

The Economic Anatomy of Downstream Petroleum Markets

Pricing Asymmetry, Benchmark Uniformity, and Spatial Oligopoly

The downstream petroleum supply chain is characterized by a complex transmission of crude oil costs to wholesale terminal racks and local retail pumps¹. Although refineries vary significantly in physical configuration, crude processing capabilities, and logistical access³, the wholesale pricing of finished motor fuel exhibits a high degree of spatial alignment. This uniformity is maintained through a structured network of benchmark pricing indexes, most notably the Oil Price Information Service (OPIS) and S&P Global Commodity Insights (Platts)⁵, pipeline logistics tariffs⁸, and spatial competition.

Simultaneously, downstream retail markets exhibit persistent price asymmetries, popularly referred to as "rockets and feathers" pricing¹. Under this dynamic, retail prices respond rapidly to upward cost shocks but decay slowly when wholesale costs decline¹. This asymmetry generates a continuous structural wealth transfer from end-consumers to downstream intermediaries¹.

The Empirical Architecture of Downstream Gasoline Price Asymmetry

The asymmetric transmission of petroleum costs remains one of the most widely documented phenomena in commodity markets¹. First coined by Robert Bacon in his 1991 analysis of the United Kingdom retail market¹, "rockets and feathers" pricing refers to the behavior where retail prices rise rapidly in response to wholesale cost increases but decline slowly when wholesale costs fall¹.

Empirical research across global gasoline markets confirms that this asymmetry is prevalent¹³. The Federal Trade Commission (FTC) Bureau of Economics has repeatedly monitored these price-setting behaviors¹⁰. A critical finding is that retail prices rise more than four times faster than they fall in response to wholesale rack price changes¹.

This asymmetric pass-through exhibits distinct structural properties depending on the specific transaction boundaries along the supply chain¹. At the upstream crude-to-spot boundary, price transmission is symmetric¹. The speed of pass-through from global benchmarks like West Texas Intermediate (WTI) or Brent crude to physical spot gasoline is symmetric, reflecting the highly liquid and financially integrated nature of upstream spot markets¹.

At the downstream spot-to-retail and rack-to-retail boundaries, however, asymmetry becomes

pronounced¹. Retail prices adjust to positive wholesale cost shocks within days, whereas negative cost shocks are passed through over several weeks¹.

This pattern is strictly categorized as pattern asymmetry (differences in the relative speed of pass-through) rather than amount asymmetry (where the net long-run pass-through differs depending on the direction of the cost change)¹. Upstream and downstream gasoline prices do not permanently diverge over time¹. Instead, they eventually return to a long-run cointegrated equilibrium, although the path back to that equilibrium is significantly slower during cost declines than during cost increases¹.

Econometric studies utilizing fractional integration and long-memory models reveal that retail gasoline prices exhibit "the Joseph effect," returning to their equilibrium value at a slow pace that challenges standard error-correction models¹⁸.

Price Boundary & Variables	Observed Asymmetry Level	Primary Pass-Through Speed	Key Empirical Findings
Spot-to-Retail [cite: 1, 14]	High Pattern Asymmetry ¹	Upward: Rapid (Days) Downward: Gradual (Weeks) ¹	Retail prices rise over four times faster than they fall in response to wholesale changes ¹ .
Crude-to-Spot [cite: 1]	Symmetric / Insignificant ¹	Uniform / Immediate ¹	Upstream spot markets exhibit rapid, symmetric adjustments to crude oil pricing ¹ .
Branded Gasoline [cite: 1]	High Asymmetry ¹	Upward: Immediate Downward: Highly Prolonged ¹	Branded fuels feature significantly more asymmetry than unbranded fuels ¹ .
Unbranded Gasoline [cite: 1, 19]	Moderate Asymmetry ¹	Upward: Rapid Downward: Moderate ¹	Unbranded stations face elastic demand, forcing faster adjustments during declines ¹ .
Conventional vs. RFG [cite: 1]	RFG exhibits higher asymmetry ¹	Upward: Rapid Downward: Slow ¹	Cities utilizing Reformulated Gasoline (RFG) experience greater

			asymmetry than neighboring conventional markets ¹ .
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The magnitude of this asymmetry varies widely across metropolitan areas and temporal scales¹. Midwest cities (such as Louisville, Minneapolis, Detroit, and Cleveland) exhibit high levels of retail price asymmetry¹. Conversely, West Coast metropolitan areas (such as San Francisco) exhibit much weaker asymmetry¹.

