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BRIEFING NOTE

Merger efficiencies and coordinated effects

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Executive summary

The paper **investigates the competitive and economic impacts of the corporate merger between GlaxoSmithKline and Pfizer within the Philippine over-the-counter cough and cold pharmaceutical market**. The authors utilize **product-level longitudinal sales data and a structural demand model** to analyze whether the transaction generated efficiency gains or influenced market behavior. The findings reveal that while **Pfizer experienced a reduction in marginal costs and prices**, confirming the achievement of merger efficiencies. The pricing of their closest competitor **increased substantially**, suggesting that the merger facilitated **post-merger tacit coordination among international brands**. Furthermore, the study highlights how **differences in market integration between local and international firms** shape pricing strategies and competitive outcomes in developing economies.

Key points

One central policy concern with horizontal mergers is that increased market power may lead to higher prices. While a default expectation may exist that horizontal mergers raise prices, efficiencies can counteract these negative effects, as emphasized by [Williamson \(1968\)](#), [Farrell and Shapiro \(1990\)](#), and [Nocke and Whinston \(2022\)](#). Indeed, some scholars argue that the burden of proof should be revised in a way that gives more presumptive legitimacy to efficiency claims (see [Hovenkamp, 2025](#)), while others argue that efficiencies may be rare (see [Rose and Sallet, 2025](#)). In fact, the 2023 Federal Trade Commission (FTC) and Department of Justice (DOJ) merger guidelines explicitly note the US Supreme Court statement that possible economies arising from a merger cannot be used as a defense if it lessens competition. One such concern—and considerably harder to assess ex ante—is that a merger may facilitate increased coordination among competitors, as recognized in the 2023 FTC/DOJ merger guidelines ([DOJ/FTC, 2023](#), Section 2.3). In this paper, we address both issues and show they can be linked.

We study the merger between consumer health brands of GlaxoSmithKline (GSK) and Pfizer, which was cleared by competition authorities worldwide. Using detailed product-level data on over-the-counter cough and cold medicines from the Philippines, we document three post-merger facts. First, merger-specific efficiency gains exist, with marginal costs declining for Pfizer

products by 9.43% but not for GSK. Second, following the merger, prices for GSK products did not decrease while those of Pfizer declined by 6.57%. Third, prices of one of the two main competitors, Sanofi increased by 8.55%, while those of Unilab, a much larger local firm with many cheaper products sold mostly in local markets, stayed the same.

We first use difference-in-differences methods on prices to examine changes in the prices of the merging parties and their competitors, using a series of control products. This analysis indicates that prices for Pfizer, one of the merging firms declined following the merger, while prices of GSK, the other merging firm, and its competitors increased. However, this exercise does not directly inform us about changes in costs, nor whether any such changes are merger-specific or instead reflect longer-run trends. It also does not provide evidence on whether firms coordinated their pricing behavior in the post-merger period.

To address these questions, we next estimate demand-side parameters using a random coefficients discrete choice model. Based on the estimated demand parameters, we then follow [Miller and Weinberg \(2017\)](#) to estimate a coordination parameter. This parameter is fixed at zero in the pre-merger period and constrained to lie between zero and one in the post-merger period. We estimate this parameter allowing for coordination between GSK/Pfizer and Sanofi, motivated by their multimarket contact and the fact that all three are international firms offering higher-end, higher-priced products. Using the estimated coordination parameter, we then back out marginal costs.

The results for the coordination parameter are asymmetric. The estimated coordination parameter for interactions between GSK/Pfizer and Sanofi is near its upper bound, suggesting substantial post-merger coordinated effects. The observed increase in Sanofi prices is not consistent with Nash–Bertrand competition alone. In contrast, when we re-estimate the coordination parameter for interactions between GSK/Pfizer and Unilab—where we expect it to be zero—it is indeed equal to zero. We interpret these findings as evidence that the merger facilitated coordinated conduct with Sanofi, but not with Unilab. This asymmetry is consistent with Sanofi’s extensive multimarket contact with GSK and Pfizer across countries, whereas Unilab’s interactions with the merging parties are largely confined to the local market.

One of the merging firms realized non-trivial efficiencies within two years of the merger, with prices for that firm’s products declining accordingly. The magnitude of these efficiencies is broadly consistent with those predicted prior to merger approval, contributing to the small but growing empirical literature documenting the realization of merger efficiencies. While efficiencies at the merging firms largely offset their own price effects, increased market power and coordinated effects *among rivals* appear to have contributed to higher prices elsewhere, underscoring the continued relevance of economics in quantifying coordinated effects in merger assessment by competition authorities. We suggest that even more effort is worth devoting to understanding, measuring, and predicting increased coordinated effects that could arise after a merger.

