Can Merger Remedies Cause More Harm than Good?*

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Abstract

This paper investigates whether merger remedies, such as divestitures, can cause more harm than good using a model of firm conduct. The model is estimated leveraging the variation generated by a large divestiture in the US beer market. First, I find that price coordination, materialized through conduct parameters, acts as a countervailing force that limits the pro-competitive effects of a divestiture. Price coordination eliminates about 80% to 133% of the welfare gains from a divestiture. Second, based on counterfactual simulations, I show that a merger cleared with divestiture is likely to reduce consumer surplus more than a merger approved without divestiture.

JEL: K21, L4, L13.

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1 Introduction

Merger policy plays a critical role in shaping economic welfare. In theory, mergers can generate both pro-competitive and anti-competitive effects. On one hand, they may lead to efficiency gains that lower consumer prices; on the other, they can enhance firms' ability to raise prices, harming consumers. Empirical evidence suggests that many mergers have resulted in higher prices for consumers (Kwoka (2014)).

The approach used by antitrust authorities to limit the negative consequences of a merger on consumer welfare is to require the implementation of remedies (Dertwinkel-Kalt and Wey (2016)).[1] Divestitures are among the most common remedies used to restore competition (Asker and Nocke (2021)). They often reduce post-merger concentration, making firms more symmetric and limiting the merged entity's ability to raise prices in the relevant market. However, this type of concentration-based argument assumes that firms react individually to changes in market conditions. It also ignores the potential coordinated effects between firms that could act as a countervailing force, limiting the pro-competitive effects of the divestiture.

A divestiture often affects those factors that facilitate price coordination in theory. In particular, price coordination is easier when firms are more symmetric (Loertscher and Marx (2021)). It is also known to be easier when firms interact frequently. The remedy process involves numerous interactions between the potential buyers or the actual buyer and the seller of the divested brand allowing 'thorough due diligence' (FTC (2017)). These theoretical justifications underscore the need to empirically examine the price and welfare effects of a divestiture, accounting for potential tacit price coordination.

This paper quantifies the price and welfare effects of divestiture in a model of firm conduct. My empirical analysis focuses on the U.S. beer market from 2007 to 2010. This choice is guided by the presence of several mergers and a divestiture,

[1] According to FTC (2017), "*For most of the mergers in which the Commission finds a competitive problem, harm to competition is likely to occur in only a subset of the markets in which the merging parties operate. In those situations, appropriate remedies may protect competition while allowing the merger to proceed.*"

generating substantial variation in product portfolio patterns, which allows for identifying multiple conduct parameters. Specifically, I study the divestiture of Labatt to North American Brewery (NAB), associated with the merger between Anheuser-Busch and Inbev (ABI) in 2008 in the U.S. beer market. My analysis also includes the other mergers occurring in the beer industry during the same time period: the MillerCoors merger and the acquisition of High Falls Brewing Company by NAB. Another rationale for this choice is the possible presence of price coordination between MillerCoors and ABI (Miller and Weinberg (2017)).

There are two key elements of my analysis. The first component involves the empirical assessment of Labatt's divestiture. I provide novel descriptive evidence showing that the price of the divested brand increased relative to the prices of brewers not directly involved in the divestiture and other mergers in the industry. These findings are complemented with new model-based evidences. Using a structural model of Nash-Bertrand competition that allows for partial price coordination, I explain the mechanisms through which the pro- and anti-competitive effects of a divestiture affect consumers in a model of manufacturer conduct. In the model, price coordination captured by conduct parameters acts a countervailing force, limiting the traditional pro-competitive effects of a divestiture. I extend the previous study by Miller and Weinberg (2017) to allow all brewers affected by a change in their ownership structure, either a merger or a divestiture, to coordinate over each other prices.[2] The results reveal that price coordination is easier with the buyer of the divested brand. I estimate that the conduct parameter governing price coordination between the mergers is slightly above 0.3. In contrast, the conduct parameter influencing the degree of price coordination between the mergers and the buyer of the divested brand is is slightly above 0.6. Second, I quantify the extent to which price coordination materialized through conduct parameters is a countervailing force limiting the pro-competitive effects of a divestiture. Based on current estimates, price coordination eliminates about 80% to 133% of the welfare benefits caused by a divestiture. The most conservative scenarios occur when a world without the Miller-Coors merger is simulated.

[2] By contrast, all brewers not directly involved in a merger or divestiture are assumed to compete à la Bertrand.

The second component of my analysis is the derivation of recommendations for divestiture policies using model-based simulations. First, I implement simulations with calibrated conduct parameters and fixed marginal costs. My findings indicate that there is a significant range of conduct parameters under which a merger cleared with divestiture deteriorates consumer surplus more than a merger cleared without divestiture. Second, I examine how consumers' welfare is affected by the choice of the buyer of the divested brand by simulating the acquisition of Labatt by other buyers in the market. The results show that the actual buyer was correctly chosen, as it is the least detrimental to consumer surplus. However, of the five potential buyers considered in my sample, the results all indicate a more severe deterioration in consumer surplus than would be caused by a simple merger. The model reveals an additional margin that antitrust authorities need to include in their analysis when selecting the buyer of the divested brand. In contrast to the setting without price coordination, diversion ratios between the products of the buyer of the divested brand and the potential coordinating partners influence the prices set by the buyer of the divested brand. Higher diversion ratios between these products limit more the pro-competitive effects of a divestiture.

More broadly, my results cast doubt on the likelihood that a divestiture effectively prevents an anti-competitive merger from negatively affecting consumers. The empirical analysis of the divestiture shows that (i) the pro-competitive effects of the divestiture are not large enough to prevent consumers from being harmed, and (ii) this is mainly because the divestiture facilitates price coordination. These results have potentially broad policy implications. Antitrust authorities must consider the potential for price coordination when imposing a divestiture. However, it is highly possible that a policy directly blocking anti-competitive mergers may be more effective than relying on divestitures.

This article has several limitations. Firstly, the studied divestiture is not part of an antitrust case involving proven price coordination; therefore, I cannot make a direct comparison between the model's predictions of price coordination and documented collusive behaviour. Instead, I present evidence showing that the observed pricing pattern is consistent with the idea that divestiture enabled price coordination. Secondly, other potential explanations remain unexplored, par-

ticularly those relating to the buyer's selection process. It is possible that sellers of divested brands select buyers who are incentivised to raise prices, potentially due to superior negotiation skills or differing strategic objectives. Modelling endogenous buyer selection or a more complex vertical market structure is beyond the scope of this paper, as this would necessitate a distinct framework and the observation of multiple divestitures.

Related Literature The literature estimating how divestitures affect prices and consumer surplus is not large (Asker and Nocke (2021)). A striking feature of both theoretical and empirical studies on divestitures is that only potential unilateral effects are considered. Dertwinkel-Kalt and Wey (2016) provide conditions under which divestiture can prevent anti-competitive mergers in a model without price coordination. Delaprez and Guignard (2025) study a large upstream merger with divestiture in the French coffee market in vertical market structure. They find that the divestiture mitigates the anti-competitive effects of the merger. The relevance of requesting a divestiture to limit the anti-competitive effects of a merger is also confirmed by Friberg and Romahn (2015), who analyze a merger in the Swedish beer market, and by Alviarez et al. (2025), who examine how divestiture impacts consumers across 76 countries, including the United States. My work is directly related to Alviarez et al. (2025), who find that divestitures mitigate the anti-competitive effects of mergers. They demonstrated that, in the U.S., the beer price index would have been 4–7% higher in the absence of divestitures. Contrary to previous authors, this article studies how the presence of price coordination affects standard policy recommendations. I show that, even in simple models ignoring the vertical structure of the market, a merger cleared conditional on a divestiture can deteriorates consumer surplus more than a merger without divestiture. The structural model I estimate also complements previous studies, such as Osinski and Sandford (2021), by explicitly calculating the impact of divestitures on consumer surplus. I show that brand performance as measured by prices and quantities is not a sufficient statistics to evaluate welfare impacts.

This paper is also related to several studies that examine how mergers and

other types of alliances affect price coordination in theory (e.g., Cooper and Ross (2009)) or empirically (Miller and Weinberg (2017)). My study is directly related to Miller and Weinberg (2017). They examine how two mergers – Anheuser-Busch Inbev and MillerCoors – may have facilitated price coordination. They find that the observed price increases for products produced by the two mergers are better explained by a model of Nash-Bertrand competition with tacit price coordination. However, they do not study the divestiture associated with the approval of the merger between Anheuser-Busch and Inbev. Therefore, I extend their results by investigating how the divestiture affects prices and welfare. Specifically, I identify two conduct parameters.[3] First, I show that, there is a large range of conduct parameters such that a merger with divestiture could deteriorate consumer surplus more than a merger cleared without divestiture. Second, I show that the conduct parameter associated with the buyer of the divested brand is larger than the conduct parameter for the two mergers. I also quantify the extent to which price coordination materializing through conduct parameters is a countervailing force limiting the pro-competitive effects of a divestiture. Last, I discuss how standard policy recommendations on the choice of the buyer are affected by possible price coordination. To the best of my knowledge, the descriptive evidence on the price effects of the divestiture, the structural estimates of the conduct parameter for a divested brand, and the policy recommendations on the choice of the buyer of the divested brand presented in this article are new to the literature.

Finally, this article relies on econometric techniques and data that are widely used in the literature providing various sources for cross-checking and validating my empirical results. Demand for beer in the U.S. has previously been estimated based on discrete choice models in various articles including Asker (2016), Goldberg and Hellerstein (2008), and Miller and Weinberg (2017). Reduced form evidence for the mergers MillerCoors and Anheuser-Busch Inbev are provided in Miller and Weinberg (2017) and Ashenfelter et al. (2015). Wang et al. (2023) study also the price effects of a divestiture in the U.S. beer market but the divestiture they

[3]There are papers estimating several conduct parameters in the literature. For instance, Michel et al. (2024) estimate several conduct parameters in the ready-to-eat cereal industry ranging from 0.178 to 0.719. Their identification strategy exploits firm promotional activities.

study is different than the one analyzed in this article. Precisely, they investigate the divestiture in the 2013 merger between Anheuser–Busch InBev and Grupo Modelo using difference-in-differences analysis. Their results are qualitatively aligned with the price effect I present in this article as they find a price increase for the divested brand. However, they do not identify economic mechanisms that explain these effects. Moreover, their approach does not allow for an analysis of the welfare effects of divestiture. In contrast, the structural model I estimate allows us to assess whether a merger approved with divestiture may have a more negative impact on consumers than a merger approved without divestiture. Finally, evidence on the price effects of mergers using counterfactual simulations are presented in Miller and Weinberg (2017) based on a Nash-Bertrand competition model with price coordination.

The article is organized as follows. Section 2 introduces a general framework for analyzing the impact of divestitures in the presence of price coordination. Section 3 describes the Labatt divestiture, the data, and key empirical facts. Section 4 estimates a supply model of price coordination tailored to the U.S. beer market. Section 5 evaluates the change in consumer surplus resulting from the divestiture and offers policy recommendations for selecting an appropriate buyer for the divested brand. Finally, Section 6 concludes.

2 Framework

2.1 Merger and Divestiture Practice with Respect to Price Coordination

Both U.S. and EU merger control frameworks recognize that mergers may facilitate price coordination among firms. These regulatory bodies assess whether the conditions necessary for coordination exist and whether such coordination is sustainable post-merger.[4] A key element in both jurisdictions is the examination

[4] In Europe, a landmark case that raised the standard of proof required to block a merger on grounds of price coordination was Airtours vs Commission (2002). The European Commission's

of historical evidence of price coordination, as well as market shares and overall market concentration. For instance, the 2023 U.S. Merger Guidelines state that "markets that are highly concentrated after a merger that significantly increases concentration (see Guideline 1) are presumptively susceptible to coordination." Similarly, the EU's 2024 Guidelines on the assessment of horizontal mergers highlight that price coordination is more easily facilitated when firms are symmetric in terms of market shares.

Given this focus, it is surprising that both sets of guidelines offer limited discussion on the potential role of divestitures in influencing price coordination. In theory, divestitures enhance symmetry in market shares, which may inadvertently increase the likelihood of coordinated behavior. Nonetheless, in several merger reviews where coordination concerns were central, competition authorities opted to resolve these issues through structural remedies, most commonly divestitures. A prominent example is the Anheuser-Busch InBev/Grupo Modelo case in the beer market, where the U.S. Department of Justice concluded that the proposed merger would "likely result in higher coordinated pricing by ABI." The transaction was ultimately cleared in 2013, conditional on the divestiture of Grupo Modelo's entire U.S. business to Constellation Brands. This remedy aimed to maintain an independent and viable competitor in the U.S. beer market, thereby alleviating competition concerns caused by the proposed merger including the facilitation of coordination. This raises the question of how effective divestiture truly is in cases where mergers are associated with multilateral effects.

In the following section, I develop a framework that highlights the importance of considering potential price coordination when imposing divestiture remedies, along with practical recommendations.

2.2 Model

I assume that f firms compete à la Bertrand in m geographic markets and t time periods. Each firm f owns a subset of product $j \in \Theta_{fmt}$. Denote $\Theta^{C}_{fmt} \neq \Theta_{fmt}$ the

decision to prohibit the merger between Airtours and First Choice was annulled, with the court ruling that it is insufficient to merely show that collusion is possible; rather, it must be shown that collusion is highly likely in order to justify a prohibition.

subset of product owned by the coordinating partner of firm f. The maximisation problem for firm f in geographic market m at time t is given by:

$$\max_{\{p_{jmt} \in \Theta_{fmt}\}} \Pi^f_{mt}(p) = \sum_{j \in \Theta_{fmt}} (p_{jmt} - c_{jmt}) q_{jmt}(p) + \sum_{j \in \Theta_{fmt}} \sum_{k \in \Theta^C_{fmt}} \phi_{jk} (p_{kmt} - c_{kmt}) q_{kmt}(p), \tag{1}$$

where c_{jmt} is the marginal cost of product j in geographic market m at time t and q_{jmt} is the quantity. The parameter $\phi_{jk} \in (0, 1)$ allows for the possibility that firms partially coordinate prices. It quantifies the extent to which a firm incorporates the profits of products $k \in \Theta^C_{fmt}$ when determining the price of its product j. In the extreme case, with all ϕ_{jk} equal to 1, the maximization problem is similar to that of a cartel. The other extreme case, with all ϕ_{jk} equal to 0 corresponds to a standard Bertrand competition problem without price coordination.