Additionally, the degree of asymmetry varies from year to year, peaking in the United States during the high-volatility environment of 2005¹. Econometric research demonstrates that temporal aggregation (averaging daily data to obtain weekly or monthly series) can obscure these patterns, understating the short-run pricing decisions made at individual stations¹.

Microeconomic Mechanisms: Consumer Search, Replacement Costs, and Spatial Oligopoly

The academic literature identifies several competing microeconomic theories to explain why gasoline prices rise rapidly but decay slowly¹. These include search-based informational rents¹, working capital replacement constraints¹², and tacit collusion¹.

Asymmetric Consumer Search Costs

Under standard consumer search theory, price dispersion exists because consumers must incur search costs (such as time, fuel, and information gathering) to find the cheapest station¹¹. Consumer search intensity is directly influenced by price trends¹².

When wholesale costs rise, price dispersion compresses, and consumer search behavior intensifies¹². Empirically, price-comparison mobile application downloads spike by 280% to 340% during rapid price increases, and consumers expand their geographic search radius by 40% to 60%¹².

Under these conditions, retailers must pass through wholesale increases immediately to prevent market share loss¹².

When wholesale prices decline, however, consumer search intensity falls¹¹. Consumer app downloads drop by 75% to 85% below baseline levels, and the geographic search radius contracts to only 15% to 20% above baseline¹².

Because consumers search less actively when prices are falling, stations gain temporary market power¹. This allows retailers to lower prices slowly, extracting informational rents during the "feathers" stage to recover the fixed operating costs of the station¹³.

Retail margins are often compressed to zero or negative territory during the "rocket" phase, making the harvest of rents during the decline phase essential for long-term viability¹².

Working Capital and Replacement Cost Pricing

Independent retail stations operate under severe working capital constraints¹². Retail fuel margins are thin, averaging only 2 to 3 cents per gallon (representing roughly 0.6% to 1% of the retail price)¹². Because of this, retailers must price their current inventory based on its *replacement cost* rather than its historical cost¹².

When wholesale prices spike, a retailer must raise street prices immediately to accumulate the cash reserves required to purchase the next, more expensive truckload of fuel¹². Failing to do so would quickly deplete operating capital¹².

When wholesale prices decline, the retailer is left holding inventory purchased at a higher historical cost and will lower prices slowly to avoid taking a direct loss²⁰.

Tacit Collusion and Pricing Focal Points

In highly concentrated retail markets, price asymmetry can be supported by tacitly collusive coordination¹. Firms use public pricing signals to maintain supracompetitive margins²¹. Matthew Lewis (2015) demonstrated that odd-numbered pricing points (particularly those ending in 5 or 9) are disproportionately used as focal points to facilitate tacit coordination²⁶.

In other markets, this coordination manifests as Edgeworth price cycles, characterized by rapid price spikes followed by a slow, daily decay²¹. In Perth, Western Australia, petrol prices cycle with weekly price jumps of 15 to 20 cents per liter initiated by dominant price leaders (such as BP), followed by a slow daily erosion of 2 cents per liter²¹.

This pricing pattern yielded profit increases of up to 57% at the peak of the cycle, resulting in a structural wealth transfer from the average consumer to retail firms²¹.

The Digital Frontier: Algorithmic Pricing and Artificial Intelligence in Spatial Competition

The widespread adoption of automated pricing software has introduced a new mechanism for tacit collusion²⁷. Rather than relying on human coordination, retail chains outsource pricing decisions to reinforcement-learning algorithms (e.g., Q-learning)²⁵. These algorithms can process vast amounts of real-time competitor data, learning to sustain supracompetitive prices without explicit agreements²⁵.