Details

- **Realization of Merger Efficiencies** : The merger generated significant, merger-specific efficiency gains for Pfizer products, resulting in a 9.43% reduction in marginal costs. Evidence of marginal cost reductions for GSK products was statistically weak and non-robust over the full sample period.
- **Divergent Pricing Behavior** : Following the merger, prices for Pfizer products dropped by 6.57%, passing on a portion of their efficiency gains to consumers. Conversely, prices

for GSK products increased by 3.25%. On a combined basis, the joint venture per se did not produce a net price increase due to Pfizer's larger market share.

- **Competitor Price Spillovers and Coordinated Effects** : Prices for Sanofi—a major multinational competitor offering high-end products—increased by 8.55% post-merger. In contrast, prices for Unilab, a dominant local manufacturer offering cheaper branded generics, remained unchanged.
- **Asymmetric Post-Merger Coordination** : Structural supply-side estimation reveals that Sanofi's price increase was driven by increased post-merger coordination rather than unilateral Nash–Bertrand pricing responses alone. The estimated coordination parameter (κ) between the merged entity and Sanofi is 0.945 (close to full joint profit maximization), whereas the coordination parameter with Unilab is zero.
- **Policy Implications** : The empirical findings demonstrate that while horizontal mergers can generate firm-level efficiencies, these cost savings do not necessarily prevent consumer harm. Increased concentration can facilitate tacit coordination among multinational rivals with extensive multimarket contact, offsetting the downward pressure on prices created by merger efficiencies.

Market Context and Transaction Background

Transaction Overview

In December 2018, GSK and Pfizer announced an agreement to combine their global consumer healthcare businesses into a joint venture. The transaction was structured with GSK holding a 68% controlling stake and Pfizer holding 32%. GSK formally acquired Pfizer's consumer healthcare operations in August 2019. The joint venture was created in part to consolidate OTC portfolios ahead of planned corporate divestitures. In July 2022, the combined business was demerged from GSK and rebranded as an independent entity, Haleon plc. Both parent companies subsequently divested their equity holdings, with complete exits achieved by 2026. The primary analysis window evaluated in the research spans 2009Q4 to 2021Q1, covering the period during which the joint venture operated under combined GSK-Pfizer ownership prior to the Haleon demerger.

Regulatory Clearance in the Philippines

The joint venture required regulatory filings across global jurisdictions. In the Philippines, the Philippine Competition Commission (PCC) evaluated the merger across overlapping OTC segments, including respiratory health, pain relief, and nutritive health. On June 27, 2019, following Phase 1 and Phase 2 reviews, the PCC formally cleared the transaction without remedies (Commission Decision No. 20-M-005/2019). The PCC concluded that although the merged entity would gain market power in adult cough medicines, it would lack enhanced incentives to raise prices post-merger.

Philippine OTC Cough and Cold Market Structure

- **Market Valuation** : In 2020, the Philippine pharmaceutical market was valued at \$4.5 billion, with OTC products accounting for 38% (\$ 1.7 billion). The OTC cough and cold segment was valued at approximately \$160 million, featuring 52 active firms.
- **Concentration Metrics** : The segment is highly concentrated. Based on 2018 sales data, five firms controlling a third of all available brands accounted for 94.4% of total market value.
- Unilab held a dominant 67.90% market share across 49 products and 16 active substances.
- Pfizer held an 8.34% market share across 8 products and 5 active substances.
- Sanofi held a 7.19% market share across 12 products and 2 active substances.

- GSK held a 6.02% market share across 10 products and 2 active substances.
- Pascual Lab held a 4.97% market share across 8 products and 2 active substances.
- 47 smaller firms collectively split the remaining 5.58% market share.
- **Pre-Merger HHI** : The baseline Herfindahl-Hirschman Index (HHI) for the segment was 4797. The predicted post-merger change in HHI (Δ HHI) was approximately 100. This met the screening thresholds for potential competitive concern under international standards (such as the 2023 US FTC/DOJ Merger Guidelines threshold of $HHI > 1800$ and Δ HHI > 100).
- **Product Formulations** : The market contains 51 distinct active substances sold primarily as proprietary "branded generics" (off-patent molecules sold under proprietary brand names). Overlaps between the merging parties were concentrated in specific active ingredients (e.g., Carbocisteine, Ambroxol, Butamirate, and Guaifenesin combinations).