The first-order condition with respect to p_{jmt} is given by:

$$q_{jmt}(p) + (p_{jmt} - c_{jmt}) \frac{\partial q_{jmt}(p)}{\partial p_{jmt}} + \sum_{k \in \Theta_{fmt}} (p_{kmt} - c_{kmt}) \frac{\partial q_{kmt}(p)}{\partial p_{jmt}} + \sum_{k \in \Theta^C_{fmt}} \phi_{jk} (p_{kmt} - c_{kmt}) \frac{\partial q_{kmt}(p)}{\partial p_{jmt}} = 0. \tag{2}$$

2.3 Stylized Example

To gain a better understanding of the effect of a divestiture on prices when there is partial price coordination, consider the following simple example. Assume three firms. Firm 1 owns one product priced at p_1, Firm 2 owns two products priced at p_2 and p_3, and Firm 3 owns one product priced at p_4. Next, I will compare the first-order conditions before and after the merger, both with and without a divestiture. For ease of exposition, I also assume that ϕ_j does not vary across k. I further assume that in the pre-merger period, $\phi_j = 0$ whereas in the post-merger

period ϕ_j may be different from 0.[5] There are multiple reasons why this may be the case, one example being that a divestiture restores more symmetry to the market, and price coordination is known to be easier when firms are more symmetric.

Merger without Divestiture

Assuming that firms 1 and 2 merge to form a new entity that sets prices p_1, p_2 and p_3, the first-order condition is as follows:

$$p_1 = c_1 - (\frac{\partial s_1}{\partial p_1})^{-1}[s_1 + \frac{\partial s_2}{\partial p_1}(p_2 - c_2) + \frac{\partial s_3}{\partial p_1}(p_3 - c_3)], \tag{3}$$

$$p_2 = c_2 - (\frac{\partial s_2}{\partial p_2})^{-1}[s_2 + \frac{\partial s_1}{\partial p_2}(p_1 - c_1) + \frac{\partial s_3}{\partial p_2}(p_3 - c_3)], \tag{4}$$

$$p_3 = c_3 - (\frac{\partial s_3}{\partial p_3})^{-1}[s_3 + \frac{\partial s_1}{\partial p_3}(p_1 - c_1) + \frac{\partial s_2}{\partial p_3}(p_2 - c_2)], \tag{5}$$

$$p_4 = c_4 - (\frac{\partial s_4}{\partial p_4})^{-1}[s_4]. \tag{6}$$

When setting the price of a product, the merged entity considers its impact on demand for that product, as well as its effect on demand for other products in its portfolio. In this example, the merged entity owns products 1, 2 and 3. Therefore, when setting the price of product 1, for example, the merged entity takes into account the fact that some demand will shift towards products 2 and 3.

Merger with Divestiture

Assume that firms 1 and 2 merge, but that product 3 is instead divested to firm 3. The merged entity sets prices p_1 and p_2. Firm 3 sets prices p_3 and p_4. The merged entity and the buyer of the divested brand may engage in tacit price coordination. The first-order condition can be rewritten as follows:

$$p_1 = c_1 - (\frac{\partial s_1}{\partial p_1})^{-1}[s_1 + \frac{\partial s_2}{\partial p_1}(p_2 - c_2) + \phi_1\frac{\partial s_3}{\partial p_1}(p_3 - c_3) + \phi_1\frac{\partial s_4}{\partial p_1}(p_4 - c_4)] \tag{7}$$

[5]The first-order conditions for the pre-merger period are provided in Supplementary Appendix A.

$$p_2 = c_2 - (\frac{\partial s_2}{\partial p_2})^{-1}[s_2 + \frac{\partial s_1}{\partial p_2}(p_1 - c_1) + \phi_2 \frac{\partial s_3}{\partial p_2}(p_3 - c_3) + \phi_2 \frac{\partial s_4}{\partial p_2}(p_4 - c_4)] \quad (8)$$

$$p_3 = c_3 - (\frac{\partial s_3}{\partial p_3})^{-1}[s_3 + \phi_3 \frac{\partial s_2}{\partial p_3}(p_2 - c_2) + \phi_3 \frac{\partial s_1}{\partial p_3}(p_1 - c_1) + \frac{\partial s_4}{\partial p_3}(p_4 - c_4)] \quad (9)$$

$$p_4 = c_4 - (\frac{\partial s_4}{\partial p_4})^{-1}[s_4 + \phi_4 \frac{\partial s_1}{\partial p_4}(p_1 - c_1) + \phi_4 \frac{\partial s_2}{\partial p_4}(p_2 - c_2) + \frac{\partial s_3}{\partial p_4}(p_3 - c_3)] \quad (10)$$

From equations (7) or (8), it can be seen that the merged entity sets prices taking into account not only its own product, but also the product owned by the buyer of the divested brand. This is weighted by either ϕ_1 or ϕ_2. Equation (7) also includes $\phi_1(\frac{\partial s_3}{\partial p_1}(p_3 - c_3) + \frac{\partial s_4}{\partial p_1}(p_4 - c_4))$. Equation (8), on the other hand, includes the term $\phi_2(\frac{\partial s_3}{\partial p_2}(p_3 - c_3) + \frac{\partial s_4}{\partial p_2}(p_4 - c_4))$.

Next, we will calculate the instantaneous pricing pressure implied by both scenarios. To do so, I extend the stylised example in Friberg and Romahn (2015) by adding the possibility of price coordination between the buyer and seller of a divested brand. I define pricing pressure as the difference in first-order conditions evaluated at pre-merger prices $\frac{\Delta p_j}{p_j}$. In the case of a merger without any divestiture, pricing pressures are determined by:

$$\frac{\Delta p_1}{p_1} = -\frac{1}{p_1}(\frac{\partial s_1}{\partial p_1})^{-1}[\frac{\partial s_2}{\partial p_1}(p_2 - c_2) + \frac{\partial s_3}{\partial p_1}(p_3 - c_3)] \quad (11)$$

$$\frac{\Delta p_2}{p_2} = -\frac{1}{p_2}(\frac{\partial s_2}{\partial p_2})^{-1}[\frac{\partial s_1}{\partial p_2}(p_1 - c_1)] \quad (12)$$

$$\frac{\Delta p_3}{p_3} = -\frac{1}{p_3}(\frac{\partial s_3}{\partial p_3})^{-1}[\frac{\partial s_1}{\partial p_3}(p_1 - c_1)] \quad (13)$$

$$\frac{\Delta p_4}{p_4} = 0. \quad (14)$$

In contrast, under a merger with divestiture, the pricing pressures are given by:

$$\frac{\Delta p_1}{p_1} = -\frac{1}{p_1}(\frac{\partial s_1}{\partial p_1})^{-1}[\frac{\partial s_2}{\partial p_1}(p_2 - c_2) + \phi_1 \frac{\partial s_3}{\partial p_1}(p_3 - c_3) + \phi_1 \frac{\partial s_4}{\partial p_1}(p_4 - c_4)] \quad (15)$$

$$\frac{\Delta p_2}{p_2} = -\frac{1}{p_2}(\frac{\partial s_2}{\partial p_2})^{-1}[\frac{\partial s_1}{\partial p_2}(p_1 - c_1) + (\phi_2 - 1)\frac{\partial s_3}{\partial p_2}(p_3 - c_3) + \phi_2\frac{\partial s_4}{\partial p_2}(p_4 - c_4)] \quad (16)$$

$$\frac{\Delta p_3}{p_3} = -\frac{1}{p_3}(\frac{\partial s_3}{\partial p_3})^{-1}[(\phi_3 - 1)\frac{\partial s_2}{\partial p_3}(p_2 - c_2) + \phi_3\frac{\partial s_1}{\partial p_3}(p_1 - c_1) + \frac{\partial s_4}{\partial p_3}(p_4 - c_4)] \quad (17)$$

$$\frac{\Delta p_4}{p_4} = -\frac{1}{p_4}(\frac{\partial s_4}{\partial p_4})^{-1}[\phi_4\frac{\partial s_1}{\partial p_4}(p_1 - c_1) + \phi_4\frac{\partial s_2}{\partial p_4}(p_2 - c_2) + \frac{\partial s_3}{\partial p_4}(p_3 - c_3)] \quad (18)$$

A comparison of pricing pressures in mergers with and without divestiture reveals two notable findings. Firstly, I compare the pricing pressures on the divested brand. Equations (13) and (17) show that the immediate pricing pressure on the divested brand under a merger with divestiture is ambiguous compared to a merger without divestiture. Specifically, the pressure is higher when $\phi_3 > \frac{\frac{\partial s_2}{\partial p_3}(p_2-c_2)-\frac{\partial s_4}{\partial p_3}(p_4-c_4)}{\frac{\partial s_2}{\partial p_3}(p_2-c_2)+\frac{\partial s_1}{\partial p_3}(p_1-c_1)}$. In other words, for a sufficiently high degree of price coordination, all else being equal, the price of the divested brand increases, which is a mechanism that has not yet been studied. Secondly, when the degree of price coordination is sufficiently high, all instantaneous pricing pressures are greater under a merger involving divestiture than under one that does not. Consequently, a merger involving divestiture can reduce consumer surplus by a greater amount than a merger approved without divestiture. The intuition behind this is straightforward: in the extreme case where $\phi_j = 1$, the merger with divestiture effectively resembles a merger involving three firms instead of two. The higher the value of ϕ_j, the closer the outcomes approach this scenario.

2.4 Policy Recommendation

In practice, the merger simulation model is one of the primary tools used to evaluate the potential price effects of mergers and divestitures. This approach has been employed in cases such as Unilever/Sara Lee and Demb/Mondelēz in the EU, and Aetna/Humana (2017) in the U.S. However, these simulations typically incorporate diversion ratio but do not account for the possibility of partial price coordination. Price coordination can be incorporated by using calibrated conduct parameters.

In this section, I explain how the prices of the buyer of the divested brand are affected by the divestiture under price coordination and interract with the classic diversion ratio. Denote $D_{jk} = -\frac{\frac{\partial s_k}{\partial p_j}}{\frac{\partial s_j}{\partial p_j}}$ as the diversion ratio for products j and k as in Conlon and Mortimer (2021). D_{jk} represents the fraction of consumers who leave product j after a price increase and switch to product k. From equation (2), omitting the subscript mt, we can express the price for product j as:[6]

$$p_j = (\frac{1}{1+\frac{1}{\epsilon_{jj}}})[c_j + \sum_{k\in\theta_f}(p_k - c_k)D_{jk}(P) + \sum_{k\in\theta_f^C}\phi_{jk}(p_k - c_k)D_{jk}(P)]. \tag{19}$$

Recall that $\Theta_f^C \neq \Theta_f$ is the subset of product k owned by the coordinating partners of firm f.

DIVESTED PRODUCTS Assume one divested product with price p_d is sold to a buyer, which initially owns only one product with price p_b. The price of the divested product is given by:

$$p_d = (\frac{1}{1+\frac{1}{\epsilon_{dd}}})[c_d - c_b D_{db}(P) + p_b D_{db}(P) + \sum_{k\in\theta^C_{\text{buyer}}}\phi_{dk}(p_k - c_k)D_{dk}(P)]. \tag{20}$$

If all ϕ are equal to zero, this is the standard first-order condition from a Nash-Bertrand game with multiproduct firms. In the presence of price coordination, there is an additional term $\sum_{k\in\theta^C_{\text{NAB}}}\phi_{jk}(p_k - c_k)D_{dk}(P)$. The more the divested product and the products in the coordination group are close substitutes, the higher is the price of the divested product, all else being equal. Note also that higher prices for the product already in the portfolio of the buyer of the divested product p_b lead to higher prices. The effect is stronger when the diversion ratio $D_{db}(P)$ is higher.

[6] See. Supplementary Appendix L for derivation.

PRODUCTS INITIALLY OWNED BY THE BUYER OF THE DIVESTED BRAND The price of the other product owned by the buyer of the divested brand is given by:

$$p_b = (\frac{1}{1+\frac{1}{\epsilon_{bb}}})[c_b + p_d D_{bd}(P) - c_d D_{bd}(P) + \sum_{k \in \theta^C_{\text{buyer}}} \phi_{bk}(p_k - c_k) D_{bk}(P)]. \tag{21}$$

3 Antitrust Case

3.1 Divestiture in the U.S. Beer Market

On July 13, 2008, Anheuser-Busch and InBev announced a proposed merger in which InBev would acquire Anheuser-Busch for approximately $52 billion. Anheuser-Bush accounted for about 50% of sales in the United States with brands such as Bud Light and Budweiser. InBev is a Belgian company that was the second largest brewer in the world, exporting brands such as Becks and Labatt.

In November 2008, the merger was approved on the condition that Labatt beers be divested. The Department of Justice (DOJ) required this divestiture because the merger was expected to have anti-competitive effects in several geographic markets: Buffalo-Rochester and Syracuse. The DOJ did not expect the merger to achieve sufficient cost efficiencies to approve it without divestiture.[7]

Labatt was acquired by KPS partners which created North American Breweries (NAB) in February 2009. The company also acquired High Falls Brewing Company (also often referred to as the Genesee Brewing Company). Before 2018, Labatt did not have a brewery located in the U.S. The first Labatt brewery located in the U.S. was opened in 2018, a period that is not covered by the dataset I use.[8]

3.2 Data

SALES I use the IRI Academic Database (Bronnenberg et al. (2008)) on sales of beer in the United States from 2007 to 2010 for grocery stores. In the dataset, one

[7] Precisely, the merger report states: "*The anti-competitive effects of the proposed acquisition are not likely to be eliminated or mitigated by any efficiencies that may be achieved by the acquisition.*"

[8] https://www.brewbound.com/news/fifco-usa-opens-labatt-brewery-in-buffalo/. Accessed June 11, 2025.

row provides information on total unit and dollar sales for a product (defined by its UPC code) at a given store in a given week. I drop sales for the cider category and 'all brands beer' for which the parent company and vendor information is not available. Following Ashenfelter et al. (2015), I drop observations if the price per 12-packs is lower than 2$ or greater than $30. Second, I restrict the sample to the major beer producers: Anheuser-Busch, Constellation Brands Inc, D.G. Yuengling, Heineken, High Falls Brewing, InBev, Molson Coors, and SABMiller. I study 21 brands: Beck's, Beck's Premier Light, Bud Light, Budweiser, Coors, Coors Light, Corona Extra, Corona Light, Dundee Honey Brown Lager, Heineken, Heineken Premium Light Lager, Labatt Blue, Labatt Blue Light, Michelob, Michelob Light, Miller Genuine Draft, Miller High Life, Miller Lite, Yuengling Black and Tan, Yuengling Light Lager, and Yuengling Traditional Lager.[9]

Thirdly, my study of sales covers 48 geographic markets, including the same 39 markets as Miller and Weinberg (2017). Finally, all prices are expressed in 12-pack equivalents and deflated using the Consumer Price Index, with 2007 dollars serving as the reference point.[10] I do not restrict the sample by package sizes, I define a product as a brand-retailer combination and study monthly sales.[11] Therefore, the raw data are aggregated along two dimensions: package sizes and month.