Empirical analyses of the German retail market following the introduction of pricing software in 2017 revealed that algorithmic adoption increased station-level margins by 9% in non-monopolistic markets²⁸. In duopoly markets, margins remained unchanged if only one station adopted the software, but increased by 28% when both stations adopted²⁷.

Furthermore, when an algorithmic seller competes with a rule-based rival, the market equilibrium price weakly increases over time²⁵. This occurs because the algorithm learns to detect and punish downward deviations within minutes, reducing the competitor's incentive to lower prices²⁸.

To model this, consider a simultaneous repeated price game where the profit function for firm

i at period t is expressed as²⁵:

$$\pi_i(p_{i,t}, p_{j,t}) = (p_{i,t} - c) \cdot q_{i,t}(p_{i,t}, p_{j,t})$$

where c is the constant marginal cost of wholesale fuel and $q_{i,t}$ is the logit demand function²⁵:

$$q_{i,t}(p_{i,t}, p_{j,t}) = \frac{e^{\frac{\gamma_i - p_{i,t}}{\mu}}}{\sum_{k=1}^n e^{\frac{\gamma_k - p_{k,t}}{\mu}} + e^{\frac{\gamma_0}{\mu}}}$$

In this model, γ_i represents the consumer's brand-specific valuation, μ represents the price sensitivity parameter, and γ_0 represents the outside utility option²⁵. As reinforcement-learning algorithms optimize this profit function, they converge on supracompetitive pricing policies, stabilizing prices above the competitive level²⁵.

This shift has significant antitrust implications²⁸. Traditional antitrust frameworks require evidence of an explicit agreement to establish illegal price-fixing³⁰. Pricing algorithms, however, can achieve tacit collusion through independent optimization in synthetic environments²⁸.

This can lead to supracompetitive pricing that bypasses traditional legal standards²⁵. In some instances, third-party software providers (such as Boomerang or a2i Systems) compile and optimize prices for competing retail chains under a unified platform³⁰.

This arrangement can soften price competition and facilitate a hub-and-spoke pricing alignment³⁰.

Market Structure & Pricing Strategy	Software Adoption Level	Margin / Profit Impact	Welfare and Spatial Impact
Non-Monopoly Market [cite: 27, 29, 31]	Single / Partial Brand Adoption ²⁷	Margins increase by 9% ²⁸	Structural breaks detected in daily frequency, size of price changes, and response times ²⁸ .
Duopoly Market (Joint) [cite: 27, 29, 31]	Complete Brand Adoption ²⁷	Margins increase by 28% ²⁷	Strong spatial coordination; algorithms detect and punish competitive deviations ²⁸ .

Perth Price Cycle (BP) [cite: 21]	Branded Signaling ²¹	Price	Top-of-cycle margins rise 57% ²¹ Bottom-of-cycle margins rise 700% ²¹	Initiates a weekly price cycle; drives a \$120 annual wealth transfer per household ²¹ .
Guatemalan Diesel Market [cite: 11]	Spatial Intermediation ¹¹		2.4 Quetzals per Liter consumer cost ¹¹	No evidence of asymmetry in gasoline, but significant asymmetry in retail diesel ¹¹ .

Macroeconomic Impacts: Consumer Lags and Structural Wealth Transfer

The persistence of rockets and feathers pricing translates into a continuous structural wealth transfer from end-consumers to downstream intermediaries¹.

Quantifying the Consumer Burden

Borenstein, Cameron, and Gilbert (1997) estimated that price asymmetry in the United States gasoline market imposes an additional cost of 2.6 cents per gallon on consumers during the adjustment period following a cost shock¹¹. While a few cents per gallon may seem small, when applied to total US gasoline consumption—which is approximately 140 billion gallons annually—the cumulative structural wealth transfer from households to downstream firms is substantial²⁰. Similarly, empirical testing of retail diesel pricing in Guatemala revealed that the net incremental cost of asymmetric pricing following a cost change of 1 quetzal per liter of diesel was 2.4 quetzals to the consumer¹¹.

