's costs. Whether firms price off accounting costs or with Calvo frictions, the first firm in the chain has the same response to the cost shock (assuming $\delta = \theta$). However, the slow-moving cost shock faced by the middle firm in the chain leads to a slower path of price increases when firms price off accounting costs. The same pattern repeats further downstream. The result is that, even though both supply chains face the same cost shock, the cumulative gap between the upstream cost and downstream prices over the path of the shock is more than 50 percent larger under accounting cost pricing.

Example 3 (Greater responsiveness to transitory shocks)**.** The two preceding examples show that prices respond more sluggishly to costs under accounting cost pricing than Calvo. This is because in both examples, current cost increases are correlated with higher future costs. If the opposite is true—for example, in the case of transitory shocks—then accounting cost pricing can instead generate *more* responsiveness than Calvo.

The left panel Figure 9 shows how prices respond to an unanticipated, transitory cost shock that arrives at $t = 0$. Prices under both Calvo frictions and AAC accounting costs rise on impact, but the response is stronger for AAC pricing, because the firms with Calvo frictions incorporate the fact that they expect costs to revert. In fact, in this example, the

Figure 9: Increased responsiveness to transitory shocks.



(a) Unanticipated cost increase at $t = 0$. **(b)** News at $t = 0$ about cost increase at $t = 5$.

Note: The Calvo model uses $\beta = (0.96)^{1/12}$ and $\theta = 0.2$, and the pricing off accounting costs model uses weighted average acquisition costs with $\delta = 0.2$ (i.e., an inventory-shipments ratio of five). In the left panel, the path of costs is $\hat{c}_t = e^{-0.2t}$ for $t \geq 0$. In the right panel, the path of costs is $\hat{c}_t = e^{-0.2(t-5)}$ for $t \geq 5$.

price response under AAC pricing is always larger than the pricing response under Calvo, though the peak of both responses are incomplete relative to the size of the initial cost shock.

For an anticipated cost shock, such as the one shown in the right panel of Figure 9, the picture is more complicated. Firms with Calvo pricing are initially more responsive before the shock materializes, because they increase their prices in anticipation of the expected cost increase. But once the shock materializes, the prices under AAC pricing jump and ultimately reach a higher peak response. In fact, while price responses for unanticipated versus anticipated cost shocks differ under Calvo frictions, the price response under AAC pricing is the same whether or not firms anticipate the cost increase; they mechanically increase their price in accordance with the average cost of inventory. The latter accords with our findings of little effect of anticipated future costs on prices in Section 2.

4.3 Price Dynamics Under FIFO and LIFO

Unlike AAC pricing, both FIFO and LIFO require keeping track of which inventory was purchased when, since costs of goods sold are calculated by tallying up unit costs for items in the inventory stock that were either purchased first or most recently. However, if the firm always has enough inventory on hand to satisfy current demand (in steady state, this corresponds to $\delta < 1$) and if $1/\delta$ is an integer, then

$$\hat{p}_t^{\text{FIFO}} = \hat{h}_t^{\text{FIFO}} = \hat{c}_{t-1/\delta}$$
$$\hat{p}_t^{\text{LIFO}} = \hat{h}_t^{\text{LIFO}} = \hat{c}_t.$$

That is, prices and accounting costs under FIFO depend on the replacement cost lagged by $1/\delta$ periods, and prices and accounting costs under LIFO are given by current replacement costs. In this respect, FIFO pricing introduces a lag exactly equal to the time that units spend in inventory before being sold, and LIFO pricing replicates the path of prices without nominal rigidities.

The fact that pricing under LIFO replicates replacement cost pricing is a byproduct of the assumption that the firm buys new inventory in each period. Okun (1981) notes that, in reality, "[firms] are not in the market for all their inputs at any time" (Okun, 1981, p. 156). One reduced-form way of modeling this idea is to consider an industry that consists of a set of producers, each of whom buys inputs once every $1/\delta$ periods and slowly exhausts those inputs over $1/\delta$ periods.[21] Since firms are only in the market for their inputs once every $1/\delta$ periods, the average price across producers in this "staggered" setting reflects historical costs from the last purchase date. Just as Proposition 5 drew a parallel between AAC pricing and Calvo frictions, Proposition 6 shows a connection between price paths under LIFO pricing with intermittent purchases and Taylor (1980) pricing frictions.

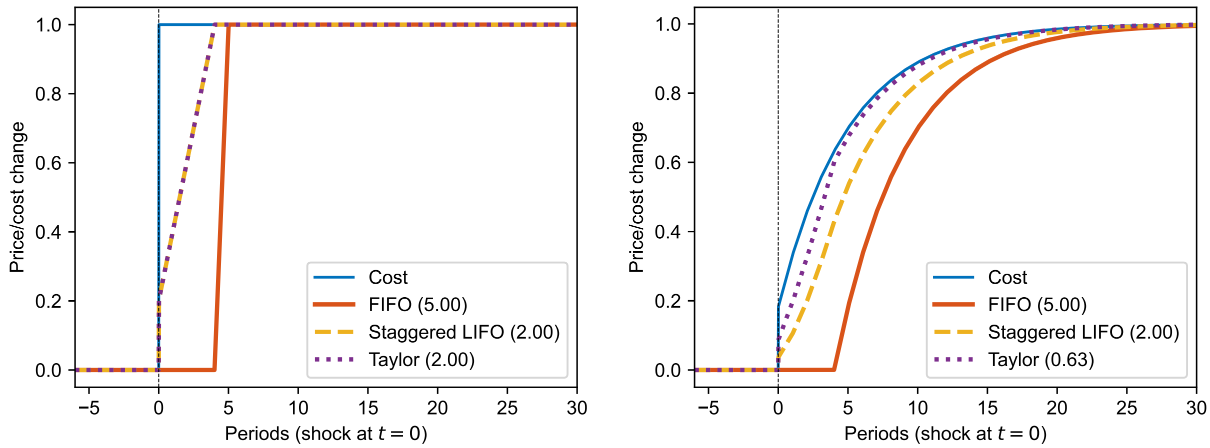
Proposition 6 (LIFO pricing with intermittent purchases *vs.* Taylor)**.** *Given a path of costs* $\{\hat{c}_t\}_{t=-\infty}^{\infty}$*, the path of average prices under LIFO pricing when producers buy inputs every* $1/\delta$ *periods and under replacement cost pricing with Taylor frictions are*

$$\hat{p}_t^{\textit{Staggered LIFO}} = \delta \sum_{k=0}^{1/\delta-1} \hat{c}_{t-k},$$
$$\hat{p}_t^{\textit{Taylor}} = \frac{1}{N}\sum_{k=0}^{N-1} \hat{c}_{t-k} + \underbrace{\frac{1}{N}\frac{1-\beta}{1-\beta^N}\sum_{k=0}^{N-1}\sum_{s=0}^{N-1} \beta^s \mathbb{E}_{t-k}\left[\hat{c}_{t+s-k} - \hat{c}_{t-k}\right]}_{\textit{Due to forward-looking reset prices}},$$

where firms under Taylor pricing reset prices every N periods and β *is the discount factor. The paths of prices under both models coincide if* $\delta = 1/N$ *and either* $\beta = 0$ *or* $\mathbb{E}_t[\hat{c}_{t+s}] = \hat{c}_t$ *for all periods t and forecast horizons s.*

[21] Our use of δ here is a slight abuse of notation, since the ratio of shipments to the average inventory stock in this setting is instead 2δ.

Figure 10: Response to immediate *vs.* slow-moving cost shocks: FIFO, LIFO, and Taylor.



(a) Immediate shock. **(b)** Slow-moving shock.

Note: The Taylor model uses $\beta = (0.96)^{1/12}$ and $N = 5$, and all models with pricing off accounting costs use $\delta = 0.2$. The cost shock sequences are the same as in Figure 7. In both panels, the cost shock is unanticipated before $t = 0$. The numbers in parentheses reflect the sluggish response of prices to costs, $\sum_{t=0}^{\infty}(c_t - p_t)$.

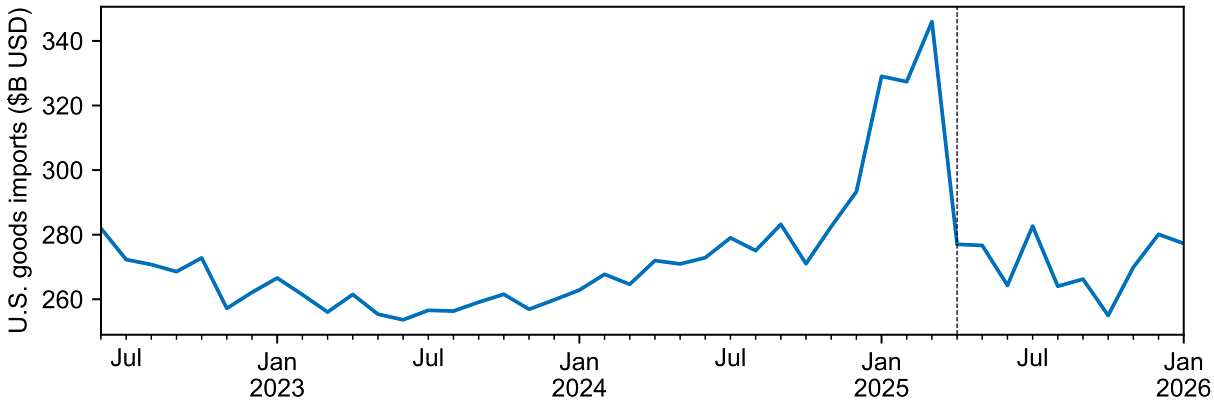
Figure 10 illustrates Proposition 6 in a quantitative example. For an immediate, permanent shock, the paths of average prices under LIFO with intermittent purchases and Taylor pricing coincide, because current costs exactly equal future costs. This is not true when the cost shock unfolds slowly over time: in that case, Taylor frictions predict a faster response of prices, because firms' reset prices incorporate the anticipated higher future costs. Compared to these models, price adjustment is always more delayed under FIFO—the price path lags the cost shock by $1/\delta$ periods—and prices under LIFO pricing with continuous purchases (not shown) coincide with the path of replacement costs.