Empirical Methodology and Data Strategy

Datasets Used

1. **IQVIA Philippine National Sales Audit (NSA)** : Subnational quarterly sales data (2008Q1–2020Q4) covering 185 distinct cough and cold products across 52 firms. Products are defined as unique combinations of manufacturer, brand/INN name, molecule, formulation code (New Form Code/NFC), and target population (adult vs. pediatric). For structural demand and supply estimation, the sample was restricted to the top 55 products across 11 firms that cumulatively account for 96% of total market volume.
2. **IQVIA MIDAS World Review Pack** : Longitudinal dataset (2009Q4–2021Q4) containing national-level sales data for cough and cold products across Indonesia, Malaysia, Thailand, and Singapore, as well as prescription hypertension drugs in the Philippines. Revenues were converted into constant 2012 US dollars, and volume was standardized by dosage units.

Difference-in-Differences and Control Group Selection

To isolate merger-specific price movements from broader market trends and avoid violations of the Stable Unit Treatment Value Assumption (SUTVA), the researchers evaluated four alternative control groups:

- **Cough & Cold Private Labels** : Extremely small market share (9 products), showing some pre-merger trend instability.
- **Cough & Cold Proprietary Competitors** : Included products from Sanofi and Unilab; susceptible to SUTVA violations due to direct pricing interactions.
- **OTC Analgesics (Pain & Fever Relief)** : Non-merging firm products in a related OTC segment; potentially subject to substitution/complement spillovers.
- **Hypertension Medications (Preferred Control)** : Segment unaffected by the merger, comprising prescription drugs with no shared active ingredients with cough and cold products. Demonstrates clear parallel pre-merger trends without spillover effects.

Reduced-Form Pricing Evidence

Using quarterly data spanning 2009Q4 to 2020Q3 (excluding the merger execution window from 2019Q1 to 2019Q3), two Difference-in-Differences (DiD) models were estimated to identify post-merger price adjustments.

Post-merger price changes:

Pfizer Products:	-6.57%	[Statistically Sig.]
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GSK Products:	+3.25%	[Statistically Weak]
Merged Entity Combined:	-2.20%	[Statistically Weak]
Sanofi (Int'l Rival):	+8.55%	[Statistically Sig.]
Unilab (Local Rival):	+0.60%	[Not Significant]

Main Reduced-Form Findings

- **Pfizer Price Reduction** : Pfizer's product prices declined significantly by 6.57% post-merger, indicating that efficiency gains were partially passed on to consumers.
- **GSK Price Increase** : GSK product prices increased by 3.25%. While statistically significant under robust standard errors, this effect became statistically weak when standard errors were clustered at the product level.
- **Net Merged Entity Price Effect** : The combined price effect for GSK and Pfizer was a minor decline of 2.1% to 2.2%, which was not statistically significant under product-clustered standard errors. The larger volume share of Pfizer offset GSK's price increases.
- **Competitor Heterogeneity** :
- **Sanofi** : Prices for Sanofi's products increased by 8.55%. When evaluated on the restricted 55-product structural sample, Sanofi's price increase was 6.72%.
- **Unilab** : Prices for Unilab products showed a non-significant change of +0.60%.

Structural Demand and Cost Analysis

Random-Coefficients Logit (RCL) Demand Framework

To account for complex substitution patterns without imposing the Independence of Irrelevant Alternatives (IIA) restriction, a Random-Coefficients Logit demand model was estimated. Potential market size was defined based on a 27.8% respiratory symptom prevalence rate, an average acute cough duration of 17.8 days, and a standard dosage regimen of 3 doses per day. Endogeneity of prices was addressed using:

- **BLP-Style Instruments** : Counts of competing products, active ingredients, and pack varieties offered by rival firms and within firm portfolios grouped by target population (adult, pediatric, both).
- **Hausman-Style Cross-Country Instruments** : Average prices of identical drug formulations across neighboring ASEAN markets (Indonesia, Malaysia, Thailand, Singapore).
- **Optimal Instruments** : Constructed following Reynaert and Verboven (2014) as conditional expectations of structural error gradients.

Demand Elasticity Estimates

- **Mean Own-Price Elasticity** : Estimated at -2.464 under the preferred RCL specification (compared to -2.884 under IV Logit and positive biased estimates under OLS).
- **Elasticity by Product Category** :
- Multinational Branded Products: -2.884 (most price-elastic demand).
- Domestic Branded Generics: -2.276.
- Pure Generics: -2.536.
- **Firm-Level Price Elasticities** :
- Sanofi: -3.148
- GSK: -2.760
- Pfizer: -2.746
- Pascual Lab: -2.655
- Unilab: -2.344

- **Cross-Price Substitution Patterns** : Demand substitution is highly asymmetric. Following a price increase by any international or local brand, the strongest consumer substitution is directed toward Unilab's broad portfolio of cheaper products (cross-price elasticities are an order of magnitude larger for Unilab than for other firms). The cross-price elasticity of Sanofi demand with respect to GSK prices is 0.027.