Downstream Variables	Observed Metric / Volatility	Macroeconomic & Household Impact	Cost Driver / Compliance Variable
Average US Household Cost [cite: 10]	Highly Volatile Retail Price Lags ¹⁰	Monthly Direct Expense: ~ \$60 per household ¹⁰	Directly driven by crude oil volatility and refinery capacity lags ¹⁰ .
US Annual RFS Compliance [cite: 20, 33]	\$0.15/gal (2024) to \$0.45/gal (2026) ²⁰	Annual Economic Burden: \$66 Billion ²⁰	Refiners pass through RFS compliance costs to downstream wholesale rack prices ³³ .

Borenstein Cost Estimate (BCG) [cite: 11]	2.6 cents per gallon excess ¹¹	Extra consumer cost per unit until new pricing equilibrium is reached ¹¹ .	Driven by asymmetric search costs and inventory lags ¹ .
Perth Price Cycle Margin [cite: 21]	Weekly 15-20 cpl price spikes ²¹	Annual Direct Cost: \$120 per household ²¹	BP price leadership; bottom-of-cycle margins increased from 0.71 cpl to 5.73 cpl ²¹ .

These microeconomic inefficiencies have broader macroeconomic effects³⁴. In wealth transfer channels, asymmetric price transmission shifts purchasing power from oil-importing economies to oil-exporting economies, and from fuel-consuming households to integrated energy firms³⁴. This reduces aggregate disposable income, dampening non-energy consumer expenditures¹⁰. These shocks also create monetary policy challenges, as downstream pricing asymmetries can sustain elevated inflation indexes even after primary energy commodities have entered a down-cycle³⁶.

Refinery Margin Expansion

The structural wealth transfer is not confined to the retail boundary; it occurs at the refinery gate as well³⁸. Independent refineries operate on the margin between crude oil input costs and refined product revenues, a margin approximated by the "crack spread"³. The standard industry benchmark for refining profitability in the United States is the 3-2-1 crack spread, which assumes that three barrels of crude oil yield two barrels of gasoline and one barrel of distillate (diesel or heating oil)³. The 3-2-1 crack spread is calculated using the following formula³:

$$CS_{3:2:1} = \frac{(2 \cdot P_{\text{gasoline}} \cdot 42) + (1 \cdot P_{\text{distillate}} \cdot 42) - (3 \cdot P_{\text{crude}})}{3}$$

where refined product prices are converted from gallons to barrels by multiplying by 42²⁴.

When crude oil prices drop sharply, wholesale refined product prices lag on the downside³². This lag causes the crack spread to expand³⁸. Historically, the 3-2-1 crack spread fluctuates between \$10 and \$20 per barrel³². However, during geopolitical disruptions or crude price collapses, refining margins can widen to \$54 per barrel³².

For a complex refiner like Valero Energy, which possesses approximately 3.2 million barrels per day of global throughput capacity, this margin expansion has a major financial impact³. A \$5 per barrel improvement in the 3-2-1 crack spread translates to \$16 million per day, or approximately \$5.8 billion per year, in incremental gross refining revenue³. After accounting for a typical margin capture rate of 70% to 80% and operating costs, the net EBITDA impact is between \$3 billion

and \$4 billion per year³.

This relationship explains why refiners frequently report record profits during periods of crude price declines³².

Spatial Price Uniformity: Benchmark Indexing and Spot Replacement Costs

A key paradox of downstream petroleum markets is how refineries with varying operational efficiencies, crude slate access, and transport logistics maintain highly aligned wholesale pricing at the same distribution terminals⁴. This pricing alignment is achieved through the pricing formulas of independent benchmark agencies: S&P Global Platts and the Oil Price Information Service (OPIS)⁵.

These agencies act as information clearinghouses for the downstream industry⁴⁰. Over 100 billion gallons of fuel are contracted annually using OPIS benchmarks⁴⁰.