4.4 Effect of Forward-Looking Purchases on Prices

While accounting cost pricing limits the response of price to future costs, firms can still respond to anticipated cost changes in other ways. They may do so by stocking up on inventory when costs are expected to rise (often referred to as "forward buying") or slowing purchases when costs are expected to fall. Figure 11 shows a sharp increase in imports of goods prior to the announcement of tariffs in April 2025, and news coverage of trade around changing tariff rates in 2025–2026 suggests that firms engaged in substantial forward buying when they expected tariffs to increase.[22]

[22]For example, PIIE notes a sharp increase in U.S. imports from many trading partners in early 2025, which they attribute to anticipatory purchases (`https://www.piie.com/blogs/realtime-economics/`

Figure 11: Forward buying of imported goods in the run-up to tariffs.



Note: Monthly imports of all goods from the Bureau of Economic Analysis IDS-0182 trade in goods estimates. The dotted vertical line marks the "Liberation Day" tariff announcements in April 2025.

The AAC pricing equation (9) shows that firm decisions to stock up on inventories or adjust purchase decisions do not affect prices to a first-order approximation. But a second-order approximation of the average acquisition cost yields,

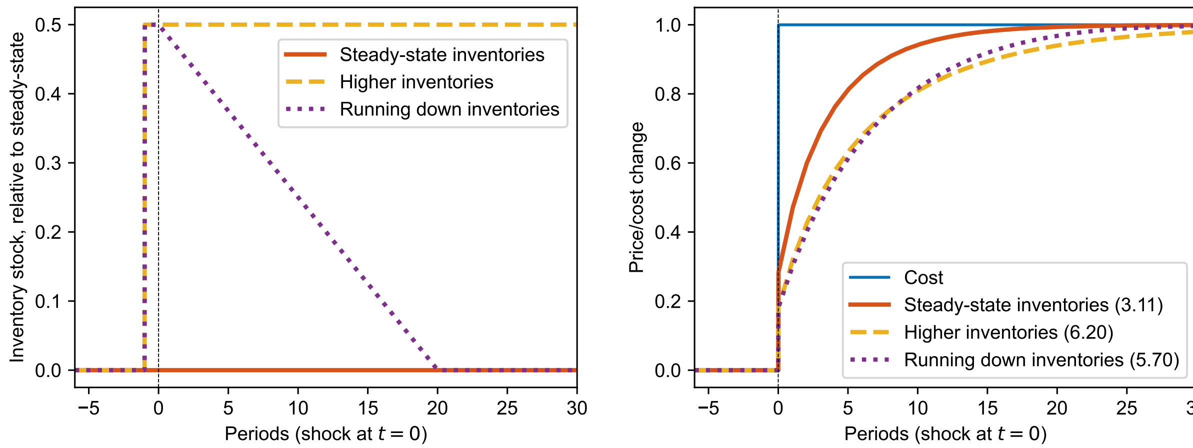
$$\hat{h}_t = \underbrace{(1-\delta)\,\hat{h}_{t-1} + \delta\hat{c}_t}_{\text{As in eq. (9)}} + \underbrace{\frac{1}{2}\delta\,(1-\delta)\left(\hat{c}_t - \hat{h}_{t-1}\right)^2}_{\text{Second-order correction}} + \underbrace{\delta\left(\hat{c}_t - \hat{h}_{t-1}\right)\left(\hat{Y}_t - \hat{I}_t\right)}_{\text{Effect of inventories / purchases}} \,. \tag{10}$$

The final term reflects the effect of inventories and purchases on accounting costs and thus on prices. If a firm stocks up on inventories before costs rise, then when the cost increase arrives, the combination of $\hat{I}_t > 0$ and $\hat{h}_{t-1} < \hat{c}_t$ depresses the current accounting cost $\hat{h}_t$ and the firm's price. (Reducing purchases $\hat{Y}_t < 0$ and depleting existing inventories has a similar effect.) This is precisely the mechanism that many of the quotes in Table 1 and Appendix Table A1 suggest played out during the onset of the tariffs in 2025.

We illustrate the effects of forward buying on the timing of price changes using this second-order approximation in Figure 12. In the figure, costs increase permanently starting at $t = 0$. We consider three scenarios for how inventories evolve in response to the shock. The first scenario assumes inventories remain fixed at the steady-state level. The second scenario assumes the firm stocks up on inventory at $t = -1$, increasing its inventory stock by 50 percent, and keeps the inventory stock permanently higher after the shock.

`2025/despite-tariffs-us-merchandise-imports-increased-and-exports-held`). In the aftermath of the Supreme Court's ruling on the illegal tariffs, The Wall Street Journal likewise reported, "The Race to Seize on Lower Tariffs Has Businesses Rushing In Shipments" (`https://www.wsj.com/economy/trade/tariffs-are-lower-and-businesses-are-racing-to-take-advantage-977bd276`).

Figure 12: Forward buying of inventories delays pass-through of cost increases.



(a) Inventory paths. **(b)** Pricing off accounting costs (AAC).

Note: The pricing off accounting costs model uses average acquisition costs with $\delta = 0.2$ (i.e., an inventory-shipments ratio of five). The left panel shows three paths for inventories relative to steady-state. The law of motion for purchases is $\hat{Y}_t = (1/\delta)(\hat{I}_t - \hat{I}_{t-1}) + \hat{D}_t$, and we assume that $\hat{D}_t = 0$ for all periods so that the inventory paths come from changes in purchases relative to steady state. The right panel shows the resulting path of prices. The numbers in parentheses reflect the sluggish response of prices to costs, $\sum_{t=0}^{\infty}(c_t - p_t)$.

The third scenario again assumes that the firm stocks up on inventory at $t = -1$, but that it gradually runs down the inventory by cutting back on purchases until the inventory stock returns to its steady-state level. We model each of these scenarios, shown graphically in the left panel of Figure 12, by assuming a path of purchases $\hat{Y}_t$ that yields the desired path of inventories.

The right panel of Figure 12 shows that forward buying substantially delays the pass-through of the cost shock to prices. In the scenario where the firm permanently increases its inventory stock, the delayed pass-through occurs because the firm holds more inventory purchased at pre-shock prices, and thus the weighted average acquisition cost converges more slowly to the new cost. In the scenario where the firm builds up and then gradually runs down its inventory stock, the average acquisition cost of inventory is slower to rise because the firm reduces purchases of new inventory immediately after the shock. Despite the different mechanisms, in both scenarios with forward buying, the cumulative gap between costs and prices over the path of the shock is about twice as large as the gap under the first scenario when the inventory stock is held fixed.

This result highlights a contrast between pricing off accounting costs and sticky prices. In models with sticky prices, sluggish pass-through of anticipated cost increases requires firms to be myopic: firms that are forward-looking will set prices that incorporate expected future cost increases, speeding up pass-through. Under pricing off accounting costs, the opposite is true (at least for cost increases). Forward-looking firms that expect costs to rise stock up on inventory, and this forward buying delays rather than accelerates pass-through. In other words, forward-looking behavior reinforces delayed price adjustment rather than erasing it.

Thus, we contend that matching the sluggish response of prices to cost increases need not require the type of rationally inattentive firm described by Gordon (1990): "Because the informational problem of trying to anticipate the effect of [a shock on costs] is difficult to formulate and probably impossible to solve, [...] the sensible firm just waits by the mailbox for news of cost increases and then, Okun-like, passes them on as price increases" (Gordon, 1990, p. 1150–1151). In our framework, the sensible firm instead acts upon available information about expected future cost changes, but only raises its price gradually as inventory is exhausted and replaced at higher cost.

5 Estimating the Extent of Accounting Cost Pricing

In this section, we use financial reports for public companies to estimate the extent to which firms price off accounting costs. Our approach exploits the fact that, while a firm's cost of goods sold will reflect the price that the firm paid for inputs in the past, the book value of inventory captures information about the input prices that the firm currently faces. Thus, we can use these income statement and balance sheet statement variables together to estimate the extent to which firms price according to accounting costs, captured in costs of goods sold, versus current replacement costs, captured in changes in the book value of inventory.