COST SAVINGS To quantify possible cost efficiencies, I follow previous studies in the literature and use the distance between the nearest brewery and the geographic market in which a given brand is sold as a proxy for cost savings related to shipping

[9] Miller and Weinberg (2017) study 13 brands: Bud Light, Budweiser, Michelob, Michelob Light, Miller Lite, Miller Genuine Draft, Miller High Life, Coors Light, Coors, Corona Extra, Corona Extra Light, Heineken, and Heineken Light. Therefore, I study a larger set of brands. I do so to have the necessary variation to study the divestiture. I add the brand Becks, Becks premier, Labatt, and Labatt blue light, which were owned by Inbev in the pre-merger period. I also add the brand Dundee honey brown lager bought by NAB in the post-divestiture period. Last, I add 3 brands owned by DG Yuengling: Yuengling black and tan, Yuengling light lager and Yuengling traditional lager.

[10] You can access the CPI data at the following link: https://fred.stlouisfed.org/series/CPIAUCSL#0.

[11] In Ashenfelter et al. (2015) the analysis is restricted to packages sizes, expressed in 144 ounces equivalents: 0.4138, 6, 0.666, 1, 0.9334, 1.666 and 2. Miller and Weinberg (2017) restrict the sample to package sizes, expressed in 144 ounces equivalents: 0.5, 1, 2, and 2.5.

costs. For products owned by D.G. Yuengling or initially owned by High Falls Brewing, driving miles between each geographic market and the nearest brewery are computed using the ORS tool plugin in QGIS. D.G. Yuengling has two breweries: one located in Pennsylvania and one located in Florida. High Falls Brewing has one brewery located in Rochester. The driving miles between each IRI market and the nearest brewery for other products in the sample are obtained directly from the supplemental material associated with Miller and Weinberg (2017). Summary statistics are displayed in Table 1.[12] The table shows that the average distance between each IRI market and the nearest brewery tend to be larger for imported beers.

[12]Note that for the brand 'Dundee Honey Brown Lager', the minimum observed distance is in the geographic market of Buffalo/Rochester, as High Falls Brewing Company has only one brewery located in this market both before and after the divestiture.

Table 1. Average Minimum Distance Between Each IRI Market and the Nearest Brewery by Brands

Brand	mean	sd	min	max
Becks	0.30	0.28	0.00	0.93
Becks Premier Light	0.30	0.27	0.00	0.93
Bud Light	0.22	0.19	0.00	0.83
Budweiser	0.22	0.19	0.00	0.83
Coors	0.50	0.35	0.00	1.34
Coors Light	0.50	0.34	0.00	1.34
Corona Extra	1.50	0.53	0.30	2.35
Corona Light	1.51	0.53	0.30	2.35
Dundee Honey Brown	0.87	0.68	0.00	2.78
Heineken	0.36	0.48	0.00	4.80
Heineken Premium	0.35	0.47	0.00	4.80
Labatt Blue	0.56	0.35	0.10	1.46
Labatt Blue Light	0.45	0.25	0.12	1.18
Michelob	0.23	0.19	0.00	0.83
Michelob Light	0.20	0.15	0.00	0.83
Miller Genuine	0.35	0.28	0.00	1.22
Miller High Life	0.35	0.28	0.00	1.22
Miller Lite	0.35	0.28	0.00	1.22
Yuengling Black	0.34	0.17	0.01	0.61
Yuengling Light	0.35	0.17	0.01	0.61
Yuengling Traditional	0.34	0.17	0.01	0.61

Note: Unit in 1000 miles.

3.3 Relevant Descriptive Evidences

Evidence 1: The Divestiture is Associated with Significant Variation Across Localized Geographic Markets

Tacit price coordination is known to be easier when deviations from tacit agreements are easy to detect. According to Levy and Reitzes (1992), this is the case

when firms compete in specific geographic markets, indeed they argue that "because of the localized nature of competition in spatial markets, cheaters may be relatively easier to detect and punish." A key feature of the divestiture of Labatt is that competition concerns were presents only in two geographic markets. Thus, the divestiture studied in this article is a perfect empirical laboratory where deviations from a tacit agreement are easy to detect and punish. In Table 2, I provide evidence to support this point. Precisely, I show the average market shares before and after the merger and divestiture in all geographic markets and in geographic markets with competition concerns. The period between the approval of the merger and the divestiture is made of 3 months. The table reveals that the divestiture is (i) quantitatively important and (ii) the market share of the divested brand varies substantially across geographic markets. On average, the market share of the divested brand is 3.75% before the divestiture and 3.78% after the divestiture across all geographic markets. The acquisition of the divested brand allowed the buyer to enter the beer market with market shares close to those of DG Yuengling, ranking in the bottom of the hierarchy in terms of market shares. In contrast, in geographic markets with competition concerns, the divested brand had a market share of 20.27% in the pre-merger period and 20.79% in the post-divestiture period. The market share of the divested brand is ranked just below AB Inbev and MillerCoors, meaning at the top of the market share hierarchy. Hence, in these markets, any potential deviation from tacit price coordination is likely to stand out.

Table 2. Market Shares Pre and Post-Divestiture Period By Geographic Market (%)

	All markets		Competition concerns	
Parent Company	Before	After	Before	After
Merged Entities				
ABI		32.11 (0.96)		24.48 (1.10)
AB	27.10 (0.61)		19.34 (0.85)	
Inbev	4.60 (0.49)		3.90 (0.62)	
Labatt (divested brand)	3.75 (0.18)		20.27 (1.06)	
NAB (buyer)				
Labatt (divested brand)		3.78 (0.15)		20.79 (0.84)
High Falls Brewing		1.52 (0.12)		2.11 (0.20)
Rivals				
High Falls Brewing	1.93 (0.19)		2.25 (0.34)	
Millercoors	28.74 (0.95)	29.95 (0.68)	20.76 (1.38)	22.16 (1.03)
Constellation	20.29 (2.71)	17.50 (2.25)	15.15 (3.52)	12.15 (2.69)
DG Yuengling	4.29 (0.81)	5.90 (0.52)	10.54 (0.82)	10.55 (0.95)
Heineken	9.26 (0.50)	9.19 (0.58)	7.75 (0.61)	7.73 (0.65)

Notes: The table reports the average (across markets) market shares before the merger (23 months) and after the divestiture (22 months) in all geographic markets and geographic markets with competition concerns only. Standard deviation are shown in parenthesis.

Evidence 2: The Prices of the Divested Brand Increased After the Divestiture

I examine the effect of the divestiture on the retail prices of the divested brand. My identification strategy involves comparing the prices of the divested brand before and after the divestiture within the post-merger period, and relative to the prices of rival products in geographic markets where the divested brand has a limited presence. This is done while controlling for price changes induced by the merger on products retained by the merging firms, as well as other confounding factors.

Specifically, I estimate the following event study specification:

$$log(p_{jmt}) = K + \alpha_j + \alpha_m + \alpha_t + \sum_{t=-4,\neq -1}^{24} \delta_t \mathbb{1}_{\text{Divested}} \times \mathbb{1}_{\text{t}} + \delta_2 \mathbb{1}_{\text{ABI}} \times \mathbb{1}_{\text{Post}} + \delta_3 \mathbb{1}_{\text{Buyer}} \times \mathbb{1}_{\text{Post}} + u_{jmt}, \quad (22)$$

where p_{jmt} denote the price of product j in geographic market m at time t. The terms α_j, α_m, and α_t represent product-specific, market-specific, and month-year-specific fixed effects, respectively. The indicator variable $\mathbb{1}_{\text{Divested}}$ equals 1 for products belonging to the divested brand. Similarly, $\mathbb{1}_{\text{ABI}}$ equals 1 for products owned by AB Inbev, while $\mathbb{1}_{\text{Buyer}}$ equals 1 for other products owned by the buyer of the divested brand. The variable $\mathbb{1}_t$ indicates period t, and $\mathbb{1}_{\text{Post}}$ is 1 for periods after the divestiture.

The divestiture event corresponds to period $t = -1$, occurring in February 2009. To isolate the effect of the divestiture from that of the merger, the analysis focuses on the pre-divestiture period overlapping with the post-merger period. This pre-divestiture window begins in November 2008, when the merger was approved subject to the divestiture of the Labatt brand.

Interaction terms $\mathbb{1}_{\text{ABI}} \times \mathbb{1}_{\text{Post}}$ and $\mathbb{1}_{\text{Buyer}} \times \mathbb{1}_{\text{Post}}$ capture price changes following the divestiture for products owned by Anheuser-Busch Inbev and other products of the buyer, respectively. Following the recommendations of Bertrand et al. (2004), standard errors are clustered at the product level.

Figure 1.1 shows the plot of the corresponding event study. There is no evidence of preexisting differential trends in prices among brewers in the treatment and control groups. This indicates that other shocks occurring before the merger and divestiture between Anheuser-Busch and Inbev do not lead to differential pretrends across merging and control manufacturers. For instance, the presence of the merger between Miller and Coors occurring before is not a threat to this identification strategy. The results reveal strong evidences that the average prices of the divested brand Labatt increased after the divestiture by up to 6%. The results reveal also that prices of products owned by Anheuser-Busch Inbev and the other products of the buyer of the divested brands increased by 4.8% and

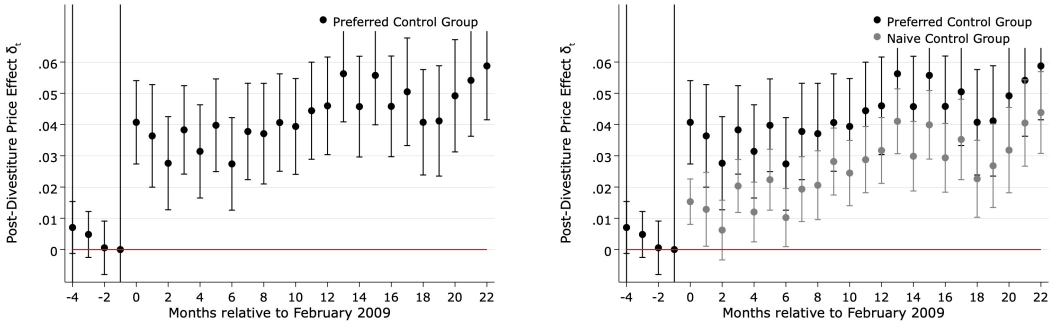
5.9% respectively. Table B1 in Supplementary Appendix B presents the estimated coefficients.

These estimates suggest that the divestiture failed to block the anti-competitive effects of the merger. A divestiture can be pro-competitive through two main channels. First, the divested brand is often sold to a buyer with a smaller product portfolio compared to the seller. Fixing marginal costs, this tends to lead to a drop in the price for the divested brand. Second, the reduction in the number of products in the portfolio of the merged entity is expected to mitigate the potential price increase resulting from the merger. The fact that the first effect does not appear in the data is surprising and requires further analyses.

A common challenge when trying to identify the impact of the divestiture on prices is that the prices in the control group may respond strategically to the divestiture. This could lead to the true effects being underestimated. To overcome this limitation, I exploit a key feature of the institutional setting. Indeed, the divested brand is not sold in all geographic markets. This enables me to compare the price of the divested brand at the time of the divestiture with the prices of products sold by competitors in markets where the divested brand is not sold. To evaluate this strategy, I compare estimates obtained from my preferred specification with estimates obtained from the same specification, but with prices of rivals in all geographic markets included in the control group. Both estimates are shown in Figure 1.2. The grey solid dots represent estimates from a regression using a broader control group comprising products of rivals not directly involved in the merger or divestiture accross all geographic markets. The black solid dots shows the estimates from a regression using as control group products of rival firms not directly involved in the merger or divestiture, within geographic markets where Labatt is not sold. The results show that not restricting the control group to prices of rivals in market where Labatt is not sold leads to lower estimates. The grey estimates and bars around points indicating 95% intervals are systematically lower. This suggests that my identification strategy effectively limits bias arising from strategic responses of untreated units to the divestiture. Finally, I show in the Appendix C that the estimated price increase for the divested brand holds under an alternative control group selection method based on matching observable

characteristics from the pre-divestiture period. However, matching may not be the optimal approach when there are spillover effects between treated and untreated units, as more similar products are likely to experience similar shocks.

Figure 1. Divestiture Treatment Effect - Event Study *Author: Yann Delaprez*



1.1 Preferred Control Group 1.2 Preferred vs Naive Control Group

Notes: The figure presents event study estimates from specification 22 for the divested brand. Panel 1.1 uses as a control group products of rival firms not directly involved in the merger or divestiture, within geographic markets where Labatt is not sold. Panel 1.2 displays two sets of estimates: black solid dots represent monthly point estimates with 95% confidence intervals (black bars), based on standard errors clustered at the product level and the same restricted control group as in Panel 1.1. Grey solid dots represent estimates from an alternative specification that uses a broader control group comprising products of rivals not directly involved in the merger or divestiture across all geographic markets, with grey bars indicating 95% confidence intervals. The vertical line at $t = -4$ marks the date of merger approval, while the line at $t = -1$ corresponds to the approval of the divestiture.

4 Quantification

Next, I calibrate and estimate the supply model in Section 2.2 to quantify the possible economic mechanisms. The supply model uses the preference parameters obtained from the demand estimation as given. As estimating the demand for US beers is standard in the literature, I provide a detailed discussion of this step in Supplementary Appendix D.

4.1 The Model

I adjust the model to study the specific mergers and divestiture in this study. In this setting, using the model in Section 2.2, I obtain J equations per market $m \times t$. The system of J first-order conditions, for a given market mt, in vector notation can be written as follows:

$$s_{mt}(p) + (I_{mt} \odot \Omega_{mt}(p))(p_{mt} - c_{mt}) = 0, \tag{23}$$

where the (j,k)-element of $\Omega_{mt}(p)$ is defined as $\dfrac{\partial s_{kmt}(p)}{\partial p_{jmt}}$.