OPIS and Platts Benchmark Methodologies and Pricing Formats

OPIS and Platts compile data from terminal racks and physical spot markets to publish daily benchmarks⁵. The primary index products include:

- **OPIS Standard Display versus Terminal Display:** The *Standard Display* provides one price per product per supplier in each geographic market, choosing the primary terminal for each supplier to avoid skewing market averages⁵. The *Terminal Display* shows posted prices for every supplier at all terminals in a given location, providing total spatial transparency⁵.
- **Time-Segmented Benchmarks:**
 - *Contract Summary:* A snapshot of the rack market frozen at 10:00 AM Eastern Time (ET), representing the most common index for supply contracts⁴⁰.
 - *Closing Summary:* A snapshot taken at 4:59 PM ET, capturing all intraday price movements⁵.
 - *Calendar-Day Summary:* A snapshot taken at 11:59 PM ET, representing the average of all price changes on that specific calendar day⁷.
- **Gross versus Net Segmentations:** *Gross* reports calculate prices before prompt-payment discounts are applied⁷. *Net* reports factor in these early-payment discounts (typically 1% to 2% for payment within 10 days)⁷.
- **Premium Averages:** Services publish independently calculated indices such as the *OPIS Low*, *Low 2*, and *Low 3*⁵. For example, the *Low 2* premium benchmark requires a minimum of two active suppliers at the rack, and the *Low 3* requires three active suppliers, allowing buyers to contract at a guaranteed discount relative to the rack average⁵.

The Spot Replacement Index (SRI)

Refineries view physical spot barrels as "replacement barrels"⁴⁷. A refiner's posted wholesale

rack price is directly tied to its daily *spot replacement cost*—the cost the refiner would incur to buy fuel in the bulk spot market if they lost their own refining capacity⁴⁷.

To standardize this relationship, OPIS publishes the Spot Replacement Index (SRI)⁷. The starting point for the SRI is the daily average of the prior day's closing spot range in the seven major U.S. spot markets (including the US Gulf Coast, New York Harbor, and Chicago)⁴³. The price service maps over 250 terminal rack markets back to these theoretical spot origins⁴⁹.

The SRI standardizes rack pricing by mathematically layering the physical spot cost with transit and logistical fees⁴³:

$$\text{Spot Replacement Cost} = \text{Spot Basis Price} \pm \text{Basis Differential} + \text{Pipeline Tariff} + \text{Inl}$$

[cite: 43, 47, 50, 51]

By pegging rack prices to the SRI, refineries ensure their daily posted prices reflect bulk physical spot volatility⁴⁷. Because all suppliers at a given terminal rack reference the same regional spot pricing and use similar pipeline logistics, their posted wholesale prices remain highly aligned, despite differences in refinery operating efficiencies⁴⁷.

Pipeline Logistical Dynamics, Tariffs, and Arbitrage Constraints

The physical alignment of wholesale fuel pricing across different states is dictated by interstate pipeline infrastructure, common carrier tariffs, and state-level environmental regulations⁸.

Pipeline Logistics and Common Carrier Tariffs

The primary artery for motor fuel distribution in the eastern United States is the Colonial Pipeline system, which transports refined petroleum products from Pasadena, Texas, to Linden, New Jersey⁸. As an interstate common carrier, Colonial does not own the gasoline it transports; rather, it charges shippers a uniform tariff approved by the Federal Energy Regulatory Commission (FERC)⁸. Colonial transports fungible batches of gasoline from multiple shippers, co-mingling them during transport⁹. Under FERC rules, the pipeline is not required to return the exact physical molecules tendered by a shipper, but must deliver gasoline of the same volume and grade that meets strict "on-specification" criteria (e.g., octane rating, distillation values, and Reid Vapor Pressure)⁹.

Structural changes in pipeline tariffs have a significant impact on spatial pricing alignment⁵². In April 2025, Colonial implemented tariff modifications that raised the minimum batch size for conventional gasoline shipments to 50,000 barrels upstream of Meridian, Mississippi, and 75,000 barrels downstream⁵². Previously, conventional gasoline could be shipped in fungible batches of 15,000 barrels⁵².

By consolidating conventional gasoline into larger batches, Colonial minimized irregular shipments and optimized pipeline flow rates⁵². However, this batch consolidation raised shipping barriers for smaller independent shippers, diverting conventional finished gasoline (such as 87-octane M-grade and 93-octane V-grade) toward export hubs on the Gulf Coast⁵².