5.1 Estimation Approach

The model in Section 3 predicts that firms' prices are a blended average of prices based on replacement costs and accounting costs, i.e., $p_t \approx \mu(\phi c_t + (1-\phi)h_t)$. Taking the ratio of sales to cost of goods sold therefore yields,

$$\frac{\text{Sales}_t}{\text{COGS}_t} = \frac{p_t D_t}{h_t D_t} \approx \frac{\mu(\phi c_t + (1-\phi)h_t)D_t}{h_t D_t} = \mu\left(\phi\frac{c_t}{h_t} + (1-\phi)\right). \tag{11}$$

Intuitively, if firms put a positive weight on replacement costs ($\phi > 0$), then the ratio of sales to cost of goods sold should be systematically higher when the current replacement cost is greater than the accounting unit cost. Conversely, if firms price entirely off accounting costs ($\phi = 0$), the ratio of sales to cost of goods sold should be insensitive to fluctuations in replacement costs relative to accounting costs.

How can we observe fluctuations in current replacement costs relative to historical input purchase costs? Notice that changes in the book value of inventory reflect purchases of new inputs, made at the current cost c_t, minus the cost of goods sold, which are valued at the accounting price h_t:

$$\text{BookValueInventory}_t = \text{BookValueInventory}_{t-1} - \underbrace{\text{COGS}_t}_{h_t D_t} + \underbrace{\text{Purchases}_t}_{c_t Y_t}.$$

Thus, the ratio of purchases to cost of goods sold can be calculated using changes in the book value of inventory from a firm's balance sheet and cost of goods sold from the firm's income statement, and is equal to

$$\frac{\text{Purchases}_t}{\text{COGS}_t} = \frac{\Delta\text{BookValueInventory}_t + \text{COGS}_t}{\text{COGS}_t} = \frac{c_t Y_t}{h_t D_t}. \tag{12}$$

The ratio of purchases to cost of goods sold contains two pieces of information. First, it reflects how current replacement costs compare to accounting costs (c_t/h_t). Second, it reflects how the quantity of purchases compares to the quantity of shipments (Y_t/D_t). The former ratio of current and historical accounting costs is precisely the ratio we are interested in to understand the degree of accounting cost pricing; the latter is a fluctuation in relative quantities that we will need to treat as an unobserved, potential confounder in our estimation strategy.

Log-linearizing (11) and (12) around a steady state with constant costs, sales, and purchases, we find

$$\widehat{\left(\frac{\text{Sales}}{\text{COGS}}\right)}_t = \phi \widehat{\left(\frac{\text{Purchases}}{\text{COGS}}\right)}_t - \phi\left(\hat{Y} - \hat{D}\right). \tag{13}$$

Thus, absent changes in markups and changes in the relative quantities of purchases and shipments, the extent of replacement cost pricing ϕ is identified by the sensitivity of the sales–COGS ratio to the purchases–COGS ratio. Our estimation strategy for ϕ will exploit this relationship between the ratio of purchases to cost of goods sold and the fluctuations in replacement costs relative to accounting costs.

Does the purchases–COGS ratio capture variation in c_t/h_t? Before turning to the estimation, it is useful to verify whether the ratio of purchases to cost of goods sold indeed captures meaningful variation in the gap between replacement costs and accounting costs. We do so using two firms whose input costs are closely tied to a single, publicly traded commodity: Starbucks and Gildan Activewear. Starbucks, which carries roughly one month of inventory on average, purchases large quantities of Arabica coffee beans to produce its coffee products. Gildan, which is one of the world's largest manufacturers of basic apparel, holds about six months of inventory on average, much of which reflects the cost of cotton and other textile inputs. Because both firms use commodity inputs to produce differentiated, branded products, we expect their purchases–COGS ratios to track fluctuations in the respective commodity prices.

Figure 13 compares the ratio of purchases to cost of goods sold for Starbucks and Gildan to commodity prices for coffee and cotton, respectively. In each figure, we construct the ratio of purchases to cost of goods sold using the sum of purchases and cost of goods sold over the trailing four quarters, to minimize the influence of seasonal variation.[23] We plot this ratio alongside the year-over-year inflation rate for the matched commodity series, which we lag by two quarters to approximately match the timing of the four-quarter trailing sums of purchases and cost of goods sold.

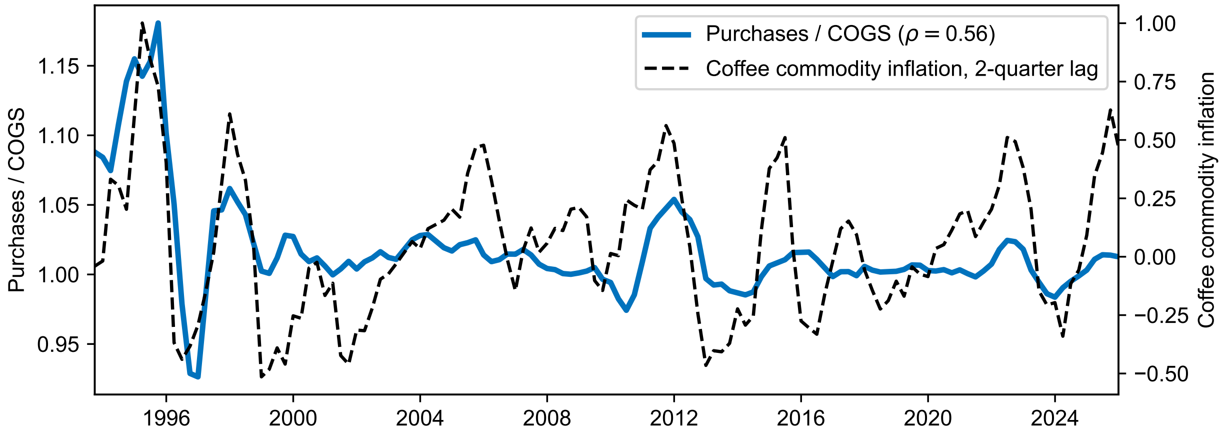
Both examples suggest that movements in the ratio of purchases to cost of goods sold at least in part reflect fluctuations in replacement costs relative to accounting costs. In both cases, rising input costs lead to a rise in the firm's ratio of purchases to accounting costs. For example, the purchases–COGS ratio for Starbucks shows pronounced peaks in 1995, 1997, 2011, and 2022, coinciding with increases in coffee commodity prices. Likewise, the purchases–COGS ratio for Gildan peaks in 2001, 2011, and 2023, alongside sharp increases in cotton commodity prices. These examples suggest that the ratio of purchases to cost of goods sold indeed captures variation in the gap between replacement costs and accounting costs necessary to estimate ϕ.

5.2 Estimation and Results

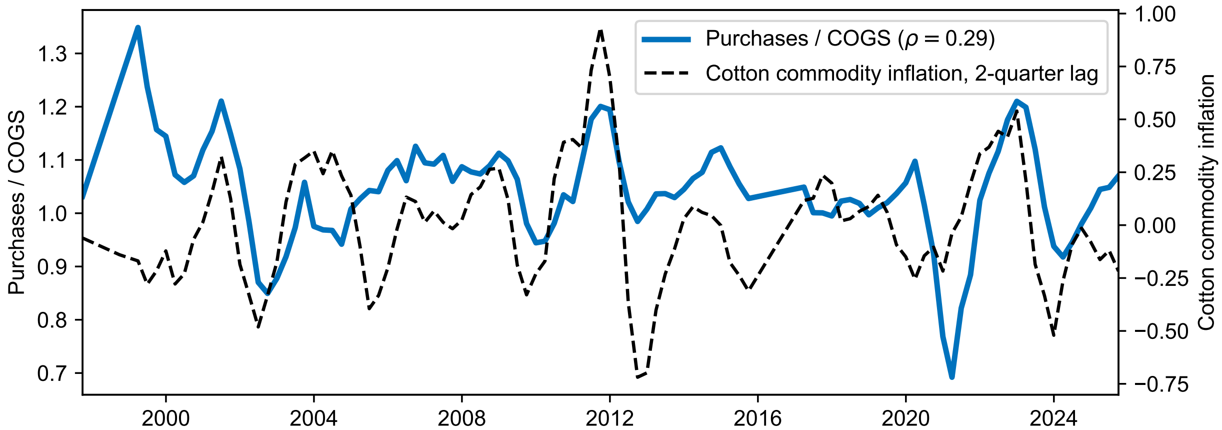
Data and specification. We use quarterly financial statements for publicly traded firms from Compustat. Appendix Table A4 enumerates filters that we use for our estimation sample. We exclude firms with missing NAICS codes and firms in the information (NAICS 51) and finance, insurance, and real estate (NAICS 52–53) sectors. We require that observations have strictly positive values inventory stocks, sales, and costs of goods sold. Since we construct purchases using the change in the book value of inventory, we also exclude observations where changes in inventory stocks are likely to be driven by mergers or spin-offs. We do so by excluding observations where Compustat deems the observation

[23] Figure 13 truncates the time series for Gildan before the Gildan–Hanes merger in 2025Q4, which led to large changes in the firm's reported assets and inventories unrelated to cost fluctuations. We apply filters for mergers and spin-offs in our estimation sample, described below.