The block-diagonal matrix I_{mt} is of dimension $J \times J$. The (j,k)-element of I^b_{mt} is defined as follows:

$$I_{jkmt} = \begin{cases} 1 & \text{if } j \text{ and } k \text{ are sold by the same brewer} \\ \phi & \text{if } j \neq k \text{ belong to ABI and MillerCoors} \\ \phi_d & \text{if } j \neq k \text{ belong to ABI (resp. MillerCoors) and NAB} \\ 0 & \text{otherwise.} \end{cases} \tag{24}$$

I further assume that in the pre-merger period, $\phi = \phi_d = 0$.[13] Recall that in my sample I observe three mergers: ABI, MillerCoors and the acquisition of High Falls Brewery by NAB (the buyer of the divested brand).[14] Therefore, I allow all mergers to coordinate on prices in the post-merger and divestiture period. Yet, the degree of price coordination between the mergers and the buyer of the divested brand may be different. By contrast, I assume that rivals not involved in any of the mergers compete à la Nash-Bertrand.

From equation (2), I obtain the brewer margins:

$$\gamma_{mt} \equiv p_{mt} - c_{mt} = -(I^b_{mt} \odot \Omega_{mt}(p))^{-1} s_{mt}(p), \tag{25}$$

[13] For the sake of clarity a simple illustrative example is provided in Supplementary Appendix E.

[14] Recall that NAB, the buyer of the divested brand is also completing the acquisition of High Falls Brewery and buying the divested brand at the same time. Therefore, I observe three mergers.

with c_{mt} the manufacturer's marginal costs that can be recovered as follows:

$$c_{mt} = p_{mt} - \gamma_{mt}. \tag{26}$$

Retail prices are determined simultaneously by brewers competing for final consumers directly in the downstream market. Therefore, it is assumed that brewers directly sell their products to consumers, thus omitting the competition between retailers.

4.2 Economic Mechanisms: Model with Calibrated Parameters

In this subsection, I study the price effects and the change in consumer surplus implied by the merger and the divestiture under different arbitrary values of the conduct parameters. This offers two key benefits: (i) it facilitates a discussion of the potential economic mechanisms at play and (ii) it makes transparent the extent to which these parameters influence the results.

No Price Coordination and No Cost Savings: The Pro-Competitive Effects of a Divestiture

I start with a model without price coordination ($\phi = \phi_d = 0$). I further assume that marginal costs are fixed at their pre-merger level. I solve for a vector of prices in three different counterfactual scenarios: (i) no merger, (ii) a merger without divestiture, and (iii) a merger with divestiture. I then compute the effect of the merger and divestiture relative to the 'no merger' scenario. I show the results in Table 3.

First, I discuss the results for the buyer and the seller of the divested brand. On average the prices of the products owned by the seller of the divested brand increase by 2.37% in the absence of divestiture and increase less if the merger is approved with divestiture. The price of the divested brand would have increased by 7.53% in the absence of divestiture, while it decreases by 0.13% in the scenario where the merger is approved with divestiture.

To sum up, the results reveal two interesting features. First, in the absence

of price coordination, standard merger simulation models highlight two pro-competitive forces: (i) the divestiture mitigates the price increase of the merged entity's products, and (ii) the price of the divested brand is expected to decrease. Second, given that the descriptive evidence shows a price increase for the divested brand, a simple merger simulation model without price coordination is not well suited for deriving a meaningful evaluation of the divestiture of Labatt. In line with previous work by Miller and Weinberg (2017), an additional element possibly explaining the observed price effects for the divested brand is the presence of price coordination. Next, I investigate this possibility.

Table 3. Counterfactuals without Price Coordination

	$\phi = 0 = \phi_d = 0$	
	No Divestiture	Divestiture
Merged Entities		
MillerCoors	3.34 %	3.32 %
ABI	2.37 %	2.29%
Divested brand	7.53 %	
NAB (buyer)		
Divested brand		-0.13 %
High Falls Brewing	0.00 %	0.07 %
Rivals		
Constellation	0.05 %	0.05%
DG Yuengling	0.03 %	0.03%
Heineken	0.03 %	0.03 %
Welfare		
ΔCS	-3.01%	-2.86%
ΔPS	3.47%	3.06%

Notes: The simulations are based on the demand parameters presented in Table D.3 and conduct parameters set to zero. The simulations are computed using the period after the divestiture and computed relative to the 'no merger' scenario. There are 52,725 observations in the sample. Additional summary statistics including standard deviations are provided in Appendix H.

Price Coordination and No Cost Savings: Divestiture may Deteriorate Consumer Surplus more than a Merger without

I repeat the exercise, but this time I assume different arbitrary values for the conduct parameters. Recall that these conduct parameters govern the degree of

tacit price coordination between the merging firms and the buyer of the divested brand, as well as between the merging firms themselves. Precisely, I set ϕ_d and ϕ equal to 0.3, 0.5, and 0.9. I focus the discussion on the computed price effects for the divested brand. With conduct parameters set to $\phi = \phi_d = 0.3$, the computed average price change after a merger without divestiture is 9.58% for the divested brand. After a merger with divestiture, the price of the divested brand increases by 3.89%.

Thus, the price of the divested brand increases after a merger with divestiture, but less than after a merger. This suggests that if marginal costs are set at their pre-merger level, a model with tacit price coordination can explain a price increase for the divested brand. By partially internalizing its rivals' profits, the buyer of the divested brand (NAB) sets higher prices for the divested brand.

Note also that for higher values of the conduct parameters ϕ and ϕ_d, one can see that the price effects associated with the product owned by ABI, tend to be larger after a merger with divestiture compared to a merger without divestiture. Tacit price coordination, materialized through the conduct parameters, may partially offset the two pro-competitive effects of the divestiture.

The results in Table 4 also provide information on the effects of the merger and divestiture on consumer surplus in the presence of tacit price coordination.[15] First, based on the preference estimates (i.e., Table D.3), the fixed marginal costs, and the conduct parameters, the consumer surplus systematically decreases after the merger, independently of the divestiture. For small values of the conduct parameters ($\phi = \phi_d < 0.5$), it decreases less when a divestiture is imposed, suggesting that divestiture actually mitigates the anti-competitive effects of the merger. However, for large values of the conduct parameters ($\phi = \phi_d > 0.5$), the merger cleared with divestiture deteriorates consumer surplus more than a merger cleared without divestiture. In this setting, consumers would be better off with a laissez-faire policy.

Recall that the purpose of this exercise is meant to illustrate how tacit price coordination affects the standard economic mechanisms associated with a divestiture. However, these simulations are based on two strong assumptions: (i)

[15] Derivation for welfare statistics are provided in Supplementary Appendix G.

marginal costs are set at their pre-merger level, and (ii) the conduct parameters take the same arbitrary value. In Section 4.3, I relax these assumptions, by estimating the conduct parameters and marginal costs. The associated simulation results are presented in Section 5.

4.3 Identification

CONDUCT PARAMETER Next, I turn to identifying ϕ and ϕ_d. These parameters have their roots in models designed to capture varying intensities of competition while preserving empirical tractability. In this vein, my use of the partial price coordination parameter follows the broader tradition of conduct parameter estimation, albeit applied in the context of differentiated products rather than homogeneous goods (see Bresnahan (1982)). This approach is similarly adopted in studies such as Ciliberto and Williams (2014), Michel et al. (2024), and Miller and Weinberg (2017), though their primary focus is not on divestitures.

A well-known critique of the conduct parameter framework is provided by Corts (1999), who argues that when the true data-generating process reflects a dynamic oligopoly model, the resulting conduct estimates may be biased. However, it is important to emphasize that the goal of this paper is not to replicate firms' dynamic pricing behavior in full detail. Rather, the aim is to assess deviations from the commonly used Nash-Bertrand benchmark. Specifically, I seek to understand how assumptions underlying merger defenses, often based on Nash-Bertrand competition, hold up under a shift in market regime. As such, the conduct parameter here should be interpreted as a reduced-form object, useful for simulating counterfactual pricing under alternative market structures.

SUPPLY ESTIMATION I assume that the marginal cost of product j in geographic market m at time t depends on some observable and unobservable cost shocks as

Table 4. Counterfactuals: Price Coordination (Calibrated Parameters)

	$\phi = 0 = \phi_d = 0$		$\phi = 0.3 = \phi_d = 0.3$	
	No Divestiture	Divestiture	No Divestiture	Divestiture
Merged Entities				
MillerCoors	3.34%	3.32%	6.73%	6.73%
AB Inbev	2.37%	2.29%	4.48%	4.43%
Labatt (divested brand)	7.53%		9.58%	
NAB (buyer)				
Labatt (divested brand)		-0.132%		3.89%
High Falls Brewing	0.00%	0.07%	0.00%	4.26%
Rivals				
Constellation	0.05%	0.05%	0.14%	0.14%
DG Yuengling	0.03%	0.03%	0.08%	0.07%
Heineken	0.03%	0.03%	0.08%	0.08%
ΔCS	-3.01%	-2.86%	-7.21%	-7.14%
ΔPS	3.47%	3.06%	5.54%	5.67%
	$\phi = \phi_d = 0.5$		$\phi = \phi_d = 0.9$	
	No Divestiture	Divestiture	No Divestiture	Divestiture
Merged Entities				
MillerCoors	9.12%	9.13%	14.20%	14.20%
ABI	5.97%	5.94%	9.04%	9.07%
Labatt (divested brand)	11.00%		14.00%	
NAB (buyer)				
Labatt (divested brand)		6.82%		13.20%
High Falls Brewing	0.00%	7.30%	0.00%	13.90%
Rivals				
Constellation	0.20%	0.20%	0.33%	0.33%
DG Yuengling	0.11%	0.11%	0.18%	0.18%
Heineken	0.12%	0.12%	0.21%	0.21%
ΔCS	-10.00%	-9.98%	-15.35%	-15.43%
ΔPS	6.55%	6.80%	7.59%	7.56%

Notes: The simulations are based on the estimates presented in Table D.3 and given conduct parameters. The simulations are based on data corresponding to the period after the divestiture and computed relative to the 'no merger' scenario. Costs remain at their levels prior to the merger. There are 52,725 observations in the sample. Additional summary statistics, including standard deviations, are provided in Appendix H.

summarized by the following equation:

$$\begin{aligned} c_{jmt} = A + \beta_0 \mathbb{1}_{MillerCoors} \times \mathbb{1}_{Post} + \beta_1 Distance_{jmt} \\ + \beta_2 \mathbb{1}_{Labatt} \times \mathbb{1}_{Post} + \beta_3 \mathbb{1}_{import} \times \mathbb{1}_{Post} \\ + \beta_4 \mathbb{1}_{Regional} \times \mathbb{1}_{Post} + \mu_j + \mu_{month} + \eta_{jmt}, \end{aligned} \tag{27}$$

where A is a constant, $\mathbb{1}_{MillerCoors} \times \mathbb{1}_{Post}$ is an indicator variable equal to 1 for MillerCoors products in the post-divestiture period. This variable captures potential cost savings for MillerCoors as in Miller and Weinberg (2017). $Distance_{jmt}$ is the distance to the nearest brewery for product j in geographic market m at time t, $\mathbb{1}_{regional} \times \mathbb{1}_{Post}$ is an indicator variable that equals 1 in the post-divestiture period if the beer is regional (e.g. DG Yuengling and High Falls Brewery) and $\mathbb{1}_{import} \times \mathbb{1}_{Post}$ is an indicator variable that equals 1 in the post-divestiture period if the beer is imported. These variables recognise that regional and imported beers may be subject to different shocks in the post-divestiture period. μ_j is a product-specific effect and μ_{month} is a month-specific effect.

Next, one can re-write the FOC described in equation (23) as follows:

$$\begin{aligned} p_{jmt} = \gamma_{jmt}(p) + A + \beta_0 \mathbb{1}_{MillerCoors} \times \mathbb{1}_{Post} + \beta_1 Distance_{jmt} \\ + \beta_2 \mathbb{1}_{Labatt} \times \mathbb{1}_{Post} \\ + \beta_3 \mathbb{1}_{import} \times \mathbb{1}_{Post} + \beta_4 \mathbb{1}_{Regional} \times \mathbb{1}_{Post} + \mu_j + \mu_{month} + \eta_{jmt}. \end{aligned} \tag{28}$$

The structural error term is given by:

$$\begin{aligned} \eta_{jmt}(\phi, \phi_d, \theta_c) \equiv p_{jmt} - \gamma_{jmt}(p) - A - \beta_0 \mathbb{1}_{MillerCoors} \times \mathbb{1}_{Post} \\ - \beta_1 Distance_{jmt} - \beta_2 \mathbb{1}_{Labatt} \times \mathbb{1}_{Post} \\ - \beta_3 \mathbb{1}_{import} \times \mathbb{1}_{Post} - \beta_4 \mathbb{1}_{Regional} \times \mathbb{1}_{Post} - \mu_j - \mu_{month}. \end{aligned} \tag{29}$$

Denote the cost parameters as θ_c. Next, I stack the parameters ϕ, ϕ_d, and the vector θ_c in the vector $\theta^s = (\phi, \phi_d, \theta_c)$. Identifying these parameters is challenging because the unobserved cost shock η_{jmt} is observed by the brewers but not by the

researcher. Thus it is likely that brewers set prices knowing the realization of η_{jmt}. Ignoring this, I could misattribute a price increase due to a positive cost shock to markups. Consequently, I must use instruments to isolate the exogenous markup changes from cost changes.

INSTRUMENTS To identify ϕ and ϕ_d, one needs at least two instruments that are relevant and valid. These instruments must directly affect the markups. The vector of instruments must also to be orthogonal to η. I use an identification strategy similar to Miller and Weinberg (2017) based on the change in ownership structure caused by the merger. Specifically, I create an instrumental variable corresponding to a dummy equal to 1 in the post-divestiture period for the products of the two mergers ($\mathbb{1}_{ABI-MC} \times \mathbb{1}_{Post-divestiture}$). I also use the change in ownership structure caused by the divestiture to create an additional instrument. This instrument is a dummy equal to 1 in the post-divestiture period for the products of the two mergers and the buyer of the divested brand ($\mathbb{1}_{ABI-MC-NAB} \times \mathbb{1}_{Post-divestiture}$). The relevance of these instruments comes directly from the model. Consider the effects taken into account by ABI when setting the price of an arbitrary product. ABI considers the effect of the price set on (i) its own demand, (ii) the demand for the other products it owns, and (iii) the profit of MillerCoors, which may be partially internalized. The instrumental variable $\mathbb{1}_{ABI-MC} \times \mathbb{1}_{Post-divestiture}$ captures these anti-competitive effects. The instrumental variable $\mathbb{1}_{ABI-MC-NAB} \times \mathbb{1}_{Post-divestiture}$ also accounts for the fact that ABI may also internalize the effect of the price it sets on the profit of the buyer of the divested brand. Finally, I assume that these instruments are orthogonal to the unobserved cost shocks and construct the following GMM objective function:

$$\hat{\theta^s} = \underset{\theta^s}{argmin}\ \eta(\theta^s)'\mathbf{Z}\mathbf{W}^{-1}\mathbf{Z}'\eta(\theta^s),$$

where $\theta^s = (\phi, \phi_d, \theta_c)$ is the vector of parameters minimizing the following GMM objective function and $\mathbf{W}$ is a weighting matrix.