Since the 2005 implementation of the Renewable Fuel Standard (RFS), refiners have increasingly favored shipping unblended sub-octanes (like CBOB and RBOB) to terminal racks where they are subsequently blended with ethanol, resulting in a 77% drop in finished M-grade pipeline shipments since 2015⁵².

In-Line Blending and the "Swell" Dispute

A persistent conflict in pipeline logistics involves in-line butane blending⁹. Butane is a cheaper petroleum byproduct with high volatility⁹. Shippers traditionally deliver high-value, low-volatility gasoline to the pipeline, leaving a "blend margin" (or "swell")⁹. Pipeline operators can perform in-line blending by injecting cheaper butane into the gasoline stream as it moves downstream, increasing the physical volume of the batch while staying within the maximum Reid Vapor Pressure (RVP) limits allowed by the tariff⁹.

Colonial entered a joint venture (Powder Springs) with Magellan Midstream Partners to perform in-line butane blending⁹. Shippers (including ExxonMobil, Shell, and Phillips 66) protested that this practice degraded the value of the fuel they received⁹. By injecting butane midstream, the pipeline operator extracted the blend margin, delivering gasoline with limited blend margin to the destination terminal⁹. This inline blending diminished the ability of downstream shippers to blend cheaper components themselves⁹.

In response to shipper complaints, FERC rejected several proposed Colonial tariff changes, ruling that the pipeline operator had failed to demonstrate that the proposals were just and reasonable, and noting that operators must compensate shippers if they deliver a less valuable, higher-RVP product than the one tendered⁵³.

Regulatory Compliance and Normalization

Spatial competition is further complicated by state-level environmental mandates, such as California's Low Carbon Fuel Standard (LCFS), Oregon's Clean Fuels Program (CFP), and California's Cap-at-the-Rack program³³. These regulations require refiners to purchase compliance credits or offsets (such as RINs under the federal RFS), raising the cost of wholesale fuel³³.

Because suppliers handle these regulatory costs differently—some including the compliance value directly in their posted rack price, while others pass it through as a separate line item on invoices—pricing indices lack standard transparency⁵⁰.

To maintain "apples-to-apples" comparison, OPIS normalizes these prices⁵⁰. The "Normalized, Without CAR Cost" index adjusts postings by removing the calculated Cap-at-the-Rack or LCFS values from a supplier's posted price, allowing buyers to compare baseline wholesale fuel costs

across states⁵⁰.

Vertical Relationships, Zone Pricing, and Open Price Term Jurisprudence

The downstream gasoline market is governed by a network of vertical contracts and ownership structures that influence how wholesale pricing adjustments are passed through to the consumer pump¹⁹.

Retail Contractual Structures and Pricing Boundaries

Downstream distribution channels are divided into four primary retail site formats¹⁹:

- **Company-Operated Stations:** The refiner owns the retail property and directly sets the retail street price¹⁹.
- **Lessee Dealers:** The refiner owns the station property and leases it to a dealer¹⁹. The dealer sets the retail price but is contractually obligated to buy branded gasoline from the refiner at the delivered Dealer Tank Wagon (DTW) price¹⁹.
- **Dealer-Owned Stations (Branded):** The retailer owns the land and building but signs a long-term supply agreement with a branded refiner to carry their flag¹⁹. They are supplied either directly by the refiner at the DTW price or through an intermediary distributor (jobber)¹⁹.
- **Independent (Unbranded) Stations:** The retailer is vertically unintegrated, purchasing unbranded fuel from the terminal rack at the posted rack price¹⁹. Unbranded operators have no supply contracts with specific refiners and compete by sourcing the cheapest wholesale fuel available¹⁹.

The pricing boundary differs between these formats¹⁹. Branded retailers purchase fuel at the delivered DTW price, which is typically higher than the unbranded rack price because it includes brand equity fees, credit card processing fees, advertising costs, and fuel additives¹⁹. However, branded dealers have first call on supplies during tight market conditions⁵⁶. Unbranded dealers purchase fuel at the posted rack price and face higher supply security risks during disruptions¹⁹.