Figure 13: Comparing Purchases / COGS to commodity input prices: Two examples.



(a) Starbucks and coffee commodity prices.



(b) Gildan and cotton commodity prices.

not comparable to previous quarters (recorded in the field COMPSTQ) and where the year-over-year change in the firm's total assets is greater than 30 percent. Finally, we restrict the sample to firms who report using FIFO or AAC accounting as their inventory valuation method. This is because, under LIFO, costs of goods sold already reflect the firm's most recent input purchase prices, and so $h_t \approx c_t$ by construction. The final sample includes about 15,000 firms, with an average of 29 quarterly observations per firm.

Using these data, we estimate the specification,

$$\log(\text{Sales}/\text{COGS})_{it} = \phi \log(\text{Purchases}/\text{COGS})_{it} + \alpha_{iq} + \varepsilon_{it}, \tag{14}$$

where $(\text{Sales}/\text{COGS})_{it}$ and $(\text{Purchases}/\text{COGS})_{it}$ are firm i's ratio of sales and purchases to cost of goods sold in quarter t, α_{iq} are firm × quarter-of-year fixed effects, and ε_{it} is a mean-zero error.

Comparing (14) to (13) shows that the term $\phi\left(\hat{Y}-\hat{D}\right)$, which depends on the ratio of the quantity of purchases to shipments, is an omitted variable in (14). This omission introduces two biases, which can be seen in the expression below.

$$\hat{\phi} \to \phi\left[1-\frac{Var\left(\hat{Y}_t-\hat{D}_t\right)}{Var\left(\widehat{\frac{\text{Purchases}}{\text{COGS}}}\right)}+\frac{Cov\left(\hat{h}_t-\hat{c}_t,\hat{Y}_t-\hat{D}_t\right)}{Var\left(\widehat{\frac{\text{Purchases}}{\text{COGS}}}\right)}\right].$$

First, fluctuations in the ratio of the quantity of purchases to shipments mean that the ratio of purchases to cost of goods sold is a noisy measure of c_t/h_t, therefore introducing an attenuation bias from measurement error. Second, quantities of purchases and shipments may move systematically with cost fluctuations. For example, if firms tend to reduce purchases when input costs rise and stock up when input costs fall below their historical levels (i.e., $Cov\left(\hat{c}_t-\hat{h}_t,\hat{Y}_t-\hat{D}_t\right)<0$), then the omitted variable will bias our estimate of ϕ upward.

We take a few steps to mitigate this omitted variable bias. First, one of the main reasons why quantities of purchases and shipments may fluctuate over time is seasonality: many firms build up inventory during one part of the year and have higher sales volumes during other parts of the year. The firm × quarter-of-year fixed effects α_{iq} in (14) absorb such firm-specific seasonal patterns.

Second, to account for possible firm-specific trends in purchases and shipments over time, we also estimate the first-differences specification,

$$\begin{aligned}&\log(\text{Sales/COGS})_{it}-\log(\text{Sales/COGS})_{it-4}\\&\quad=\phi\left[\log(\text{Purchases/COGS})_{it}-\log(\text{Purchases/COGS})_{it-4}\right]+\alpha_{iq}+\varepsilon_{it}.\end{aligned}\quad(15)$$

The first-differences specification uses year-over-year changes in both the dependent and independent variables, to ensure our results are not driven by trends in firms' shipment–purchase ratios, or by secular trends in inventory holdings or markups more broadly.

Finally, we also estimate both (14) and (15) using oil supply shocks from Känzig (2021) interacted with NAICS-4 industry fixed effects as an instrument for log(Purchases/COGS). Note that while the instrument should remove the attenuation bias from measurement error, it does not address the bias that results from how quantities of purchases and shipments respond to cost changes. If purchase quantities tend to be fall when input costs rise (which strikes us as the empirically plausible case), our IV estimates will tend to overestimate the extent of replacement cost pricing and thus underestimate the extent of accounting cost pricing.

Table 4: Estimating ϕ, the extent of replacement cost pricing.

	Log(Sales / COGS)			
	Levels		First Differences	
	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)
Log(Purchases / COGS)	0.147**	0.380**	0.126**	0.351**
	(0.015)	(0.104)	(0.014)	(0.079)
Firm × Quarter-of-Year FEs	Yes	Yes	Yes	Yes
N	382 211	369 469	345 468	333 935
R^2	0.86	0.86	0.09	0.04

Note: Columns 1–2 report results from (14), and columns 3–4 report results from (15). We exclude observations in the bottom and top 1 percent of values for the dependent and independent variables. Columns 2 and 4 use oil supply shocks from Känzig (2021) interacted with NAICS-4 fixed effects as an instrument for Log(Purchases / COGS). Regressions weighted by sales. Driscoll-Kraay standard errors with eight lags in parentheses. * indicates significance at 10%, ** at 5%.

Baseline results. Table 4 columns 1 and 3 report the results from estimating specifications (14) and (15). We find $\phi \in [0.12, 0.15]$, suggesting a substantial extent of accounting cost pricing. Columns 2 and 4 report IV estimates that place $\phi \in [0.35, 0.40]$.

We find similar point estimates for ϕ under a number of alternate specifications in Appendix Table A5. We extend specifications (14) and (15) to include time fixed effects, thus exploiting relative differences in cost fluctuations facing firms, and find a similar extent of accounting cost pricing for both firms using AAC and FIFO accounting. We further include a control for the ratio of purchases to cost of goods sold for other firms in the same NAICS4 industry using LIFO accounting. The idea is that, under LIFO accounting, $h_t \approx c_t$, and thus changes in the ratio of purchases to cost of goods sold reflect only changes in quantities of purchases and shipments. To the extent that purchase and shipment quantities are correlated across firms in an industry, we can then use these LIFO peers to control for changes in purchase and shipment quantities. Across these specifications, we find similar estimates of ϕ to the baseline estimates in Table 4.

Heterogeneity by industry characteristics. Section 3 predicts that the extent of replacement cost pricing should rise in competitive industries with homogeneous output goods and in industries with readily observable costs. We test this prediction in Table 5 by interacting the firm's ratio of purchases to cost of goods sold with an indicator for whether the firm's NAICS industry has reference prices or an organized exchange, using categorizations by Rauch (1999). We find a higher extent of replacement cost pricing in both

Table 5: Heterogeneity in the extent of replacement cost pricing by industry.

	Log(Sales / COGS)					
	Levels		First Differences			
	OLS	OLS	OLS	OLS	IV	IV
	(1)	(2)	(3)	(4)	(5)	(6)
Log(Purchases / COGS)	0.122**	0.125**	0.101**	0.103**	−0.268	−0.136
	(0.016)	(0.019)	(0.017)	(0.016)	(0.376)	(0.265)
× Reference prices (r)	0.079**		0.074*		1.006*	
	(0.029)		(0.042)		(0.599)	
× Organized exchange (w)	0.254**		0.168**		0.720**	
	(0.062)		(0.051)		(0.329)	
× Industry LIFO share		0.185**		0.144**		0.744**
		(0.090)		(0.068)		(0.353)
Firm × Quarter-of-Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
N	251 379	276 804	227 964	251 033	225 546	242 882
R^2	0.88	0.88	0.09	0.09	0.08	0.01

Note: Industries with reference prices (r) and organized exchanges (w) are identified using the Rauch (1999) liberal classification, which we map to NAICS codes using a SITC-NAICS concordance. The industry LIFO share is constructed using data from the 2017 Economic Census. Columns 5–6 use oil supply shocks from Känzig (2021) interacted with NAICS-4 fixed effects as an instrument for Log(Purchases / COGS). Regressions weighted by sales. Driscoll-Kraay standard errors with eight lags in parentheses. * indicates significance at 10%, ** at 5%.

industries with reference prices and organized exchange markets. In fact, IV estimates suggest that firms in these industries largely account for the positive weight on replacement cost prices in the sample. Focusing exclusively on firms in industries with administered prices, the OLS estimates of the extent of replacement cost pricing are $\phi \in [0.10, 0.13]$, and IV estimates are not significantly different from zero.

We also expect that firms should exhibit greater replacement cost pricing if their competitors' prices are more closely correlated with recent costs rather than historical input costs. Table 5 interacts the firm's ratio of purchases to cost of goods sold with the share of inventories in a firm's NAICS industry that are valued using LIFO accounting. In line with our predictions, the extent of replacement cost pricing increases with the share of a firm's competitors who use LIFO. For firms in industries where LIFO is rare, our OLS estimates of the extent of replacement cost pricing are again in the range $\phi \in [0.10, 0.13]$, and IV estimates are not significantly different from zero.

Thus, Table 5 suggests two conclusions. First, the comparative statics predicted by the theory—that the extent of replacement cost pricing should be higher for firms in industries with competitive, homogeneous outputs and with observable input costs—

appear to borne out in the data. Second, the degree to which public firms using FIFO and AAC price off replacement costs appears to be largely driven by firms in those industries. For firms in industries with administered prices and few LIFO competitors, the estimated extent of accounting cost pricing ranges from 85% to complete.