4.4 Supply Estimation

Table 5 shows the estimated parameters for the supply model. The estimates associated with ϕ and ϕ_d are both statistically significant. It reveals that a model of Nash-Bertrand competition is rejected at any conventional levels. It suggests that ABI (or MillerCoors) and NAB internalize about 65% of their price effects on each other's profits in the post-divestiture period. This is larger than the internalization of price effects by ABI and MillerCoors on each other profits, which is about 34%.[16]

Next, I comment on the results for the estimated cost parameters. The estimate associated with the variable $\mathbb{1}_{MillerCoors} \times \mathbb{1}_{Post}$, which captures potential cost efficiencies that are not a reduction in shipping distance, is equal to -0.136. This represents cost savings of about 2%. This is lower than the estimates found in Miller and Weinberg (2017) which is expected. Indeed, the sample I use includes additional beers and regions with limited sales of beer. The estimate associated with the distance variable is 0.271 and is statistically significant at any conventional levels. The estimates associated with the divested brand Labatt is equal to 0.094 and is statistically significant. This indicates that the marginal costs of production for the divested brand weakly increased. This may be explained by the fact that the buyer of the divested brand is less experienced to produce this beer compared to the previous owner Inbev. This is also a potential channel explaining why an increase in prices is observed for Labatt. In next section, I assess the quantitative importance of this channel relative to a shift in the parameters ϕ and ϕ_d.

Finally, the marginal cost of imported beers decreases by 0.712$ in the post-divestiture period. These cost savings for imported beers are justified by qualitative evidence. For example, Heineken implemented two programs to reduce costs: the Fit2Fight program and the Total Cost Management program (TCM). In their 2009 annual report, they state that "*TCM bore fruit, with EUR155 million of costs taken out of the business*". Therefore, it is reasonable to observe cost savings for these beers following the divestiture.

[16]The estimate of the conduct parameter for ABI and MillerCoors is broadly consistent with the results in Miller and Weinberg (2017), where they present estimates ranging from 0.24 to 0.37.

Table 5. Supply Estimates

	Estimate (SE)
Conduct	
ϕ	0.343*** (0.009)
ϕ_d	0.652*** (0.026)
Marginal Costs	
$\mathbb{1}_{MillerCoors} \times \mathbb{1}_{Post}$	-0.136*** (0.013)
Distance	0.271*** (0.015)
$\mathbb{1}_{Labatt} \times \mathbb{1}_{Post}$	0.094* (0.051)
$\mathbb{1}_{import} \times \mathbb{1}_{Post}$	-0.712*** (0.010)
$\mathbb{1}_{regional} \times \mathbb{1}_{Post}$	0.530*** (0.015)
μ_j	✓
μ_{month}	✓
$Constant$	✓
N	104,906
GMM	0.000

Notes: The table reports the estimated supply parameters based on Equation (28). There are 104,906 observations for the period 2007-2010 period. The sample excludes the months between June 2008 and May 2009 as in Miller and Weinberg (2017). Specifications include product fixed effects, period dummies and a constant. Robust standard errors in parentheses.

I show the average markups and marginal costs implied by this specification in the pre-merger and post-divestiture periods in Table 6. Markups are on average higher for brewers that experienced a change in ownership structure in the form of a merger (MillerCoors and ABI) or a divestiture (NAB). The estimated marginal costs of imported beers are, on average, higher than those of domestic beers, which aligns with descriptive evidence external to the model, as shown in Table 1.

Table 6. Markups and Marginal Costs

	Marginal costs		Markups	
	Pre	Post	Pre	Post
Merged Entities				
MillerCoors	6.39 (1.04)	6.16 (1.02)	2.23 (0.16)	2.77 (0.15)
AB	12.06 (0.82)		1.90 (0.01)	
Inbev	7.21 (0.95)		2.67 (0.12)	
ABI		8.49 (2.15)		2.96 (0.17)
Labatt (divested brand)	9.25 (1.43)		1.90 (0.01)	
NAB (buyer)				
Labatt (divested brand)		8.48 (1.38)		2.88 (0.14)
High Falls Brewing	8.86 (1.25)	9.21 (0.92)	1.87 (0.00)	2.88 (0.15)
Rivals				
Constellation	12.37 (0.66)	11.66 (0.64)	2.16 (0.04)	2.22 (0.05)
DG Yuengling	7.55 (0.61)	7.94 (0.52)	1.93 (0.01)	1.93 (0.01)
Heineken	12.72 (0.57)	12.10 (0.59)	2.06 (0.03)	2.07 (0.03)

Notes: Standard deviation in parentheses. The table reports the average (across markets) brewer markups and marginal costs before the merger (23 months) and after the divestiture (22 months) based on the estimates in Table 5.

5 Welfare and Policy Recommendation on the Choice of the Buyer

Next, using the estimated model, I quantify the impact of the divestiture on consumer surplus. I compute the percentage change in prices and consumer surplus caused by the merger ('No Divestiture' column) and the merger with divestiture

('Divestiture' columns) based on the demand estimates in Table D.3 and the cost parameters in Table 5. The results are shown in Table 7. The columns with $\phi = 0.34$ and $\phi_d = 0$ correspond to results without price coordination caused by the divestiture. The columns with $\phi = 0.34$ and $\phi_d = 0.65$ are based on the estimated conduct parameters. First, I comment on the price effects for the divested brand. In the absence of price coordination and based on these estimates, the price of the divested brand would have decreased. Yet, consumer surplus would have decreased. Therefore, prices are not a sufficient statistic to evaluate welfare effects. This complement results in Osinski and Sandford (2021) by suggesting that remedies must be evaluated by their impact on consumer welfare rather than by the performance of the divested asset. Next, I assess the relative importance of various mechanisms that may explain the observed price increase for the divested brand. In column (3), the specification where $\phi = 0.34$ and $\phi_d = 0$, and assuming a cost increase for the divested brand, the price rises by less than 1%, which is below the empirical evidence reported in Figure 1. This mechanism alone removes only 3.16% of the expected welfare gains from the divestiture. Under these conditions, the merger with divestiture results in a smaller loss of consumer welfare compared to a merger without divestiture.

I then investigate the extent to which price coordination alone can negate the pro-competitive effects of the divestiture. I show the results in column (4). In this scenario where $\phi = 0.34$, $\phi_d = 0.65$ and no cost changes are assumed, the price of the divested brand increases by approximately 9%. While this is qualitatively consistent with the descriptive evidence in Figure 1. Notably, in this case, the divestiture leads to a larger deterioration in consumer surplus than a merger without divestiture, eliminating 133% of the welfare gains originally attributed to the divestiture.

Finally, in the scenario where $\phi = 0.34$, $\phi_d = 0.65$, and cost increases are included (column (5)), the merger with divestiture again results in a greater reduction in consumer welfare than a merger without divestiture. This suggests that partial price coordination serves as a significant countervailing force, effectively undermining the pro-competitive benefits of the divestiture.[17] In the next section,

[17] In Supplementary Appendix J, I present results from the same simulations under a coun-

I examine the extent to which this depends on the buyer using counterfactual simulations.

Table 7. Price Effects - Estimated Conduct Parameters

Conduct	$\phi = 0.34, \phi_d = 0$		$\phi = 0.34, \phi_d = 0$	$\phi = 0.34, \phi_d = 0.65$	
Costs	No costs No Divestiture	No costs Divestiture	Costs Divestiture	No costs Divestiture	Costs Divestiture
	(1)	(2)	(3)	(4)	(5)
Merged Entities					
MillerCoors	5.48%	5.44%	5.44%	5.57%	5.57%
ABI	4.79%	4.66%	4.66%	4.78%	4.78%
Divested brand	8.05%				
NAB (buyer)					
Divested brand		-0.36%	0.56%	9.17%	10.1%
Other brands	0.18%	0.28%	0.28%	9.21%	9.21%
Rivals					
Constellation	0.16%	0.15%	0.15%	0.16%	0.16%
DG Yuengling	0.06%	0.05%	0.05%	0.06%	0.06%
Heineken	0.08%	0.08%	0.08%	0.09%	0.09%
Welfare					
Δ CS	-6.40%	-6.16%	-6.17%	-6.48%	-6.49%
Δ PS	7.33%	6.85%	6.63%	7.45%	7.21%

Notes: The simulations are based on the demand parameters presented in Table D.3, with conduct parameters and cost parameters in Table 5. The simulations are computed using the period after the divestiture and relative to the 'no merger' scenario. There are 52,725 observations. See Appendix I for summary statistics.

terfactual scenario where the MillerCoors merger does not occur. The analysis shows that price coordination offsets approximately 80% of the welfare gains generated by the divestiture.

5.1 Price and Welfare Effects

I assess the changes in prices and consumer surplus that would result from selling the divested brand (Labatt) to another brewer. I recompute the equilibrium vector of prices by solving the system of equations described in equation (2) based on four counterfactual scenarios. I assume that the acquisition of Labatt is made by each rival separately: (i) Constellation, (ii) DG Yuengling, (iii) Heineken, or (iv) MillerCoors.

The results are presented in Table 8. Divesting Labatt to a buyer other than NAB leads to a greater reduction in consumer surplus than proceeding with the merger without any divestiture. Recall from Table 7 that without the divestiture, the merger between Anheuser-Busch and Inbev would result in a decrease in consumer surplus approximately equal to 6.40%. In all counterfactual scenarios the consumer surplus decreases more. Based on this sample, divesting Labatt to any of the five potential buyers would reduce consumer surplus more than a merger would. This is fully explained by price coordination. In the absence of price coordination, the divestiture is always beneficial because it reduces consumer surplus less than a merger without divestiture. A merger without divestiture reduces consumer surplus by -1.93%. In all counterfactual scenarios involving divestiture without price coordination, the negative impact on consumers is reduced. On a more positive note, the findings suggest that the buyer selection was appropriate under price coordination, as the adverse effect on consumer surplus is minimized when the actual buyer is involved.

An additional noteworthy insight arises from examining the total buyer diversion ratios during the pre-merger period. Using pre-merger data, this metric is computed as the firm-level average of the expression $\sum_{k\in\theta_{buyer}}(p_k - c_k)D_{jk}(P) + \sum_{k\in\theta^C_{buyer}}\phi_{jk}(p_k - c_k)D_{jk}(P)$ from equation (19), without markup weighting. In the absence of price coordination, I set ϕ_{jk} equal to 0, whereas under price coordination, the actual conduct parameters are applied. Among counterfactual buyers, MillerCoors appears as the most harmful assuming no price coordination, with a corresponding drop in consumer surplus of -1.89 and the highest total buyer diversion ratio of 0.15. However, a striking contrast emerges when assuming price

coordination. Despite the fact that Constellation has lower pre-merger market shares than MillerCoors, Constellation leads to a significantly larger consumer surplus loss of about 13.3%. This substantial impact is likely due to Constellation's higher associated total diversion ratios. This highlights that policymakers could benefit from incorporating the buyer's total diversion ratio, including that toward coordinating partners' products, weighted by conduct parameters calibrated to realistic values.

Table 8. Counterfactuals: The Role of the Buyer – Price Coordination

	Buyer – Divested Brand							
	Constellation		DG Yuengling		Heineken		MillerCoors	
Conduct Parameter – ϕ	0	0.34	0	0.34	0	0.34	0	0.34
Conduct Parameter – ϕ_d	0	0.65	0	0.65	0	0.65	0	0.65
Change in Prices (%)								
Divested Brand	2.91	14.3	0.77	10.6	1.87	12.4	6.38	10.5
MillerCoors	1.82	8.58	1.81	7.03	1.81	7.21	1.93	9.09
ABI	2.23	7.79	2.22	6.21	2.23	6.45	2.24	7.12
High Falls	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Constellation	0.12	9.11	0.04	0.22	0.04	0.34	0.04	0.28
DG Yuengling	0.01	0.13	0.09	10.8	0.01	0.10	0.01	0.10
Heineken	0.02	0.26	0.02	0.12	0.10	8.17	0.02	0.15
Welfare								
ΔCS (%)	-1.79	-13.28	-1.73	-8.64	-1.76	-10.21	-1.89	-10.44
ΔPS (%)	4.40	17.63	4.10	8.30	4.28	12.85	4.54	8.76
Pre-Merger Market Share (%)	20.29%		4.29%		9.26%		28.74%	
Pre-Merger Buyer Diversion Ratio	0.12	0.52	0.03	0.41	0.08	0.48	0.15	0.44
Pre-Merger Buyer Diversion Ratio (markup-weighted)	0.25	1.75	0.05	1.34	0.17	1.55	0.59	1.53

Notes: The simulations are based on the demand parameters presented in Table D.3, and conduct and cost parameters in Table 5. Prices are computed after the divestiture and are relative to the 'no merger' scenario.

6 Conclusion

This study examines how divestitures affect prices and consumer welfare in the U.S. beer industry. In contrast to previous empirical studies of divestiture, I consider not only unilateral but also multilateral effects.

First, I find that price coordination, materialized through conduct parameters, acts as a countervailing force limiting the pro-competitive effect of the divestiture. My analysis allows for quantifying the importance of this countervailing force: price coordination eliminates about 80% to 133% of the welfare benefits caused by the divestiture. In the most conservative scenario, the merger between Miller and Coors is excluded from the analysis. Second, based on counterfactual simulations, I show that it is likely that a merger cleared with divestiture is more harmful to consumer welfare than a simple merger. The negative effects may outweigh their intended benefits. In a setting with price coordination, any buyers other than NAB would have deteriorated consumer welfare more than a merger directly approved. This is not the case in a setting without price coordination. More generally, when a merger and divestiture do not lead to any cost efficiencies and the conduct parameters are high, consumer welfare is less negatively affected after a merger without a divestiture policy.