Retail Format	Real Property Owner	Pricing Authority	Wholesale Cost Basis	Supply Security Level
Company-Operated [cite: 19, 54]	Refiner ¹⁹	Refiner (Direct) ¹⁹	Internal Transfer Cost ¹⁹	Absolute ⁵⁶
Lessee Dealer [cite: 19, 54]	Refiner ¹⁹	Lessee Dealer ¹⁹	Dealer Tank Wagon (DTW) ¹⁹	High (Branded Contract) ⁵⁶

Dealer-Owned (Branded) [cite: 19, 56]	Retailer ¹⁹	Retailer ¹⁹	DTW or Branded Jobber Price ¹⁹	High (First Call on Supplies) ⁵⁶
Independent (Unbranded) [cite: 19]	Retailer ¹⁹	Retailer (Direct) ¹⁹	Posted Price ¹⁹ Rack	Low (Interrupted first during shortages) ⁵⁶

Zone Pricing and Spatial Price Discrimination

Zone pricing is a marketing practice where refiners establish different wholesale DTW prices for the same brand and grade of gasoline based on geographic "price zones"⁵⁶. These zones are not defined by law; rather, they are established unilaterally by refiners using geographic markers, natural barriers (rivers, parks), man-made infrastructure (highways), traffic patterns, population density, and local competition⁵⁶. A single refiner may maintain anywhere from 10 to 200 distinct pricing zones within a single state, with prices varying by 1 to 10 cents per gallon between adjacent zones⁵⁷.

The economic and policy debate over zone pricing is highly contentious:

- **Regulators and Critics:** The FTC and state Attorneys General have argued that zone pricing is an exercise of localized market power⁵⁵. Incumbents can use targeted zone pricing to lower prices near a new market entrant (predatory pricing) without lowering prices across the broader metropolitan area, deterring entry and protecting supracompetitive margins in less competitive zones⁵⁸.
- **Refiners and Suppliers:** Refiners (such as Chevron and ExxonMobil) defend the practice, arguing that zone pricing allows them to adjust wholesale costs to support dealers facing aggressive local competition (such as proximity to a high-volume unbranded independent or a state border with lower fuel taxes)⁵⁵.

Attempts by state legislatures (such as Connecticut and Maryland) to ban zone pricing in favor of uniform terminal pricing have faced strong industry opposition⁵⁷. Opponents argue that mandating uniform wholesale prices would not increase supply and could lead to higher average prices by reducing the refiner's ability to subsidize dealers in highly competitive corridors⁵⁷.

UCC Section 2-305 Open Price Term Jurisprudence

Because downstream fuel prices are highly volatile, long-term supply contracts between refiners and dealers cannot function under fixed nominal prices⁶⁰. To provide pricing flexibility, these agreements utilize an **open price term**⁶⁰. Under these contracts, the dealer is contractually obligated to buy branded fuel at the refiner's "dealer price in effect" (DTW) at the time of delivery, granting the refiner unilateral discretion to set the price⁶¹.

This pricing authority has led to significant litigation under Uniform Commercial Code (UCC) Section 2-305(2) (and its state codifications), which mandates that a price to be fixed by a seller

or buyer must be set in "good faith"⁶¹. Under UCC Article 2, "good faith" for a merchant requires both subjective "honesty in fact" and the objective "observance of reasonable commercial standards of fair dealing in the trade"⁶².

Franchised dealers have filed numerous lawsuits (e.g., *Casserlie v. Shell Oil Co.* in Ohio⁶², *Windy Cove v. Circle K Stores* in the 9th Circuit⁶⁴, and *HRN v. Shell* in Texas⁶¹), alleging that refiners breached their duty of good faith by setting DTW prices so high that dealers could not earn a reasonable margin⁶¹. Dealers argued that refiners used high DTW prices to drive independent franchise dealers out of business to replace them with more profitable company-operated locations⁶¹.