6 Quantitative Analysis

In this section, we evaluate the extent to which accounting cost pricing can generate realistic delays in aggregate price adjustment in a calibrated, input–output model of the U.S. economy. We first extend our results on price dynamics from the previous sections to a model with general input–output linkages and calibrate the model using a detailed information on the inventory turnover rates of disaggregated industries. Then, we simulate delays in the pass-through of commodity cost shocks to consumer prices in a model with accounting cost pricing and compare our results to canonical models with sticky prices.

6.1 Shock Propagation in a Network

Following Baqaee and Farhi (2020) and Rubbo (2023), we consider an economy consisting of N industries and a single factor (value added). A continuum of identical firms in each industry produce varieties of an industry output by combining value added with intermediate inputs from other industries in a constant returns, neoclassical production function. Each industry's output is a CES aggregate over individual firm varieties. Household consumption is a CES bundle of industry goods. We treat the price of value added as exogenous and log-linearize the model around a zero inflation, perfect foresight steady state. We denote the steady-state input–output matrix by Ω, where Ω_{ij} is industry i's expenditures on inputs from industry j as a share of total expenditures.

To characterize how cost shocks propagate through this economy, we define a pricing rule, $\mathcal{P}_i : \{\hat{mc}_{it+\tau}\}_{\tau=-\infty}^{\infty} \mapsto \hat{p}_{it}$, as a map from the path of an industry's marginal costs to its prices (both log-linearized around their steady state levels). For example, with flexible and competitive pricing, the pricing rule is simply $\hat{p}_{it} = \hat{mc}_{it}$. Each industry's marginal costs in turn depend on the prices of their suppliers. So, we can define an equilibrium as a path of prices that solves the fixed point,

$$\hat{p}_{it} = \mathcal{P}_i\left(\{\hat{mc}_i\left(\hat{\boldsymbol{p}}_{t+\tau}\right)\}_{\tau=-\infty}^{\infty}\right), \qquad \text{for all } i \text{ and } t,$$

where $\hat{\boldsymbol{p}}_t = (\hat{p}_{1t}, ..., \hat{p}_{Nt})$ is the vector of all industry prices at time t and $\hat{mc}_i(\cdot)$ is industry i's marginal cost as a function of contemporaneous industry prices.

Proposition 7 provides equilibrium conditions in the network economy under each pricing rule. These equilibrium conditions also provide a natural way to solve for the path of prices in a calibrated model.

Proposition 7 (Network price dynamics)**.** *Let $\{\hat{\boldsymbol{c}}_t\}_{t=0}^{\infty}$ be a path of exogenous cost shocks, where $\hat{\boldsymbol{c}}_t = (\hat{c}_{1t}, \ldots, \hat{c}_{Nt})$ is the vector of cost shocks to each industry at time t. The following expressions characterize the dynamics of industry prices $\hat{\boldsymbol{p}}_t = (\hat{p}_{1t}, \ldots, \hat{p}_{Nt})$ under different pricing rules.*

1. ***Average acquisition cost (AAC) pricing:*** *Industry prices follow*

$$\hat{\boldsymbol{p}}_t = (I - \Delta\Omega)^{-1} \left[(I - \Delta)\hat{\boldsymbol{p}}_{t-1} + \Delta\hat{\boldsymbol{c}}_t\right],$$

where $\Delta = \operatorname{diag}(\delta_1, \ldots, \delta_N)$ is a diagonal matrix of industry shipment-inventory ratios.

2. ***FIFO pricing:*** *The price of each industry i follows*

$$\hat{p}_{it} = \sum_j \Omega_{ij}\hat{p}_{j,t-d_i} + \hat{c}_{i,t-d_i},$$

where $d_i = \lceil \delta_i^{-1} \rceil$ is the inventory turnover time for industry i.

3. ***Calvo pricing:*** *Industry prices follow the second-order difference equation,*

$$\hat{\boldsymbol{p}}_t = \left(I - K\Omega + \beta\,(I - \Theta)^2\right)^{-1} \left[(I - \Theta)\,\hat{\boldsymbol{p}}_{t-1} + \beta\,(I - \Theta)\,\hat{\boldsymbol{p}}_{t+1} + K\hat{\boldsymbol{c}}_t\right],$$

where β is the discount factor, $\Theta = \operatorname{diag}(\theta_1, \ldots, \theta_N)$ is a diagonal matrix of industry Calvo adjustment probabilities, and $K = \Theta(I - \beta(I - \Theta))$.

Given the same path of cost shocks $\{\hat{\boldsymbol{c}}_t\}_{t=0}^{\infty}$, the paths of prices for each industry under AAC pricing and Calvo frictions coincide if $\delta_i = \theta_i$ for all i and $\beta = 0$.

Under AAC pricing, the matrix $(I - \Delta\Omega)^{-1}$ acts as a modified Leontief multiplier: it captures how cost increases propagate through the input-output network, dampened by the fact that downstream firms gradually fold new input prices into their average costs. Under FIFO pricing, a cost shock to an upstream sector cascades downstream at a speed determined by the cumulative inventory holding periods along the supply chain. The longer the chain of production, the longer the aggregate price level takes to absorb the shock. Assuming that firms set prices at the beginning of the period and keep them

Table 6: Data sources for calibration.

Parameter	Description	Source
Ω	Input–output matrix	BEA 2017 405-industry input-output table
β	Discount factor	$(0.96)^{1/12}$
δ_i	Shipment-inventory ratios	2017 Economic Census inventories, COGS
d_i	Inventory turnover time	$\lceil \delta_i^{-1} \rceil$
θ_i	Industry Calvo frictions	Pasten et al. (2020)

fixed within the period, the FIFO inventory delays are given by $d_i = \lceil \delta_i^{-1} \rceil$. Finally, under Calvo frictions, because reset prices today depend on expectations of prices tomorrow, the equilibrium condition is on the entire path of prices.

From Proposition 7, it is easy to see that when $\beta = 0$ and $\Delta = \Theta$, the AAC and Calvo price paths coincide. When $\beta = 0$, the relative speeds of pass-through under AAC and Calvo pricing therefore depend on a comparison of Δ and Θ. If inventory delays are smaller than the average length of price spells, then prices adjust faster under AAC pricing, and vice versa. Relative to AAC pricing, FIFO pricing with delays $d_i = \lceil \delta_i^{-1} \rceil$ tends to result in slower price adjustment (though not always). Under AAC, prices react immediately but incompletely to cost shocks, since cost shocks affect the blended average cost of inventories; under FIFO, prices only adjust once the full inventory delay period has passed.

6.2 Calibrating the Model with Accounting Cost Pricing

Table 6 describes the data sources that we use to calibrate the model to the U.S. economy. We use the Bureau of Economic Analysis detailed input–output table and use a discount rate of $\beta = (0.96)^{1/12}$, implying an annual interest rate of 4%.

Shipment–inventory ratios. We construct average shipment–inventory ratios at the most disaggregated level (up to 6-digit NAICS code) available using data from the 2017 Economic Census. The Economic Census reports end-of-year inventories and cost of goods sold for industries in mining (NAICS sector 21), manufacturing (sector 31–33), wholesale trade (sector 42), and retail trade (sector 44–45).

Appendix Figure A1 shows a histogram of inventory–shipment ratios across NAICS-6 industry. The average NAICS-6 industry holds just under two months of shipments in inventories; the average manufacturing industry holds 2.5 months of inventory. There is a tail of industries with substantially higher inventory stocks, such as wineries and distilleries (which hold 21 and 10 months of shipments in inventory), biological product manufacturing (which holds 12 months of shipments in inventory), and aircraft manufacturing and aerospace products and parts manufacturing (which hold 11 and 9 months of shipments in inventory).[24]

Since inventories are available for only a subset of sectors, our calibration departs from Proposition 7 and considers a hybrid economy in which firms in the mining, manufacturing, and trade sectors face no price rigidities but engage in accounting cost pricing, while firms in all other sectors have sticky prices. Our goal in doing so is to compare the price rigidity generated by accounting cost pricing with sticky prices for those sectors where we observe inventories, holding fixed the behavior of other sectors in the economy without inventories.

Even so, a comparison of shipment–inventory ratios δ_i with mean frequencies of price adjustment θ_i suggests that pricing off accounting costs alone is likely to generate smaller delays in aggregate price adjustment. Using industry-level frequencies of price adjustment θ_i calculated by Pasten et al. (2020) using data underlying the producer price index, Appendix Figure A3 compares the mean duration of price spells $1/\theta_i$ to our inventory–shipment ratios $1/\delta_i$. These frequencies of price adjustment imply that the average price spell lasts over 10 months for more than half the industries in the sample, substantially larger than most industries' inventory holdings.

Correcting for margin industries. The BEA treats industries in wholesale and retail trade as margin industries. This means that the BEA input–output table reflects only inputs used to provide value-added services by the wholesale and retail trade sectors and does not record merchandise sold through wholesale and retail trade as inputs to those industries (sales through the wholesale and retail trade sector are logged directly as sales to the purchasing industry). In the margin industry approach used by the BEA, when a consumer purchases a product, they simultaneously purchase the good from its corresponding manufacturing industry, and a margin service from the trade sectors.