Therefore, antitrust authorities must account the possibility of price coordination when imposing a divestiture. Yet, it is highly possible that a policy of directly blocking an anti-competitive merger will outperform a merger with a divestiture policy.

Appendix

A Stylized Example

The first-order conditions in the pre-merger period for the stylized example presented in Section 2.3 are given by the following equations:

$$p_1 = c_1 - (\frac{\partial s_1}{\partial p_1})^{-1}[s_1] \tag{30}$$

$$p_2 = c_2 - (\frac{\partial s_2}{\partial p_2})^{-1}[s_2 + \frac{\partial s_3}{\partial p_2}(p_3 - c_3)] \tag{31}$$

$$p_3 = c_3 - (\frac{\partial s_3}{\partial p_3})^{-1}[s_3 + \frac{\partial s_2}{\partial p_3}(p_2 - c_2)] \tag{32}$$

$$p_4 = c_4 - (\frac{\partial s_4}{\partial p_4})^{-1}[s_4] \tag{33}$$

B Event Study Estimates

Table 9. Event Study Regression Results

Time Relative to Event	Estimate (SE)	Variable	Estimate (SE)
$t-4$	0.007 (0.004)	Buyer	0.060 (0.009)
$t-3$	0.005 (0.004)	ABI	0.048 (0.006)
$t-2$	0.001 (0.004)	Constant	2.386 (0.015)
t	0.041 (0.007)		
$t+1$	0.036 (0.008)		
$t+2$	0.028 (0.008)		
$t+3$	0.038 (0.007)		
$t+4$	0.031 (0.008)		
$t+5$	0.040 (0.008)		
$t+6$	0.027 (0.008)		
$t+7$	0.038 (0.008)		
$t+8$	0.037 (0.008)		
$t+9$	0.041 (0.008)		
$t+10$	0.039 (0.008)		
$t+11$	0.044 (0.008)		
$t+12$	0.046 (0.008)		
$t+13$	0.056 (0.008)		
$t+14$	0.046 (0.008)		
$t+15$	0.056 (0.008)		
$t+16$	0.046 (0.008)		
$t+17$	0.051 (0.009)		
$t+18$	0.041 (0.009)		
$t+19$	0.041 (0.009)		
$t+20$	0.049 (0.009)		
$t+21$	0.054 (0.009)		
$t+22$	0.059 (0.009)		

Note: Standard errors clustered at the product level are shown in parentheses. "t" denotes the event week.

C Event Study Based on Matching

This Appendix discuss the internal validity of my estimates further. I show that the qualitative pattern for the price effects presented in Section 3.3 is robust to using a control group based on matching. I match each treated product to its 300 nearest (not treated) neighbors in the pre-divestiture period using Mahalanobis distance. I calculate distances using the following characteristics: a dummy equal to 1 if the beer is imported, not imported, a draft, a pilsner, a lager, or a porter; the number of rival light beers offered by competing firms; the number of rival imported beers offered by competing firms; the number of imported beers per firm; the number of products per firm; and the number of products per retailer.

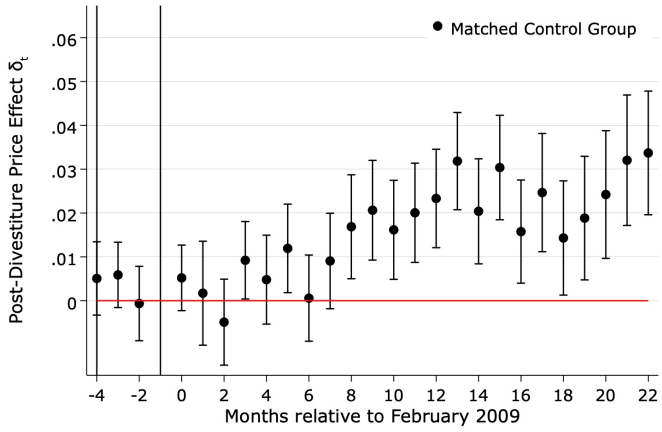
Table 10 compare characteristics of treated and non treated products in my sample. Column 'Treated' (resp. 'Control' and 'Control (matched)') shows the average value for the characteristics of interests in the treated group (resp. control group used in Figure 1.1 or based on matching). Figure 2, shows the event studies.

Table 10. Comparison of Treated and Control Products

Variables	**Treated**	**Control (matched)**	**Control**
Count imported beers per firms	7.201	6.856	7.598
Rivals imported beers	23.318	22.783	21.520
Rivals light beers	29.040	23.926	21.418
Count product retailer	18.311	17.457	17.328
Count product firm	11.876	17.276	21.415
Not imported	0.000	0.286	0.679
Imported	1.000	0.713	0.321
Draft	0.000	0.000	0.000
Lager	0.679	0.881	1.000
Pilsner	0.321	0.118	0.000
Porter	0.000	0.000	0.000

Notes: This table compares treated products to two types of control groups: one selected using observable characteristics from the pre-divestiture period (Matched), and the control group used in Figure 1.1.

Figure 2. Divestiture Treatment Effect: Event Study Using Matched Control Group
Author: Yann Delaprez



Notes: The figure presents event study estimates from specification 22 for the divested brand. Dots represent point estimate for each month with bars around points indicating 95% confidence interval with standard errors clustered at product level. Control group comprises a matched sample of products. The vertical line at $t = -4$ marks the date of merger approval, while the line at $t = -1$ corresponds to the approval of the divestiture.

D The Demand

D.1 Random Coefficient Logit Model

I estimate demand using a random coefficient logit model. Each consumer chooses a product $j \in \mathcal{J}_{mt} = \{1, ..., J\}$ or the outside good $j = 0$. Product j is a brand-retailer combination. Consumers are assumed to purchase one unit of the good that gives the highest utility among $\mathcal{J}_{mt}$ products.

The indirect utility function $\mathcal{U}_{ijmt}$ for consumer *i* buying product $j \in \mathcal{J}_{mt}$ in period t and geographic market m is specified as follows:

$$\mathcal{U}_{ijmt} = -\alpha_i p_{jmt} + \beta_i \mathbb{1}_{\text{Imported}} + \beta_{\text{year-month}} + \beta_{\text{retailer}} + \beta_{\text{brand}} + \xi_{jmt} + \epsilon_{ijmt}, \quad (34)$$

p_{jmt} is the price of product j in geographic market m at time t, $\mathbb{1}_{\text{Imported}}$ is an indicator variable equal to 1 if product j is imported, $\beta_{\text{year-month}}$ represents year-month-specific coefficients, β_{retailer} represents retailer-specific coefficients, β_{brand} captures brand-specific effects, and ξ_{jmt} is an unobserved (by the researcher) characteristic of product j in period t and geographic market m.

I account for unobserved heterogeneity to model consumer valuation of prices and imported beers such as:

$$\alpha_i = \alpha + \sigma_1 v_i, \quad (35)$$

and

$$\beta_i = \beta + \sigma_2 v_i, \quad \text{with} \quad v_i \sim N(0,1), \quad (36)$$

where α (resp. β) is the mean valuation of p_{jmt} (resp. $\mathbb{1}_{\text{Imported}}$). σ_1 and σ_2 are parameters interpreted as the standard deviation across consumers of the mean valuation of p_{jmt} and $\mathbb{1}_{\text{Imported}}$.

The outside option allows consumers to substitute away from the set of products considered. I assume that the market size is equal to 1.5 times the total sales in a given geographic market. The outside good includes all beers outside the

selected sample. The indirect utility for the outside good is normalized to zero such that:

$$\mathcal{U}_{i0mt} = \varepsilon_{i0mt}. \tag{37}$$

Assuming that ε_{ijmt} is independently and identically distributed across consumers, products, geographic markets and time as a Type 1 Extreme Value, predicted market shares are then given by the logit choice probability integrated over v_i:

$$\begin{aligned} & s_{jmt}(\delta_{jmt}, \alpha, \beta, \sigma_1, \sigma_2) = \\ & \quad \int \frac{\exp\left(-\alpha_i p_{jmt} + \beta_i \mathbb{1}_{\text{Imported}} + \beta_{\text{year-month}} + \beta_{\text{retailer}} + \beta_{\text{brand}} + \xi_{jmt}\right)}{1 + \sum_{k=1}^{Jt} \exp\left(-\alpha_i p_{jmt} + \beta_i \mathbb{1}_{\text{Imported}} + \beta_{\text{year-month}} + \beta_{\text{retailer}} + \beta_{\text{brand}} + \xi_{jmt}\right)} dv_i \\ & = \int \frac{\exp\left(\delta_{jmt} - \alpha_i p_{jmt} + \beta_i \mathbb{1}_{\text{Imported}}\right)}{1 + \sum_{k=1}^{Jt} \exp\left(\delta_{kmt} - \alpha_i p_{jmt} + \beta_i \mathbb{1}_{\text{Imported}}\right)} dv_i \end{aligned} \tag{38}$$

Next, define q_{jmt} the quantity of product j that is sold at t and q_{0mt} the quantity of the outside good at t.
The observed market share of product j at t is thus given by $s_{jmt} = \frac{q_{jmt}}{\sum_j q_{jmt} + q_{0mt}}$.
The market shares system is defined by:

$$s_{jmt}(\delta_{jmt}, \alpha, \beta, \sigma_1, \sigma_2) = s_{jmt}. \tag{39}$$

D.2 Identification

DEMAND ESTIMATION The preference parameters include α, β, σ_1, σ_2 (note that β is captured by the brand fixed effects β_{brand}), 20 parameters corresponding to the brand effects (one brand is taken as reference), 35 parameters corresponding to the month dummies (January 2007 is taken as reference), 109 parameters corresponding to the retailer dummies (a retailer is taken as reference), and a constant. I stack these parameters to be estimated in the vector θ^d. Next, I define the structural error term $g_{jmt}(\theta^d) \equiv \xi_{jmt}$ as the variation in market shares not explained by the model. The demand unobservables ξ_{jmt} are obtained by inverting the system of market shares defined in (39) as in Berry et al. (1995).

θ^d is the vector of parameters minimizing a generalized method of moments

objective function and is defined as follows:

$$\underset{\theta^d}{argmin} \quad g(\theta^d)' Z W Z' g(\theta^d). \tag{40}$$

Z is a matrix of instruments and W is the optimal weighting matrix. The vector $g(\theta^d)$ stacks the ξ_{jmt} over each market. The estimation of the random coefficient Logit is based on Berry et al. (1995).

INSTRUMENTS Failing to account for the endogeneity of prices - arising from their simultaneous determination by supply and demand - typically biases the price coefficient estimates toward zero. To address this issue, I employ instrumental variables.

I construct three categories of instruments. First, I leverage variation stemming from changes in ownership structure due to the merger and subsequent divestiture. Specifically, I create three indicator variables that equal one in the post-divestiture period for products owned by Anheuser-Busch InBev ($\mathbb{1}_{ABI} \times \mathbb{1}_{\text{Post-divestiture}}$), Miller-Coors ($\mathbb{1}_{MC} \times \mathbb{1}_{\text{Post-divestiture}}$), and NAB ($\mathbb{1}_{NAB} \times \mathbb{1}_{\text{Post-divestiture}}$). I then interact these indicators with a variable that equals one in geographic markets where anticompetitive concerns were anticipated. This approach exploits institutional variation: the divested brand's market share differs significantly across markets. As shown in Table 2, the divested brand holds a larger market share in areas with expected competition concerns, implying that the ownership change may differentially affect markups in these markets. These instruments are valid under the assumption that they are uncorrelated with unobserved demand shocks and affect demand only through changes in markups that shift supply.

Second, I use four instruments in the spirit of Berry, Levinsohn, and Pakes (BLP): the count of rival products of the same style (Draft, Lager, Pilsner, Porter) by brewer. These instruments are presumed relevant as they capture variation in competitive intensity across markets and are valid if uncorrelated with unobserved demand.

Third, I include a cost-shifter instrument: the distance between each product's market and the nearest brewery. For each product-market pair, this variable

captures variation in marginal cost, which influences prices but not demand shocks directly.

The empirical relevance and validity of these instruments are assessed and discussed in detail in Appendix D.4.

D.3 Demand Results

In Table D.3, I display the estimates for the Logit and Random Coefficient Logit demand parameters.[18] In column (i), I show the results for the Logit demand parameters using Ordinary Least Squares. In column (ii), I present the results for the Logit demand estimates using instruments to cope with the endogeneity of prices. In column (iii), I show the results for the most flexible specification of demand, which allows consumers to have heterogeneous preferences for prices and imported beers, based on Random Coefficient Logit demand.
In the absence of instruments, the coefficient associated with prices is biased toward zero and equal to -0.32 (column (i)). Instrumenting for prices moves the estimate associated with prices further away from zero. Based on simple Logit (column (ii)), the estimate is equal to about -0.80. Using random coefficient logit (column (iii)), the coefficient associated with prices is equal to -0.53 and is statistically significant at any conventional levels. The estimate for the standard deviation of the valuation of prices , σ_1, is statistically significant at any conventional levels and equal to 0.15. The estimate for the standard deviation of the valuation of imported beers, σ_2, is equal to zero and not estimated precisely. Note that the mean valuation for beers is captured by brand fixed effects. This specification delivers a median own-price elasticity of demand equal to -4.787.[19] Comparing this implied median own-price elasticity of demand with previous estimates in the literature estimating demand for beer, reveals that it is broadly in line with the literature.[20] For instance, demand specifications in Miller and Weinberg (2017) deliver a median own-price elasticity of demand for beer ranging from -6.10 to

[18] The first-stage estimates and all demand estimates are displayed in Appendix D.4.
[19] The specification implies 0% of negative marginal costs.
[20] In Appendix D.6, I provide more detailed information on the own-price elasticity of demand by brand.

-3.81.[21]

Table D.3. Demand Parameter Estimates

	OLS	Logit-IV	RCL
	(i)	(ii)	(iii)
Price	-0.32***	-0.80***	-0.53***
	(0.004)	(0.022)	(0.023)
Standard deviation (σ_1)			0.15***
			(0.019)
Standard deviation (σ_2)			0.000
			(5.700)
Brand dummies	✓	✓	✓
Year-month dummies	✓	✓	✓
Retailer dummies	✓	✓	✓
Constant	✓	✓	✓
N	104,906	104,906	104,906
Own-price Elasticity (median)	-3.245	-8.259	-4.787

Notes: The table reports the estimated demand parameters with the Logit and Random coefficient Logit demands based on the utility function in (34). There are 104,906 observations for the period 2007–2010 at the brand-retailer-region-month-year level. The samples exclude the months between June 2008 and May 2009 as in Miller and Weinberg (2017). Specifications include 20 brand dummies, 47 year-month dummies, 121 retailer dummies and a constant. Robust standard errors in parentheses. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

[21] In Table D.7, I show the average (or median) own-price elasticity found in various additional articles.