Cost Reductions and Efficiency Gains

Using the structural demand parameters, marginal costs were backed out under oligopoly first-order conditions:

- **Pfizer Marginal Costs** : Declined post-merger by 9.43% (or \$0.534 per dose in absolute terms; log specification indicates a 7.9% to 9.9% reduction). This confirms the existence of substantive, merger-specific efficiencies for Pfizer.
- **GSK Marginal Costs** : Showed a non-robust point decline of \$0.244 per dose (or 3.8% in log terms), which was statistically weak in the full sample period, though significant in narrower event windows.
- **Markup Expansions** :
 - GSK average price-cost markups increased from 41.15% pre-merger to 44.84% post-merger.
 - Pfizer average markups increased from 39.66% pre-merger to 41.35% post-merger.
 - Sanofi markups increased slightly from 48.33% to 49.65%.
 - Unilab markups shifted marginally from 45.25% to 46.15%.

Coordinated Effects and Market Conduct Analysis

Supply-Side Conduct Framework

To determine whether Sanofi's 8.55% price increase was merely a unilateral Nash–Bertrand response to GSK's higher prices or the result of heightened tacit coordination, the authors estimated a structural supply-side conduct parameter (κ). In this framework, $\kappa = 0$ represents uncoordinated Nash–Bertrand competition, while $\kappa = 1$ reflects complete joint profit maximization. Pre-merger coordination was set to $\kappa = 0$, and post-merger conduct parameters were estimated for non-merging rivals.

Conduct Parameter Estimation Results

- **GSK/Pfizer Coordination with Sanofi** : The estimated post-merger conduct parameter κ between the merged entity and Sanofi is **0.945** conditional on demand estimates. This point estimate is near the upper bound of 1.0, indicating substantial post-merger pricing coordination.
- **GSK/Pfizer Coordination with Unilab** : The estimated post-merger conduct parameter κ between the merged entity and Unilab is **0.000**
- **Robustness Across Specifications** : Across alternative demand model specifications (allowing additional random coefficients), the coordination parameter for Sanofi remained consistently close to 1.0 (e.g., 1.000 in alternative models), while the parameter for Unilab remained consistently at 0.000.

Economic Mechanism: Multimarket Contact

The stark asymmetry in post-merger coordination between Sanofi and Unilab is explained by market structure and firm relationships:

- **International Multimarket Contact** : GSK, Pfizer, and Sanofi are global pharmaceutical multinationals with repeated interactions and overlapping product lines across numerous international jurisdictions. The consolidation of GSK and Pfizer

reduced the number of independent global decision-makers in the premium segment, enhancing the sustainability of tacit coordination with Sanofi.

- **Local Market Isolation** : Unilab is a domestic firm whose operations and interactions with the merging parties are almost entirely restricted to the Philippine market. Unilab competes in a distinct, lower-priced market segment focused on high-volume branded generics, insulating it from the coordinated pricing dynamics of the premium international brands.

Key Takeaways and Policy Implications

1. **Efficiencies Do Not Preclude Competitive Harm** : The study validates that horizontal mergers can achieve significant cost synergies (as evidenced by Pfizer's 9.43% reduction in marginal costs). However, these efficiencies failed to prevent overall market price distortions because increased market power enabled coordinated price increases among unmerged rivals.
2. **Coordinated Effects in Merger Review** : Competition authorities frequently treat merger efficiency claims as rebuttal evidence while facing challenges in quantifying ex-ante coordinated effects. The findings demonstrate that coordinated conduct can be a primary channel of post-merger consumer harm, supporting the heightened scrutiny of coordinated effects mandated in regulatory frameworks such as the 2023 FTC/DOJ Merger Guidelines.
3. **Multimarket Contact as a Facilitating Factor** : When evaluating horizontal mergers involving multinational corporations, competition agencies must evaluate broader international multimarket contacts. Repeated interactions across jurisdictions can facilitate post-merger tacit collusion in regional or domestic markets, even when local market concentration metrics (ΔHHI) appear moderate.
4. **Retrospective Evaluation Utility** : The study illustrates the necessity of combining reduced-form pricing analyses with structural conduct models in ex-post merger reviews. Structural approaches allow researchers to separate unobserved marginal cost improvements from shifts in market conduct, providing clearer guidance for future merger enforcement standards.