In our framework, the fact that industry goods spend time sitting in the inventories of wholesale distributors or retailers before being delivered to customers can contribute to delays in pass-through. We thus reroute the input–output network to treat industries in wholesale and retail trade like other productive industries. In our corrected input–output

[24] Appendix Figure A2 shows that our measure of inventory–shipment ratios has a correlation of $\rho = 0.68$ with measures from Antràs and Tubdenov (2025), who calculate industry ratios of inventory to cost of goods sold using data on public firms from Compustat. The benefit of using the Economic Census data is that our measures also reflect inventory holdings of private firms and that we are able to measure shipment–inventory ratios for a broader set of industries (501 NAICS-6 industries, compared to 269 in Antràs and Tubdenov 2025).

table, the trade sector purchases goods from the manufacturer, adds its margin, then resells to consumers at a new price, allowing trade inventories to affect pass-through.

A challenge is that the BEA does not record which goods are sold in which retail/wholesale industry: the BEA's margin tables instead provide provides aggregate retail and wholesale margins on each industry's shipments. To re-construct the input–output network including trade flows, we reverse the steps described to construct trade margins described in the BEA's handbook on the input–output accounts (Horowitz and Planting 2009). In particular, for each industry with non-zero retail and wholesale margins, we hand-construct a mapping from the industry to wholesale and retail product lines in the 2017 Economic Census. We use the gross margin of these product lines to estimate the share of purchases from an industry that are made through wholesale and retail channels *vs.* direct from industry suppliers. Then, we explicitly model the wholesale and retail sellers of each industry's outputs as new industries in our trade-corrected input–output table. Our final table contains 843 industries inclusive of these trade industries.

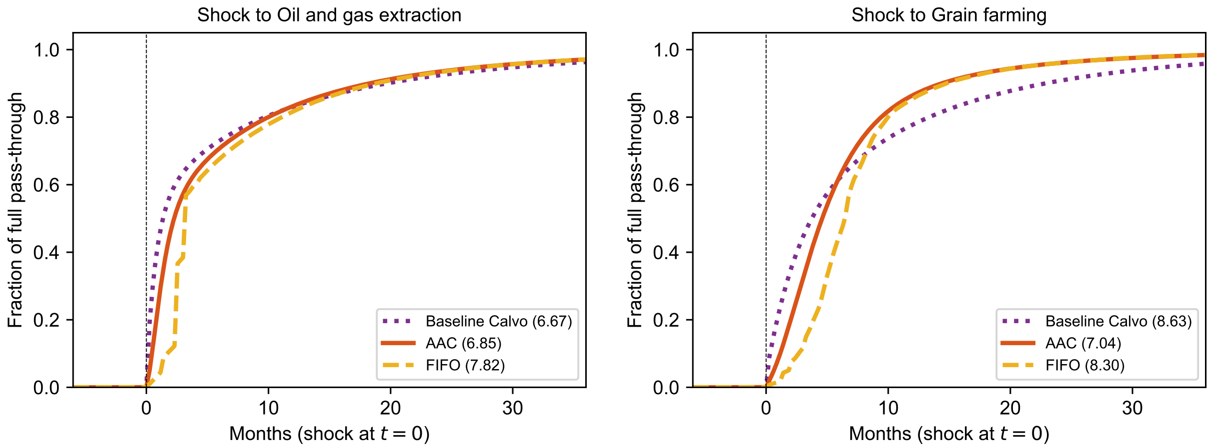
6.3 Delayed Price Adjustment to Cost Shocks

We use our calibrated model to simulate the pass-through of commodity shocks to the consumer price index. In our model, delays in pass-through for industries with inventories (in mining, manufacturing, and wholesale and retail trade) arise because of production and inventory lags, combined with firms' incentive to synchronize price changes with changes in accounting costs, rather than sticky prices.

We start by simulating an unanticipated, permanent cost shock to a single industry, and let the prices of downstream goods adjust. Figure 14 plots the results of this exercise when we shock the oil and gas extraction and grain farming industries. We summarize these delays in pass-through by calculating the cumulative gap between the cost shock and the change in the consumer price index, normalized to the long-run pass-through of the cost shock to price index (that is, our statistic is $\sum_{t=0}^{\infty}(1 - \hat{p}_{\text{CPI},t}/\hat{p}_{\text{CPI},\infty})$, where $\hat{p}_{\text{CPI},t}$ is the price of the personal consumption expenditures basket at time t, measured as a log-deviation from steady state). For both oil and gas extraction and grain farming, the calibrations with AAC and FIFO pricing produce remarkably similar delays in aggregate price adjustment to the shock as the benchmark model with Calvo frictions.

We extend this analysis to other commodity sectors in Appendix Table A6. We select commodity industries as those that price on organized exchanges or use reference prices. For the ten industries with the largest long-run pass-through to the consumer price index, Appendix Table A6 reports the cumulative pass-through delay to the consumer price index

Figure 14: Response of consumer price index to industry-level cost shocks.



(a) Oil and gas extraction. **(b)** Grain farming.

Note: The left panel plots the response of the consumer price index to a immediate, permanent shock the oil and gas extraction industry (`211000`), and the right panel to the grain farming industry (`1111B0`). In both plots, the response of the consumer price index is normalized relative to the long-run response. The numbers in parentheses are the cumulative pass-through delay, $\sum_{t=0}^{\infty}(1-\hat{p}_{\mathrm{CPI},t}/\hat{p}_{\mathrm{CPI},\infty})$.

in our model. In about half the cases, the delays in the adjustment of the consumer price index to the commodity shock are greater under AAC or FIFO than under the baseline Calvo model.

The reason that the calibration with accounting cost pricing generates similar lags in aggregate price adjustment as Calvo—despite the fact that the shipment–inventory ratios we estimate, δ_i, tend to be higher than corresponding frequencies of price adjustment θ_i—is twofold. First, the forward-looking nature of reset prices in the Calvo model undoes some of the model's delays in price adjustment. Thus, the model of accounting cost pricing can generate similar lags in price adjustment even when $\delta_i > \theta_i$. Second, our calibration of the model with accounting cost pricing also explicitly takes into account the time that goods spend as inventories in the wholesale and retail sectors, which are missing from standard calibrations of the Calvo model that use the BEA's treatment of margin industries.

7 Conclusion

Descriptions of pricing, both academic and in popular press, frequently invoke the idea that production lags and inventories delay the pass-through of cost changes to downstream prices. Take, for example, coverage of coffee bean prices in 2025–2026:

> [...I]ndustry experts estimate it takes at least nine months for raw bean prices to filter through to coffee drinkers, partly due to roasting times and price negotiations, meaning it could be well into next year before prices retreat. [....] Most industry experts expect a coffee production surplus[...], which should, alongside the tariff removal, soften raw bean prices and eventually feed through to U.S. consumers. But this will take time, analysts say, because U.S. roasters typically hold about two to three months' worth of bean stocks on average and need another two to three months to roast and package their products.[25]

Similarly, Okun (1981) writes on the timing of price changes:

> It is reasonably predictable that today's changes in cattle prices will show up on the supermarket counter only after a lag; the butcher does not keep changing price tags in pace with changes in some putative replacement cost.

Motivated by this evidence, we propose a theory of *accounting cost pricing*. In a simple principal–agent model, we show that these behaviors can arise because of a need to monitor managerial decisions. While the incentives used by the principal can limit value-eroding managerial discretion, it also distorts manager pricing decisions to incorporate information about historical input costs and fixed costs that are irrelevant to the optimal price and ignore valuable information about current replacement costs and demand conditions that are germane. Moreover, our model explains why we tend to see accounting cost pricing for some firms—like coffee roasters and butchers—but not others, like petroleum refineries, retail gas stations, and precious metal jewelers.

Accounting cost pricing can predict similar price dynamics to sticky-price models—though the parameters that discipline delayed adjustment under accounting cost pricing have to do with the lag between when inputs or inventories are purchased and when they are shipped out to customers, rather than the length of price spells. But the dependence on how historical purchase costs work through accounting costs of goods sold also predicts some key differences in how firms' prices respond to slow-moving persistent and transitory shocks, and how much supply chains can exacerbate delays in price adjustment. In the context of the 2025–2026 tariffs, accounting cost pricing, combined with forward buying, can explain why pass-through to inflation was gradual, even when firms anticipated tariffs well in advance.

[25] `https://www.reuters.com/world/americas/us-coffee-drinkers-face-higher-prices-even-after-trumps-tariff-reset-2025-12-19/`

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Online Appendix to *Pricing Off Accounting Costs*

(Not for publication)

A Additional Tables and Figures

Table A1: Inventories and prices: Examples from earnings calls.