D.4 First-Stage Demand Estimates and Estimates Dummies (Logit-IV)

Table D.4. First-stage estimates: Logit-IV

	(1)
	p_{jmt}
$\mathbb{1}_{\text{MC}} \times \mathbb{1}_{\text{Post divestiture}} \times \mathbb{1}_{\text{competition}}$	-0.288 (0.024)
$\mathbb{1}_{\text{ABI}} \times \mathbb{1}_{\text{Post divestiture}} \times \mathbb{1}_{\text{competition}}$	0.215 (0.034)
$\mathbb{1}_{\text{NAB}} \times \mathbb{1}_{\text{Post divestiture}} \times \mathbb{1}_{\text{competition}}$	-1.293 (0.070)
rivals1	0.113 (0.003)
rivals2	0.001 (0.000)
rivals3	-0.101 (0.002)
rivals4	-0.001 (0.002)
distance	0.443 (0.011)
Year-Month dummies	✓
Retailer dummies	✓
Brand dummies	✓
N	104906
F-test excluded instruments	504.61

Notes: Robust standard errors in parentheses

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

D.5 Estimates Dummies: Logit-IV

Table D.5. Estimates Brand dummies with Standard Errors

Variable	**Estimate (SE)**
Becks	-
Becks Premier Light	-1.31*** (0.023)
Bud Light	2.46*** (0.029)
Budweiser	1.76*** (0.029)
Coors	-0.96*** (0.030)
Coors Light	1.80*** (0.029)
Corona Extra	2.33*** (0.022)
Corona Light	1.34*** (0.022)
Dundee Honey Brown Lager	-1.97*** (0.026)
Heineken	2.01*** (0.022)
Heineken Premium Light Lager	0.62*** (0.022)
Labatt Blue	-1.18*** (0.025)
Labatt Blue Light	-1.52*** (0.032)
Michelob	-1.54*** (0.026)
Michelob Light	-0.85*** (0.027)
Miller Genuine Draft	-0.28*** (0.029)
Miller High Life	-0.21*** (0.035)
Miller Lite	1.77*** (0.029)
Yuengling Black and Tan	-1.12*** (0.036)
Yuengling Light Lager	-1.18*** (0.036)
Yuengling Traditional Lager	0.67*** (0.036)

Table D.5. Estimates Year-Month with Standard Errors

Variable	Estimate	(SE)	Variable	Estimate	(SE)
Year month 1	-		Year month 30	0.069*	(0.031)
Year month 2	0.024	(0.029)	Year month 31	0.034	(0.031)
Year month 3	0.080**	(0.029)	Year month 32	0.068*	(0.031)
Year month 4	0.022	(0.029)	Year month 33	0.0022	(0.031)
Year month 5	-0.040	(0.029)	Year month 34	0.11***	(0.031)
Year month 6	-0.038	(0.029)	Year month 35	0.061*	(0.031)
Year month 7	-0.060*	(0.030)	Year month 36	0.063*	(0.031)
Year month 8	-0.036	(0.029)	Year month 37	0.085**	(0.031)
Year month 9	-0.079**	(0.029)	Year month 38	0.083**	(0.031)
Year month 10	-0.032	(0.029)	Year month 39	0.099**	(0.031)
Year month 11	-0.074*	(0.029)	Year month 40	0.086**	(0.031)
Year month 12	-0.097***	(0.029)	Year month 41	0.042	(0.031)
Year month 13	0.088**	(0.031)	Year month 42	0.030	(0.031)
Year month 14	0.11***	(0.031)	Year month 43	0.00044	(0.031)
Year month 15	0.086**	(0.031)	Year month 44	0.044	(0.031)
Year month 16	0.088**	(0.031)	Year month 45	-0.020	(0.031)
Year month 17	0.0070	(0.031)	Year month 46	0.016	(0.031)

Table D.5. Estimates Retailer Dummies with Standard Errors

Retailer	Estimate (SE)	Retailer	Estimate (SE)	Retailer	Estimate (SE)	Retailer	Estimate (SE)
1	-	2	0.85*** (0.061)	3	0.99*** (0.079)	4	0.61*** (0.063)
5	0.99*** (0.081)	6	1.19*** (0.081)	8	1.32*** (0.059)	9	1.07*** (0.070)
10	1.47*** (0.070)	11	0.78*** (0.070)	13	1.07*** (0.069)	14	0.43*** (0.059)
15	-0.55*** (0.072)	16	1.05*** (0.064)	18	1.20*** (0.070)	20	1.09*** (0.069)
21	-1.47*** (0.11)	22	1.24*** (0.070)	23	0.73*** (0.069)	24	0.52*** (0.069)
27	-0.47*** (0.065)	28	0.97*** (0.054)	29	1.09*** (0.067)	30	1.87*** (0.070)
32	-0.97*** (0.069)	34	1.84*** (0.067)	35	-1.12*** (0.10)	36	2.82*** (0.069)
37	-0.89*** (0.073)	38	1.63*** (0.068)	39	-2.47*** (0.074)	40	0.61*** (0.072)
41	0.02 (0.063)	42	0.70*** (0.058)	43	0.38*** (0.055)	44	1.11*** (0.056)
46	-0.60*** (0.078)	47	0.69*** (0.061)	48	1.13*** (0.086)	49	1.32*** (0.065)
50	1.46*** (0.065)	51	1.37*** (0.063)	52	1.63*** (0.065)	53	1.18*** (0.058)
54	0.71*** (0.059)	55	1.00*** (0.070)	56	0.52*** (0.069)	57	-1.20*** (0.067)
58	-0.18* (0.075)	60	0.74*** (0.069)	61	0.96*** (0.058)	62	1.13*** (0.064)
63	-0.11 (0.073)	64	-0.10 (0.063)	65	1.40*** (0.061)	66	1.20*** (0.056)
67	-0.22** (0.082)	68	0.28** (0.095)	69	1.13*** (0.071)	70	1.33*** (0.063)
71	-0.60*** (0.11)	72	-0.45*** (0.064)	74	1.04*** (0.097)	75	1.09*** (0.060)
76	1.21*** (0.058)	77	-0.28*** (0.068)	78	-0.29*** (0.060)	79	0.70*** (0.064)
80	0.91*** (0.058)	81	0.42*** (0.064)	82	0.81*** (0.066)	83	0.51*** (0.065)
84	0.68*** (0.058)	85	-0.02 (0.065)	86	-0.75*** (0.090)	87	1.24*** (0.072)
88	1.17*** (0.060)	89	1.08*** (0.069)	90	1.42*** (0.097)	91	1.24*** (0.069)
92	1.29*** (0.067)	93	1.83*** (0.066)	94	0.49*** (0.066)	95	0.95*** (0.062)
96	0.88*** (0.062)	97	0.85*** (0.060)	98	0.22*** (0.058)	99	-0.65*** (0.061)
100	2.12*** (0.080)	101	2.28*** (0.067)	102	1.75*** (0.095)	103	0.97*** (0.067)
104	1.04*** (0.060)	105	0.60*** (0.056)	106	-0.18** (0.060)	107	-0.92*** (0.061)
108	1.43*** (0.066)	109	1.85*** (0.080)	110	2.03*** (0.064)	111	1.83*** (0.080)
113	0.43*** (0.077)	114	1.29*** (0.074)	115	1.13*** (0.073)	116	1.37*** (0.062)
117	1.09*** (0.060)	118	1.15*** (0.058)	119	1.63*** (0.056)	120	0.15* (0.076)
121	-0.14* (0.063)	122	-1.21*** (0.076)				

D.6 Mean Own-Price Elasticity by Brand

Table D.6. Average Own-Price Elasticity - Brand

Brand	Own-Price Elasticity
Becks	-7.605
Becks Premier Light	-7.593
Bud Light	-4.164
Budweiser	-4.295
Coors	-4.260
Coors Light	-4.255
Corona Extra	-7.547
Corona Light	-7.595
Dundee Honey Brown Lager	-4.905
Heineken	-7.677
Heineken Premium Light Lager	-7.671
Labatt Blue	-6.617
Labatt Blue Light	-6.320
Michelob	-4.815
Michelob Light	-4.754
Miller Genuine Draft	-4.392
Miller High Life	-3.599
Miller Lite	-4.236
Yuengling Black and Tan	-4.515
Yuengling Light Lager	-4.482
Yuengling Traditional Lager	-4.366

Note: This table shows the average own-price elasticity for each brand computed with the estimates in Table D.3, column (3).

D.7 Comparison with Other Papers in the Literature - Own-Price Elasticity

Table D.7. Comparison of Own-Price Elasticity with the Literature

	Range Average Own-Price Elasticity
Other papers	
Friberg and Romahn (2015)	-5.95
Asker (2016)	-3.4
Miller and Weinberg (2017)	[-6.10, -3.81]*

Note: This table shows the average own-price elasticity (* denotes median own-price elasticities) for all demand specifications presented in several papers estimating demand for beer.

E Illustrative Example

Assume 4 brewers producing one beer and 1 brewer producing 2 beers. In the pre-merger period, the ownership matrix is as follows:

$$I^b_{m,pre} = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix} \tag{41}$$

Next, assume that brewers 1 and 2 merge; Brewer 3 and 4 merge; and one product owned by brewer 4 is divested to brewer 5.

In the absence of price coordination, the ownership matrix is as follows:

$$I^b_{m,post} = \begin{pmatrix} 1 & 1 & 0 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 1 & 1 \end{pmatrix} \tag{42}$$

Allowing the data to reveal potential price coordination, the ownership matrix is as follows:

$$I^b_{m,post} = \begin{pmatrix} 1 & 1 & \phi & \phi & \phi_d & \phi_d \\ 1 & 1 & \phi & \phi & \phi_d & \phi_d \\ \phi & \phi & 1 & 1 & \phi_d & \phi_d \\ \phi & \phi & 1 & 1 & \phi_d & \phi_d \\ \phi_d & \phi_d & \phi_d & \phi_d & 1 & 1 \\ \phi_d & \phi_d & \phi_d & \phi_d & 1 & 1 \end{pmatrix} \tag{43}$$

F Robustness: Calibrated Nested Logit

This Appendix demonstrates that the finding that a merger with divestiture can reduce consumer surplus more than a merger without divestiture when conduct parameters are high remains robust under Nested Logit preferences. I also show that this results is also robust under the estimated conduct parameters and Nested Logit preferences. Additionally, it shows that policymakers can readily evaluate how price coordination may offset the expected benefits of a divestiture using calibrated parameters for both preferences and conduct parameters.

Calibrated Nested Logit Assume demand is given by a one-level Nested Logit. Consumers can choose products j in two groups: imported or not imported beers. A consumer i in geographic market m at time t has the following indirect utility for product j:

$$U_{ijmt} = K - \alpha p_{jmt} + \xi_{jmt} + \zeta_{ig} + (1-\rho)\epsilon_{ijmt}, \tag{44}$$

where K is a constant, p_{jmt} is the price of product j in geographic market m at time t. $\zeta_{ig} + (1-\rho)\epsilon_{ijmt}$ is an i.i.d random variable following an extreme value distribution. The distributional assumption of the nested logit on the random term ϵ_{ijmt} allows to derive the nested logit shares for each j in geographic market m at time t. Omitting the subscript mt the market share of product j is given by:

$$s_j(\delta_j, \rho) = s_{j|g} s_g = \frac{exp(\frac{K-\alpha p_{jmt}}{1-\rho})}{exp(\frac{I_g}{1-\rho})} \times \frac{exp(I_g)}{exp(I)}, \tag{45}$$

where $I_g \equiv (1-\rho) log(\sum_{j=1}^{J_g} exp(\frac{K-\alpha p_{jmt}}{1-\rho}))$ and $I \equiv log(\sum_{g=0}^{G} exp(I_g))$. Denote q_j the observed quantity of product j and q_0 the quantity of the outside good. The observed market share of product j is equal to $s_j = \frac{q_j}{\sum_j q_j + q_0}$. The system of market shares is defined by the following equation in each geographic market m at time t:

$$s_j(K, \alpha, \rho) = s_j. \tag{46}$$

I set $K = 0$, $\alpha = 0.2$ and $\rho = 0.65$ which yields a median own-price elasticity of -5.81. Table F1 replicates the analysis from Section 4.2, now assuming preferences

Table F.1. Counterfactuals — Nested Logit and Price Coordination (Calibrated Parameters)

Conduct	$\phi = \phi_d = 0.3$		$\phi = \phi_d = 0.5$		$\phi = \phi_d = 0.9$	
	No Divestiture	Divestiture	No Divestiture	Divestiture	No Divestiture	Divestiture
Merged Entities						
MillerCoors	15.24	15.80	19.07	20.72	27.18	33.28
ABI	6.23	4.31	9.81	9.04	18.23	21.41
Divested brand	1.66	-0.76	2.26	0.70	3.45	3.44
NAB (buyer)						
Divested brand	1.66	-0.76	2.26	0.70	3.45	3.44
High Falls Brewing	0.24	7.60	0.35	13.39	0.65	29.14
Rivals						
Constellation	0.12	-0.08	0.17	0.03	0.27	0.26
DG Yuengling	1.04	1.08	1.37	1.49	2.05	2.39
Heineken	0.12	-0.08	0.16	0.03	0.25	0.25
Welfare						
Δ CS (%)	-3.927	-3.810	-5.721	-5.951	-9.490	-10.894

Notes: Simulations are based on calibrated preferences and conduct parameters, using post-divestiture data and computed relative to the "no merger" scenario. Costs remain at pre-merger levels. Sample size: 52,725 observations.

follow a nested logit model. The results remain qualitatively similar: for conduct parameters above 0.5, a merger without divestiture reduces consumer surplus by approximately 5.7%, while a merger with divestiture results in an even greater reduction of about 6%.

Finally, Table F.2 replicates the analysis from columns (1) and (4) of Table 7, this time under the assumption that consumer preferences follow a nested logit model.

The results remain qualitatively similar: a merger accompanied by divestiture reduces consumer surplus more than a merger without divestiture. Specifically, the merger with divestiture leads to an estimated consumer surplus loss of approximately 4.3%, compared to a 4.6% loss in the case of a merger without divestiture.