The courts have largely rejected these subjective bad-faith arguments, establishing a robust **safe harbor** under UCC Section 2-305, guided by the following principles:

1. **The Range-of-Competitors Rule:** Under the majority rule, a DTW or "price in effect" is presumptively set in good faith if it falls within the range of DTW prices charged by major competitor refiners in the same geographic market⁶¹. It is undisputed that a price is commercially reasonable if it is lower than at least one competitor's price⁶⁴.
2. **Rebuttal via Objective Bad Faith:** To rebut the safe harbor presumption, a plaintiff cannot rely on circumstantial evidence of a seller's bad subjective motives (such as a desire to run a dealer out of business)⁶¹. The presumption can only be rebutted by showing objective bad faith, which requires proving that the price was either:
 - o *Discriminatory:* Charging different DTW prices to similarly-situated dealers within the same pricing zone without a cost-justified reason⁶¹.
 - o *Commercially Unreasonable:* Setting prices completely outside the range of those charged by other sellers in the market⁶².
3. **DTW-to-Rack Price Differentials:** Courts have repeatedly ruled that a significant spread between a refiner's DTW price and the unbranded rack price does not establish bad faith⁶². These two price points represent different functional levels of the distribution chain, reflecting different transaction volumes, credit terms, transport costs, and support services⁶².

This legal framework shields refiners from pricing claims as long as their posted DTW prices remain aligned with competitor pricing ranges, reinforcing the downstream pricing uniformity coordinated by third-party benchmark reporting⁶¹.

Legal Precedent	Jurisdiction / Date	Central Question	Legal Standard	Key Finding & Standard Established
Casserlie v. Shell Oil Co.	Ohio Supreme Court (2009) ⁶²	Standard governing "good faith" in open-		Merchants must meet both subjective

[cite: 62]		price terms under UCC § 2-305 ⁶² .	honesty and objective commercial standards ⁶² . A DTW-to-rack differential does not establish bad faith ⁶² .
Windy Cove v. Circle K Stores [cite: 64]	US Court of Appeals, 9th Circuit (2025) ⁶⁴	Whether a non-standard pricing formula violates the UCC § 2-305 good faith obligation ⁶⁴ .	Under the "price in effect" rule, a price within the range of competitors is presumptively set in good faith, regardless of the formula used ⁶⁴ .
HRN v. Shell Oil Co. [cite: 61, 65]	Texas Supreme Court (2004) ⁶¹	Whether subjective intent to replace dealers with company stores constitutes bad faith ⁶¹ .	Summary judgment for Shell was affirmed ⁶¹ . Subjective motives do not breach UCC § 2-305 if prices are commercially reasonable and non-discriminatory ⁶¹ .

Conclusions

The downstream petroleum supply chain operates as a highly coordinated spatial oligopoly²¹. While physical operations, refining efficiencies, and transport logistics are heterogeneous³, wholesale pricing is highly aligned through a shared reliance on third-party benchmark indexes (OPIS/Platts) and Spot Replacement Indexing⁵.

This pricing uniformity is reinforced by the common carrier architecture of interstate pipelines, which co-mingle fuel batches and standardize transit costs⁸.

Simultaneously, downstream retail markets exhibit persistent structural asymmetries¹. The "rockets and feathers" pricing pattern is an emergent property of search frictions, working capital constraints, and localized market power¹².

By raising prices immediately during cost spikes to cover replacement costs and lowering them gradually during cost declines when consumer search behavior drops, downstream firms extract informational rents¹².

This pricing pattern is further supported by the growing use of automated pricing algorithms,

which learn to maintain supracompetitive prices and coordinate spatial margins²⁵.

From a policy and antitrust perspective, this pricing structure is highly resilient¹. Because the uniform pricing of wholesale fuel is driven by rational indexing and logistics, it does not constitute illegal collusion under current antitrust standards²⁰.

Furthermore, courts have insulated refiners' unilateral pricing authority under UCC Section 2-305, establishing a safe harbor for open-price terms that fall within competitor pricing ranges⁶¹. As a result, downstream pricing asymmetries remain structurally integrated into the petroleum supply chain, sustaining a continuous transfer of wealth from consumer households to refining, wholesale, and retail intermediaries¹¹.

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