Company	Date	Quote
Wayfair	Oct 31, 2019	As suppliers communicate pricing decisions to us, our pricing algorithms seek to maintain a balance between factoring in our higher wholesale costs and keeping us market priced. In practice, this [...] means that for a short period of time, inventory-carrying retailers may have a slight cost advantage. This should dissipate over the next couple of quarters as the market rebalances, pre-tariff inventory is depleted and all retailers incur higher wholesale costs reflective of tariffs.
Boeing	Apr 23, 2025	So we have the opportunity for those duties that we pay, those tariffs that we pay, to recover that when we deliver the aircraft. Now, you know, it creates a little bit of a cash flow timing issue that we'll have to work through.
Global Industrial	July 29, 2025	We anticipate implementing additional pricing actions as inventory affected by tariffs moves through our cost of sales. [....] Management of our margin profile remains a key area of focus as we move through the current cycle we have started to see the timing benefit of pre tariff inventory decline. [...O]ur goal is to manage price cost neutral.
Floor and Decor	July 31, 2025	And looking across spectrum of publicly traded, you know, flooring companies and people that sell our category, we feel like we're doing better and we feel like we are taking share. I do think that the independent channels have taken price earlier, quicker because they had to and we're able because the way we turned this is when the benefit of slow turning inventory is beneficial. We were able to hold off and take less price increase.
Oil States International	Oct 31, 2025	Now it is also our belief that everybody has the same supply sources which are generally foreign. We're all experiencing the same thing. But there's also been a build up of inventory as activity is slowed. So I think the industry has to work through the pre-tariff inventory. But then it is my view if the tariffs hold they're going to have to be passed on to customers. It's one of timing.

Newell Brands	Aug 1, 2025	We have identified 10 other categories where we have a relative sourcing advantage versus competition based on country of origin and or where we have existing tariff-free inventory available for incremental promotions. Collectively, we have successfully secured tariff-related relative sourcing advantage or tariff-free inventory wins with over 30 customers across nearly every domestic channel where we go to market. [....] Broadly what we're seeing is that in most categories where everybody is affected by tariffs, pricing is moving up, but it's not moving up at the same on the same timing. We're not seeing generally speaking more aggressive promoted prices. But what we are seeing is in some cases competitors are delaying the date of the price increase because they still have inventory onshore that hasn't been subject to the tariffs. We expect this situation on pricing from a competitive standpoint to really get a lot clearer over the next three to six months as the pre-tariff inventory sort of runs out and the price increases become more visible at retail.
Whirlpool	Oct 28, 2025	So we know there's quite a bit of an inventory overhang. Inventory which was at pre tariff cost. That's an important one. Of course by definition as you go through Q3 and Q4 with the anticipation that import volumes come down, that excess inventory at one point will quote unquote flush through the system, we would expect that to be happening kind of towards the end of Q4. [...] I would expect in 26 to see industry behavior which is more reflective of normal shipment patterns and particularly more important the underlying cost base.
Light & Wonder	Nov 5, 2025	The reality is we've worked through the majority of the pre-tariff inventory at this point and so we will now start to see impacts to that mid to low, sorry, mid to high single digit millions as we go forward. That's something that we and the team are going to continue to look at through the margin enhancement initiatives to see what we can mitigate.
Academy Sports and Outdoors	Dec 9, 2025	The goal was when we first learned these accelerated tariffs is we were looking at it saying, okay, there's a lot of inventory on this side of the water at those pre-accelerated tariff prices. If we can pull those into our warehouses and DCs, that should allow us to be priced at last year's level on a lot of these items going into holiday.

John Deere	Feb 19, 2026	You know, we've seen, you know, competition, you know, as of late, last quarter or two, you know, take some price increase, signal some price increase. The timing of that, we're keeping an eye on, you know, our, many of our competitors still have a lot of inventory in the, in the field. So as those price increases for 2026 start to manifest themselves in transaction price, you know, there's a bit of a lag there that, that, that creates some pressure.

Table A2: Descriptive statistics about firm respondents in Schoenle (2026) survey.

Q: Which best describes your role?		
Answer	Count	Share
Owner / co-owner	106	0.26
General manager	83	0.21
Supervisor	69	0.17
Store manager	46	0.12
Pricing manager / revenue manager	36	0.09
Other	60	0.15
Q: Are you personally involved in deciding the posted price(s) for your main product(s) or service(s)?		
Yes, I decide the prices	260	0.65
Yes, I implement prices decided by others – but have some leeway such as timing or size of changes	140	0.35
Q: What is your main product or service category?		
Professional services (e.g., repair, cleaning)	104	0.26
Grocery / food retail	67	0.17
Personal services (e.g., barbershop, salon, spa)	46	0.12
Building materials / hardware	41	0.10
Restaurants / prepared food	35	0.09
Retail gasoline / fuel	20	0.05
Other	87	0.22
Q: How many locations does your business operate?		
1	170	0.42
2–5	127	0.32
6–20	65	0.16
21+	38	0.10

Table A3: Effect of airlines' fuel costs on planned and realized quantities.

	Log Seats$_{irt}$		*Log Load Factor$_{irt}$*	
	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)
Log Fuel Cost$_{it}$	−0.435***	0.515***	−0.023**	−0.115*
	(0.104)	(0.125)	(0.011)	(0.064)
Route × Carrier (*ir*) FEs	Yes	Yes	Yes	Yes
Route × Month (*rt*) FEs	Yes	Yes	Yes	Yes
N (millions)	2.99	2.91	2.92	2.84
R^2	0.93	0.93	0.89	0.89

Note: Columns 2 and 4 use carrier fixed effects interacted with the log change in the spot fuel price over the past year as an instrument for Log Fuel Cost$_{it}$ − Log Spot Fuel Price$_t$. A route is defined as an origin–destination pair and an indicator for whether a ticket is roundtrip. Standard errors two-way clustered by carrier and route. * indicates significance at the 10% level, ** at 5%.

Table A4: Compustat sample filters.

Filter	Description	Observations	Unique firms
Starting sample	–	2 106 695	45 401
Industry	Excludes firms with missing NAICS codes or in NAICS sector 51 (information), 52–53 (finance, insurance, and real estate)	1 272 910	23 607
Key fields	Following fields are non-empty and strictly positive: Inventory stock (`INVTQ`) in current quarter and same quarter of prior year, sales (`SALEQ`), and cost of goods sold (`COGSQ`).	801 669	18 187
Comparable observations	`COMPSTQ` is empty, and year-over-year change in total assets is below 30%.	580 386	17 771
Inventory valuation method	Primary method is FIFO or AAC	423 153	14 686

Table A5: Estimating the extent of replacement cost pricing: Robustness.

	Log(Sales / COGS)					
	Levels			First Differences		
	(1)	(2)	(3)	(4)	(5)	(6)
Log(Purchases / COGS)	0.145**	0.135**		0.116**	0.122**	
	(0.013)	(0.019)		(0.012)	(0.016)	
Log(Purchases / COGS) for LIFO firms in industry		0.004			0.003	
		(0.007)			(0.010)	
Log(Purchases / COGS) × AAC			0.177**			0.128**
			(0.016)			(0.019)
Log(Purchases / COGS) × FIFO			0.124**			0.124**
			(0.020)			(0.016)
Firm × Quarter-of-Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Calendar Quarter FEs	Yes			Yes		
N	382 211	257 763	382 211	345 468	228 312	345 468
R^2	0.87	0.88	0.86	0.10	0.12	0.09

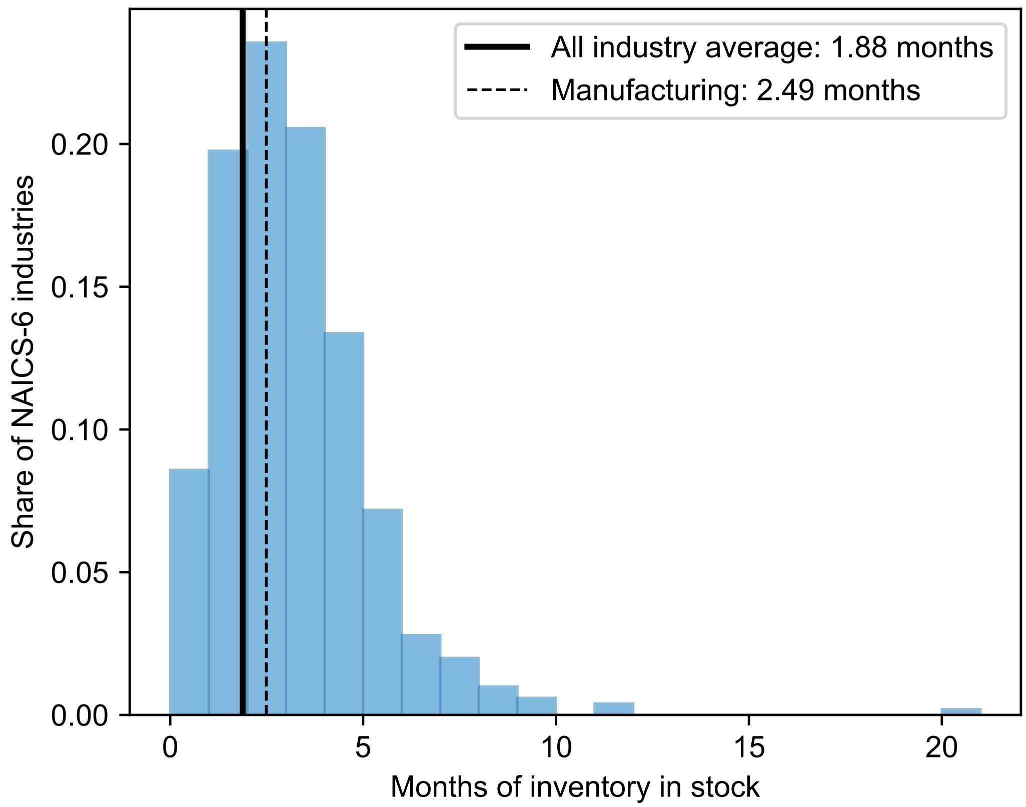
Note: Columns 1–2 report results from (14), and columns 3–4 report results from (15). We exclude observations in the bottom and top 1 percent of values for the dependent and independent variables. The control for Log(Purchases / COGS) for LIFO firms in firm *i*'s industry uses the median Log(Purchases / COGS) for all firms in the same NAICS-4 industry as *i* in the same calendar quarter. Regressions weighted by sales. Driscoll-Kraay standard errors with eight lags in parentheses. * indicates significance at 10%, ** at 5%.