Table F.2. Counterfactuals — Nested Logit and Price Coordination (Calibrated Parameters)

Conduct	$\phi = 0.34$ and $\phi_d = 0$	$\phi = 0.34$ and $\phi_d = 0.65$
	No Divestiture	Divestiture
Merged Entities		
MillerCoors	15.98	17.78
ABI	6.91	6.55
Divested	1.78	1.56
NAB (buyer)		
Divested	1.78	1.56
High Falls Brewing	0.26	16.10
Rivals		
Constellation	0.13	0.08
DG Yuengling	1.10	1.28
Heineken	0.13	0.08
Welfare		
Δ CS (%)	-4.276	-4.578

Notes: The simulations are based on calibrated preferences and conduct parameters. The simulations are based on data corresponding to the period after the divestiture and computed relative to the 'no merger' scenario. Costs remain at their levels prior to the merger. There are 52,725 observations in the sample.

G Welfare Statistics

Consumer Surplus

I use the formula derived by Small and Rosen (1981). Based on the utility function specified in equation (34), the change in consumer surplus for an individual i in an arbitrary market mt, is given by the following equation:

$$\Delta E[CS_i] = \frac{1}{|\alpha_i|}[log(\sum_j exp(-\alpha_i p^{\star}_{jmt} + \beta_i \mathbb{1}_{Imported} + \beta_{\text{year-month}} + \beta_{\text{retailer}} + \beta_{\text{brand}})) - log(\sum_j exp(-\alpha_i p^{nomerger}_{jmt} + \beta_i \mathbb{1}_{Imported} + \beta_{\text{year-month}} + \beta_{\text{retailer}} + \beta_{\text{brand}}))], \quad (47)$$

where $p^{\star}_{jmt}$ is a counterfactual equilibrium price for a given counterfactual scenario and $p^{nomerger}_{jmt}$ is a counterfactual equilibrium price in the 'no merger' scenario. This equation gives the average change in consumer surplus for the subpopulation of the economy with the same representative utility as i.

H Average Prices and Standard Deviation (Calibrated Parameters)

Table H.1 reports summary statistics (average prices by brewer and standard deviations) for the vector of prices used to compute percentage changes in Table 4.

Table H.1. Average Prices by Firm for each Scenario

	$\phi=0=\phi_d=0$		$\phi=0.3=\phi_d=0.3$		$\phi=\phi_d=0.5$
	No Divestiture (1)	Divestiture (2)	No Divestiture (3)	Divestiture (4)	No Divestiture (5)
Merged Entities					
MillerCoors	8.82 (0.88)	8.82 (0.88)	9.11 (0.89)	9.11 (0.89)	9.31 (0.90)
ABI	11.45 (2.49)	11.44 (2.49)	11.68 (2.50)	11.67 (2.50)	11.84 (2.51)
NAB (buyer)					
Divested	12.01 (0.29)	11.16 (0.26)	12.24 (0.31)	11.61 (0.28)	12.40 (0.32)
High Falls Brewing	10.73 (0.00)	10.74 (0.00)	10.73 (0.00)	11.18 (0.04)	10.73 (0.00)
Rivals					
Constellation	14.55 (0.01)	14.55 (0.01)	14.56 (0.01)	14.56 (0.01)	14.57 (0.01)
DG Yuengling	9.49 (0.13)	9.49 (0.13)	9.50 (0.13)	9.50 (0.13)	9.50 (0.13)
Heineken	14.59 (0.05)	14.59 (0.05)	14.60 (0.05)	14.60 (0.05)	14.60 (0.05)

	$\phi=\phi_d=0.5$	$\phi=\phi_d=0.9$		$\phi=\phi_d=0$
	Divestiture (6)	No Divestiture (7)	Divestiture (8)	No merger (9)
Merged Entities				
MillerCoors	9.31 (0.90)	9.74 (0.92)	9.74 (0.92)	8.54 (0.86)
ABI	11.84 (2.51)	12.18 (2.53)	12.18 (2.53)	11.13 (2.11)
NAB (buyer)				
Divested	11.93 (0.29)	12.74 (0.34)	12.64 (0.33)	11.17 (0.26)
High Falls Brewing	11.51 (0.08)	10.73 (0.00)	12.22 (0.15)	10.73 (0.00)
Rivals				
Constellation	14.57 (0.01)	14.59 (0.02)	14.59 (0.02)	14.54 (0.01)
DG Yuengling	9.50 (0.13)	9.51 (0.13)	9.51 (0.13)	9.49 (0.13)
Heineken	14.60 (0.05)	14.61 (0.05)	14.61 (0.05)	14.58 (0.05)

Notes: The simulations are based on the estimates presented in Table D.3 and given conduct parameters. The simulations are based on data corresponding to the period after the divestiture and computed relative to the 'no merger' scenario.

I Average Prices and Standard Deviation with Estimated Parameters

Table I.1 reports summary statistics (average prices by brewer and standard deviations) for the vector of prices used to compute percentage changes in Table 7.

Table I.1. Average Prices by Firm for each Scenario

Conduct	$\phi = 0.34, \phi_d = 0$	$\phi = 0.34, \phi_d = 0$	$\phi = 0.34, \phi_d = 0$
Costs	No costs	No costs	Costs
	No Divestiture	Divestiture	Divestiture
	(1)	(2)	(3)
Merged Entities			
MillerCoors	8.91 (1.04)	8.90 (1.04)	8.90 (1.04)
ABI	11.44 (2.19)	11.43 (2.19)	11.43 (2.19)
NAB (buyer)			
Divested	11.13 (1.42)	10.27 (1.37)	10.37 (1.37)
High Falls Brewing	11.08 (0.92)	11.09 (0.92)	11.09 (0.92)
Rivals			
Constellation	13.87 (0.63)	13.87 (0.63)	13.87 (0.63)
DG Yuengling	9.87 (0.52)	9.87 (0.52)	9.87 (0.52)
Heineken	14.17 (0.59)	14.17 (0.59)	14.17 (0.59)
Conduct	$\phi = 0.34, \phi_d = 0.65$	$\phi = 0.34, \phi_d = 0.65$	$\phi = 0, \phi_d = 0$
Costs	No costs	Costs	No costs
	Divestiture	Divestiture	No merger
	(4)	(5)	(6)
Merged Entities			
MillerCoors	8.91 (1.04)	8.91 (1.04)	8.45 (1.02)
ABI	11.44 (2.19)	11.44 (2.19)	10.89 (1.85)
NAB (buyer)			
Divested	11.25 (1.42)	11.34 (1.42)	10.31 (1.37)
High Falls Brewing	12.07 (0.93)	12.07 (0.93)	11.06 (0.91)
Rivals			
Constellation	13.87 (0.63)	13.87 (0.63)	13.84 (0.63)
DG Yuengling	9.87 (0.52)	9.87 (0.52)	9.86 (0.52)
Heineken	14.17 (0.59)	14.17 (0.59)	14.16 (0.59)

Notes: The vector of prices are solutions to the first order condition defined by equation (2) for the scenario of interest. The parameters used are the demand parameters presented in Table D.3, alongside the conduct parameters and cost parameters in Table 5. Standard deviations in parentheses relate to variation across markets. There are 52,725 observations in the sample corresponding to the post-divestiture period.

J Robustness - Alternative Ownership Matrix

To provide insights beyond the specific case studied, I examine to what extent the divestiture would have offset the pro-competitive effects of the merger, had the merger between Miller and Coors not occurred. To this end, I re-estimate the price effects of the merger—with and without divestiture—under the counterfactual scenario where the MillerCoors merger does not take place.

In the second column of Table J.1, I report the predicted price effect assuming a divestiture but without price coordination. Under this setting, prices are expected to decline. In contrast, the last column shows that a merger with divestiture would lead to a 4.9% price increase for Labatt. While this result is qualitatively consistent with the findings under actual market conditions (presented in Table 7), the magnitude of the price increase is lower. In this scenario price coordination removes 80% of the expected welfare gains from the divestiture.

There are two channels through which the MillerCoors merger affects prices. First, there is a direct effect: MillerCoors is excluded from the coordinating group, which influences pricing. Second, there is an indirect effect arising from the strategic complementarity of prices. In the absence of the MillerCoors merger, prices do not rise as they otherwise might, and Labatt has less incentive to respond with higher prices of its own.

Table J.1. Price Effects - Estimated Conduct Parameters

Price Coordination	No	No	Yes
	No Divestiture	Divestiture	Divestiture
Merged Entities			
MillerCoors	0.03%	0.02%	0.02%
ABI	2.18%	2.07%	2.15%
Divested brand	7.63%		
NAB (buyer)			
Divested brand		-0.19%	4.88%
Other brands	0.00%	0.09%	4.85%
Rivals			
Constellation	0.02%	0.01%	0.01%
DG Yuengling	0.00%	0.00%	0.00%
Heineken	0.01%	0.00%	0.01%
Welfare			
Δ CS	-0.56	-0.37	-0.52

Notes: The simulations are based on the demand parameters presented in Table D.3. In the last column, partial price coordination is assumed for ABI and NAB with a conduct parameter equal to 0.34. The simulations are computed using the period after the divestiture and computed relative to the 'no merger' scenario.

K Average Prices and Standard Deviation (Counterfactual Buyer)

Table K.1 reports summary statistics (average prices by brewer and standard deviations) for the vector of prices used to compute percentage changes in Table 8.

Table K.1. Average Prices by Firm for each Scenario

	Constellation		DG Yuengling		No merger
Price Coordination	No	Yes	No	Yes	No
	(1)	(2)	(3)	(4)	(9)
MillerCoors	8.60 (1.03)	9.17 (1.06)	8.60 (1.03)	9.04 (1.05)	8.45 (1.02)
ABI	11.17 (2.18)	11.77 (2.24)	11.17 (2.18)	11.60 (2.21)	10.89 (1.85)
Divested	10.61 (1.39)	11.77 (1.45)	10.39 (1.39)	11.40 (1.44)	10.31 (1.37)
High Falls Brewing	11.08 (0.92)	11.08 (0.92)	11.08 (0.92)	11.08 (0.92)	11.06 (0.91)
Constellation	13.86 (0.63)	15.10 (0.67)	13.85 (0.63)	13.88 (0.63)	13.84 (0.63)
DG Yuengling	9.86 (0.52)	9.87 (0.52)	9.87 (0.52)	10.93 (0.55)	9.86 (0.52)
Heineken	14.16 (0.59)	14.20 (0.59)	14.16 (0.59)	14.18 (0.59)	14.16 (0.59)
	Heineken		MillerCoors		
Price Coordination	No	Yes	No	Yes	
	(5)	(6)	(7)	(8)	
MillerCoors	8.60 (1.03)	9.05 (1.05)	8.61 (1.03)	9.21 (1.05)	
ABI	11.17 (2.18)	11.63 (2.22)	11.17 (2.18)	11.69 (2.20)	
Divested	10.50 (1.39)	11.58 (1.45)	10.96 (1.39)	11.38 (1.42)	
High Falls Brewing	11.08 (0.92)	11.08 (0.92)	11.08 (0.92)	11.08 (0.92)	
Constellation	13.85 (0.63)	13.89 (0.63)	13.85 (0.63)	13.88 (0.63)	
DG Yuengling	9.86 (0.52)	9.87 (0.52)	9.86 (0.52)	9.87 (0.52)	
Heineken	14.17 (0.59)	15.31 (0.63)	14.16 (0.59)	14.18 (0.59)	

Notes: The vector of prices are solutions to the first order condition defined by equation (2) for the scenario of interest. The parameters used are the demand parameters presented in Table D.3, alongside the conduct parameters and cost parameters in Table 5. Standard deviations in parentheses relate to variation across markets. There are 52,725 observations in the sample corresponding to the post-divestiture period.

L FOC and Diversion Ratio

Recall the first order condition from equation (2). Omitting subscript mt, the first-order condition with respect to p_j is given by:

$$s_j(p) + (p_j - c_j)\frac{\partial s_j(p)}{\partial p_j} + \sum_{k \in \Theta_f}(p_k - c_k)\frac{\partial s_k(p)}{\partial p_j} + \sum_{k \in \Theta_f^C}\phi_{jk}(p_k - c_k)\frac{\partial s_k(p)}{\partial p_j} = 0. \quad (48)$$

Then, we have:

$$p_j = \frac{-s_j - \sum_{k \in \Theta_f}(p_k - c_k)\frac{\partial s_k}{\partial p_j} - \sum_{k \in \Theta_f^C}\phi_{jk}(p_k - c_k)\frac{\partial s_k}{\partial p_j} + c_j\frac{\partial s_j}{\partial p_j}}{\frac{\partial s_j}{\partial p_j}} \quad (49)$$

$\iff$

$$p_j = \frac{-s_j\frac{p_j}{s_j}}{\frac{\partial s_j}{\partial p_j}\frac{p_j}{s_j}} + \frac{(-\sum_{k \in \Theta_f}(p_k - c_k)\frac{\partial s_k}{\partial p_j} - \sum_{k \in \Theta_f^C}\phi_{jk}(p_k - c_k)\frac{\partial s_k}{\partial p_j} + c_j\frac{\partial s_j}{\partial p_j})}{\frac{\partial s_j}{\partial p_j}} \quad (50)$$

Denote $\epsilon_{jj} = \frac{\partial s_j}{\partial p_j}\frac{p_j}{s_j}$ the own-price elasticity of demand. We have:

$$p_j(1 + \frac{1}{\epsilon_{jj}}) = \frac{(-\sum_{k \in \Theta_f}(p_k - c_k)\frac{\partial s_k}{\partial p_j} - \sum_{k \in \Theta_f^C}\phi_{jk}(p_k - c_k)\frac{\partial s_k}{\partial p_j} + c_j\frac{\partial s_j}{\partial p_j})}{\frac{\partial s_j}{\partial p_j}} \quad (51)$$

Denote $D_{j,k} = -\frac{\frac{\partial s_k}{\partial p_j}}{\frac{\partial s_j}{\partial p_j}}$ the diversion ratio between product j and k. Then, I can re-write the equation as follows:

$$p_j(1 + \frac{1}{\epsilon_{jj}}) = c_j + \sum_{k \in \Theta_f}(p_k - c_k)D_{jk}(P) + \sum_{k \in \Theta_f^C}\phi_{jk}(p_k - c_k)D_{jk}(P) \quad (52)$$

$\iff$

$$p_j = (\frac{1}{1 + \frac{1}{\epsilon_{jj}}})[c_j + \sum_{k \in \Theta_f}(p_k - c_k)D_{jk}(P) + \sum_{k \in \Theta_f^C}\phi_{jk}(p_k - c_k)D_{jk}(P)], \quad (53)$$

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