Table A6: Delays in adjustment of consumer price index to industry cost shock.

Code	Industry description	Long-run pass-through (%)	Cumulative delay Calvo	AAC	FIFO
324110	Petroleum refineries	4.35	5.70	5.59	6.21
221100	Electric power generation, transmission, and distribution	2.56	7.34	5.74	5.97
31161A	Animal (except poultry) slaughtering, rendering, and processing	1.78	3.41	4.34	4.84
325190	Other basic organic chemical manufacturing	1.53	13.25	10.99	11.82
1121A0	Beef cattle ranching and farming, including feedlots and dual-purpose ranching and farming	1.35	4.75	4.95	5.89
1111B0	Grain farming	1.27	8.63	7.04	8.30
325211	Plastics material and resin manufacturing	1.02	16.00	11.40	12.38
331110	Iron and steel mills and ferroalloy manufacturing	0.87	18.37	12.10	13.15
322210	Paperboard container manufacturing	0.80	13.55	9.89	10.68
111300	Fruit and tree nut farming	0.79	6.05	5.98	6.91

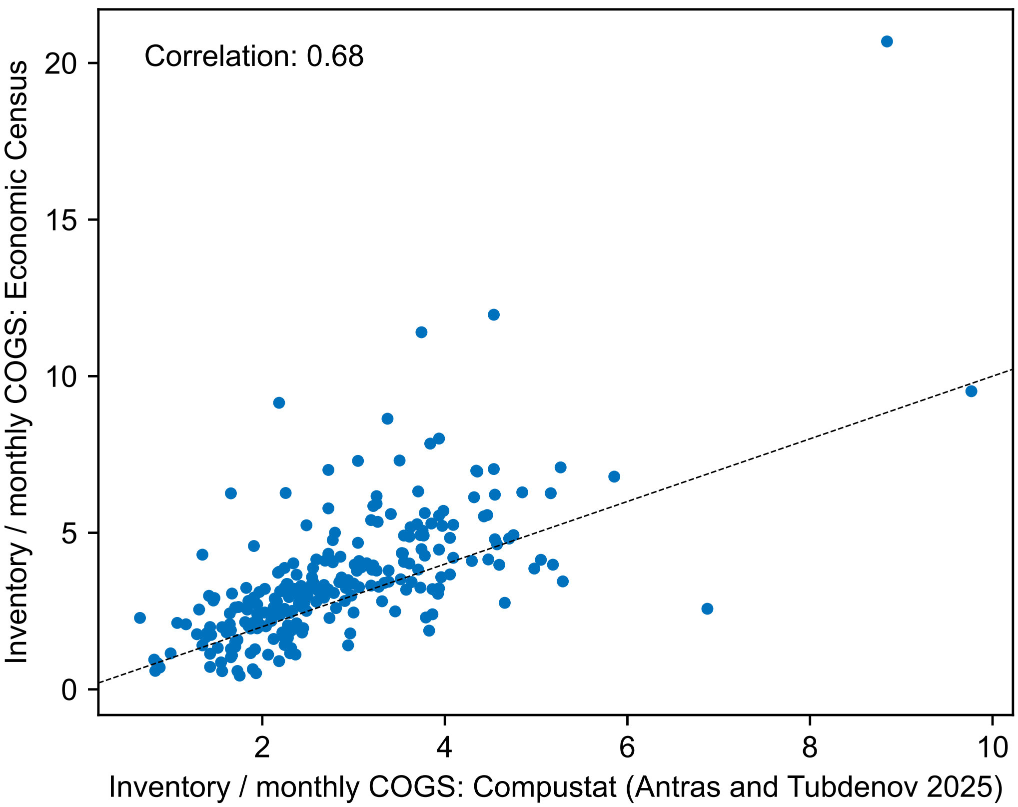
Note: The table includes ten industries categorized as organized exchange or reference-priced industries, according to Rauch's (1999) liberal classification. The column "long-run pass-through" reports the long-run elasticity of the consumer price index to the industry's prices. The Calvo, AAC, and FIFO columns report the cumulative pass-through delay, $\sum_{t=0}^{\infty}(1-\hat{p}_{\text{CPI},t}/\hat{p}_{\text{CPI},\infty})$.

Figure A1: Histogram of inventory–shipment ratios across NAICS-6 industries.



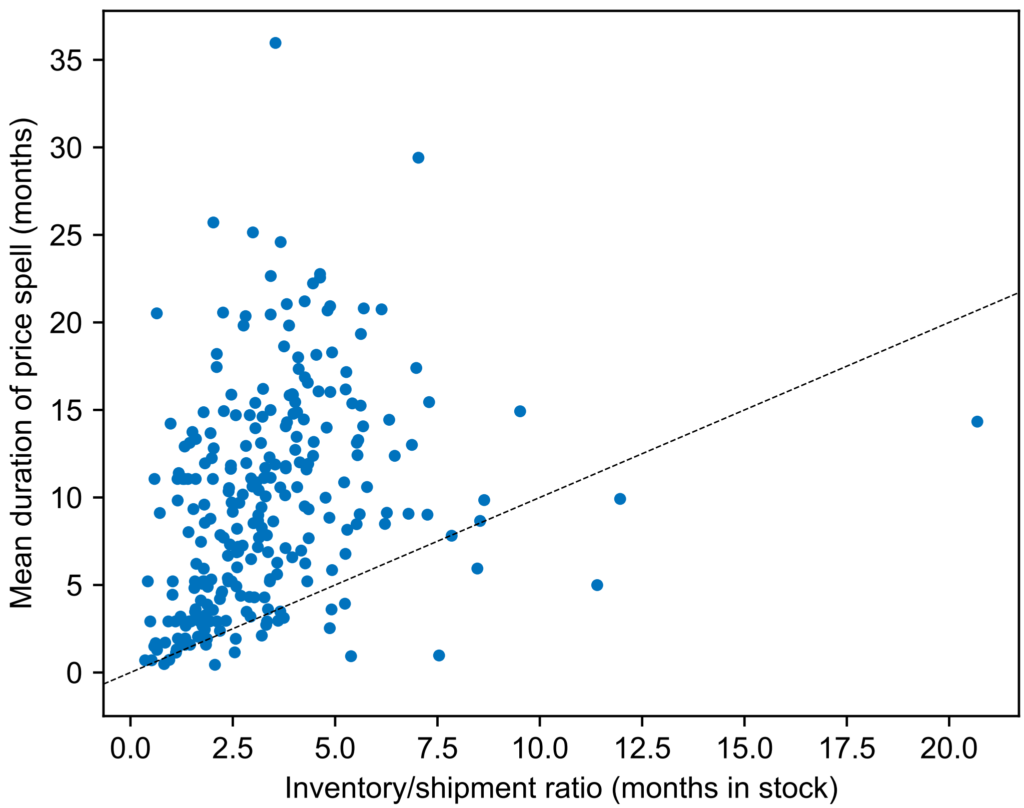
Note: The histogram includes 501 NAICS-6 industries in the following sectors: mining (NAICS 21), manufacturing (NAICS 31–33), wholesale trade (NAICS 42), and retail trade (NAICS 44–45).

Figure A2: Correlation between inventory–shipment ratios from 2017 Economic Census and measures from public firms by Antràs and Tubdenov (2025).



Note: Each scatterpoint is a NAICS-6 industry. The plot contains 246 NAICS-6 industries where we can construct measures of the inventory–COGS ratio from the 2017 Economic Census and where Antràs and Tubdenov (2025) report the average inventory–COGS ratio for public firms (which they refer to as the average period of production).

Figure A3: Shipment–inventory ratios δ_i *vs.* frequencies of price adjustment θ_i.



Note: Each scatterpoint is an industry in the BEA detailed input–output tables. Inventory–shipment ratios are from the 2017 Economic Census and frequencies of price adjustment are from Pasten et al. (2020). We calculate the mean duration of a price spell as the inverse of the monthly frequency of price adjustment.